COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Crankshaft Position (CKP)-Camshaft Position (CMP) Correlation	P0016	Detects implausible camshaft/crankshaft sensor correlation by comparing the differences between calculated camshaft and crankshaft positions.	Difference between CKP position and CMP sensor **OR** Difference between CKP position and CMP sensor **AND** the CMP position tolerance CMP position tolerance is the error between TDC and first edge of cam detection. Prevents false CMP reading from passing the above < 6 deg test.	>= 6 degrees crank angle. < 6 degrees crank angle > 12 degrees (cam).	DTCs not active Ignition Engine Speed	P0642,P0643, P0335, P0336 ON ≥ 50 rpm	fail conditions true for 255 crankshaft increments (60 increments/revolution) 5 cam phases (4 phases/cam revolution)	A
Turbocharger Boost Control Position Not Learned	P003A	Detects in range vane position errors during a vane sweep initiated to learn minium vane position values.	Position of the vanes opened during a learn are **OR** Position of the vanes closed during a learn are:	< 5.54% OR > 36.94% <69.92% OR > 95.60%	DTCs not active Injected Fuel engine speed Engine Coolant Temp Baro Battery voltage	P117, P118, P2563, P2564, P2565, P2228,P2229 <30 mm^3/S 600 rpm< engine speed <750 rpm 71C< ECT <96C 60 kpa <=Baro <=110	fail conditions true for 30 seconds. Performed once per ignition cycle	B
Turbocharger Boost Control Solenoid Circuit Low	P0047	Electronic out-put driver circuitry determines circuit integrity on the Turbo Boost Solenoid Cntrl Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Ignition	On	fail conditions true for 4 seconds. Test performed continuously	B
Turbocharger Boost Control Solenoid Circuit High	P0048	Electronic out-put driver circuitry determines circuit integrity on the Turbo Boost Solenoid Cntrl Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Ignition	On	fail conditions true for 4 seconds. Test performed continuously	B
Fuel Rail Pressure [FRP] Too Low	P0087	Actual rail pressure is checked against desired rail pressure to detect low rail pressure conditions.	Path 1) Measured Rail Pressure Sensor is below Desired Rail Pressure **OR** Path 2) Measured Rail Pressure Sensor is	>15 Mpa < = 22.5 Mpa	DTCs not active Rail Pressure control	P0090, P0192, P0193 Rail Pressure control in closed loop. (closed loop RP control occurs when engine transitions from crank to Run mode)	Path1) fail condition true for 10seconds. Path2) fail conditions true for 12.5 seconds .	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Fuel Rail Pressure [FRP] Too High	P0088	Measured rail pressure is checked against desired rail pressure to detect high rail pressure conditions.	Path1) Measured Rail Pressure Sensor is above Desired Rail Pressure AND Rail Pressure Desired Fuel Flow AND fuel injection qty **OR** Path 2) Measured Rail Pressure Sensor is	>20 Mpa <= 100 mm3/sec > 1 mm3/stroke. > 189 Mpa	DTCs not active Rail Pressure control	P0090, P0192, P0193 Rail Pressure control in closed loop. (closed loop RP control occurs when engine transitions from crank to Run mode) "Rail Pressure Desired Fuel Flow is calculated based on RPM and FR pressure."	Path 1) fail condition true for 10seconds. Test performed continuously. Path 2) 6 seconds. Test performed continuously.	A
Fuel Rail Pressure Regulator Control Circuit	P0090	Electronic out-put driver circuitry determines circuit integrity on the Fuel Pressure Regulator Cntrl Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Ignition	On	fail conditions true for:500 m seconds Test performed continuously	A
Intake Air Temperature (IAT) Sensor 2 Circuit Low Voltage	P0097	Detects a sensor circuit short to ground.	Air temperature sensor voltage -same as- Air temperature	<= 0.178 volt >150 degC	Ignition State	On	fail conditions true for 4 seconds. Test performed continuously 100msec rate	B
Intake Air Temperature (IAT) Sensor 2 Circuit High Voltage	P0098	Detects a sensor circuit short high voltage or a sensor circuit open	Air temperature sensor voltage -same as- Air temperature	>=4.86 volt <-50degC	Ignition State	On	fail conditions true for 4 seconds. Test performed continuously 100msec rate	B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Mass Air Flow (MAF) Sensor Performance	P0101	Detects skewed MAF sensor by comparing measured MAF to calculated expected MAF based on volumetric efficency of the engine	Normalized air flow ratio OR Normalized air flow ratio The normalized air flow ratio = calculated air flow actual air flow	< 0.86 > 1.20	DTCs not active. Baro RPM ECT EGR	P0102,P0103,P0107,P0108,P0106P2228,P2229,P0117,P0118, P0112,P0113,P0652,P0653,P0642 P0643,P0652,P0653,P0698,P0699 >= 72kPa 500 < RPM < 3100 < 120 deg c Not Active	fail conditions true for 16 seconds Test performed continuously .	B
Mass Air Flow (MAF) Sensor Circuit Low Voltage	P0102	Detects low frequency readings on the MAF circuit, indicating an OOR low condition on the MAF circuit	MAF Signal	< 90 us same as Flow > 1900 kg/hr	RPM	500 to 3100	fail conditions true for 3 seconds Test performed continuously	B
Mass Air Flow (MAF) Sensor Circuit High Voltage	P0103	Detects high frequency readings on the MAF circuit, indicating an OOR high condition on the MAF circuit	MAF Signal	> 881 us same as Flow < 10 kg/hr	Ignition	On	fail conditions true for 3 seconds Test performed continuously	B
Manifold Absolute Pressure (MAP) Sensor Performance	P0106	Detects a skewed MAP or BARO sensor by comparing MAP readings to the Baro sensor	Absolute value (Baro - MAP)	> 15kPa	DTCs not active Ignition RPM .	P0107,P0108,P2228,P2229 On, < 750.	fail conditions true for 10 sec. Test performed continuously.	A
Manifold Absolute Pressure (MAP) Sensor Circuit Low Voltage	P0107	Detects low voltage readings on the MAP circuit, indicating an OOR low condition on the MAP circuit	MAP Sensor Signal	<43.9 mv same as 10kpa	Ignition voltage Engine Run time	>11 volts >1sec	fail condition true for 2 seconds Test performed continuously	A
Manifold Absolute Pressure (MAP) Sensor Circuit High Voltage	P0108	Detects high voltage readings on the MAP circuit, indicating an OOR high condition on the MAP circuit	MAP Sensor Signal	>4750 mv same as 343kpa	Engine Run time	>1sec	fail condition true for 2 seconds Test performed continuously	A
Intake Air Temperature (IAT) Sensor Circuit Low Voltage	P0112	Detects low voltage readings on the IAT circuit, indicating an OOR low condition on the IAT circuit	IAT -same as- IAT	<= 0.178 volts >150degC	Ignition	On	fail conditions true for 1 second Test performed continuously 100msec rate	A
Intake Air Temperature (IAT) Sensor Circuit High Voltage	P0113	Detects high voltage readings on the IAT circuit, indicating an OOR high condition on the IAT circuit	IAT -same as- IAT	>=4.8 volt <-40degC	Ignition	On	fail conditions true for 1 second Test performed continuously 100msec rate	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Engine Coolant Temperature (ECT) Sensor Performance	P0116	Detects a biased ECT or Air Temperature Sensor (IAT) 2 by comparing start-up temperatures between the two sensors.	absolute value of (Startup Coolant Temperature Sensor - Air Temperature Sensor 2) AND block heater influence determined to be not true.	> 15degC Block heater influence is true if after 60 sec from engine start the ECT drops > 5 degC	engine state	running	Diagnostic sets on first fail Test performed once per key cycle	B
Engine Coolant Temperature (ECT) Sensor Circuit Low Voltage	P0117	Detects low voltage readings on the ECT circuit, indicating an OOR low condition on the ECT circuit	Coolant Temperature Sensor voltage -same as- Coolant Temperature	<= 0.065 volt >150degC	Ignition	On	fail conditions true for 15 second Test performed continuously 100msec rate	A
Engine Coolant Temperature (ECT) Sensor Circuit High Voltage	P0118	Detects high voltage readings on the ECT circuit, indicating an OOR high condition on the ECT circuit	Coolant Temperature Sensor voltage -same as- Coolant Temperature	>= 4.8 V >-40 degC	Ignition	On	fail conditions true for 60 second Test performed continuously 100msec rate	A
Engine Coolant Temperature (ECT) Below Thermostat Regulating Temperature	P0128	Detects a stuck open thermostat by comparing actual engine coolant heat up profile to an expected modeled heat up profile. The targets are dependant on start up conditions (high and low regions) High region Engine Temperature at start < 52 degC AND ambient air temperature > 10 degC **OR** Low Region	PATH 1 High Region) Modeled coolant temp predicts coolant temp AND Actual coolant temp is PATH 2 Low Region) Modeled coolant temp AND Actual coolant temp	 > 82 degC < 71 degC > 60 degC < 50 degC	DTCs not active Engine start-up Coolant Temp PATH 1 High Region) Ambient air temp PATH 2 Low Region) Ambient air temp	P0112,P0113,P0116,P0117, P0118 -7 degC < ECT < 52 degC >10 deg -7 degC<Ambient air <=10 degC	Diagnostic sets on first fail Test performed once per key cycle	B
Fuel Tempertaure Sensor Performance	P0181	Detects bias Fuel Temperature Sensor or Intake Air Temperature Sensor by comparing thier start-up values.	Absolute value of (Startup Intake Air Temperature Sensor - Startup Fuel Temperature Sensor) AND block heater OR sun load influence determined to be not true.	> 10degC AND Block heater influence is true if after 60 sec of engine run time, ECT drops 5.3 deg or more. Sun load influence is true if after 6.6 mins of vehicle operation at VSS > 24kph the IAT drops 2.5degC		engine running	sets on first fail Test performed once per key cycle	B
Fuel Temperature Sensor Circuit Low Voltage	P0182	Detects low voltage readings on the FTS circuit, indicating an OOR low condition on the FTS circuit	Fuel temperature - same as - Fuel temperature	<0.07 V - same as - > 120degC	Ignition	On	fail conditions true for 1 seconds Test performed continuously at 100msec rate	B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Fuel Temperature Sensor Circuit High Voltage	P0183	Detects high voltage readings on the FTS circuit, indicating an OOR high condition on the FTS circuit	Fuel temperature - same as - Fuel temperature	> 4.72 V - same as - < -30degC	Ignition	On	fail conditions true for 1 seconds Test performed continuously at100msec rate	B
