

**1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS**

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
MASS AIR FLOW SYSTEM PERFORMANCE (RATIONALITY)	P0101	Rationality Under conditions when the two should match, the Mass Air Flow reading should match calculated Mass Air Flow (based on speed density). If delta Mass Air Flow is too large, a faulty Mass Air Flow condition exists.	Mass Air Flow frequency > 50% different from speed density calculation.	No MAF, MAP or TPS DTC's System Voltage > = 10 volts System Voltage < = 16 volts TP < 50% when engine vacuum > 65 kpa Delta TP over 100 msec < 3% All above condition's are stable for 2 seconds.	50 test failures in a 100 test sample  100 ms/test  Continuous.	B
MASS AIR FLOW SENSOR CIRCUIT LOW FREQUENCY	P0102	Circuit Continuity Detects Mass Air Flow frequency readings outside normal operating range. If the frequency is outside a calibrated range, a faulty Mass Air Flow condition exists.	Mass Air Flow frequency < 10 Hz	Engine Speed > = 300 RPM System Voltage > = 8 volts Above conditions met for >= 0 seconds.	4 test failures in a 12 test sample.  Reference interrupt loop  Continuous.	A
MASS AIR FLOW SENSOR CIRCUIT HIGH FREQUENCY	P0103	Circuit Continuity Detects Mass Air Flow frequency readings outside normal operating range. If the frequency is outside a calibrated range, a faulty Mass Air Flow condition exists.	Mass Air Flow frequency > 11,250 Hz	Engine Speed > = 300 RPM System Voltage > = 8 volts Above conditions met for >= 0 seconds.	6 test failures in a 12 test sample.  Reference interrupt loop  Continuous.	A
MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW	P0107	Circuit Continuity This DTC detects a continuous short to low or open in either the signal circuit or the MAP sensor.	Raw MAP < 0.10 Volts	No TP sensor DTC's set Engine Running Throttle Position is <= 0% when engine speed is <= 1200 RPM or Throttle Position is <= 20 % when engine speed is > 1200 RPM	150 test failures in a 300 test sample.  12.5 ms/test (Every MAP read)  Continuous	A
MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH	P0108	Circuit Continuity This DTC detects a continuous short to high in either the signal circuit or the MAP sensor.	Raw MAP > 4.3 Volts	No TP sensor DTC's set Engine Running Throttle Position is < 5 % when engine speed is <= 1000 RPM or Throttle Position is < 18 % when engine speed is > 1000 RPM	250 test failures in a 300 test sample.  12.5 ms/test (Every MAP read)  Continuous	A
INTAKE AIR TEMP SENSOR CIRCUIT LOW (HIGH TEMP)	P0112	Circuit Continuity This DTC detects a continuous short to ground in the IAT signal circuit or the IAT sensor	<u>Low, High Resistance Pull-up</u> Raw IAT < 0.24 Volts	No MAF sensor DTC's set No ECT sensor DTC's set No VS sensor DTC's set Vehicle Speed >= 25 mph Engine Run Time > 30 seconds	45 test failures in a 50 test sample  100 ms/test  Continuous	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
INTAKE AIR TEMP SENSOR CIRCUIT HIGH (LOW TEMP)	P0113	Circuit Continuity This DTC detects a continuous open or short to high in the IAT signal circuit or the IAT sensor	<u>Low, High Resistance Pull-up</u> Raw IAT > 4.96 Volts	No MAF sensor DTC's set No ECT sensor DTC's set No VS sensor DTC's set Coolant Temperature > 0 deg. C Air Flow < 15 g/sec Vehicle Speed < 7 mph	45 test failures in a 50 test sample.  100 ms/test  Continuous	B
ENGINE COOLANT TEMP SENSOR CIRCUIT LOW (HIGH TEMP)	P0117	Circuit Continuity This DTC detects a continuous short to ground in the ECT signal circuit or the ECT sensor.	<u>Low Resistance Pull-up</u> Raw ECT < 1.12 Volts <u>High Resistance Pull-up</u> Raw ECT < 0.039 Volts	Engine run time > 10 seconds	100 test failures in a 200 test sample.  100 ms/test  Continuous	A
ENGINE COOLANT TEMP SENSOR CIRCUIT HIGH (LOW TEMP)	P0118	Circuit Continuity This DTC detects a continuous short to high or open in the ECT signal circuit or the ECT sensor.	<u>Low, High Resistance Pull-up</u> Raw ECT > 4.9 Volts	Engine run time > 60 seconds	100 test failures in a 200 test sample.  100 ms/test  Continuous	A
TP SENSOR CIRCUIT PERFORMANCE	P0121	Rationality This DTC detects if the TP sensor is stuck.	Actual throttle position does not match RPM vs. predicted TP lookup tables	Engine run time > 10 seconds ECT > 0 Deg C. IAC between 0 and 255 counts. Map stable for 1 second. Map delta < 1.5 kpa during test. Map < 55 kpa for stuck high rationality. Map > 65 kpa for stuck low rationality.	150 test failures in a 200 test sample. Continuous every 100ms	B
TP SENSOR CIRCUIT LOW	P0122	Circuit continuity. This DTC detects a continuous open or short to ground in the TP signal line.	TP sensor voltage < .2 volts	None	90 test failures in a 100 test sample size. Continuous every 100ms.	A
TP SENSOR CIRCUIT HIGH	P0123	Circuit continuity. This DTC detects a continuous short to high in the TP signal line or the TP sensor.	TP voltage > 4.75 volts.	None	90 test failures in a 100 test sample size. Continuous every 100ms.	A
ENGINE COOLANT TEMP EXCESSIVE TIME TO CLOSED LOOP	P0125	Rationality This DTC detects if a stabilized minimum closed loop is reached and maintained after engine startup.	Minimum stabilized ECT > 33.6 deg C	Engine running -36 deg. C > = Start up ECT < 40 deg. C (test must run once for a hot start) No ECT, IAT DTC's set IAT > = -7 deg. C VS > = 1 mph 2300g/s > accum air > 20250g/s 140 sec < Closed Loop timer < 1350 secs (depends on start-up temp)	2 consecutive test failures  Every 100 ms	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B1S1) HEATED OXYGEN SENSOR CIRCUIT LOW	P0131	Circuit Continuity Detects an HO2S voltage stationary lean (low signal voltage) condition.	Oxygen sensor voltage below 200 mv  <OR> Oxygen sensor voltage below 360 mv	Closed Loop Fuel Control. TPS: 3-20% Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active  Power Enrichment active .5 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	310 test failures in a 330 test sample and polling the rear HO2S sensor twice.  100 ms/test  Continuous  45 test failures in a 50 test sample  100 ms/test  Continuous	A
(B1S1) HEATED OXYGEN SENSOR CIRCUIT HIGH	P0132	Circuit Continuity Detects an HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage above 775 mv  <OR> Oxygen sensor voltage above 540 mv	Closed Loop Fuel Control. TPS: 0- 100 % Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active  Decel Fuel Cut Off active 1 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	310 test failures in a 330 test sample and polling the rear HO2S sensor twice.  100 ms/test  Continuous  45 test failures in a 50 test sample  100 ms/test  Continuous	A
(B1S1) HEATED OXYGEN SENSOR CIRCUIT SLOW RESPONSE	P0133	Response Detects slow rich to lean and lean to rich HO2S signal transition rates.	The oxygen sensor transitions between rich and lean states. HO2S sensor average transition time: L/R > 100 ms R/L > 100 ms	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec  Once per trip.	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B1S1) HEATED OXYGEN SENSOR CIRCUIT NO ACTIVITY	P0134	Circuit Continuity Detects an HO2S circuit open.	Oxygen sensor voltage remains between 350-550 mv	Closed Loop Fuel Control. Predicted Oxygen Sensor Temperature greater than 390 C. Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Engine Run > 70 sec	570 test failures in a 600 test sample  100 ms/test  Continuous.	A
