2005   1.6L (L91)
DIAGNOSTIC PARAMETERS

NOTE: Printing this file may require 8.5" x 14" (legal size) paper, depending on your printer setup.

Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
MAP Rationality	P0106	10.33 - 104.8 kPa The map reading is compared to expected MAP high & low limits based on RPM & TPS	Power test: Altitude compensated MAP reading > Maximum table Table is based on RPM and TPS Altitude compensated MAP reading < Minimum table. Table is based on RPM and TPS Deceleration test: Altitude compensated MAP reading < Deceleration table. Table is based on RPM when TPS < 0.2% TPS	None of the following DTC's: Coolant Sensor P0117, P0118 Coolant Sensor Stuck P0115 Coolant C/L System P0125 EGR Flow P0401 EGR P0402,P0404, P0488, P0405, P0406 EST P0351, P0352. EVAP Purge O0441 Idle P0506.P0507 Injector P0201,P0202,P0203,P0204 MAP Sensor P0107, P0108 Misfire P0300 Purge Solenoid P0443 TPS P0122, P0123 Common Stable conditions Engine running Coolant Temperature > -10 degrees C Valid barometric pressure update TCC is not transitioning Decel Test Stable Conditions 1300 rpm< RPM < 4500 rpm Delta Idle airflow < 5% Power Test Stable Conditions Engine speed > 1300 rpm Engine speed < 4500 rpm A/C clutch not transitioning Traction/Torque Control is not active If ETC: Brake switch not activated If PwrStrSwtch: Power Steering not cramped Delta RPM < 200 rpm (Delta TPS <3% OR Delta MAP< 5 kPa) If EGR: Delta EGR < 6% Delta Idle Air < 5% If Cam Phasing: VCPC stable Common Enable Conditions No MAP short fail conditions (high/low) present	Power test: MAP out of range for 100 fail samples out of 200 total test samples Deceleration test: MAP out of range for 20 fail samples out of 40 total test samples Continuous monitoring every 125 msec	Absolute Pressure Sensor	Type B	Analog

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				No TPS Short Fail conditions (high/low) present EGR Flow intrusive test not active Decel Test Enable Conditions Decel Stable conditions met TPS < 0.2 % VSS > 20 kph Decel Enable conditions timer > 1.5 sec. Power Test Enable Conditions Power Stable conditions met Power Enable condition timer > 1.5 sec				
MAP Intermittent High Volts	P1106	10.33 - 104.8 kPa This code detects a continuous short to high in either the signal circuit or the MAP sensor	Raw MAP > 98% of sensor reading scale(103.0kpa)	No TPS fail conditions (high/low) present Engine running > 10 sec. TPS < 15% if RPM < 2500 or TPS < 35% if RPM > 2500	256 test failures within a 7682 test samples (2.0 sec./60.0 sec.) Continuous monitoring 7.81msec	Absolute Pressure Sensor	Type Cnl	Analog
MAP LO Volts	P0107	10.33 - 104.8 kPa This code detects a continuous short to low or open in either the signal circuit or the MAP	Raw MAP < 2.0% of sensor reading scale(12.0kpa)	No TPS fail conditions (high/low) present TPS ³ 0% if RPM £ 1000 or TPS > 5.0% if RPM >1000 System voltage > 11.5 volts	320 test failures within a 640 test sample (2.5 sec./5.0 sec.) Continuous monitoring 7.81msec	Absolute Pressure Sensor	Type A	Analog
MAP Intermittent Low Volts	P1107	10.33 - 104.8 kPa This code detects a continuous short to low or open in either the signal circuit or the MAP	Raw MAP < 2.0% of sensor reading scale(12.0kpa)	No TPS fail conditions (high/low) present TPS ³ 0% if RPM £ 1000 or TPS > 5.0% if RPM >1000 System voltage >11.5 volts	256 test failures within a 7682 test samples (2.0 sec./60.0 sec.) Continuous monitoring 7.81msec	Absolute Pressure Sensor	Type Cnl	Analog
MAP HI Volts	P0108	10.33 - 104.8 kPa This code detects a continuous short to high in either the signal circuit or the MAP sensor	Raw MAP > 98% of sensor reading scale(103.0kpa)	No TPS fail conditions (high/low) present Engine running > 10 sec. TPS < 15% if RPM < 2500 or TPS < 35% if RPM > 2500	320 test failures within a 640 test samples (2.5 sec./5.0 sec.) Continuous monitoring 7.81msec	Absolute Pressure Sensor	Type A	Analog
Intake Air Temp Intermittent High Volts (Low Temperature)	P1111	-40 to 151°C This code detects a continuous short to high in either the signal circuit or the sensor	Raw IAT > 98% of sensor reading scale(-38°C)	Vehicle speed <25KPH Engine run time > 120 sec Coolant temp > 70°C Airflow < 15 g/s None of the following DTC's: Vehicle Speed Sensor (VSS) P0502 Coolant Sensor: P0117, P0118	32 test failures within a 960 test samples (4.0 sec./120.0 sec.) Continuous monitoring every 125msec	Thermistor	Type Cnl	Analog

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Intake Air Temp LO Volts (High Temp.)	P0112	-40 to 151°C This code detects a continuous short to ground in either the signal circuit or the sensor	Raw IAT < 2% of sensor reading scale(149°C)	Vehicle speed ³ 50KPH Engine run time > 120 sec None of the following DTC's: Vehicle Speed Sensor (VSS) P0502	80 test failures within a 160 test samples (10.0 sec./20.0 sec.) Continuous monitoring every 125msec	Thermistor	Type A	Analog
Intake Air Temp Intermittent Low Volts (High Temperature)	P1112	-40 to 151°C This code detects a continuous short to ground in either the signal circuit or the sensor	Raw IAT < 2% of sensor reading scale(149°C)	Vehicle speed ³ 50 MPH Engine run time > 120 sec None of the following DTC's: Vehicle Speed Sensor (VSS) P0502	32 test failures within 960 test samples (10.0 sec./20.0 sec.) Continuous monitoring every 125msec	Thermistor	Type Cnl	Analog
Intake Air Temp HI Volts (Low Temp.)	P0113	-40 to 151°C This code detects a continuous short to high in either the signal circuit or the sensor	Raw IAT > 98% of sensor reading scale(-38°C)	Vehicle speed <25KPH Engine run time > 120 sec Coolant temp > 70°C Airflow < 15 g/s None of the following DTC's: Vehicle Speed Sensor (VSS) P0502 Coolant Sensor: P0117, P0118	80 test failures within a 160 test samples (4.0 sec./120.0 sec.) Continuous monitoring every 125msec	Thermistor	Type A	Analog

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IAT Skewed Rationality	P0111	-40 to 151°C This code detects a continuous short to ground in either the signal circuit or the sensor	Skewed Low fails if (Startup Coolant - Startup IAT) < 20 deg C Skewed High fails if IAT > threshold based on startup coolant	None of the following DTC's: MAP Sensor P0107, P0108 MAP Rationality P0106 TPS P0122, P0123 Coolant Sensor P0117, P0118 IAT DTC's: P0112, P0113 System Voltage Low P0562 VSS P0502 Common Enable Conditions Soaktime > 480 minutes Engine is running IAT stored on previous trip Skewed Low Test Startup Coolant > -20 deg C VSS > 40 kph Airflow > 12 g/sec Skewed Low Delay timer > 2400 cts (300 sec) No report if (Max IAT - Min IAT) > 10 deg C Skewed High Test VSS > 40 kph Airflow > 12 g/sec Skewed High Delay timer > 2400 cts (300 sec) No report if (Max IAT - Min IAT) > 10 deg C No report if (IAT < threshold based on startup coolant temperature)	Test passes 10 consecutive counts or Test fails 10 consecutive counts Continuous monitoring every 125 msec The test is performed once per trip	Thermistor	Type B	Analog