Fuel Rail Pressure [FRP] Sensor Performance	P0191	Detects a biased sensor by determining the FRP sensor voltage to be in the correct range for atmospheric pressure at engine off and with sufficient pressure bleed-off time.	PATH 1) FRP voltage OR FRP voltage PATH 2) FRP voltage OR FRP voltage	PATH 1) < 0.352V (-7.5 Mpa) OR > 0.65V (7.7 Mpa) PATH 2) < 0.352V (-7.5 Mpa) OR > 0.65V (7.7Mpa)	PATH 1 DTCs not active ECM in INITIALIZATION Engine off timer Coolant temperature Engine Speed = 0 rpm PATH 2 DTCs not active ECM status fuel temperature wait timer	P0016, P062F, P0116, P0117, P0118, P0192, P0193, P0652, P0653 > 20 min 0 degC <= CTS <= 120 degC, 0 rpm PATH 2) P0652, P0653, P0192, P0193 AFTERRUN (engine off, ECM still active) ≥ 60 degC >60-70 seconds after engine shutoff, depending on FRP at shutoff: higher pressure == higher wait time (see supporting tables P0191)	failure conditions true for one sample. Test is once per Path per key cycle	A
Fuel Rail Pressure [FRP] Sensor Circuit Low Voltage	P0192	Detects low voltage readings on the FRP circuit, indicating an OOR low condition on the FRP circuit	Rail Pressure Sensor voltage	< 0.254 V (-12.44 Mpa)	DTCs not active	P0652, P0653	failconditions true for 200 msec Test performed continuously	A
Fuel Rail Pressure [FRP] Sensor Circuit High Voltage	P0193	Detects high voltage readings on the FRP circuit, indicating an OOR high condition on the FRP circuit	Rail Pressure Sensor voltage	> 4.75 V (216.4 Mpa)	P0652, P0653 DTCs not set	P0652, P0653 DTCs not set	fail condition true for 200 msec Test performed continuously	A
Injector 1 Control Circuit	P0201	Electronic out-put driver circuitry determines circuit integrity on the injector Cntrl Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 1		fail conditions true for 3 msec. Monitored continuously	A
Injector 2 Control Circuit	P0202	Electronic out-put driver circuitry determines circuit integrity on the injector Cntrl Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 2		fail conditions true for 3 msec. Monitored continuously	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Injector 3 Control Circuit	P0203	Electronic out-put driver circuitry determines circuit integrity on the injector Cntrl Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 3		fail conditions true for 3 msec. Monitored continuously	A
Injector 4 Control Circuit	P0204	Electronic out-put driver circuitry determines circuit integrity on the injector Cntrl Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 4		fail conditions true for 3 msec. Monitored continuously	A
Injector 5 Control Circuit	P0205	Electronic out-put driver circuitry determines circuit integrity on the injector Cntrl Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 5		fail conditions true for 3 msec. Monitored continuously	A
Injector 6 Control Circuit	P0206	Electronic out-put driver circuitry determines circuit integrity on the injector Cntrl Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 6		fail conditions true for 3 msec. Monitored continuously	A
Injector 7 Control Circuit	P0207	Electronic out-put driver circuitry determines circuit integrity on the injector Cntrl Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 7		fail conditions true for 3 msec. Monitored continuously	A
Injector 8 Control Circuit	P0208	Electronic out-put driver circuitry determines circuit integrity on the injector Cntrl Circuit.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 8		fail conditions true for 3 msec. Monitored continuously	A
Turbocharger Engine Overboost	P0234	Detects an Overboost condition by comparing desired to measured boost values.	Measured Boost	>(see Supporting tables P0234) above desired boost	DTCs not active Engine RPM	P2564,P2565 800 <= Engine RPM <=3600	fail conditions true for 10 second Test performed continuously	A
Turbochager Engine Underboost	P0299	Detects an Underboost condition by comparing desired to measured boost values.	Measured Boost	>(see Supporting tables P0299) below desired boost	DTCs not active Engine RPM	P2564,P2565 800 <= Engine RPM <=3600	fail conditions true for 10 second Test performed continuously	A
Cylinder 1 Injector Leaking	P029D	Detects if the injector is leaking by Looking at the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	Cylinder #1, FBC	> -7.0 mm3	Engine Speed coolant temp Fueling Vehicle speed	600 - 850 RPM > 40 Deg C < 15mm3 < 5km/hr.	fail condition true for 1 minute Test performed once per key cycle.	B
Cylinder 2 Injector Leaking	P02A1	Detects if the injector is leaking by Looking at the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	Cylinder #2, FBC	> -7.0 mm3	Engine Speed coolant temp Fueling Vehicle speed	600 - 850 RPM > 40 Deg C < 15mm3 < 5km/hr.	fail condition true for 1 minute Test performed once per key cycle.	B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Cylinder 3 Injector Leaking	P02A5	Detects if the injector is leaking by Looking at the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	Cylinder #3, FBC	> -7.0 mm3	Engine Speed coolant temp Fueling Vehicle speed	600 - 850 RPM > 40 Deg C < 15mm3 < 5km/hr.	fail condition true for 1 minute Test performed once per key cycle.	B
Cylinder 4 Injector Leaking	P02A9	Detects if the injector is leaking by Looking at the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	Cylinder #4, FBC	> -7.0 mm3	Engine Speed coolant temp Fueling Vehicle speed	600 - 850 RPM > 40 Deg C < 15mm3 < 5km/hr.	fail condition true for 1 minute Test performed once per key cycle.	B
Cylinder 5 Injector Leaking	P02AD	Detects if the injector is leaking by Looking at the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	Cylinder #5, FBC	> -7.0 mm3	Engine Speed coolant temp Fueling Vehicle speed	600 - 850 RPM > 40 Deg C < 15mm3 < 5km/hr.	fail condition true for 1 minute Test performed once per key cycle.	B
Cylinder 6 Injector Leaking	P02B1	Detects if the injector is leaking by Looking at the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	Cylinder #6, FBC	> -7.0 mm3	Engine Speed coolant temp Fueling Vehicle speed	600 - 850 RPM > 40 Deg C < 15mm3 < 5km/hr.	fail condition true for 1 minute Test performed once per key cycle.	B
Cylinder 7 Injector Leaking	P02B5	Detects if the injector is leaking by Looking at the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	Cylinder #7, FBC	> -7.0 mm3	Engine Speed coolant temp Fueling Vehicle speed	600 - 850 RPM > 40 Deg C < 15mm3 < 5km/hr.	fail condition true for 1 minute Test performed once per key cycle.	B
Cylinder 8 Injector Leaking	P02B9	Detects if the injector is leaking by Looking at the amount of fuel compensation (reduction) as determined by Fuel Balance Control (FBC)	Cylinder #8, FBC	> -7.0 mm3	Engine Speed coolant temp Fueling Vehicle speed	600 - 850 RPM > 40 Deg C < 15mm3 < 5km/hr.	fail condition true for 1 minute Test performed once per key cycle.	B
Throttle Valve Actuator Solenoid Control Circuit	P02E0	Detects circuit faults on the TVA solenoid by measuring current above a calibrated duty cycle.	circuit current	< 25 mA	ECM powered up TVA Duty Cycle	> 0.5sec >10%	fail condition true for 1 second Test performed continuously	B
Throttle Valve Actuator (TVA) Position Sensor Performance	P02E7	Detects in range TVA position errors by comparing the difference between desired and actual TVA position.	Delta from target position	> = +/- 3%	DTCs not active	P02E0,P02E8,P02E9, P0642, P0643	fail condition true for 10 sec. Test performed continously during TVA operation	B
Throttle Valve Actuator (TVA) Position Sensor Circuit low Voltage	P02E8	Detects low voltage readings on the TVA circuit, indicating an OOR low condition on the TVA circuit	TVA Position sensor	<= 0.102 v (0% position)	DTCs not active Ignition	P0698,P0699 ON	fail condition true for 3 seconds Test performed continuously	B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Throttle Valve Actuator (TVA) Position Sensor High Voltage	P02E9	Detects high frequency readings on the TVA circuit, indicating an OOR high condition on the TVA circuit	TVA Position sensor	>= 4745 mv (100% position)	DTCs not active Ignition	P0698,P0699 ON	fail condition true for 3 seconds Test performed continuously	B
Engine Misfire Detected	P0300	Indicates engine has experienced more than one clyinder misfiring	Misfires exist on more than one clyinder		Ignition	ON	Sets on first fail Test performed once per key cycle	B
Cylinder 1 Misfire Detected	P0301	Detects clyinder misfire. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event. Calculates cylinder speed after an injection event for the cylinder under test and compares it to the minimum average speed.	Cylinder #1 RPM	< minimum average cylinder speed.	DTCs are not set Coolant temperature Engine speed (ES) injected fuel (IF) vehicle speed Engine run time	P0335,P0336,P0117,P0118, P0201,P0202,P0203,P0204, P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155, P0502,P062C >= 40degC 600 rpm < ES < 1300 rpm 3 mm3/S < IF < 50 mm3/S vehicle speed<= 3 Kph > 10 seconds Above conditions must be true for 20 engine revolutions	fail condition true for 260 revolutions. Test performend once per key cycle in a total of 400 revolutions	B
Cylinder 2 Misfire Detected	P0302	Detects clyinder misfire. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event. Calculates cylinder speed after an injection event for the cylinder under test and compares it to the minimum average speed.	Cylinder #2 RPM	< minimum average cylinder speed.	DTCs are not set Coolant temperature Engine speed (ES) injected fuel (IF) vehicle speed Engine run time	P0335,P0336,P0117,P0118, P0201,P0202,P0203,P0204, P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155, P0502,P062C >= 40degC 600 rpm < ES < 1300 rpm 3 mm3/S < IF < 50 mm3/S vehicle speed<= 3 Kph > 10 seconds	fail condition true for 260 revolutions. Test performend once per key cycle in a total of 400 revolutions	B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Cylinder 3 Misfire Detected	P0303	Detects clyinder misfire. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event. Calculates cylinder speed after an injection event for the cylinder under test and compares it to the minimum average speed.	Cylinder #3 RPM	< minimum average cylinder speed.	DTCs are not set Coolant temperature Engine speed (ES) injected fuel (IF) vehicle speed Engine run time	P0335,P0336,P0117,P0118, P0201,P0202,P0203,P0204, P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155, P0502,P062C >= 40degC 600 rpm < ES < 1300 rpm 3 mm3/S < IF < 50 mm3/S vehicle speed<= 3 Kph > 10 seconds Above conditions must be true for 20 engine revolutions	fail condition true for 260 revolutions. Test performend once per key cycle in a total of 400 revolutions	B