(B1S1) HEATED OXYGEN SENSOR HEATER CIRCUIT	P0135	Detects a malfunctioning HO2S heater circuit by comparing time to HO2S activity to a calibrated threshold.	Oxygen sensor time to activity exceeds a lookup table value as a function of average flow rate.	Cold Start (IAT & ECT <50 C and less than 8 degrees difference) Valid mid bias calculated 16 v > System Voltage >10 v. No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	Once per cold start trip.	B
(B1S2) HEATED OXYGEN SENSOR CIRCUIT LOW	P0137	Circuit Continuity Detects an HO2S voltage stationary lean (low signal voltage) condition.	Oxygen sensor voltage remains below 90 mv   <OR> Oxygen sensor voltage below 420 mv	Closed Loop Fuel Control. TPS: 3-20% Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active  Power Enrichment active 1 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	770 test failures in a 800 test sample and polling the front HO2S sensor twice.  100 ms/test  Continuous  45 test failures in a 50 test sample  100 ms/test  Continuous	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B1S2) HEATED OXYGEN SENSOR CIRCUIT HIGH	P0138	Circuit Continuity Detects an HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage above 930 mv  <OR> Oxygen sensor voltage above 480 mv	Closed Loop Fuel Control. TPS: 0- 100 % Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active  Decel Fuel Cut Off active 3 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	380 test failures in a 400 test sample and polling the front HO2S sensor twice.  100 ms/test  Continuous  45 test failures in a 50 test sample  100 ms/test  Continuous	B
(B1S2) HEATED OXYGEN SENSOR CIRCUIT NO ACTIVITY	P0140	Circuit Continuity Detects an HO2S circuit open.	Oxygen sensor voltage remains between 409-489 mv. (1450 out of 1500 samples).	Closed Loop Fuel Control. Predicted Oxygen Sensor Temperature greater than 390 C. Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Engine Run > 70 sec	1450 test failures in a 1500 test sample  100 ms/test  Continuous	B
(B1S2) HEATED OXYGEN SENSOR HEATER CIRCUIT	P0141	Detects a malfunctioning HO2S heater circuit by comparing time to HO2S activity to a calibrated threshold.	Oxygen sensor time to activity exceeds a lookup table value as a function of average flow rate.	Cold Start (IAT & ECT <50 C and less than 8 degrees difference) Valid mid bias calculated 16 v > System Voltage >10 v. No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	Once per cold start trip.	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B2S1) HEATED OXYGEN SENSOR CIRCUIT LOW	P0151	Circuit Continuity Detects an HO2S voltage stationary lean (low signal voltage) condition.	Oxygen sensor voltage below 200 mv  <OR> Oxygen sensor voltage below 360 mv	Closed Loop Fuel Control. TPS: 3-20% Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active  Power Enrichment active .5 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	310 test failures in a 330 test sample and polling the rear HO2S sensor twice.  100 ms/test  Continuous  45 test failures in a 50 test sample  100 ms/test  Continuous	A
(B2S1) HEATED OXYGEN SENSOR CIRCUIT HIGH	P0152	Circuit Continuity Detects an HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage above 775 mv  <OR> Oxygen sensor voltage above 540 mv	Closed Loop Fuel Control. TPS: 0- 100 % Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active  Decel Fuel Cut Off active 1 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	310 test failures in a 330 test sample and polling the rear HO2S sensor twice.  100 ms/test  Continuous  45 test failures in a 50 test sample  100 ms/test  Continuous	A
(B2S1) HEATED OXYGEN SENSOR CIRCUIT SLOW RESPONSE	P0153	Response Detects slow rich to lean and lean to rich HO2S signal transition rates.	The oxygen sensor transitions between rich and lean states. HO2S sensor average transition time: L/R > 100 ms R/L > 100 ms	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec  Once per trip.	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B2S1) HEATED OXYGEN SENSOR CIRCUIT NO ACTIVITY	P0154	Circuit Continuity Detects an HO2S circuit open.	Oxygen sensor voltage remains between 350-550 mv	Closed Loop Fuel Control. Predicted Oxygen Sensor Temperature greater than 390 C. Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Engine Run > 70 sec	570 test failures in a 600 test sample  100 ms/test  Continuous	A
(B2S1) HEATED OXYGEN SENSOR HEATER CIRCUIT	P0155	Detects a malfunctioning HO2S heater circuit by comparing time to HO2S activity to a calibrated threshold.	Oxygen sensor time to activity exceeds a lookup table value as a function of average flow rate.	Cold Start (IAT & ECT <50 C and less than 8 degrees difference) Valid mid bias calculated 16 v > System Voltage >10 v. No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	Once per cold start trip.	B
(B2S2) HEATED OXYGEN SENSOR CIRCUIT LOW	P0157	Circuit Continuity Detects an HO2S voltage stationary lean (low signal voltage) condition.	Oxygen sensor voltage remains below 90 mv   <OR> Oxygen sensor voltage below 420 mv	Closed Loop Fuel Control. TPS: 3-20% Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active  Power Enrichment active 1 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	770 test failures in a 800 test sample and polling the front HO2S sensor twice.  100 ms/test  Continuous  45 test failures in a 50 test sample  100 ms/test  Continuous	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
(B2S2) HEATED OXYGEN SENSOR CIRCUIT HIGH	P0158	Circuit Continuity Detects an HO2S voltage stationary rich (high signal voltage) condition.	Oxygen sensor voltage above 930 mv  <OR> Oxygen sensor voltage above 480 mv	Closed Loop Fuel Control. TPS: 0- 100 % Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active  Decel Fuel Cut Off active 3 sec Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	380 test failures in a 400 test sample and polling the front HO2S sensor twice.  100 ms/test  Continuous  45 test failures in a 50 test sample  100 ms/test  Continuous	B
(B2S2) HEATED OXYGEN SENSOR CIRCUIT NO ACTIVITY	P0160	Circuit Continuity Detects an HO2S circuit open.	Oxygen sensor voltage remains between 409-489 mv.	Closed Loop Fuel Control. Predicted Oxygen Sensor Temperature greater than 390 C. Minimum system voltage: 9v No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active Engine Run > 70 sec	1450 test failures in a 1500 test sample  100 ms/test  Continuous	B
(B2S2) HEATED OXYGEN SENSOR HEATER CIRCUIT	P0161	Detects a malfunctioning HO2S heater circuit by comparing time to HO2S activity to a calibrated threshold.	Oxygen sensor time to activity exceeds a lookup table value as a function of average flow rate.	Cold Start (IAT & ECT <50 C and less than 8 degrees difference) Valid mid bias calculated 16 v > System Voltage >10 v. No AIR, EGR, Catalyst diagnostic active No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	Once per cold start trip.	B
BANK 1 FUEL TRIM SYSTEM LEAN	P0171	Determines if the fuel control system is in a lean condition	The normalized weighted long term fuel trim parameter > +24%	No VSS, Throttle, Purge control, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Air flow, or AIR DTC's BARO > 74 KPa 115°C > ECT > 50°C 90 g/s > MAF > 5 g/s 90 Kpa > MAP > 26 KPa 90°C > IAT > -20°C 3000 rpm > Engine speed > 400 rpm TP < 90% VS < 85 mph Fuel Level > 10%	6 seconds  Continuous	B