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
IAT Stuck Rationality	P0110	-40 to 151°C This code detects a continuous short to ground in either the signal circuit or the sensor	IAT Delta < 3 deg C (IAT delta = IAT from previous key cycle - current IAT)	None of the following DTC's: MAP Sensor P0107, P0108 MAP Rationality P0106 TPS P0122, P0123 Coolant Sensor P0117, P0118 IAT DTC's: P0112, P0113 System Voltage Low P0562 VSS P0502 Common Enable Conditions Soaktime > 480 minutes Engine is running IAT stored on previous trip Driving Enable Conditions VSS > 40 kph Airflow > 12 g/sec Driving conditions met for 2400 cts (300 seconds) Idle Enable Conditions TPS< 0.2% VSS < 2 kph Driving conditions complete for key cycle Idle conditions met for 480 cts (60 seconds)	Test passes 10 consecutive counts or Test fails 10 consecutive counts If test doesn't pass based on (IAT from previous key cycle more than 3 deg C different than current IAT), then a drive/idle test will run. Continuous monitoring every 125 msec The test is performed once per trip	Thermistor	Type B	Analog
Engine Coolant Temp Intermittent Low Volts (High Temperature)	P1114	-40 to 151°C This code detects a continuous short to ground in the signal circuit or the sensor	Low resistance pull-up: Raw coolant < 2% of sensor reading scale (149°C) High resistance pull-up: Raw coolant < 2% of sensor reading scale (149°C)	Engine run time >120 sec	32 test failures within 960 test samples Continuous monitoring every 125msec	Thermistor	Type Cnl	Analog
Engine Coolant Temp Intermittent High Volts (Low Temperature)	P1115	-40 to 151°C This code detects a continuous short to high in the signal circuit or the sensor	Low resistance pull-up: Raw coolant > 98% of sensor reading scale (-38°C) High resistance pull-up: Raw coolant > 98% of sensor reading scale (-38°C)	Engine run time > 120 sec	32 test failures within 960 test samples Continuous monitoring every 125msec	Thermistor	Type Cnl	Analog
Engine Coolant Temp Low Volts (High Temperature)	P0117	-40 to 151°C This code detects a continuous short to ground in the signal circuit or the sensor	Low resistance pull-up: Raw coolant < 2% of sensor reading scale (149°C) High resistance pull-up: Raw coolant < 2% of sensor reading scale (149°C)	Engine run time > 120 sec	80 test failures within a 160 test samples Continuous monitoring every 125msec	Thermistor	Type A	Analog

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
Engine Coolant Temp High Volts (Low Temperature)	P0118	-40 to 151°C This code detects a continuous short to high in the signal circuit or the sensor	Low resistance pull-up: Raw coolant > 98% of sensor reading scale (-38°C) High resistance pull-up: Raw coolant > 98% of sensor reading scale (-38°C)	Engine run time > 120 sec	80 test failures within a 160 test samples Continous monitoring every 125msec	Thermistor	Type A	Analog
TPS Intermittent High Volts	P1121	0-100% (0 - 5.0 volts) This code detects a continuous short to high in either the circuit or the sensor	Raw TPS > 98% of sensor reading scale	None	256 test failures within 7682 test sample (2.0 sec./60.0 sec.) Continuous monitoring every 7.81msec	Potentiometer	Type Cnl	Analog
TPS Low Volts	P0122	0-100% (0 - 5.0 volts) This code detects a continuous short to ground in either the circuit or the sensor	Raw TPS < 2.8% of sensor reading scale	None	320 test failures within a 640 test sample (2.5 sec./5.0 sec.) Continuous monitoring every 7.81msec	Potentiometer	Type A	Analog
TPS Intermittent Low Volts	P1122	0-100% (0 - 5.0 volts) This code detects a continuous short to ground in either the circuit or the sensor	Raw TPS < 2.8% of sensor reading scale	None	256 test failures within 7682 test sample (2.0 sec./60.0 sec.) Continuous monitoring every 7.81msec	Potentiometer	Type Cnl	Analog
TPS High Volts	P0123	0-100% (0 - 5.0 volts) This code detects a continuous short to high in either the circuit or the sensor	Raw TPS > 98% of sensor reading scale	None	320 test failures within a 640 test sample (2.5 sec./5.0 sec.) Continuous monitoring every 7.81msec	Potentiometer	Type A	Analog
Stuck Coolant Temp Sensor	P0115	-39 - 149°C This code detects a coolant temp sensor that is stuck within an expected range of movement.	(coolant temp sensor reading - start up coolant temp) < 3°C	None of the following DTC's: ECT P0117,P0118 Low Power Counter P2610 Engine soak time > 360 min. Engine running	240 test failures within 300 test samples Every 500msec The test is performed once per trip	Thermistor	Type B	Analog

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Insufficient Coolant Temperature for Stable Operation	P0125	-39 - 149°C This code detects a cooling system that cannot achieve a temperature sufficient to achieve closed loop fueling Coolant threshold is based on the difference between (Coolant temperature to meet C/L conditions) and minimum of (StartUp Coolant temperature and StartUp Intake Air Temperature)	Coolant temperature sensor reading < coolant threshold after engine run time = time threshold	None of the following DTC's: Coolant Sensor P0117, P0118 TPS P0122, P0123 VSS P0502 System Voltage P0562, P0563 SPI ECM TCM U0101 SPI PSVI P0606 SPI SIDM P0606 Test can enable if: Engine is running Coolant Sensor output in range 2% < Coolant sensor output < 98% within first 10 counts Startup Coolant < 34deg C. Test will not report a failure if idle time > idle time threshold The idle time threshold is based on minimum of (StartUp Coolant or StartUp Intake Air Temperature) Test will not report a failure if accumulated airflow < airflow threshold AirflowThreshold is based on the minimum of (StartUp Coolant or StartUp Intake Air Temperature)	Test passes 10 times consecutively Every 500msec The test is performed once per trip	Thermistor	Type B	Analog

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Coolant Temperature Below Thermostat Regulating Temperature (Coolant Thermostat)	P0128	-39 - 149°C This code detects a thermostat that is stuck open and prevents the engine coolant from reaching normal operating temperatures	Coolant temperature sensor reading < coolant threshold after engine run time = time threshold Coolant threshold is based on StartUp Coolant temperature Time threshold is based on the minimum of (StartUp Coolant and StartUp Intake Air Temperature)	None of the following DTC's: Coolant Sensor P0117, P0118 TPS P0122, P0123 VSS P0502 System Voltage P0562, P0563 SPI ECM TCM U0101 SPI PSVI P0606 SPI SIDM P0606 Test can enable if: Engine is running Coolant Sensor output in range 2% < Coolant sensor output < 98% within first 10 counts Startup Coolant Temperature < (Tstat coolant threshold - 20 deg C) Minimum IAT this key on < -39deg C. Test will not report a failure if idle time > time threshold based on minimum of (StartUp Coolant or StartUp Intake Air Temperature) Test will not report a failure if accumulated airflow < airflow threshold based on minimum of (StartUp Coolant or StartUp Intake Air Temperature)	Test passes 10 consecutive counts Every 500msec The test is performed once per trip	Thermistor	Type B	Analog