Cylinder 4 Misfire Detected	P0304	Detects clyinder misfire. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event. Calculates cylinder speed after an injection event for the cylinder under test and compares it to the minimum average speed.	Cylinder #4 RPM	< minimum average cylinder speed.	DTCs are not set Coolant temperature Engine speed (ES) injected fuel (IF) vehicle speed Engine run time	P0335,P0336,P0117,P0118, P0201,P0202,P0203,P0204, P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155, P0502,P062C >= 40degC 600 rpm < ES < 1300 rpm 3 mm3/S < IF < 50 mm3/S vehicle speed<= 3 Kph > 10 seconds Above conditions must be true for 20 engine revolutions	fail condition true for 260 revolutions. Test performend once per key cycle in a total of 400 revolutions	B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Cylinder 5 Misfire Detected	P0305	Detects clyinder misfire. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event. Calculates cylinder speed after an injection event for the cylinder under test and compares it to the minimum average speed.	Cylinder #5 RPM	< minimum average cylinder speed.	DTCs are not set Coolant temperature Engine speed (ES) injected fuel (IF) vehicle speed Engine run time	P0335,P0336,P0117,P0118, P0201,P0202,P0203,P0204, P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155, P0502,P062C >= 40degC 600 rpm < ES < 1300 rpm 3 mm3/S < IF < 50 mm3/S vehicle speed<= 3 Kph > 10 seconds Above conditions must be true for 20 engine revolutions	fail condition true for 260 revolutions. Test performend once per key cycle in a total of 400 revolutions	B
Cylinder 6 Misfire Detected	P0306	Detects clyinder misfire. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event. Calculates cylinder speed after an injection event for the cylinder under test and compares it to the minimum average speed.	Cylinder #6 RPM	< minimum average cylinder speed.	DTCs are not set Coolant temperature Engine speed (ES) injected fuel (IF) vehicle speed Engine run time	P0335,P0336,P0117,P0118, P0201,P0202,P0203,P0204, P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155, P0502,P062C >= 40degC 600 rpm < ES < 1300 rpm 3 mm3/S < IF < 50 mm3/S vehicle speed<= 3 Kph > 10 seconds Above conditions must be true for 20 engine revolutions	fail condition true for 260 revolutions. Test performend once per key cycle in a total of 400 revolutions	B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Cylinder 7 Misfire Detected	P0307	Detects clyinder misfire. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event. Calculates cylinder speed after an injection event for the cylinder under test and compares it to the minimum average speed.	Cylinder #7 RPM	< minimum average cylinder speed.	DTCs are not set Coolant temperature Engine speed (ES) injected fuel (IF) vehicle speed Engine run time	P0335,P0336,P0117,P0118, P0201,P0202,P0203,P0204, P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155, P0502,P062C >= 40degC 600 rpm < ES < 1300 rpm 3 mm3/S < IF < 50 mm3/S vehicle speed<= 3 Kph > 10 seconds Above conditions must be true for 20 engine revolutions	fail condition true for 260 revolutions. Test performend once per key cycle in a total of 400 revolutions	B
Cylinder 8 Misfire Detected	P0308	Detects clyinder misfire. The minimum average cly speed is calculated every 2 rotations and represents the average speed that all cly are rotating at after a combustion event. Calculates cylinder speed after an injection event for the cylinder under test and compares it to the minimum average speed.	Cylinder #8 RPM	< minimum average cylinder speed.	DTCs are not set Coolant temperature Engine speed (ES) injected fuel (IF) vehicle speed Engine run time	P0335,P0336,P0117,P0118, P0201,P0202,P0203,P0204, P0205,P0206,P0207,P0208, P2146,P2149,P2152,P2155, P0502,P062C >= 40degC 600 rpm < ES < 1300 rpm 3 mm3/S < IF < 50 mm3/S vehicle speed<= 3 Kph > 10 seconds Above conditions must be true for 20 engine revolutions	fail condition true for 260 revolutions. Test performend once per key cycle in a total of 400 revolutions	B
Crankshaft Position [CKP] Sensor Circuit	P0335	Detects crankshaft sensor circuit failure by monitoring for valid signals from CKP sensor while CMP sensor is also sending valid signals	CKP edge detection status CKP signal	= FALSE (no digital edge transitions measured in CKP signal.) does not match calibrated pattern	DTCs are not set Ignition Engine is running	P0652, P0653 ON	fail conditions exists for 20 camshaft phases (4 phases per cam revolution)	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Crankshaft Position [CKP] Sensor Performance	P0336	Detects implausible crankshaft sensor operation by detecting correct crank sensor signal patterns.	Path A) CKP pattern AND CKP signal **OR** Path B)CMP detected phase signals since the last interrupt	not yet recognizable not transitioning >12	DTCs are not set Engine is running	P0652, P0653	A.) Failure exists for 312 crankshaft increments B.) Failure exists for < 312 increments (elapsed from A.) AND failure still exists for 12 cam phases	A
Camshaft Position [CMP] Sensor Circuit	P0340	Detects camshaft sensor circuit failure by monitoring for valid signals from CMP sensor while CKP sensor is also sending valid signals	CMP edge detection status CMP signal pattern	= FALSE (no digital edge transitions measured in CMP signal.) does not match calibrated pattern	DTCs not active Ignition Engine Speed	P0642, P0643, P0335, P0336 ON ≥ 50 rpm (implies engine crankshaft speed recognized)	Fail conditions exists for 132 crankshaft increments	A
Camshaft Position [CMP] Sensor Performance	P0341	Detects implausible camshaft sensor operation by detecting in-correct cam sensor patterns	CKP signal pattern AND CMP pattern	valid pattern detected in-valid CMP pattern detected	DTCs not active Ignition Engine Speed	P0335, P0336 ON ≥ 50 rpm (implies engine crankshaft speed recognized)	fail condition exists for 240 crankshaft (CKP) increments.	A
Wait to Start Lamp (WTS) Control Circuit	P0381	This diagnostic checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.			Lamp must be commanded on for short to battery/open faults. Lamp must be commanded off for shot to ground/no load	fail condition exists for 3 sec. Test performed continuosly	B
Exhaust Gas Recirculation(EGR) Flow Insufficient	P0401	Detects insufficient EGR flow. Actual MAF readings are compared to desired MAF values as an indication of how much EGR is flowing.	Measured Mass Air Flow	> table look-up See Supporting tables P0401 air deviation	DTCs not active EGR state	P0101,P0102,P0103,P0403, P0405,P0406 EGR Actively being controlled	fail condition true for 15 seconds Test performed continuously	B
Exhaust Gas Recirculation(EGR) Flow Excessive	P0402	Detects excessive EGR flow. Actual MAF readings are compared to desired MAF values as an indication of how much EGR is flowing.	Measured Mass Air Flow	< table look-up See Supporting tables P0402 air deviation	DTCs not active EGR state	P0101,P0102,P0103,P0403, P0405,P0406 EGR Actively being controlled	fail condition true for 15 seconds Test performed continuously	B
Exhaust Gas Recirculation (EGR) Solenoid Control Circuit	P0403	Electronic out-put driver circuitry determines that current draw of the circuit corresponds to the EGR solenoid duty cycle.	circuit current	< 25 mA	ECM Power Up Time Engine running EGR Duty Cycle	> 0.5sec >10%	fail condition true for 1 second. Test performed continuously	B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Exhaust Gas Recirculation(EGR) Position Sensor Circuit Low Voltage	P0405	Detects low voltage readings on the EGR position circuit, indicating an OOR low condition on the EGR position circuit	EGR Position sensor	<= 254 mv (0% position)	DTCs not active Ignition on	P0698,P0699 Ignition on	fail condition true for 3 seconds Test performed continuously	B
Exhaust Gas Recirculation(EGR) Position Sensor Circuit High Voltage	P0406	Detects high voltage readings on the EGR position circuit, indicating an OOR high condition on the EGR position circuit	EGR Position sensor	>= 4745 mv (100% position)	DTCs not active Ignition	P0698,P0699 ON	fail condition true for 3 seconds Test performed continuously	B
Exhaust Gas Recirculation(EGR) Temperature Sensor 1Circuit Low Voltage	P040C	Detects low voltage readings on the EGR temperature circuit, indicating an OOR low condition on the EGR temperature 1 circuit	EGR Temperature sensor	<= 395 mv (689 Deg C)	Ignition Engine run time Coolant Lift	ON > 30 seconds > 60 Deg C > 4%	fail condition true for 3 seconds Test performed continuously	B
Exhaust Gas Recirculation(EGR) Temperature Sensor 1Circuit High Voltage	P040D	Detects high voltage readings on the EGR temperature circuit, indicating an OOR high condition on the EGR temperature 1 circuit	EGR Temperature sensor	>= 4700 mv (32 Deg C)	Ignition Engine run time Coolant Lift	ON > 30 seconds > 60 Deg C > 4%	fail condition true for 3 seconds Test performed continuously	B
Exhaust Gas Recirculation(EGR) Temperature Sensor Correlation (EGT 1/ EGT 2)	P040F	Detects biased Exhaust Temperature Sensors by comparing the two EGR temp sensor after an engine off soak time	Absolute value of (EGR Temperature1- EGR Temperature 2) Engine Off Time	<= 40 degC > 5 hrs	DTCs not active IAT Ignition	P040C,P040D,P041C, P041D >-7degC ON	fail condition true for 3 seconds Test performed continuously	B
Exhaust Gas Recirculation(EGR) Temperature Sensor 2 Circuit Low Voltage	P041C	Detects low voltage readings on the EGR temperature circuit, indicating an OOR low condition on the EGR temperature 2 circuit	EGR Temperature sensor	<= 395 mv (689 Deg C)	Ignition Engine run time Coolant Lift	ON > 30 seconds > 60 Deg C > 4%	fail condition true for 3 seconds Test performed continuously	B
Exhaust Gas Recirculation(EGR) Temperature Sensor 2 Circuit High Voltage	P041D	Detects high voltage readings on the EGR temperature circuit, indicating an OOR high condition on the EGR temperature 2 circuit	EGR Temperature sensor	>= 4700 mv (32 Deg C)	Ignition Engine run time Coolant Lift	ON > 30 seconds > 60 Deg C > 4%	fail condition true for 3 seconds Test performed continuously	B
Catalyst System Low Efficiency	P0420	Detects the ability of the NMHC catalyst to provide exotherms suffiecient to allow regeneration of the DPF	DOC out temp	< 585 deg C at the start of regen.	Must be in Regen		fail conditions exists for 272 secs. Test performed once per regen event	B
Exhaust Gas Recirculation(EGR) Position Sensor Performance	P046C	Detects in range EGR valve position errors by comparing desired EGR position to actual EGR valve position	Delta from target position	> = +/- 3%	DTCs not active EGR control	P0401,P0402,P0403,P0642, P0643 Active	fail conditions exist for 5 sec. Test performed continously	B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Cooling Fan Speed Output Circuit	P0480	This diagnostic checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.			Cooling Fan must be commanded on for short to battery/open faults. Cooling Fan must be commanded off for short to ground/no load	fail condition exists for 600ms. Monitoring is continuous at 20msec rate	B