1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
BANK 1 FUEL TRIM SYSTEM RICH	P0172	Determines if the fuel control system is in a rich condition	The normalized weighted long term fuel trim parameter < -13% and no excessive purge vapors present	No VSS, Throttle, Purge control, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Air flow, or AIR DTC's BARO > 74 KPa 115°C > ECT > 50°C 90 g/s > MAF > 5 g/s 90 Kpa > MAP > 26 KPa 90°C > IAT > -20°C 3000 rpm > Engine speed > 400 rpm TP < 90% VS < 85 mph  Excess Purge Test: 35 g/s > MAF > 10 g/s Purge Duty Cycle > 20% RPM > 800	49 seconds  Continuous	B
BANK 2 FUEL TRIM SYSTEM LEAN	P0174	Determines if the fuel control system is in a lean condition	The normalized weighted long term fuel trim parameter > +24%	No VSS, Throttle, Purge control, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Air flow, or AIR DTC's BARO > 74 KPa 115°C > ECT > 50°C 90 g/s > MAF > 5 g/s 90 Kpa > MAP > 26 KPa 90°C > IAT > -20°C 3000 rpm > Engine speed > 400 rpm TP < 90% VS < 85 mph Fuel Level > 10%	6 seconds  Continuous	B
BANK 2 FUEL TRIM SYSTEM RICH	P0175	Determines if the fuel control system is in a rich condition	The normalized weighted long term fuel trim parameter < -13% and no excessive purge vapors present	No VSS, Throttle, Purge control, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Air flow, or AIR DTC's BARO > 74 KPa 115°C > ECT > 50°C 90 g/s > MAF > 5 g/s 90 Kpa > MAP > 26 KPa 90°C > IAT > -20°C 3000 rpm > Engine speed > 400 rpm TP < 90% VS < 85 mph  Excess Purge Test: 35 g/s > MAF > 10 g/s Purge Duty Cycle > 20% RPM > 800	49 seconds  Continuous	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
FUEL PUMP CONTROL CIRCUIT	P0230	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds Continuous.	A
ENGINE MISFIRE DETECTED	P0300	These DTC's will determine if a multiple or a cylinder specific misfire is occurring by monitoring crankshaft velocity.	Deceleration index vs Engine speed vs Load with Engine position  FTP Threshold - 1.5% I/M Threshold - 1.5% Catalyst Damage - 3.1% to 11.9%  Fuel level > 10% (Does not disable if a Fuel System DTC is active.)	No MAF DTC's No Cam Position Sensor DTC's No Crank Position Sensor DTC's No Vehicle Speed Sensor DTC's No Engine Coolant Sensor DTC's No Throttle Position Sensor DTC's No Camel Mode DTC's Engine speed > 450 RPM but < 3001 RPM System voltage > 11 volts but < 16 volts + Throttle position D < 2.0% / 100 ms - Throttle position D < 1.0% / 100 ms Engine run time > 20 revs ECT > -7C but < 130C Not a Rough Road - ABS	Emission Level: 10 failed 200 revolution blocks out of 16  Catalyst Damaging Level: 4 failed 200 revolution blocks out of 16  Continuous	B  Catalyst Damaging (Flashes)
KNOCK SENSOR CIRCUIT	P0325	Check knock detector integrated circuit.	Delta filtered noise level greater than a defined value or instantaneous knock signal greater than a defined value for a defined time.	To run delta noise test: 1500 < engine rpm < 3000 Coolant temp > 70C TPS > 0.5% Engine run time > 20 sec MAP < 60 kPa. To run instantaneous knock signal test: MAP > 60 kPa.	24 failed tests within 30 tests. Each test is 100 msec.	B
KNOCK SENSOR 1 CIRCUIT LOW	P0327	Check knock sensor filtered noise level - front knock sensor	Delta filtered noise level outside of defined range. Filtered noise counts < 20 or > 254	To run test: 1500 < engine rpm < 3000 Coolant temp > 70C TPS > 0.5% Engine run time > 20 sec MAP < 60 kPa.	24 failed tests within 30 tests. Each test is 100 msec.	B
KNOCK SENSOR 2 CIRCUIT LOW	P0332	Check knock sensor filtered noise level - rear knock sensor	Delta filtered noise level outside of defined range. Filtered noise counts < 20 or > 254	To run test: 1500 < engine rpm < 3000 Coolant temp > 70C TPS > 0.5% Engine run time > 20 sec MAP < 60 kPa.	24 failed tests within 30 tests. Each test is 100 msec.	B
CRANKSHAFT POSITION SENSOR CIRCUIT	P0335	24X signal This diagnostic will detect if there is no output from the crankshaft position sensor.	No output (~0 volts) from the crankshaft position sensor.	5 Volts < Ignition Voltage < 17 Volts Cam is transitioning Sensed mass airflow >= 2.8984 No Cam Position Sensor DTC's No Airflow DTC's PCM state = READY or CRANK	15 test failures in a 30 test sample.  100 ms/test  Continuous	A