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Engine Coolant Over Temperature Condition	P0217	50 deg C to 110 deg C This code detects a coolant sensor that is skewed to the high-side The diagnostic monitors the coolant temperature on a cold start. If the coolant temperature reaches a high value without aggressive driving conditions, a fault will be detected.	Coolant temperature sensor reading > 110 degrees C	None of the following DTC's: Coolant Sensor P0117, P0118 Low Power Counter P2610 TPS P0122, P0123 VSS P0502 System Voltage P0562, P0563 SPI ECM TCM U0101 SPI PSVI P0606 SPI SIDM P0606 Test can enable if: Engine is running Coolant temperature > 50 deg.C IAT < 35 deg C. Coolant Sensor output in range within first 10 counts, Soaktime > 360 minutes OR StartUp Coolant < 45 deg. C Airflow conditions are analzyed for 60 secs to provide initial engine load conditions Once initial data is completed, airflow is monitored for aggressive driving conditions for 240 seconds If the average airflow > 35 g/sec or if the EWMA airflow > 33 g/sec, then the diagnostic will not report a pass or fail. Diagnostic can increment the pass counter if after a delay of 10 seconds, passing conditions are met.	Test passes 10 counts before 10 fail counts Every 125msec The test is performed once per trip	Thermistor	Type B	Analog

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Front O2 sensor low volts	P0131	0.0V-1.0V Determines if O2 sensor shorted low	O2 sensor voltage<0.05V	Closed loop stoich ECT>60°C System volt > 10V Delay 3 sec after conditions met None of the following DTC's: Coolant Sensor P0117, P0118 Crank Sensor P0336, P0337. EGR Flow P0401 EGR P0402,P0404, P0488, P0405, P0406 EST P0351, P0352. EVAP Purge P0441 Fuel Trim P0171, P0172 Idle P0506, P0507 Injector P0201, P0202,P0203,P0204 MAP Sensor P0107, P0108 MAP rationality P0106 Misfire P0300 Purge solenoid P0443 TPS P0122, P0123 VSS P0502.	100 test failures in 120 test samples. Failure needs to be repeated twice poll rear O2 sensor). Continuous monitoring every 125msec	Exhaust Oxygen Sensor	Type A	Analog
Front O2 sensor high volts	P0132	0.0V-1.0V Determines if O2 sensor shorted high	O2 sensor voltage >0.952V	Closed loop stoich ECT>60°C System volt > 10V Delay 3 sec after conditions met No related malfs (See P0131)	100 test failures within 120 test samples. Failure needs to be repeated twice (poll of rear O2 sensor). Continuous monitoring every 125msec	Exhaust Oxygen Sensor	Type A	Analog

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Front O2 sensor Average response time	P0133	0.0V-1.0V Determines O2 sensor functionality by checking response rate	O2 sensor average transition time between 0.3-0.6V is greater than: Lean to rich: 125 msec AT 125 msec MT Rich to lean: 90 msec AT 101 msec MT OR Number if switches is less than: 40 counts (A/T) 60 counts (M/T) OR Ratio of response time (Rich to Lean average / Lean to Rich average) is less than 0.55 (A/T) or greater than 2.13 (A/T) or is less than 0.58 (M/T) or greater than 2.35 (M/T)	Closed loop stoich Coolant >70°C System volt > 10V Engine run time > 60 sec Purge fuel < 20% 1500 < RPM < 3000 RPM 9 <Air Flow < 30 g/sec Engine running status within certain range (RPM, TPS). Delay 2 sec after conditions met No related malfs (See P0131) and none of the following DTC's: O2 Front P0131, P0132, P0134, P2196, P2195 IAT DTC's (P0112, P0113)	Once per key cycle Monitored every 1 second until test is complete.	Exhaust Oxygen Sensor	Type B	Analog
Front O2 sensor No Activity or Open	P0134	0.0V-1.0V Determines if O2 sensor is open circuited	O2 sensor voltage is stuck in range (0.3V, 0.6V)	ECT>60°C System volt > 10V Engine run time > 60 sec Air flow > 9g/s Delay 3 sec after exit DFCO No related malfs (See P0131)	612 test failures in 720 test samples Continuous monitoring every 125msec	Exhaust Oxygen Sensor	Type A	Analog
Front O2 Heater Circuit Not functioning	P0135	0 amps - 8 amps Determines if front O2 heater functionality by measuring current	Filtered O2 heater current > 0.1 amps	Engine Run time >60 sec System Voltage > 10 volts MAP < 65 kPa None of the following DTC's: Coolant Sensor P0117, P0118 MAP P0106, P1017	20 test failures in 40 test samples every 1 sec	Exhaust Oxygen Sensor Heater	Type B	Digital
Front O2 sensor Rich in DFCO	P2196	0.0V-1.0V Determines if O2 sensor indicates rich exhaust while in decel fuel cut-off (DFCO)	O2 sensor voltage > 0.55V in DFCO mode	In DFCO mode System volt > 10V Delay 3 sec after in DFCO mode No related malfs (See P0131)	90 test failures in a 100 sample test Continuous monitoring every 125msec	Exhaust Oxygen Sensor	Type A	Analog

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Fuel Trim System Lean During Power Enrichment	P2195	0.0V-1.0V Determines if O2 sensor indicated lean exhaust while in power enrichment (PE)	O2 sensor voltage < 0.35V in PE mode	In PE mode ECT>60°C System volt > 10V Air fuel ratio <= 13.5 Delay 2 sec after in PE mode No related malfs (See P0131)	90 test failures in a 100 sample test Continuous monitoring every 125 msec	Exhaust Oxygen Sensor	Type B	Analog
Post O2 sensor Low Volts	P0137	0.0V-1.0V Determines if O2 sensor shorted low	O2 sensor voltage<0.052V in closed loop control or PE test: O2 sensor voltage < 0.35V	ECT>60°C System voltage > 10V Closed loop test: delay for 3 sec after in C/L Airflow > 9g/s PE test: Air fuel ratio <= 13.5 delay for 2 sec after in PE No related malfs (See P0131) and no O2 rear heater P0141	Closed loop test: 850 test failures in 1000 test samples. Failure needs to be repeated for 2 times (poll of front O2 sensor). PE test: 90 test failures in 100 test samples Continuous monitoring every 125msec	Exhaust Oxygen Sensor	Type A	Analog
Post O2 sensor High Volts	P0138	0.0V-1.0V Determines if O2 sensor shorted high	O2 sensor volt >0.952V in closed loop control or O2 sensor voltage > 0.55V in DFCO	ECT>60°C System voltage > 10V Closed loop test: delay for 3 sec after in C/L Airflow > 9g/s DFCO test: delay for 2 sec after in DFCO No related malfs (See P0131) and no O2 rear heater P0141	Closed loop test: 850 test failures in 1000 test samples. Failure needs to be repeated for 2 times (poll of front O2 sensor). DFCO test: 90 test failures in 100 test samples Continuous monitoring every 125msec	Exhaust Oxygen Sensor	Type A	Analog
Post O2 sensor No Activity or Open	P0140	0.0V-1.0V Determines if O2 sensor is open circuited	0.422 volts<02 sensor voltage <0.478 volts	Engine run time > 60 sec System voltage > 10V Airflow > 9 g/s Coolant > 60 deg C Closed loop stoich Delay for 3 sec after exit DFCO No related malfs (See P0131) and no O2 rear heater P0141	1300 test failures in 1500 test samples Continuous monitoring every 125msec	Exhaust Oxygen Sensor	Type A	Analog