Cooling Fan System Performance	P0483	Detects inability to control fan speed to desired RPM	abs (Actual Cooling Fan Speed - Commanded Cooling Fan Speed)	> 500 rpm.	Cooling Fan Output Driver Duty Cycle Cooling Fan Input Shaft speed	**>= 36%** < 6000 rpm	fail condition exists for 30 seconds Monitoring is continuous 20msec rate	B
Cooling Fan Speed High	P0495	Detects a locked fan. When fan speed control solenoid is off, the fan speed should follow input speed plus some slip for the given input speed.	Cooling Fan Speed	is not within a tolerance of the Cooling Fan Input speed as indicated in Supporting tables P0495 drag speed.	Cooling Fan Output Driver Duty Cycle Cooling Fan clutch fluid model	**<=** 35% indicates < 15ml in fan clutch working chamber AND Cooling Fan Input Speed > 1500 rpm	fail conditions true for timer dependent on altitude (see Supporting Tables P0495 pump out times) Test performed continuously. 20msec rate	B
Vehicle Speed Sensor (VSS) Absence of Signal	P0502	Monitors the difference between the Vehicle speed as indicated by replicated TOSS (R-TOSS) and Vehicle Speed provided over CAN from the TCM.	(RTOSS vehicle speed - CAN message vehicle speed)	>8 kph	DTCs are not set Coolant Temperature Engine Speed Engine Torque PTO,	P0117,P0118 > 10deg C > 800,rpm >200 Nm not active,	fail conditions true for 45 seconds Test performed continuously	B
Idle Speed Too Low	P0506	Detects an idle speed govenor that is unable to achieve the desired idle speed and the idle speed is too low	Target Idle Speed - Actual Engine Speed	> 100 rpm	DTCs are not set Engine RPM Idle governor is enabled and requesting torque Engine Coolant Temp Vehicle Speed	P0016,P0117,P0118,P0335, P0336 > 300 RPM > 40 degC < 1 Kph	fail conditions true for 20 seconds. Test performed continuously. 100msec loop	B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Idle Speed Too High	P0507	Detects an idle speed govenor that is unable to achieve the desired idle speed and the idle speed is too high.	Target Idle Speed - Actual Engine Speed	> 200 rpm	DTCs are not set Engine RPM Idle governor is enabled Engine Coolant Temp Vehicle Speed	P0016,P0117,P0118,P0335, P0336 > 300 RPM > 40 degC < 1 Kph	fail conditions true for 20 seconds. Test performed continuously. 100msec loop	B
Cooling Fan Speed Sensor Circuit	P0526	Detects fan speed circuit erros by monitoring for a lack of target wheel pulses	No pulses detected		Engine running		fail conditions exist for 3000ms. Test performed continuosly 20msec rate	B
Exhaust Gas Temperature (EGT) Sensor 1 Circuit Low Voltage	P0545	Detects low voltage readings on the EGT temperature 1 circuit, indicating an OOR low condition on the EGT temperature 1 circuit	Exhaust Temp Sensor 1	<0.318 v same as -40 degC	Ignition	ON	fail condition exists for 300ms sec Test performed continuously	A
Exhaust Gas Temperature (EGT) Sensor 1 Circuit High Voltage	P0546	Detects high voltage readings on the EGT temperature 1 circuit, indicating an OOR high condition on the EGT temperature 1 circuit	Exhaust Temp Sensor 1 Signal	> 3.37 v same as 1000 degC	Ignition	ON	fail condition exists for 300ms sec Test performed continuously	A
Control Module Not Programmed	P0602	Detects if the ECM is programmed.	ECM is not programmed	(K_Check_Service_Calibration = TRUE.)	Ignition	ON	Run every key cycle	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Control Module Internal Performance	P0606	Monitors that ECM is operating correctly at proper voltage. All internal hardware modules are communicating correctly. Injector power stages can be properly shut off by ECM during start-up test. Internal watchdog module reports that microprocessor responds to querie	PATH1: Microprocessor overvoltage is detected by hardware-based diagnositcs. PATH2: Internal SPI bus communication error detected in hardware. PATH3: Redunudant injector shut-off path tests faulted during engine startup (test to confirm that ECM can disable injection successfully). PATH4: Internal watchdog module (seperate HW) reports calculation and/or timing error with microprocessor. PATH5: Injector on-time microseconds (i.e. still torque-producing) is still being commanded after the driver has released the accelerator pedal and all applicable debounce timers that account for torque interventions have elapsed. PATH6: An ECM recovery has been triggered by any of the above paths or RAM and ROM checks.	> 220 microseconds			Continuous	A
Control Module Analog to Digital Performance	P060B	Electronic ECM circuitry determines if ADC is correctly converting signals within the correct time periods.	Converted ADC voltage from special channel connected to 3.5V microprocessor supply	>= 3.87V OR <= 3.37V	ECM powered up Engine speed APP2 test impulse	>= 400rpm carried out for APP2 voltage check test	Continuous	A
Internal Control Module Engine RPM Performance	P061C	Monitors Main and Redundant engine speed calculations for agreement. Detects failure in engine speed calculation through redundant calculation algorithm.	Difference between CKP engine speed and redundantly-calculated engine speed	> 320 rpm.	Engine speed	< 1300 rpm.	fail conditions exists for 880 ms.	A
TPU error on R-TOSS signal	P062C	Electronic ECM circuitry determines if faults related to the TPU chip used to calculate Vehicle speed exist.			Ignition	ON	fai conditions exists for 1 sec. Monitoring is continuous	A
Control Module Long Term Memory Performance	P062F	Each data block of memory is read for a check sum error and flags a fault is found.			Ignition	ON	once at key-up	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Intake Air (IA) Heater Switch/Control Circuit	P0640	Electronic GPCM circuitry determines if faults related to the control circuit of the IA heater exist.	digital response signal	= high when heartbeat signal is activated	IAH Commanded	OFF	fail conditions exist for 650msec. Test is conducted every 2 seconds.	B
5 Volt Reference 1 Circuit Low Voltage	P0642	Detects circuit faults which lower the 5V reference 1 supply voltage out of regulation	5 Volt Reference 1	< 4.86V	Ignition	ON	fail conditions true for 160 msec. Monitoring is Continuous	A
5 Volt Reference 1 Circuit High Voltage	P0643	Detects circuit faults which raise the 5V reference 1 supply voltage out of regulation	5 Volt Reference 1	> 5.1V	Ignition	ON	fail conditions true for 160 msec. Monitoring is Continuous	A
Glow Plug Control Module Performance	P064C	ECM monitors serial data from GPCM for P064C Error Message. Diagnosis is performed in GPCM	P064C Error Message received from the Glow Plug Control Module via GMLAN indicating one or more of the conditions below; 1) Any of the 8 glow plug switches is defective 2)No IGN1 voltage 3)GPCM is overtemp 4)GPCM is overvoltage or undervoltage 5)Internal voltage supply to the Intake Air heater is too low 6)Difference between IGN1 and KI 30 (Battery) voltage is too high 7)Difference between battery voltage measured by ECM and battery voltage measured by the GPCM is too high 8)GPCM ROM, RAM or EEPROM failure	SEE "GPCM Summary table" worksheet	Ignition	ON	fail conditions exist for 3000msec. Frequency is every 250msec.	B
Malfunction Indicator Lamp (MIL) Control Circuit	P0650	This diagnostic checks the circuit for electrical integrity during operation.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.			Lamp must be commanded on for short to battery/open faults. Lamp must be commanded off for shot to ground/no load	Fail condition exists for 2 sec. Monitoring is continuos	no MIL
5 Volt Reference 2 Circuit Low Voltage	P0652	Detects circuit faults which lower the 5V reference 2 supply voltage out of regulation	5 Volt Reference 2	< 4.86V	Ignition	ON	fail conditions true for 160 msec. Monitoring is Continuous	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
5 Volt Reference 2 Circuit High Voltage	P0653	Detects circuit faults which raise the 5V reference 2 supply voltage out of regulation	5 Volt Reference 2	> 5.1V	Ignition	ON	fail conditions true for 160 msec. Monitoring is Continuous	A
Cylinder #1 Glow Plug Control Circuit	P0671	Monitors Serial Data Communication from the GPCM indicating a fault exists on Cyl #1 Glow Plug	Glow Plug circuit	= open, shorted, high resistance low resistance SEE "GPCM Summary table" worksheet	Ignition on Glow plugs commanded on		fault exists for 1 sec. Frequency is every 250msec.	B
Cylinder #2 Glow Plug Control Circuit	P0672	Monitors Serial Data Communication from the GPCM indicating a fault exists on Cyl #2 Glow Plug	Glow Plug circuit	= open, shorted, high resistance low resistance SEE "GPCM Summary table" worksheet	Ignition on Glow plugs commanded on		fail condition exists for 1 sec. 250msec loop.	B
Cylinder #3 Glow Plug Control Circuit	P0673	Monitors Serial Data Communication from the GPCM indicating a fault exists on Cyl #3 Glow Plug	Glow Plug circuit	= open, shorted, high resistance low resistance SEE "GPCM Summary table" worksheet	Ignition on Glow plugs commanded on		fail condition exists for 1 sec. 250msec loop.	B
Cylinder #4 Glow Plug Control Circuit	P0674	Monitors Serial Data Communication from the GPCM indicating a fault exists on Cyl #4 Glow Plug	Glow Plug circuit	= open, shorted, high resistance low resistance SEE "GPCM Summary table" worksheet	Ignition on Glow plugs commanded on		fail condition exists for 1 sec. 250msec loop.	B
Cylinder #5 Glow Plug Control Circuit	P0675	Monitors Serial Data Communication from the GPCM indicating a fault exists on Cyl #5 Glow Plug	Glow Plug circuit	= open, shorted, high resistance low resistance SEE "GPCM Summary table" worksheet	Ignition on Glow plugs commanded on		fail condition exists for 1 sec. 250msec loop.	B
Cylinder #6 Glow Plug Control Circuit	P0676	Monitors Serial Data Communication from the GPCM indicating a fault exists on Cyl #6 Glow Plug	Glow Plug circuit	= open, shorted, high resistance low resistance SEE "GPCM Summary table" worksheet	Ignition on Glow plugs commanded on		fail condition exists for 1 sec. 250msec loop.	B
Cylinder #7 Glow Plug Control Circuit	P0677	Monitors Serial Data Communication from the GPCM indicating a fault exists on Cyl #7 Glow Plug	Glow Plug circuit	= open, shorted, high resistance low resistance SEE "GPCM Summary table" worksheet	Ignition on Glow plugs commanded on		fail condition exists for 1 sec. 250msec loop.	B
Cylinder #8 Glow Plug Control Circuit	P0678	Monitors Serial Data Communication from the GPCM indicating a fault exists on Cyl #8 Glow Plug	Glow Plug circuit	= open, shorted, high resistance low resistance SEE "GPCM Summary table" worksheet	Ignition on Glow plugs commanded on		fail condition exists for 1 sec. 250msec loop.	B