**1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS**

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERF.	P0336	24X signal This diagnostic will detect occurrences when engine position is no longer known.	The "Match" signal from the Ignition Control I.C. falling to a low voltage level (~0 volts).	5 Volts < Ignition Voltage < 17 Volts PCM state = CRANK or RUN	50 test failures in a 3120 test sample.  50 ms/test  Continuous	A
CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERF.	P0341	Monitor for cam position state change when expected at crankshaft sync.	Evaluated at crankshaft position synchronization.	5 Volts < Ignition Voltage < 17 Volts Engine RPM < 4000	15 Failures out of 100 100 ms/test Continuous	B
CAMSHAFT POSITION SENSOR CIRCUIT LOW	P0342	Monitor for continuous low state when state should be high.	Evaluated at crankshaft position synchronization	5 Volts < Ignition Voltage < 17 Volts Engine RPM < 4000	15 Failures out of 50 100 msec / test Continuous	B
CAMSHAFT POSITION SENSOR CIRCUIT HIGH	P0343	Monitor for continuous high state when state should be low.	Evaluated at crankshaft position synchronization	5 Volts < Ignition Voltage < 17 Volts Engine RPM < 4000	15 Failures out of 50 100 msec / test Continuous	B
IGNITION CONTROL #1 CIRCUIT	P0351	Monitor EST channel A (Cylinder 1)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is >= 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100  12.5 msec / test  Continuous	A
IGNITION CONTROL #2 CIRCUIT	P0352	Monitor EST channel D (Cylinder 2)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is >= 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100  12.5 msec / test  Continuous	A
IGNITION CONTROL #3 CIRCUIT	P0353	Monitor EST channel H (Cylinder 3)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is >= 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100  12.5 msec / test  Continuous	A
IGNITION CONTROL #4 CIRCUIT	P0354	Monitor EST channel G (Cylinder 4)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is >= 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100  12.5 msec / test  Continuous	A
IGNITION CONTROL #5 CIRCUIT	P0355	Monitor EST channel F (Cylinder 5)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is >= 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100  12.5 msec / test  Continuous	A

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
IGNITION CONTROL #6 CIRCUIT	P0356	Monitor EST channel E (Cylinder 6)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is >= 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100 12.5 msec / test Continuous	A
IGNITION CONTROL #7 CIRCUIT	P0357	Monitor EST channel C (Cylinder 7)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is >= 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100 12.5 msec / test Continuous	A
IGNITION CONTROL #8 CIRCUIT	P0358	Monitor EST channel B (Cylinder 8)	EST line is Stuck Low, is open, or is Stuck High. If engine speed is >= 1500 RPM test failures and samples count as 2.	9 Volts < Ignition Voltage < 17 Volts	30 Failures out of 100 12.5 msec / test Continuous	A
EGR FLOW LOW	P0401	This DTC detects if EGR flow is insufficient.	Actual delta MAP change is less than a table lookup delta MAP change as a function of an EGR valve commanded position during a decel.	No TP DTCs set No MAP DTCs set No VSS DTCs set No ECT DTCs set No IAT DTCs set No EGR Pintle DTCs set No System voltage DTCs set ECT between 60 Deg C and 117 Deg C IAT < 65 Deg C System voltage between 11.7 volts and 16 volts Vehicle speed between 27 MPH and 70 MPH RPM between 800 RPM and 2000 RPM IAC not moving more than 5 steps Engine vacuum between 83 kpa and 60 kpa Baro > 70 kpa MAP not changing more than .5 kpa TP < 1% VSS change < 4 MPH	2 seconds Once per trip.	A
EGR VALVE CIRCUIT PERFORMANCE	P0404	This DTC detects if the pintle position error is too large.	Pintle position error > 20%. Position error counter > 100 counts.	System voltage 11.7 volts or greater. EGR flow test not in progress. Desired EGR position >0%.	Continuous every 100 ms.	A
EGR VALVE POSITION SENSOR CIRCUIT LOW VOLTAGE	P0405	This DTC detects if the pintle position feedback circuit is open or shorted to ground.	EGR feedback sensor signal < .14 volts.	System voltage 11.7 volts or greater.	10 seconds. Continuous every 100 ms.	A