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Post O2 sensor Heater	P0141	Determines if O2 sensor heater is functioning properly by monitoring heater electrical current	Heater electrical current is less than 0.1 Amps	Engine run time >30 sec System voltage > 10V	60 test failures in 70 test samples Continous monitoring every 1 sec	Exhaust Oxygen Sensor Heater	Type B	Analog
Fuel trim system too lean	P0171	Determines if the system is in a lean condition	The average of short term fuel trim values >=0.9375 and the average of adaptive index multiplier values >= 1.3	No intrusive tests active None of the following DTC's: Cam Sensor P0341, P0342 Coolant Sensor P0117, P0118 Coolant System P0115, P0125, P0128, P0217. Crank Sensor P0336, P0337. EGR P0402,P0404, P0488, P0405, P0406, EST P0351, P0352. EVAP Purge P0441 IAT P0112, P0113 Idle P0506, P0506 Injector P0201, P0202,P0203,P0204 MAP rationality P0106 MAP Sensor P0107, P0108 Misfire P0300 O2 Front P0131, P0132, P0133, P0134, P2196, P2195 O2 front heater P0135 Purge solenoid P0443 TPS P0122, P0123 Throttle position< 95% Engine speed >700 RPM but <6000 RPM Baro >72.0 kPa 70°C<Coolant temp<115°C 25kPa < MAP < 99.7kPa -40°C < MAT < 120°C Vehicle speed < 140 KPH System is in Closed Loop Adaptive index ready System voltage>11V 1.5<Airflow<45 g/s	Lean counter > 10 Continuous monitoring every 250 msec	Short term fuel trim and adaptive Index Multiplier	Type B	Software

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Fuel Trim System Too Rich	P0172	Determines if the system is in a rich condition not caused by high purge vapor	The average of short term fuel trim values<=1.054 adaptive index multiplier values <= .72	No intrusive tests active No related malfunctions (See P0171) Throttle position< 95% Engine speed >700 RPM but <6000 RPM Baro >72.0 kPa 70°C<Coolant temp<115°C 25kPa < MAP < 99.7kPa -40°C < MAT < 120°C Vehicle speed < 140 KPH System is in Closed Loop Adaptive index ready System voltage>11V 1.5<Airflow<45 g/s	Rich counter > 10 Continuous monitoring every 250 msec	Short term fuel trim and adaptive Index Multiplier	Type B	Software
Injector Output Circuit Fault	P0201 P0202 P0203 P0204	Detects short to ground and/or open circuit and short to battery conditions for low side drive injector outputs of FET I/C's.	Monitor fault feedback signal from FETS.	Engine in run mode Battery voltage > 9.0V Engine speed > 700 rpm	Fault present > 5 sec. Continuous monitoring every 125 msec.	GFD feedback voltage	Type A	Digital

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
Multi Cyl. Misfire Detected	P0300	This DTC will determine if individual cylinder misfire or multiple cylinder misfire is occurring by monitoring crankshaft velocity.	Deceleration index versus engine speed versus load and crankshaft position Emission Threshold - 2.75% for Automatic transm. 2.75% for Manual transm. Catalyst damage - See speed and load chart	Engine load and engine speed is in a detectable region and is at or above zero torqueif Engine Runtime >= 10 sec, see Misfire Detection Region Graph attached, else no Zero Torque or Undetectable Region Disable. Camshaft position sensor is in synchronization Exhaust gas recirculation flow diagnostic is not in progress Fuel level > 15% rated tank capacity Decel fuel cutoff not active Fuel is not shutoff from high engine speed of 6525 RPM for M/T or 6500 RPM for A/T in drive and 6525 RPM in park for A/T veh. Fuel is not shutoff at 255 KPH. Positive delta throttle position < 65% / 125 ms minus delta throttle position < 100% / 125 ms Have not encountered an abusive engine speed of 7025 RPM for M/T and 7025 RPM for A/T vehicles. Crankshaft speed patterns are normal Engine acceleration rate (jerk) > 33 consecutive powerstrokes for A/T(38 for M/T). Engine deceleration rate (jerk) > 25 consecutive	Emission Level: 5 failed 100 engine cycle blocks out of 16 - 4 times Catalyst Damaging Level: See speed and load chart attached. Continuous monitoring every ref event	Crankshaft position sensor and camshaft position sensor	DTC type B for Emission level DTC type A for catalyst damaging level	Digital

Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
				powerstrokes for A/T (18 for M/T) Throttle position < 0% when vehicle speed >511 kph Engine Speed <= 2300 RPM when Engine Run Time<= 10 sec. and 600 RPM <= Engine speed <= 6500 RPM when Engine Run Time >= 10 sec. The above criteria prevents normal delays from occurring in the first 10 sec after power up to meet the no power-up delay requirement 11 Volts <= Vehicle voltage <= 16 volts when Engine Run Time >= 10 sec. Else no Ignition Voltage Disable -7 °C <= Coolant temp.<= 120 °C if Coolant Startup Temp ³ -7°C 21°C £ Coolant temp.£ 120 °C if Coolant Startup Temp £ -7°C Engine speed £ 1800 RPM or the crank angle sensing error has been learned There is the correct ratio between crankshaft position sensor pulses and camshaft position sensor pulses None of the following DTC's: Coolant Sensor P0117, P0118 Crank Sensor P0336, P0337 MAP Rationality P0106 MAP P0107, P0108 TPS P0122, P0123 VSS P0502				
Knock System Internal Malf	P0324	This DTC will detect a malfunction in the knock filter integrated circuit.	A. Average reading < 3.9% for any of the 4 cyl. B. Average reading > 80% for any of the 4 cyl.	None of the following DTC's: MAP Rationality P0106 MAP P0107, P0108 VAC < Table (10 to 50 kPa based on RPM) RPM > 1600 Coolant > 50°C	Must receive 26 failures within 80 executions. Continuous monitoring performed every 125 ms.	Piezoelectric Knock Sensor	Type B	Analog