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
5 Volt Reference 3 Circuit Low Voltage	P0698	Detects circuit faults which lower the 5V reference 3 supply voltage out of regulation	5 Volt Reference 3	< 4.86V	Ignition	ON	fail conditions true for 160 msec. Monitoring is Continuous	A
5 Volt Reference 3 Circuit High Voltage	P0699	Detects circuit faults which raise the 5V reference 3 supply voltage out of regulation	5 Volt Reference 3	> 5.1V	Ignition	ON	fail conditions true for 160 msec. Monitoring is Continuous	A
Transmission Control Module (TCM) Requested MIL Illumination	P0700	Monitors Serial Data Communication for TCM faults.	Serial Data communication from the TCM indicates a fault exists with the transmission.		Ignition	ON	active on first message received. Monitored continuously	A
Park/Neutral Position (PNP) Switch Circuit Low Voltage	P0851	Detects low voltage condition on the PNP circuit by comparing the ECM sensed input to the broadcasted state from the TCM over GMLAN serial data	GMLAN Message for PNP position indicates park nuetral and dis-agrees with ECM sensed position based on PNP switch inputs to ECM		DTCs not active Battery Voltage Ignition on	U0101,P0852 11v < BV < 18v	Fail conditions exist for 1 sec. Monitored continuously	B
Park/Neutral Position (PNP) Switch Circuit High Voltage	P0852	Detects high voltage condition on the PNP circuit by comparing the ECM sensed input to the broadcasted state from the TCM over GMLAN serial data	ECM sensed position based on PNP switch inputs to ECM indacates park or nuetral and the GMLAN message from the TCM dis-agrees.		DTCs not active Engine speed Vehicle speed Actual Engine Torque Battery voltage Pedal Position	U0101, P0851 > 650rpm > 24kPH > 120 newton meters 11v < BV < 18v, > 0%	Fail conditions exist for 1 sec. Monitored continuously	B
Injector 1 Control Circuit Shorted	P1224	Electronic out-put driver circuitry determines that the injector circuit is shorted.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 1		fail conditions true for 3 msec. Monitored continuosly	A
Injector 2 Control Circuit Shorted	P1227	Electronic out-put driver circuitry determines that the injector circuit is shorted.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 2		fail conditions true for 3 msec. Monitored continuosly	A
Injector 3 Control Circuit Shorted	P122A	Electronic out-put driver circuitry determines that the injector circuit is shorted.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 3		fail conditions true for 3 msec. Monitored continuosly	A
Injector 4 Control Circuit Shorted	P1233	Electronic out-put driver circuitry determines that the injector circuit is shorted.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 4		fail conditions true for 3 msec. Monitored continuosly	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Injector 5 Control Circuit Shorted	P1236	Electronic out-put driver circuitry determines that the injector circuit is shorted.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 5		fail conditions true for 3 msec. Monitored continuosly	A
Injector 6 Control Circuit Shorted	P1239	Electronic out-put driver circuitry determines that the injector circuit is shorted.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 6		fail conditions true for 3 msec. Monitored continuosly	A
Injector 7 Control Circuit Shorted	P1242	Electronic out-put driver circuitry determines that the injector circuit is shorted.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 7		fail conditions true for 3 msec. Monitored continuosly	A
Injector 8 Control Circuit Shorted	P1247	Electronic out-put driver circuitry determines that the injector circuit is shorted.	The ECM detects that the commanded state of the driver and the actual state of the control circuit do not match.		Engine running. Injection event is being attempted for Cly 8		fail condition true for 3 msec. Monitored continuosly	A
Diesel Particulate Filter Regeneration Frequency Too Low	P1448	Monitors the time between regerations and detects if the regeration frequency is too low	Running average of time between the last two *completed* DPF regens (with idle time subtraced out)	> 20 hours.	Engine running		fail condition true 1 time. Test performed continuously.	A
Intake Air (IA) Heater Feedback Circuit	P154A	Electronic GPCM circuitry determines if faults related to the IA heater feedback circuit exist.	digital response signal AND IAH current	= low > 20 A	IAH Commanded Battery Voltage at IAH	ON > 8.6 Volt	fail conditions exist for 650msec. Frequency is every 10msec.	B
Intake Air (IA) Heater Voltage Signal Circuit	P154B	Electronic GPCM circuitry determines if faults related to the voltage level present at the IA heater exist.	IAH Battery voltage AND GPCM Battery Voltage GPCMKL30	> 16.0 Volt AND >8.0 volts < 16.0 Volt	IAH Commanded ON		fail conditions exist for 650msec. Frequency is every 10msec.	B
Intake Air (IA) Heater Current Signal Circuit	P154C	Electronic GPCM circuitry determines if faults related to the IA heater current signal circuit exist.	IAH current line detected open, shorted to ground or shorted to battery		IAH Commanded Battery Voltage at IAH GPCM Ignition voltage	ON > 6.9 Volt >= 6.9 Volt	fail conditions exist for 320msec. Frequency is every 10msec.	B
Intake Air (IA) Heater Temperature Signal Circuit	P154D	Electronic GPCM circuitry determines if faults related to the control circuit of the IA heater exist.	IAH temperature line detected open, shorted to ground or shorted to battery		IAH Commanded Battery Voltage at IAH	ON 6.9 Volts < BV <18 volts	fail conditions exist for 650msec. Frequency is every 10msec.	B
Engine Calibration Information Not Programmed – GPCM	P160C	ECM monitors serial data from GPCM for P160C Error Message indicating GPCM is not programmed with injector trim values.	Glow Plug Control Module determines IQA data has <u>not</u> been programmed in the GPCM		Ignition	ON	fail conditions exist for 1 second. Frequency is every 160msec.	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Intake Air (IA) Heater Over Temperature	P166B	ECM monitors serial data from GPCM for P166B Error Message indicating GPCM detects IAH overtemperature	Temperature IAH	> 80 °C	IAH Commanded engine run time Battery Voltage at IAH	ON > 40 sec > 8.6 Volt	fail conditions exist for 1 second. Frequency is every 160msec.	B
Intake Air (IA) Heater Resistance	P166C	ECM monitors serial data from GPCM for P166C Error Message indicating GPCM detects high IA heater reistance	Calculated resistance AND IAH current	> 500 mOhm > 20 A	IAH Commanded engine run time Battery Voltage at IAH	ON > 40 sec > 8.6 Volt	fail conditions exist for 1 second. Frequency is every 160msec.	B
Diesel Particulate Filter Efficiency Below Threshold Bank 1	P2002	Detects a DPF that is leaking particulates at 8X the standard	Res flow	< f(Delta Pressure and exhaust flow) (see supporting tables P2002)	Time since successful regen Distance since successful regen Accumulated soot	< = 600 seconds. <= 18.6 Miles <=40 grams.	fail conditions exist for 30 sec. Test performed after a regen	B
Exhaust Gas Temperature (EGT) Sensor 2 Circuit Low Voltage	P2032	Detects low voltage readings on the EGT temperature circuit, indicating an OOR low condition on the EGT temperature 2 circuit	Exhaust Temp Sensor 2 Signal	<0.307 v same as -40 degC	Ignition	ON	fail condition exist for 300 sec Test performed continuously	A
Exhaust Gas Temperature (EGT) Sensor 2 Circuit High Voltage	P2033	Detects high voltage readings on the EGT temperature circuit, indicating an OOR high condition on the EGT temperature 2 circuit	Exhaust Temp Sensor 2 Signal	> 3.37 v same as 1000 degC	Ignition	ON	fail condition exist for 300 sec Test performed continuously	A
Exhaust Gas Temperature (EGT) Sensor 1-2 Correlation	P20E2	Detects biased Exhaust Temperature Sensors by comparing the two EGT temp sensor after an engine off soak time	absolute value of (Startup Exhaust Gas Temperature 1 Sensor - Startup Exhaust Gas Temperature 2 Sensor)	> 20 degC.	DTCs not active. Engine Off Timer	P0545,P0546,P2032,P2033 > 5 hrs	Diagnostic sets on first fail Test performed once per key cycle	B
Accelerator Pedal Position (APP) Sensor 1 Circuit Low Voltage	P2122	Detects low voltage readings on the APP circuit, indicating an OOR low condition on the APP 2 circuit	Accelerator pedal 1 voltage	<= 0.806 volts (-2%)	P2122, P2123 are not currently set No sensor supply errors. No A-to-D pulse test Ignition ON	P060B,P0643,P0642,P0652, P06523,P0699,P0698, P2123 ON	fail conditions exists for 0.24 seconds Test performed continuously 100msec rate	C
Accelerator Pedal Position (APP) Sensor 1 Circuit High Voltage	P2123	Detects high voltage readings on the APP circuit, indicating an OOR high condition on the APP 1 circuit	Accelerator pedal 1 voltage	>= 4.75 volts(141%)	DTCs not active Ignition	P060B,P0643,P0642,P0652, P06523,P0699,P0698, P2122 ON	fail conditions exists for 0.24 seconds Test performed continuously 100msec rate	C
Accelerator Pedal Position (APP) Sensor 2 Circuit Low Voltage	P2127	Detects low voltage readings on the APP circuit, indicating an OOR low condition on the APP 1 circuit	Accelerator pedal 2 voltage	<= 0.308 volts (-24%)	DTCs not active Ignition	P060B,P0643,P0642,P0652, P06523,P0699,P0698, P2128 ON	fail conditions exists for 0.24 seconds Test performed continuously 100msec rate	C