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
AIR INJECTION SYSTEM	P0410	<p><b>Passive:</b> HO2S sensors indicate lean condition present during open loop operation. Verify proper operation of AIR pump.</p> <p><b>Active:</b> HO2S sensors indicate lean condition present when AIR pump is turned on during closed loop operation.</p>	<p><b>Passive:</b> HO2S sensor &lt; approx. 400 mv during open loop operation</p> <p><b>Active:</b> HO2S sensor &lt; 222 mv for &gt;= 1.5 seconds or fuel integrator delta of 14 counts when pump turned on during closed loop operation.</p>	<p><b>Passive:</b> No MAF, MAP, IAT, ECT, TPS, HO2S, injector, misfire, EGR, fuel system, AIR pump relay IAC or EVAP DTC set. HO2S mid bias volt test passed. Engine run &gt; 2 sec. Air flow &lt; 30 g/s ECT &lt; 109 deg C A/F Ratio &gt; 13:1 Engine Load &lt; 25% of full engine load) Ignition voltage &gt; 11.7V PE, DFCO, COT not active</p> <p><b>Active</b> Same as above except: MBV test fail will not disable Engine run &gt;= 200 sec after closed loop operation A/F = 14.7:1 Fuel integrator &gt;123 &amp; &lt; 136 RPM &gt; 600 ECT &gt; = 70 Deg C Engine load &lt; 25% Air flow &lt;= 22 g/s IAT &gt;10 In BLM cell 0,3,4,5,6,9,10,20,21,22</p>	<p><b>Passive:</b> During open loop operation. Once per trip.</p> <p><b>Active:</b> 3 seconds Up to 3 times per trip if passive test fails or is inconclusive</p>	B
AIR INJECTION SYSTEM SOLENOID CONTROL CIRCUIT MALF (ODM)	P0412	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds Continuous.	B
AIR INJECTION SYSTEM RELAY CONTROL CIRCUIT MALF (ODM)	P0418	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds Continuous.	B

**1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS**

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
BANK 1 CATALYTIC CONVERTER LOW OXYGEN STORAGE	P0420	Comparing rear HO2S sensor signal amplitude to the front HO2S sensor signal amplitude thereby measuring the oxygen storage capability of the catalytic converter.	Rear HO2S amplitude approaches a calibrated threshold (approx. 90% of front HO2S amplitude)	Catalyst predicted temperature $\geq 400^{\circ}\text{C}$ $\Delta$ engine load $< 2\%/sec$ ECT $> 65^{\circ}\text{C}$ IAT $> -30\text{C}$ Vehicle speed: $20 < \text{MPH} < 85$ TPS $> 2\%$ Engine Speed: $800 < \text{RPM} < 3000$ $14 \text{ g/s} < \text{Air flow} < 40 \text{ g/s}$ $25 \text{ kPa} < \text{MAP} < 80 \text{ kPa}$ Closed loop No VSS, Transmission, Throttle, Purge control, Oxygen sensor, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Cam sensor, Air flow, AIR, IAC, or Fuel trim DTC's	50 acceptable HO2S samples collected at a 12.5 ms rate.  Once per trip	A
BANK 2 CATALYTIC CONVERTER LOW OXYGEN STORAGE	P0430	Comparing rear HO2S sensor signal amplitude to the front HO2S sensor signal amplitude thereby measuring the oxygen storage capability of the catalytic converter.	Rear HO2S amplitude approaches a calibrated threshold (approx. 90% of front HO2S amplitude)	Catalyst predicted temperature $\geq 400^{\circ}\text{C}$ $\Delta$ engine load $< 2\%/sec$ ECT $> 65^{\circ}\text{C}$ IAT $> -30\text{C}$ Vehicle speed: $20 < \text{MPH} < 85$ TPS $> 2\%$ Engine Speed: $800 < \text{RPM} < 3000$ $14 \text{ g/s} < \text{Air flow} < 40 \text{ g/s}$ $25 \text{ kPa} < \text{MAP} < 80 \text{ kPa}$ Closed loop No VSS, Transmission, Throttle, Purge control, Oxygen sensor, Misfire, MAT, MAP, Camel Mode, Injector, EST Control, EGR Sensor, Coolant, Crank sensor, Cam sensor, Air flow, AIR, IAC, or Fuel trim DTC's	50 acceptable HO2S samples collected at a 12.5 ms rate.  Once per trip	A