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
Knock Sensor Circuit Fault	P0327	This DTC will detect knock sensor failures and knock sensor wiring failures. There is also a sensor short to ground test.	Min difference between cylinders > 0.4%	None of the following DTC's: MAP Rationality P0106 MAP P0107, P0108 VAC < Table (10 to 50 kPa based on RPM) RPM > 1600 Coolant > 50°C	Must receive 26 failures within 64 executions. Continuous monitoring performed every 125 ms.	Piezoelectric Knock Sensor	Type B	Analog
58X Crank Position Extra/Missing Pulses (Noisy)	P0336	This diagnostic will detect extra/missing pulses in the 58X signal	Extra or missing pulses detected between consecutive 58X reference pulses	Engine running # of extra or missing teeth ³ 2 per revolution	Extra or missing pulses detected in 10 crankshaft rotations within a 100 revolution sample size. Continuously monitored every 7.8 msec	Variable Reluctance Crankshaft Sensor	Type B	Digital
58X Crank Position Tooth Error Not Learned	P0315	This DTC indicates that crankwheel tooth error has not been learned.	Tooth Error not learned if the manufacture enable counter is set to zero.	None of the following DTC's: Cam Sensor P0341, P0342 Coolant Sensor P0117, P0118 Crank Sensor P0336, P0337 EGR P0402,P0404, P0488, P0405, P0406, EST P0351, P0352. Injector P0201, P0202,P0203,P0204 Knock Sensor P0324, P0327 MAP Sensor P0107, P0108 MAP rationality P0106 O2 front P0132 TPS P0122, P0123 Trans MIL P0700 VSS P0502.	The manufacture enable counter is set to zero. Monitored every 125 msec	Tooth Error learning status	Type A	Digital
58X Crank Position No Signal	P0337	This diagnostic will detect if crank sensor signal is present	58X reference pulse not seen during crank	None of the following DTC's: Cam Sensor P0341, P0342 during crank delta volt drop>0.6V and delta MAP >1.2KPA for MT delta volt drop>1.2V and delta MAP >0.8 KPA for AT	If 58X not seen for 8 seconds, test failed Continuously monitored every 7.8 msec	Variable Reluctance Crankshaft Sensor	Type A	Digital
CAM Rationality	P0341	This diagnostic will determine if CAM sensor is synchronized correctly	CAM sensor reference pulse is not detected at the correct interval every 4 cylinders	Engine running	40 test failures within a 200 test sample size Continuous monitoring every ref event	Hall effect CAM Sensor	Type B	Digital

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
CAM Position No Signal	P0342	This diagnostic will determine if no CAM sensor signal is present	CAM sensor is not seen once every 4 cylinders	Engine running	If CAM not seen for 32 TDC cylinder 1 events, test failed Continuous monitoring every ref event	Hall effect CAM Sensor	Type A	Digital
Ignition Control Circuit Circuit A Fault (cyl 2, 3) Circuit B Fault (cyl 1, 4)	P0351 P0352	This will detect a short to ground, battery or open circuit on ESC output.	Monitor fault feedback signal.	Ignition on. Fault flag increments fail count.	Must receive 20 failures within 40 test cycles. Continuous monitoring performed every 125 ms.	Output driver feedback voltage	Type A	Digital
Rough Road Source Detect	P0317	This will detect if no rough road source is present (ABS, G-sensor, or WSS) A valid signal from one of the selected sources is seen at the ECM	If neither of the selected pair of rough road source hardware is detected	Engine Run Time ³ 10 seconds	72 out of 80 samples to fail test Continuous monitoring every 125 msec	voltage	Type Cnl	Software
G Sensor Rough Road Rationality	P1391	-1.5 to +3.5 G's	Test A: G-Sensor output at idle: below -0.39 G's or above 2.21 G's. Test B: G-Sensor movement < 0.00024 G's while driving	Test A: Engine running Vehicle speed £ 5 KPH Test B: 30 KPH < vehicle speed < 70 KPH Engine Run Time ³ 10 seconds	Test A: 180 failed tests detected within a 200 sample size Test B: 180 failed tests detected within a 200 sample size Continuous monitoring every 125 msec	Capacitive sensor	Type Cnl	Software
G Sensor Rough Road Low Volts	P1392	-1.5 to +3.5 G's	G-Sensor output <2%	Engine Run Time ³ 10 seconds	80 failed tests detected within a 160 sample size Continuous monitoring every 125 msec	Capacitive Sensor	Type Cnl	Analog
G Sensor Rough Road High Volts	P1393	-1.5 to +3.5 G's	G-Sensor output >98%	Engine Run Time ³ 10 seconds	80 failed tests detected within a 160 sample size Continuous monitoring every 125 msec	Capacitive Sensor	Type Cnl	Analog

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
WSSD Rough Road System fault	P1396	Determine linear wheel speed excessive variation.	The wheel speed variation test detects at least one missing edge from the wheel speed sensor signal.	Test Enable: Coolant Temp ³ 60 C 11 Volts £ Vehicle voltage £ 16 volts Engine State = Run None of the following DTC's: Coolant Sensor P0117, P0118 Coolant System P0115, P0125, P0128, P0217. EGR P0402,P0404, P0488, P0405, P0406, EST P0351, P0352. Injector P0201, P0202,P0203,P0204 MAP Sensor P0107, P0108 MAP rationality P0106 Misfire P0300 TPS P0122, P0123	3 failed tests detected within a 128 sample size Continuous monitoring every 125 msec	WSSD input	Type Cnl	Software
WSSD Rough Road Serial Data fault	P1397	Determine linear wheel speed fail threshold.	Detects a good or failed wheel speed sensor under power conditions.	Test Enable: Coolant Temp ³ 60 C 11 Volts £ Vehicle voltage £ 16 volts Engine State = Run None of the following DTC's: Coolant Sensor P0117, P0118 Coolant System P0115, P0125, P0128, P0217. EGR P0402,P0404, P0488, P0405, P0406, EST P0351, P0352. Injector P0201, P0202,P0203,P0204 MAP Sensor P0107, P0108 MAP rationality P0106 Misfire P0300 TPS P0122, P0123	180 failed tests detected within a 200 sample size Continuous monitoring every 125 msec	WSSD input	Type Cnl	Software

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D

EGR Insufficient Flow	P0401	This diagnostic will determine if there is a reduction in EGR flow	EGR is closed then opened. The associated change in MAP is compared with a threshold from RPM vs Baro table .
			
			The results are statistically filtered (EWMA) and compared to a decision decision limit. DTC is set when the filtered result exceeds the decision limit.
				None of the following DTC's:
				Coolant Sensor P0117, P0118
				Coolant System P0115, P0125, P0128, P0217.
				EGR P0402,P0404, P0488, P0405, P0406,
				EST P0351, P0352.
				EVAP Continuous Purge P0441
				IAT P0112, P0113
				Idle P0506,P0507
				Injector P0201, P0202,P0203,P0204
				MAP Sensor P0107, P0108
				MAP rationality P0106
				TPS P0122, P0123
				VSS P0502.
				