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Accelerator Pedal Position (APP) Sensor 2 Circuit High Voltage	P2128	Detects high voltage readings on the APP circuit, indicating an OOR high condition on the APP 2 circuit	Accelerator pedal 2 voltage	>= 2.5 volts (186%)	DTCs not active Ignition	P060B,P0643,P0642,P0652, P06523,P0699,P0698, P2127 ON	fail conditions exists for 0.24 seconds Test performed continuously 100msec rate	C
Accelerator Pedal Position (APP) Sensor 1-2 Correlation	P2138	Detects in range pedal positions errors by comparing voltages on each sensor. The voltages should indicate	Difference in indicated position between Accelerator pedal sensor 1 & 2	> 2%.	DTCs not active Ignition	P060B,P0643,P0642,P0652, P06523,P0699,P0698, P2122,P2123,P2127,P2128 ON	fail conditions exists for 0.30 seconds Test performed continuously 100msec rate	C
Injector Positive Voltage Control Circuit Group 1	P2146	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on #1 injector charging banks.	Electronic out-put driver circuitry determines the faults (open/short/no load) do exist	Electronic out-put driver circuitry determines the faults (open/short/no load) do exist	Engine running. Injection event is being attempted for injectors 1&4 connected to bank 1		Fail condition exists for 6 msec. Monitored continuosly	A
Injector Positive Voltage Control Circuit Group 2	P2149	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on #2 injector charging banks.	Electronic out-put driver circuitry determines the faults (open/short/no load) do exist		Engine running. Injection event is being attempted for injectors 7&6 connected to bank 2		Fail condition exists for 6 msec. Monitored continuosly	A
Injector Positive Voltage Control Circuit Group 3	P2152	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on #3 injector charging banks.	Electronic out-put driver circuitry determines the faults (open/short/no load) do exist		Engine running. Injection event is being attempted for injectors 2&5 connected to bank 3		Fail condition exists for 6 msec. Monitored continuosly	A
Injector Positive Voltage Control Circuit Group 4	P2155	ECM Electronic out-put driver circuitry determines if faults (open/short/no load) exist on #4 injector charging banks.	Electronic out-put driver circuitry determines the faults (open/short/no load) do exist		Engine running. Injection event is being attempted for injectors 8&3 connected to bank 4		Fail condition exists for 6 msec. Monitored continuosly	A
Barometric Pressure (BARO) Circuit Low Input	P2228	Detects low voltage readings on the ECM internal BARO circuit, indicating an OOR low condition on the BARO circuit	Baro Sensor Signal	Baro Sensor Signal <1.5 v same as 60kpa	DTCs not active Ignition	P0652,P0653 ON	fail condition exists for 800msec Test performed continuously	B
Barometric Pressure (BARO) Circuit High Input	P2229	Detects high voltage readings on the ECM internal BARO circuit, indicating an OOR high condition on the BARO circuit	Baro Sensor Signal	Baro Sensor Signal >4.5v same as 110 kPa	DTCs not active Ignition	P0652,P0653 ON	fail condition exists for 800msec Test performed continuously	B
Diesel Particulate Filter Differential Pressure Too High	P244B	Detects a DPF which has over loaded with soot by monitoring for high differential pressure sensor readings	Differential pressure sensor	> f (exhaust flow rate, DPF temperature) See Supporting tables P244B	Engine running		fail conditions exist for 30 sec. Test performed continuously	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Catalyst Temperature Too Low During Regeneration	P244C	Detects DPF temperatures lower than expected during regen by monitoring the exhaust gas temperature sensor before the DPF.	Exhaust temperature sensor before the DPF	> 100 Deg C below the target temperature f(fuel,RPM).See supporting tables 244C Target Temp Map.	Control system in active DPF regeneration		fail conditions exist for 5 min. Test performed continuously.	B
Diesel Particulate Filter Differential Pressure Sensor Performance	P2453	Detects in range faults on the DPF differential pressures sensor. Three conditions are evaluated:1 engine off when little pressure differentail should exist. 2 Engine running with a positive change in exhaust flow should result in an increase in diff press. 3 Engine running with a negative positive change in exhaust flow should result in a reduction in diff press.	1. abs(Differential pressure sensor signal) 2. Or Differential pressure sensor gradient 3. Or Differential pressure sensor gradient	> 4.1 kPa > 0.6 kPa/sec. < -0.6 hPa/sec	1. Engine off. 2.Engine running and when a change in the exahust flow gradient 3. Engine running and when a change in the exhausf flow gradient	 > 200 m^3/h/sec. < -200 m^3/h/sec.	1. Fail conditions exist for 500 msec. Test performed once during ECM power down. 2. Fail conditions exist for 900 msec. Test performed continuously. 3. Fail conditions exist for 900 msec. Test performed continuously.	A
Diesel Particulate Filter Differential Pressure Sensor Circuit Low Voltage	P2454	Detects low voltage readings on the DPF differential pressure sensor circuit, indicating an OOR low condition on the circuit	Differential pressure sensor signal	< .930 v (2 kPpa)	Ignition	ON	fail condition exist for 3.75 seconds. Test performed continuously	A
Diesel Particulate Filter Differential Pressure Sensor Circuit High Voltage	P2455	Detects high voltage readings on the DPF differential pressure sensor circuit, indicating an OOR high condition on the circuit	Differential pressure sensor signal	> 4.745 v (100 kPa)	Ignition	ON	fail condition exist for 3.75 seconds. Test performed continuously	A
Exhaust Gas (EGR) Cooler Performance	P2457	Performs a functional check of the EGR cooler performance by monitoring the EGR exhaust temperature into the cooler and comparing it to the EGR exhaust temperature out of the EGR cooler.	Temperature difference between temperature sensor #2 and temperature sensor #1 EGR opening position	=> f(fuel,RPM) see supporting tables P2457 > 4% for 60 seconds	DTCs not active Ignition	P040C,P040D,P041C, P041D P040F ON	fail condition exist for 3 seconds. Test performed continuously	B
Diesel Particulate Filter - Soot Accumulation	P2463	Detects high levels of soot in the DPF as indicated by the soot model.	DPF has accumulated	>= 70 grams of particulates	Engine running		fail condition true for 5 mins. Test performed continuosly	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
ECM Power Relay Circuit	P2510	Detects stuck power relay that is not responding to ECM commands to power down or a relay that is opening too early in power down. Stuck on is determined by timer values longer than possible if relay opened at end of after run. Opening too soon is indicated by a lackof EEPROM write at the last after run.	Relay is responding incorrectly to ECM command to turn off.		Engine has tranistioned from start to run OR After run (Power down) has occurred		Diagnostic sets on 1st failure Test performed twice a drive cycle	A
Turbocharger Boost Control Position Sensor Performance	P2563	Detects in range Turbo vane position errors by comparing desired vane position to actual vane position	Delta from target position	> = +/- 15%	DTCs not active Engine Run time	P0045, P2564 >30 sec	failconditions exist for 5 sec Test performed continuously	B
Turbocharger Boost Control Position Sensor Circuit Low Voltage	P2564	Detects low voltage readings on the Turbo boost control position sensor circuit, indicating an OOR low condition on the circuit	Turbocharger Vane Position Sensor Signal	< 0.277v (5.5%) full open	Engine Run time	>3sec	fail condition exists for 1second Test performed continuously	B
Turbocharger Boost Control Position Sensor Circuit High Voltage	P2565	Detects high voltage readings on the Turbo boost control position sensor circuit, indicating an OOR high condition on the circuit	Turbocharger Vane Position Sensor Signal	> 4.78v (95.6%) full closed	Engine Run time	>3sec	fail condition exists for 1second Test performed continuously	B
Control Module Ignition Off Timer Performance	P2610	Detects errors in the engine off timer calculations.If in ECM power up or afterrun, the IOT chip is not responding with a value **OR** In after run a SW timer and the IOT are started after a calibration time they are both stopped and they must agree within a calibration amount.	1) Ignition off timer reads OR timer unchanged for OR 2) HW and SW timer error	<0 sec >60 sec > 2 secs after 20 sec of time	1) ECM powered up 2) ECM powered down		Diagnostic sets on 1st failure Test performed once at power up and once at power down	B
Fuel Injector Calibration Not Programmed	P268A	Detects un-programed Injector Calibration Data (IQA) in ECM	Injector Calibration Data (IQA)	is not programmed in the ECM	Ignition	ON	Sets on first fail Test performed once at key-up	A
Cylinder 1 Injector Data Incorrect (IQA)	P268C	Detects a miss match in IQA values between ECM and GPCM	Cylinder #1 IQA values	IQA values are not = between ECM and GPCM	Engine running		Sets on first fail Test performed continuously	A
Cylinder2 Injector Data Incorrect (IQA)	P268D	Detects a miss match in IQA values between ECM and GPCM	Cylinder #2 IQA values	IQA values are not = between ECM and GPCM	Engine running		Sets on first fail Test performed continuously	A