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
EVAP. Emission Control System Malfunction	P0440	0.1 V - 4.90V This DTC will detect a weak vacuum condition (large leak or restriction) in the EVAP. system.	<b><u>WEAK VACUUM TEST- STAGE I (Cold Test):</u></b> Tank Vac. < 9 in. H <sub>2</sub> O <b><u>WEAK VACUUM TEST- STAGE II (Warm Test):</u></b> Stage I test failed previous trip and this trip. Tank Vac. < 11 in. H <sub>2</sub> O  OR  If HC vapor is not present and the SMALL LEAK TEST has failed.	<b><u>TEST ENABLE :</u></b> MAP DTC's not active Volt-DTC's not active TP Sensor DTC's not active VS Sensor DTC's not active O2 Sensor DTC's not active CAT Sensor DTC's not active IAT Sensor DTC's not active Fuel Level >15.0% but < 85.0% Powerup Vacuum Test Fail = False System Voltage > 10V but < 17V <b><u>COLD START TEST:</u></b> ECT > 3.75°C but < 30° C IAT > 3.75°C but < 30° C Cold Temperature Δ ( ECT - IAT): < 1.5°C if IAT > ECT < 8.25 °C if ECT > IAT Baro > 75.0 kPa Fuel Level Input = True Fuel Level Present Test = True	<b><u>WEAK VACUUM TEST- STAGE I (Cold Test):</u></b> Fault present for a time ≥ 30 sec. (Vac. Weighted)  <b><u>WEAK VACUUM TEST- STAGE II (Warm Test):</u></b> Fault present for a time ≥ 1400 sec.  Once per cold start	A  (Behaves as a Type B)
EVAP SYSTEM SMALL LEAK DETECTED	P0442	0.1 V - 4.90V This DTC will detect a small leak in the EVAP. system between the fuel fill cap and up to but not including the purge solenoid.	<b><u>SMALL LEAK TEST FAIL:</u></b> Vacuum < 7" H <sub>2</sub> O for a time < 25 sec. Vacuum Decay (determined by fuel level and intake temperature) ≥ a value determined by Start Vacuum minus Tank Vacuum for a period ≥ 15 seconds. Vacuum > 0.1 in. H <sub>2</sub> O for a time ≤ 35 seconds.	<b><u>TEST ENABLE :</u></b> MAP DTC's not active Volt-DTC's not active TP Sensor DTC's not active VS Sensor DTC's not active O2 Sensor DTC's not active CAT Sensor DTC's not active IAT Sensor DTC's not active Fuel Level >15.0% but < 85.0% <b><u>COLD START TEST:</u></b> ECT > 3.75°C but < 30° C IAT > 3.75°C but < 30° C Cold Temperature Δ ( ECT - IAT): < 1.5°C if IAT > ECT < 8.25 °C if ECT > IAT Baro > 75.0 kPa Fuel Level Input = True Fuel Level Present Test = True <b><u>FUEL SLOSH TEST:</u></b> Tank Vacuum Δ ≤ 0.3 TO .55 in. H <sub>2</sub> O or Fuel Level Δ ≤ 3 TO 7 Liters (both by fuel level) <b><u>WEAK VACUUM TEST (Stage II) :</u></b> Throttle position < 75% Vehicle speed < 70 mph Tank Vacuum ≥ 11in. H <sub>2</sub> O within 30 seconds.	Vacuum Decay ≥ 15 seconds  Once per cold start	A  (Behaves as a Type B)

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
EVAP CANISTER PURGE SOLENOID VALVE CIRCUIT (ODM)	P0443	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds. continuous.	B
EVAP CANISTER VENT BLOCKED	P0446	This DTC will determine if a restriction is present in the vent solenoid, vent filter, vent hose or canister.	<b><u>EXCESS VACUUM TEST - STAGE I :</u></b> Vent solenoid <b>commanded</b> OPEN Fuel Tank Vacuum ≥ 7 in. H <sub>2</sub> O for 2 seconds(monitored during initial purge ramp)  <b>OR</b> <b><u>EXCESS VACUUM TEST - STAGE II :</u></b> Vent solenoid <b>commanded</b> OPEN during normal purge. Fuel Tank Vacuum ≥ 12.9 in. H <sub>2</sub> O for a time ≥ 4 seconds	<b><u>TEST ENABLE :</u></b> MAP DTC's not active Volt-DTC's not active TP Sensor DTC's not active VS Sensor DTC's not active O2 Sensor DTC's not active CAT Sensor DTC's not active IAT Sensor DTC's not active Fuel Level >15.0% but < 85.0% System Voltage > 10V but < 17V <b><u>COLD START TEST:</u></b> ECT > 3.75°C but < 30° C IAT > 3.75°C but < 30° C Cold Temperature Δ ( ECT - IAT): < 1.5°C if IAT > ECT < 8.25 °C if ECT > IAT Baro > 75.0 kPa Fuel Level Input = True Fuel Level Present Test = True <b><u>FUEL SLOSH TEST:</u></b> Tank Vacuum Δ ≤ 0.3 TO .55 in. H <sub>2</sub> O or Fuel Level Δ ≤ 3 TO 7 Liters (both by fuel level) <b><u>PURGE HC PRESENT :</u></b> Purge Closed Loop Multiplier ≥ 0.35 for a time ≤ a table value based on coolant temperature <b><u>WEAK VACUUM TEST -Stage I:</u></b> Tank Vacuum ≥ 11in. H <sub>2</sub> O within 30 seconds.	<b><u>EXCESS VACUUM TEST - STAGE II :</u></b> 180 seconds  Once per cold start at: • Powerup • Excess Vac. Stage I • Excess Vac. Stage II	A
EVAP VENT SOLENOID CONTROL CIRCUIT	P0449	Circuit Continuity Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed > 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds Continuous.	B
EVAP SYSTEM PRESSURE LOW	P0452	This DTC will detect a vacuum sensor stuck low	tank vacuum raw voltage < 0.1 volt for 5 seconds	<b><u>runs continuously after a 1 second delay for sensor warm-up</u></b>		B
EVAP SYSTEM PRESSURE HIGH	P0453	This DTC will detect a vacuum sensor stuck hi	tank vacuum raw voltage >4.90 volt for 5 seconds	<b><u>runs continuously after a 1 second delay for sensor warm-up</u></b>		B