				Tests run in DFCO mode
				Baro> 72kPa
				Vehicle speed >18 KPH
				AC clutch/transmission status unchanged
				RPM within (1550-2900) A/T
				RPM within (1400-2900) M/T
				Compensated MAP within range (10.3 kPa, 37 kPa),
				
				To start test:
				   TPS< 1%
				   EGR< 1%
				   Delta MAP< 1.0 kPa
				
				Test will be aborted when:
				  Delta Vehicle Speed > 4 KPH
				  Delta RPM > 50 (increase)
				  EGR opened less than 90% commanded position
					One sample taken per trip Monitored every 125 msec
					
					Test run more frequently under the following condition
					
					 - RAM clear
					 - a large change is observed
					   in measured diag index
						Delta manifold absolute pressure
						
						Linear EGR Valve
							Type A	Software

EGR Excessive Flow during Crank	P0402	0-5 V Detects an EGR open to a large value during crank.	EGR position > 70% for 3 sec during crank	Engine cranking (not running) Ignition voltage with in range (10 - 16v)	Test runs during cranking monitored every 125 msec	Potentiometer	Type B	Analog

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
EGR Open Valve Position Error	P0404	0-5 V This DTC will detect an open valve position error	Difference between current and commanded position > 15 %	Desired EGR position>0 Delta Desired EGR < 3% Engine Running Air Temperature > 3°C Ignition voltage within range (11.7 v, 16v) None of the following DTC's: EGR P0405, P0406, IAT P0112, P0113 VSS P0502.	40 failures out of 80 test samples The above fail condition repeats 3 times, each is separated by at least a 5 sec period with desired EGR position <3% Continous monitoring every 125 msec	Potentiometer	Type B	Analog
EGR Closed Valve Pintle Error	P0488	0-5 V This DTC will detect an EGR valve that will not close completely	Difference between current and learned low position > 10%	Desired EGR position=0 Engine running Ignition voltage (11.7v, 16v) Air Temperature > 3°C None of the following DTC's: EGR P0405, P0406, IAT P0112, P0113 VSS P0502.	40 failures out of 40 test samples The above fail condition repeats 3 times, each is separated by at least a 5sec period with desired EGR position > 30% Continous monitoring every 125 msec	Potentiometer	Type B	Analog
EGR Pintle Position Sensor Circuit Low	P0405	0-5 V This DTC will detect open/short low circuit or sensor	EGR position < 2%	Ignition voltage within (11.7v, 16v)	Fail conditions last more than 10 sec. Continuous monitoring every 125 msec	Potentiometer	Type A	Analog
EGR Pintle Position High Voltage	P0406	0-5 V This DTC will detect short high circuit or sensor	EGR position signal > 98%	Ignition voltage within (11.7v, 16v)	Fail conditions last more than 10 sec. Continuous monitoring every 125 msec	Potentiometer	Type A	Analog

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
Catalyst Bank 1 Low Efficiency	P0420	This determines the oxygen storage capacity of the converter and correlates it to converter efficiency	Oxygen storage capacity index time < TBD sec	Before idle test, vehicle needs to be driven for at least: 16 sec at Airflow > 7.8 g/s (MT) 11 sec at Airflow > 11 g/s (AT) OSC test conditions: At idle (D/R position for AT) Closed loop Purge concebtration learned Engine run time > 570 sec. 2.25 < Airflow< 7.5 g/sec (A/T) 2.25 < Airflow< 6.5 g/sec (M/T) TPS<1.5% 70<ECT<109C -7<IAT<105C BARO>72KPA 300°C < Catalyst temp < 900°C C/L Integrator change<0.05 Idle time < 1min Veh.speed<3KPH BLM learned Above stabilized for 4.5 sec. Test is aborted for this idle if: D engine speed > 80rpm or A/C state changed or FAN state changed or Insufficient A/F shift None of the following DTC's: Cam Sensor P0341, P0342 Coolant Sensor P0117, P0118 Coolant System P0115, P0125, P0128, P0217. Crank Sensor P0336, P0337. EGR P0402,P0404, P0488, P0405, P0406, EST P0351, P0352. EVAP Purge P0441 Fuel Trim P0171, P0172 Idle Diagnostic P0506, P0507 Injector P0201, P0202,P0203,P0204 MAP rationality P0106 MAP Sensor P0107, P0108 Misfire P0300 O2 Front P0131, P0132, P0133, P0134, P2196, P2195 O2 front heater P0135	One pass/fail decision per key on Continuous monitoring every 125 msec	Exhaust Oxygen Sensor and Software	Type A	Software

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
				O2 rear heater P0137, P0138, P0140, P0141 Purge solenoid P0443 System Voltage Low P0562 TPS P0122, P0123 VSS P0502.				
EVAP System Malf/Large Leak	P0455	This diagnostic will detect a large leak by monitoring the level of vacuum in the Evap system while the canister vent line is closed. As the engine purges the Evap system, tank vacuum should rise.	Test is failed if tank vacuum <10 inches of H2O after sufficient purge vol.	**None of the following DTC's:** Coolant Sensor P0117, P0118 EGR P0402,P0404, P0488, P0405, P0406 Fuel Lvl P0462, P0463 IAT P0112, P0113 Idle P0506,P0507 Injector P0201,P0202,P0203, P0204 MAP P0107, P0108 MAP rationality P0106 Misfire P0300 O2 Front P0131, P0132, P0133, P0134, P2196, P2195 O2 Front heater P0135 O2 Rear Heater P0141 O2 Rear P0137, P0138, P0140 Purge solenoid P0443 Tank Pressure P0452, P0453 TPS P0122, P0123 VSS P0502 Common EVPD Enable Criteria: 9V < Ignition Volt < 16V Baro>72 kPa { Soak Time > 720 minutes OR (Startup IAT-Startup ECT < 12°C AND Startup ECT -Startup IAT < 50°C) } Note: If Soak Time Fault set, Startup temp conditions must be met (but MIL will be on) -5°C < Startup ECT and IAT < 42°C Start-up IAT-IAT<3°C Purge enable time < timer based on Startup Coolant 24% < Vapor space < 94% 1s < Engine Run Time < 360s + Purge enable time	Once per ignition cycle Evaluated at 125 msec	Tank vacuum sensor (differential pressure) and software	Type B diagnostic, but report to executive as Type A.	Software

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
Evap Continuous Purge Flow	P0441	This diagnostic will detect a 0.020" leak in the purge tank vacuum with the vent commanded close and the purge solenoid closed. If tank vacuum is greater than a cal for a period of time, the purge solenoid test is failed.	Test is failed if tank vacuum> Threshold for 2 second.	**No related malfs (See P0455)** (See P0455) Continuous Purge Flow Enable Criteria: 1s < Engine Run Time < 100s	Once per ignition cycle Evaluated at 125 msec	Tank vacuum (differential pressure) and software	Type B diagnostic, executive as Type A.	Software

EVAP Small Leak	P0442	This diagnostic will detect the level of vacuum in the Evap system while vapor pressure slope is also calculated and subtracted from the vacuum decay slope. The corrected vacuum decay slope is compared to a threshold to determine if the leak size is > 0.040" .	If a 10 second decay slope is > a slope threshold based on fuel present.	No related malfs (See P0455)
				Common EVPD Enable Critieria
				(See P0455)
				Small Leak Enable Criteria:
				Idle { RPM< 1200 rpm, Vehicle Speed<3km/h, TPS<1% }
				Creep { RPM<1300rpm, Vehicle Speed<6km/h,
				  Creep TPS<2%, Delta MAP < 10 kPa, 50% of
				  creep decay time is allowed per 1 test }
					Once per ignition cycle	Tank sensor (differential and software	Type B but report to executive as	Software