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITION	TIME REQUIRED	MIL ILLUM.
Cylinder 3 Injector Data Incorrect (IQA)	P268E	Detects a miss match in IQA values between ECM and GPCM	Cylinder #3 IQA values	IQA values are not = between ECM and GPCM	Engine running		Sets on first fail Test performed continuously	A
Cylinder 4 Injector Data Incorrect (IQA)	P268F	Detects a miss match in IQA values between ECM and GPCM	Cylinder #4 IQA values	IQA values are not = between ECM and GPCM	Engine running		Sets on first fail Test performed continuously	A
Cylinder 5 Injector Data Incorrect (IQA)	P2690	Detects a miss match in IQA values between ECM and GPCM	Cylinder #5 IQA values	IQA values are not = between ECM and GPCM	Engine running		Sets on first fail Test performed continuously	A
Cylinder 6 Injector Data Incorrect (IQA)	P2691	Detects a miss match in IQA values between ECM and GPCM	Cylinder #6 IQA values	IQA values are not = between ECM and GPCM	Engine running		Sets on first fail Test performed continuously	A
Cylinder 7 Injector Data Incorrect (IQA)	P2692	Detects a miss match in IQA values between ECM and GPCM	Cylinder #7 IQA values	IQA values are not = between ECM and GPCM	Engine running		Sets on first fail Test performed continuously	A
Cylinder 8 Injector Data Incorrect (IQA)	P2693	Detects a miss match in IQA values between ECM and GPCM	Cylinder #8 IQA values	IQA values are not = between ECM and GPCM	Engine running		Sets on first fail Test performed continuously	A
Lost communications with Transmission Control System	U0101	Detects loss of communication between ECM and TCM	ECM fails to receive message	$199	Ignition	ON	Monitor time is 10sec. Frequency is every 160msec.	A
Lost Communications with Glow Plug Control Module	U0106	Detects loss of communication between ECM and GPCM	PATH 1)The ECM fails to receive message PATH 2)GPCM fails to receive message	$3BD. $0C9	Ignition	ON	Monitor time is 10sec. Frequency is every 160msec.	B