1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
PRIMARY COOLING FAN RELAY CONTROL CIRCUIT MALF (ODM)	P0480	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed greater than 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds. Continuous.	B
SECONDARY COOLING FAN RELAY CONTROL CIRCUIT MALF (ODM)	P481	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed greater than 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds. Continuous.	B
VEHICLE SPEED SENSOR SYSTEM PERFORMANCE (MANUAL TRANS)	P0500	This DTC detects a missing signal from the vehicle speed sensor in a manual transmission vehicle.	Vehicle speed = 0 when enable conditions met	Manual VSS diagnostic enabled No MAP DTC's set No TPS DTC's set No ECT DTC's set No idle system DTC's set No IAC valve DTC's set Coolant >= 35 deg. C Engine speed > 1000 rpm 5 % < throttle position < 100 % A/C off: 40 kpa < MAP < 100 kpa A/C on: 45 kpa < MAP < 100 kpa Above conditions met > 2 seconds to enable diagnostic	500 test failures in a 1000 test sample 100 ms/test Continuous	B Manual Transmission Only
IDLE SYSTEM - LOW ENGINE SPEED	P0506	Determines if a low idle is a result of an engine mechanical problem. Low RPM is 100 RPM below desired	Idle > 100 RPM low from desired	<b>Passive:</b> No MAF, MAP, IAT, ECT, TP, Injector, Fuel System, Misfire, EGR, VSS or Purge DTC Engine Run > 60 sec. ECT >= 60 Deg C Baro > 65 kPa IGN. voltage > 9 & < 17 volts IAT > -10 deg C TP < 1% VS <= 1 MPH Time > 5 seconds to fail. > 8 seconds to pass	<b>Passive:</b> Must be outside the fail criteria continuously for 5 seconds. Must be within pass criteria for 8 seconds continuously.	B
IDLE SYSTEM - HIGH ENGINE SPEED	P0507	Determines if a high idle is a result of an engine mechanical problem. High RPM is 200 RPM above desired	<b>Passive:</b> Idle > 200 RPM high from desired	<b>Passive:</b> No MAF, MAP, IAT, ECT, TP, Injector, Fuel System, Misfire, EGR, VSS or Purge DTC Engine Run > 60 sec. ECT >= 60 Deg C Baro > 65 kPa IGN. voltage > 9 & < 17 volts IAT > -10 deg C TP < 1% VS <= 1 MPH Time > 5 seconds to fail. > 8 seconds to pass	<b>Passive:</b> Must be outside the fail criteria continuously for 5 seconds. Must be within pass criteria for 8 seconds continuously.	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
PCM - FLASH EEPROM CHECKSUM ERROR	P0601	Indicates that PCM is unable to correctly read data from the flash memory.	Calculated checksum does not match expected checksum for the program.	Ignition in Run or Crank.	One occurrence.  Check is performed at power-up and every 60 seconds thereafter.	A
PCM - PROGRAMMING ERROR	P0602	Indicates that the PCM is not flashed.	PCM not flashed.	Ignition on.	1 test failure 100 ms after PCM powered-up	A
PCM RAM FAILURE	P0604	Indicates that PCM is unable to correctly write and read data to and from RAM	Data read does not match data written	Ignition in Run or Crank	One occurrence.  Check is performed at power-up and every 60 seconds thereafter.	A
2ND AND 3RD GEAR BLOCKOUT RELAY CIRCUIT MALF (ODM)	P0803	Control circuit voltage is monitored during operation. It should be low during operation and near B+ when "off".	The PCM detects that the commanded state of the driver and the actual state of the control circuit do not match.	Engine speed greater than 600 rpm. Ignition voltage > 6.0 volts, but < 16 volts	10 seconds.  Continuous.	B
HO2S SYSTEM -TOO FEW HO2S R/L AND L/R SWITCHES (BANK 1, SENSOR 1)	P1133	The DTC determines if the HO2S sensor is functioning properly by monitoring the number of L/R and R/L switches.	Number of switches in 100 seconds: L/R switches < 30 R/L switches < 30	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec  Once per trip.	B
HO2S TRANSITION TIME RATIO (BANK 1, SENSOR 1)	P1134	Monitors the ratio between rich to lean and lean to rich transition times	The ratio of rich to lean and lean to rich oxygen sensor transitions. .4375 < Ratio < 4.4063	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec  Once per trip.	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
HO2S SYSTEM -TOO FEW HO2S R/L AND L/R SWITCHES (BANK 2, SENSOR 1)	P1153	The DTC determines if the HO2S sensor is functioning properly by monitoring the number of L/R and R/L switches.	Number of switches in 100 seconds: L/R switches < 30 R/L switches < 30	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec  Once per trip.	B
HO2S TRANSITION TIME RATIO (BANK 2, SENSOR 1)	P1154	Monitors the ratio between rich to lean and lean to rich transition times	The ratio of rich to lean and lean to rich oxygen sensor transitions. .59375 < Ratio < 4.6875	Closed Loop Fuel Control. 1000 < RPM < 2300 15 < Air Flow < 35 g/sec. Minimum system voltage: 9v ECT > 65 Deg C CCP>0 Engine Run > 120 sec No Throttle, MAT, Camel Mode, Injector, EST Control, Coolant, Crank Sensor, or Air Flow Faults active	100 sec  Once per trip.	B
ENGINE PROTECTION MODE ACTIVE	P1258	Monitor for engine protection mode active.	Coolant temperature >= 132C for more than 10 seconds.	No coolant sensor DTC's.	Set immediately upon engine protection mode active.	A
CRANKSHAFT POSITION SYSTEM VARIATION NOT LEARNED	P1336	Monitor for valid crankshaft error compensation factors	Factors are considered NOT valid if the factor sum is greater than 4.001 or less than 3.999	OBD Manufacturer Enable Counter = 0	100 ms/test	A
EGR VALVE CIRCUIT PERFORMANCE Actual Position > Commanded Position.	P1404	This DTC determines if the EGR valve pintle is stuck open when the valve is commanded closed.	Actual position >.29 volts from closed position.	System voltage 11.7 volts or greater.	3 failures for 3 seconds (with 100% pintle movement for .7 seconds between tests). Continuous every 100 ms.	A