EVAP Very Small Leak	P0456	This diagnostic will detect a small leak by monitoring the Evap system while the system is sealed. A vapor pressure slope is subtracted from the vacuum decay slope. The corrected vacuum decay slope is compared to a threshold to determine if the leak size is > 0.020".	If a 25 second corrected vacuum threshold based on fuel level, a very small leak is present.	No related malfs (See P0455) (See P0455) Small Leak Enable Criteria	Once per ignition cycle Evaluated at 125 msec	Tank vacuum (differential pressure) and	Type B diagnostic, executive as Type A.	Software
EVAP Vent Blocked	P0446	This diagnostic will detect a vent control failure by monitoring tank vacuum vent commanded open. If tank vacuum is > cal for a period of time, a failed vent is detected. Start-up tank vacuum is outside a window.	Test is failed if tank vacuum > 8 "H20 for 2 seconds. Test is passed met.	No related malfs (See P0455) Common EVPD Enable Critieria Vent Blocked Enable Criteria: Restricted Path Test Time < 120s	Once per ignition cycle Evaluated at 125 msec	Tank vacuum sensor pressure) and software	Type B diagnostic, but report to Type A.	Analog

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
EVAP Purge Solenoid Control Circuit	P0443	Detects open and shorted circuits.	Read the fault feedback signal from the output driver to determine short vbatt/gnd faults.	Ignition on. IGN V > 11V None of the following DTC's: SPI PSVI P0606 SPI SIDM P0606	30 test failures within 60 test samples Continuous monitoring every 125 msec	Output driver Feedback Voltage	Type B	Digital
Vent Solenoid Circuit Fault	P0449	Detects open and shorted circuits	Read the fault feedback signal from the output driver to determine short vbatt/gnd faults.	Ignition on. IGN V > 11 V None of the following DTC's: SPI PSVI P0606 SPI SIDM P0606	10 test failures within 20 test samples Contiuous monitoring every 125 msec	Output driver Feedback Voltage	Type A.	Digital
Tank Pressure LO	P0452	0.3 to 4.7volts This DTC detects a short t low sensor	0.3 to 4.7volts This DTC detects a short to low sensor	Test is fail if sensor output<1% of Vrefvolts	100 test failures within 200 test samples. (125msec/test) Continuous monitoring	Absolute pressure sensor	Type A.	Analog
Tank Pressure HI	P0453	0.3 to 4.7volts This DTC detects a short t low sensor	0.3 to 4.7volts This DTC detects a short to low sensor	Test is fail if sensor output>99% ofVref	100 test failures within 200 test samples. (125msec/test)	Absolute pressure sensor	Type A.	Analog
Fuel Level Stuck	P0461	10 to 244 counts This DTC detects a stuck fuel level sender	Raw fuel level sender output D <3.5% after driving for 250 km	Ignition on None of the following DTC's: Fuel Lvl Sensor P0462, P0463 VSS 502	Continuous monitoring (125msec/test)	Potentiometer	Type B	Analog
Fuel Level LO Volts	P0462	0 to 5 volts This DTC detects a continuous short to low or open in either the signal circuit or the fuel level sender	Raw fuel level sender output < 5% of sensor reading scale	Ignition on	80 test failures within a 160 test sample (10 sec./20 sec.) Continuous monitoring every 125msec.	Potentiometer	Type A	Analog
Fuel Level HI Volts	P0463	0 to 5 volts This DTC detects a continuous short to high in either the signal circuit or the fuel level sender	Raw fuel level sender output > 85% of sensor reading scale	Ignition on	80 test failures within a 160 test sample (10 sec./20 sec.) Continuous monitoring every 125msec.	Potentiometer	Type A	Analog

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
Fuel Level Sensor Intermittent- Noisy	P0464	0 to 5 volts Detects a noisy fuel level signal	Fuel Level Sensor Output change > 3.9%	None of the following DTC's: IAT Sensor P0112, P0113 MAP Sensor P0107, P0108 TPS P0122, P0123 VSS P0502 Engine Running Delay 5 sec if Delta MAP > 10 kPa or Delta RPM > 50 rpm or VSS > 1 kph or Delta TPS > 2% IAT > -10°C	50 test failures in 80 test samples Continuous monitoring every 125msec.	Potentiometer	Type B	Analog
VSS (engine side) Digital Hall Switch No Signal (MT only)	P0502	0 - 255 kph Detects an abnormal vehicle speed sensor output	Power Test : Indicated Vehicle speed < 5 kph Decel Test : Indicated Vehicle speed < 5 kph	Engine running Coolant > 60°C 11<voltage<16 volts Power Test A) RPM within (1200,4000) TPS within (25%, 60%) MAP > 60 kPa Decel test: B) MAP < 30 kPa Delta RPM of cycle £ 50 TPS £ 0.8% 1800 < RPM < 6000 None of the following DTC's: Coolant Sensor P0117, P0118 Coolant System P0115, P0125, P0128, P0217. EGR P0402,P0404, P0488, P0405, P0406, EST P0351, P0352. Injector P0201, P0202,P0203,P0204 MAP Sensor P0107, P0108 MAP rationality P0106 Misfire P0300 TPS P0122, P0123	Power test: 280 tests failed within a 300 test sample size (35 sec./37.5sec.) Decel test: 280 tests failed within a 300 test sample size (35 sec./37.5sec.) Continuous monitoring every 125msec.	Hall Sensor	Type B	Digital

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
Idle speed RPM low	P0506	Determines if a low idle condition exists. A low idle is defined as 100 RPM below the desired idle RPM	Idle engine speed error> 100 RPM for 10 seconds	Test Enable: No intrusive tests are active None of the following DTC's: Cam P0341, P0342 Coolant System P0115, P0125 Coolant Sensor P0117, P0118 Crank Sensor P0336, P0337. EGR P0402,P0404,P0488,P0405,P0406 EST P0351, P0352. EVAP Purge P0441 Fuel Trim P0171, P0172 IAT P0112, P0113 Injector P0201, P0202,P0203,P0204 MAP P0107, P0108 MAP rationality P0106 Misfire P0300 O2 front heater P0135 O2 Front P0131, P0132, P0133, P0134, P2196, P2195 O2 rear heater P0141 Purge solenoid P0443 TPS P0122, P0123 VSS P0502. Engine run time > 60 sec Baro > 72 kpa Coolant temp > 60°C 11.0 < Ignition Volt < 16.0V IAT > -20 C IAC valve is controlled fully open Above met for a time > 5 sec to enable the diagnostic MAP<60 kpa	Continous monitoring at idle condition every 125 msec	Software	Type B	Software