SUPPORTING TABLES

P0191
Fuel Pressure Sensor Rationality

	Rail Pressure at engine shut down (MPa)		200	250	400	1000	1150	1300											
	Time (seconds)		30	50	55	60	65	70											

P0234, P0299
Boost deviation Maps

PCR_pDvtMax_MAP

				RPM															
			40	**1800**	**2000**	**3000**	**4000**												
	injection qty mm3	**1**	400	400	210	300	400												
		20	400	400	210	300	400												
P0234 Over Boost		**40**	400	400	210	300	400												
		80	400	400	400	400	400												
		125	400	400	400	400	400												

PCR_pDvtMin_MAP

				RPM															
			40	**1800**	**2000**	**3000**	**4000**												
	injection qty mm3	**1**	-400	-400	-300	-300	-400												
		20	-400	-400	-300	-300	-400												
P0299 Under Boost		**40**	-400	-400	-300	-300	-400												
		80	-400	-400	-400	-400	-400												
		125	-400	-400	-400	-400	-400												

P0401,P0402
EGR Flow
Air Deviation Maps

AirCtl_mMaxDvt_MAP

				RPM															
			1000	**2000**	**3000**	**4000**													
	injection qty mm3	**20**	195	195	300	300													
P0402 EGR Flow Max		**40**	195	195	300	300													
		80	300	300	300	300													
		115	300	300	300	300													

AirCtl_mMinDvt_MAP

				RPM															
			1000	**2000**	**3000**	**4000**													
	injection qty mm3	**20**	-100	-150	-170	-170													
P0402 EGR Flow Min		**40**	−150	-150	-170	-170													
		80	−150	-200	-200	-200													
		115	−150	-200	-200	-200													

SUPPORTING TABLES

					Barometric pressure														
P0495			**76.0 kpa**	**77.1 kpa**	**84.4 kpa**	**85.4 kpa**	**89.4 kpa**	**90.0 kpa**	**100.0 kpa**										
Cooling Fan Speed High	**Coolant Temp °C**	-6.94	1092	20	16.8	16.4	14.6	14.4	10										
		-5.94	1092	20	16.8	16.4	14.6	14.4	10										
		99.96	1092	20	16.8	16.4	14.6	14.4	10	pump out times in secs									
		101	1092	20	16.8	16.4	14.6	14.4	10										
		103	1092	20	16.8	16.4	14.6	14.4	10										
		105	1092	20	16.8	16.4	14.6	14.4	10										
		125	1092	1092	1092	1092	1092	1092	1092										
	Fan Shaft Input Speed	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600	6000	6400	6800	
	Fan drag Speed	400	800	1200	1600	1970	2364	2758	3152	3546	3940	4300	4300	4300	4300	4300	4300	4300	

P2002 DPF Efficiency MAP																	
	Volume of exhaust Flow (meters^3 / hours)	0	25	50	100	200	400	1000	1001	1002	1600	1601	1602	1800	2000	2200	2400
	Calculated Res Flow= DPF Delta pressure / exhaust flow hPa/(meters^3/hours)	-0.0540	-0.0540	-0.0540	-0.0470	-0.0450	-0.0430	-0.0410	-0.0410	-0.0430	-0.0470	-0.0470	-0.0470	-0.0520	-0.0520	-0.0520	-0.0520

P244B DPF High Pressure MAP			**DPF Surface Temperature [deg. C]**															
			100	**200**	**275**	**300**	**325**	**350**	**375**	**400**	**425**	**450**	**475**	**500**	**525**	**550**	**600**	**650**
	Exhaust flow rate [m^3/hr]	**100**	40	40	40	40	40	40	47	47	47	47	47	47	47	47	47	47
		300	58	65	90	95	87	79	82	86	89	93	96	88	92	96	96	100
		400	102	105	111	117	98	96	99	99	98	98	110	124	128	132	136	140
		500	145	145	132	138	109	113	116	112	107	103	125	129	164	168	172	180
		600	182	182	168	178	167	198	174	167	160	132	160	157	208	212	216	224
		700	218	218	204	217	224	284	233	223	213	162	196	185	173	161	260	268
		900	312	312	316	227	214	216	214	225	230	235	247	260	266	272	274	364
		1100	448	432	428	428	432	432	436	440	308	332	373	382	392	383	377	480
		1300	620	600	584	584	584	580	580	584	584	384	412	435	465	494	481	620
		1500	620	764	740	736	732	728	724	724	728	732	469	511	558	605	587	756
		1700	620	1000	980	988	996	988	980	968	968	964	960	960	960	960	625	968
		1900	620	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
		2100	620	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
		2400	620	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
		2700	620	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
		3000	620	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

SUPPORTING TABLES

				RPM																
	Injector Fuel Rate [mm^3/cyc		800	1000	1500	2100														
P244C		0	600	651.5	651.5	651.5														
Target Temp Map		40	600	651.5	651.5	651.5														
		50	600	651.5	651.5	651.5														
		60	600	651.5	651.5	651.5														
EGR Cooler																				
Efficientcy																				
				RPM																
			800	1000	2000	2500	3000													
	injection qty mm3	5	-10	-30	-30	-30	-30													
		10	-10	-30	-30	-30	-30													
		15	-10	-30	-30	-30	-30	degC out put												
		20	-10	-30	-30	-30	-30													
		25	-10	-30	-30	-30	-30													