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
AIR INJECTION SYSTEM	P1415	<p><b>Passive:</b> HO2S sensors indicate lean condition present during open loop operation. Verify proper operation of AIR pump.</p> <p><b>Active:</b> HO2S sensors indicate lean condition present when AIR pump is turned on during closed loop operation.</p>	<p><b>Passive:</b> HO2S sensor &lt; approx. 400 mv during open loop operation</p> <p><b>Active:</b> HO2S sensor &lt; 222 mv for &gt;= 1.5 seconds or fuel integrator delta of 14 counts when pump turned on during closed loop operation.</p>	<p><b>Passive:</b> No MAF, MAP, IAT, ECT, TPS, HO2S, injector, misfire, EGR, fuel system, AIR pump relay IAC or EVAP DTC set. HO2S mid bias volt test passed. Engine run &gt; 2 sec. Air flow &lt; 30 g/s ECT &lt; 109 deg C A/F Ratio &gt; 13:1 Engine Load &lt; 25% of full engine load) Ignition voltage &gt; 11.7V PE, DFCCO, COT not active</p> <p><b>Active</b> Same as above except: MBV test fail will not disable Engine run &gt;= 200 sec after closed loop operation A/F = 14.7:1 Fuel integrator &gt;123 &amp; &lt; 136 RPM &gt; 600 ECT &gt; = 70 Deg C Engine load &lt; 25% Air flow &lt;= 22 g/s IAT &gt;10 In BLM cell 0,3,4,5,6,9,10,20,21,22</p>	<p><b>Passive:</b> During open loop operation. Once per trip.</p> <p><b>Active:</b> 3 seconds Up to 3 times per trip if passive test fails or is inconclusive</p>	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
AIR INJECTION SYSTEM	P1416	<p><b>Passive:</b> HO2S sensors indicate lean condition present during open loop operation. Verify proper operation of AIR pump.</p> <p><b>Active:</b> HO2S sensors indicate lean condition present when AIR pump is turned on during closed loop operation.</p>	<p><b>Passive:</b> HO2S sensor &lt; approx. 400 mv during open loop operation</p> <p><b>Active:</b> HO2S sensor &lt; 222 mv for &gt;= 1.5 seconds or fuel integrator delta of 14 counts when pump turned on during closed loop operation.</p>	<p><b>Passive:</b> No MAF, MAP, IAT, ECT, TPS, HO2S, injector, misfire, EGR, fuel system, AIR pump relay IAC or EVAP DTC set. HO2S mid bias volt test passed. Engine run &gt; 2 sec. Air flow &lt; 30 g/s ECT &lt; 109 deg C A/F Ratio &gt; 13:1 Engine Load &lt; 25% of full engine load) Ignition voltage &gt; 11.7V PE, DFCO, COT not active</p> <p><b>Active</b> Same as above except: MBV test fail will not disable Engine run &gt;= 200 sec after closed loop operation A/F = 14.7:1 Fuel integrator &gt;123 &amp; &lt; 136 RPM &gt; 600 ECT &gt; = 70 Deg C Engine load &lt; 25% Air flow &lt;= 22 g/s IAT &gt;10 In BLM cell 0,3,4,5,6,9,10,20,21,22</p>	<p><b>Passive:</b> During open loop operation. Once per trip.</p> <p><b>Active:</b> 3 seconds Up to 3 times per trip if passive test fails or is inconclusive</p>	B

1998 5.7L (LS1) F-car Camaro, Firebird ENGINE DIAGNOSTIC PARAMETERS

98c57G\_F\_\_yE.DOC

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
EVAP SYSTEM FLOW DURING NON-PURGE	P1441	This DTC will determine if the purge solenoid is leaking.	<b><u>PURGE VALVE LEAK TEST:</u></b> Purge Valve closed TP > 0% but < 99.6% Vacuum ≥ 10 KPa Tank Vacuum ≥ 12 in. H <sub>2</sub> O for 2 sec within ≤ 37.5 seconds after 30 second delay.	<b><u>TEST ENABLE :</u></b> MAP DTC's not active Volt-DTC's not active TP Sensor DTC's not active VS Sensor DTC's not active O2 Sensor DTC's not active CAT Sensor DTC's not active IAT Sensor DTC's not active Fuel Level >15.0% but < 85.0% System Voltage > 10V but < 17V <b><u>COLD START TEST:</u></b> ECT > 3.75°C but < 30° C IAT > 3.75°C but < 30° C Cold Temperature Δ ( ECT - IAT): < 1.5°C if IAT > ECT < 8.25 °C if ECT > IAT Baro >75.0 kPa Fuel Level Input = True Fuel Level Present Test = True <b><u>EXCESS VACUUM TEST -STAGE I :</u></b> Vent solenoid <b>commanded</b> OPEN Fuel Tank Vacuum < 7 in. H <sub>2</sub> O <b><u>WEAK VACUUM TEST -Stage I :</u></b> Throttle position < 75% Vehicle speed < 70 mph Tank Vacuum ≥ 11 in. H <sub>2</sub> O within 30 seconds.	<b><u>PURGE VALVE LEAK TEST:</u></b> 180 seconds Max.  Once per cold start	B
5 VOLT REFERENCE A CIRCUIT	P1635	Determines if the supply voltage for the 5 volt reference is within an acceptable limit.	Compares the ratio of the 5 volt reference circuit voltage to the 5 volt supply voltage.	5 volt reference circuit voltage differs from 5 volt supply voltage by plus or minus approximately .01 volt. PCM is powered up	Condition present > 2 seconds Continuous.	B
5 VOLT REFERENCE B CIRCUIT	P1639	Determines if the supply voltage for the 5 volt reference is within an acceptable limit	Compares the ratio of the 5 volt reference circuit voltage to the 5 volt supply voltage.	5 volt reference circuit voltage differs from 5 volt supply voltage by plus or minus approximately .01 volt. PCM is powered up	Condition present > 2 seconds Continuous.	B