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
Idle speed RPM high	P0507	Determines if a high idle condition exists. A high idle is defined as 200 RPM above the desired idle RPM	Idle engine speed error> 200 RPM for 10 sec.	Test Enable: No intrusive tests are active No related malfs (See P0506) Engine run time > 60 sec Baro > 72 kpa Coolant temp > 60°C 11.0 < Ignition Volt < 16.0V IAT > -20 C IAC valve is controlled fully closed Above met for a time > 5 sec to enable the diagnostic MAP>22 kpa	Continous monitoring at idle condition every 125 msec	Software	Type B	Software
A/C Refrigerant Pressure Low Volts	P0532	0 to 5 Volts This code detects a continuous short to ground in either the circuit or the sensor	Raw A/C pressure<1% of sensor readig scale	Engine running	80 test failures within a 160 test sample (10 sec./20 sec.) Continuous monitoring every 125msec	Pressure Sensor	Type Cnl	Analog
A/C Refrigerant Pressure High Volts	P0533	0 to 5 Volts This code detects a continuous short to high in either the circuit or the sensor	Raw A/C pressure>99% of sensor readig scale	Engine running	80 test failures within a 160 test sample (10 sec./20 sec.) Continuous monitoring every 125msec	Pressure Sensor	Type Cnl	Analog
A/C Clutch Output Circuit Fault	P0645	Detects open and shorted circuits	Read the fault feedback signal from the output driver to determine short vbatt/gnd faults.	Ignition on. IGN V > 11 V None of the following DTC's: SPI SIDM P0606	10 test failures within 20 test samples every 125msec	Output driver Feedback Voltage	Type Cnl	Digital
System Voltage Too Low (engine side)	P0562	11.0-16.0 volts This code checks if the system voltage is too low	System voltage < 11.0 v	Ignition on	Test failed if fail conditions last for 300sec within 360sec Monitored every 1 sec	Software	Type Cnl	Analog
System Voltage Too High (engine side)	P0563	11.0-16.0 volts This code checks if the system voltage is too high	System voltage > 16 volts	Ignition on	Test failed if fail conditions last for 300sec within 360sec Monitored every 1 sec	Software	Type B	Analog
ECM Checksum Error	P0601	Checksum of s/w and calibrations match expected checksum. No data errors.	Checksum of s/w or calibrations does not match expected checksum	S/w major ID not equal to value in S/W	Once per key cycle Monitored at 125 msec	16 bit checksum	Type A	Software
Control module programming error	P0602	Calibration ID matches software level.	Calibration ID does not match software level.		Once per key cycle Monitored at 125 msec	16 bit checksum	Type A	Software

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DIAGNOSTIC PARAMETERS

Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
Lower Power Counter Error	P2610	Verifies operation of LPC I/C and communciatio between LPC and main cpu.	Monitors spi bits and countdown rate of I/C. Expected-Actual > 3 sec	Ignition on. IGN V > 11V Engine run timer >10 sec	Performed once per key cycle. If test fails, code will be set. Monitored at 500 msec	Software	Type B	Software
Lower Power Counter Reset	P2610	Detects if LPC I/C has bee reset due to LPC I/C malfunction.	Monitors LPC I/C overflow bit.	Ignition on. Engine not running No NVM Reset occurred	Performed once per key cycle. If test fails, code will be set. Monitored at 500 msec	Software	Type B	Software
SPI Communications Between ECM and TCM	U0101	Detects if CAN communication between engine and transmission products are corrupted.	Monitors periodic TCM status message. If message not received fail counter incremented.	Ignition on. BATT V > 11V. RUNTIME > 2sec Device Control not active.	20 test failures within 30 test samples Continuous monitoring executed every 15.6 msec.		Type Z for M/T Type B for A/T	Digital
SPI Communications Error with SIDM chip	P0606	Detects if SPI communication between main cpu and output driver I/C is corrupted	Monitors specific bits in the spi message structure. If bits are corrupted, fail counter incremented.	Ignition on. BATT V > 11V.	20 test failures within 40 test samples Continuous monitoring executed every 125 msec.		Type A	Digital
SPI Communications Error with PSVI chip	P0606	Detects if SPI communication between main cpu and output driver I/C is corrupted	Monitors specific bits in the spi message structure. If bits are corrupted, fail counter incremented.	Ignition on. BATT V > 11V.	20 test failures within 40 test samples Continuous monitoring executed every 125 msec.		Type B	Digital
Transmission Fault General TCM Malfunction A/T Application ONLY	P0700	Indicate failure code is detected by TCM	Received message from TCM indicating malfunction is detected in TCM.	none	Message received regularly from TCM through CAN	Software	Refer to TCM	Software

Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
Intake Air System Leak	P2279	Determines if an engine vacuum leak exists. Under idle conditions, the MAP estimate correction is a weighted difference between the predicted MAP and the actual MAP reading.	MAP estimate correction > threshold for 20 seconds Threshold = A/T: 8.0 if AC on in P/N 6.5 if AC on in gear 8.5 if AC off in P/N 7.5 if AC off in gear M/T 8.5 if AC on 9 if AC off	Test Enable: No intrusive tests are active None of the following DTC's present: 58X DTC's P0336, P0337 Cam DTC's P0341, P0342 Coolant sensor DTC's: P0117, P0118 Coolant System P0115, P0125 EGR DTC's P0402, P0404 P0488, P0405, P0406. EST DTC's P0351, P0352 EVAP Cont.Purge Flow DTC: P0441 Fuel System DTC's: P0171,P0172 IAT DTC's: P0112, P0113 Injector DTC's: P0201, P0202, P0203, P0204 MAP DTCs: P0107, P0108 MAP rationality P0106 Misfire DTC P0300 O2 Front P0131, P0132, P0133, P0134, P2196, P2195 O2 heater DTC's: P0135, P0141 TPS DTC's: P0122, P0123 VSS DTC: P0502 Engine run time > 60 sec Baro > 72 kpa Coolant temp > 60°C 11.0 < Ignition Volt < 16.0V IAT > -20 C MAP<60 kpa Idle Conditions met: (Throttle closed, No AC transition, No Transmission state change (AT only) No Cooling fan transition No IAC reset Crank to run c/l delay expired) Above met for a time > 5 sec	Continous monitoring at idle condition every 125 msec	Software	Type B	Software
ABS PWM Rough Road Rough Road Data Invalid	P1380	Determine if the PWM signal from ABS module indicates there is a ABS system fault	ABS controller indicates an ABS system fault	Engine Run Time ³ 10 seconds	15 test failures within 31 test samples Continuous monitoring every 125 msec.	ABS PWM input	Type Cnl	Software

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Sensed Parameter (Indicate Application)	Fault Code	Acceptable Operating Range & Rationality	Primary Malf Detection Parameters	Secondary Monitoring Parameters & Conditions	Monitoring Time, Length and Frequency of Check	Monitoring Method	Fault Code Storage & MIL	Signal Type A/D
ABS Rough Road Serial Data Fault	P1381	Determine if the PWM signal from ABS module for rough road is too hi or too low	5%<PWM<98% indicates a serial data fault	Engine Run Time ³ 10 seconds	15 test failures within 31 test samples Continuous monitoring every 125 msec.	ABS PWM input	Type Cnl	Software
VGIS Solenoid Circuit	P0660	check if VGIS solenoid circuit is OK	Monitor fault feedback signal from FETS to GFD I/C.	Engine run time > 0 IG Voltage > 10	Faults condition lasts 10 seconds Continuous monitoring every 125 msec	GFD feedback voltage	Type Cnl	Digital
Anti-Theft, No Response	U0167	Detects communication link failure between ECM and Immobilizer	No immobilizer message ID for ECM release time window (1.5 or 2.0 sec)	Ignition on Immobilizer option autodetected ECM release time window expired VSS < 512 kph	Keyword 2000 serial data	Software	Type Cnl	
Anti-Theft Incorrect Response	U426	Detects incorrect message identification received	Wrong immobilizer message received	Ignition on Immobilizer option selected ECM release time window expired VSS < 512 kph	Keyword 2000 serial data	Software	Type Cnl	