Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.
Catalytic Converter Monitoring	P0420	Front vs. Rear O2 sensor signal	Evaluated data 1,75 times FTP std	65 (unitless)	Coolant temp	>70°C	20 s accumulated	Statistical treatment, up to 6 DCY, after that: Immediately
					Throttle	Open	Once / DCY	
					Delta load, positive	< 200 mg/combustion/s		
					Delta load, negative	< - 100 mg/combustion/s		
					Engine speed, man. trans	1270 - 2800 rpm		
					Engine speed, aut. trans	1200 - 2800 rpm		
					Load	140 - 400 mg/combustion		
					Time after engine start	>200 s		
					Fuel control	Closed loop		
					Catalyst temperature	>350 C, calculated		
					Front O2 sensor duty cycle	35-65%		
					Rear O2 sensor signal	Not below 550 mV for over 650 ms		
Synchronization error	P0340	Rationality	Ignition	Not synchronized	Engine speed	Running	1 sec	Two DCY
					Revolutions	>500 after start phase	Once / DCY	
					Extra enablement delay when ECT or IAT is below -10°C at engine starting	500 revolutions		
					Battery voltage	> 10,0 V		
Misfire Emissions	P0300 to P0304	Ion current detection. At idle: combination of ion current and crankshaft speed evaluation.	Misfire counter 1000 revs.	> 3,0 %	Engine speed	< redline rpm	1000 revolutions	Two DCY
					Load change transient MAP	> ± 5,0 kPa/combustion, trig + 10 – 25 revolutions	Continuous	
					Load	> 0 and not in disable region above 3000 rpm & low load		
					EVAP test, disablement at purge valve activation and deactivation	At purge valve activation status change + 10 revolutions		
					No fuel cut off	At fuel cut and for 10 revolutions after fueling re-start		
					Battery voltage	> 10.0 V		
					Enabling delay when ECT is below -7°C at engine starting	Delayed until ECT > 21 °C		
		Special case in hot fuel conditions	Count 70% of detected misfires before evaluating vs. fault limit. Applies only to first 1000 revs.		ECT at engine shut off	> 110 °C		
					ECT at engine starting	> 110 °C		
					IAT at engine starting	> 70 °C		
Misfire Catalyst Temperature	P1300 to P1304	Same as above	Misfire counter 200 revolutions	See separate map	Same as above	Same as above	200 revolutions	Two DCY / MIL blink
Misfire Catalyst temperature at low fuel conditions	P1390 to P1394	Same as above	Same as above	Same as above	Same as above +	Same as above +	Same as above	Same as above
					Fuel level	< 5% (4 liters)	Continuous	
Detect signals	P1312	Detect 1-2 missing	Detect signal	High	Engine speed	Running	200 combustions	Two DCY
	P1334	Detect 3-4 missing			Battery voltage	> 10,0 V	Continuous	
Knock signal	P0327	Knock signal low	Knock signal	< 250 mV	Engine speed	> 800 rpm	25 combustions	Two DCY
					Voltage	> 11,0 V	Continuous	
					No ignition cut in throttle limp-home			
0,5 mm leak check								
EVAP Canister Vent Valve	P1444	Circuit continuity check	Short-cut gnd or not connected	0V	Engine speed	Running	1 sec, Continuous	Two DCY
	P1445		Short-cut Ubatt	12V	Battery voltage	> 10,0 V	At engine start	
					Purge	Not active		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions		Time Required	MIL Illumin.
EVAP leak test						Enable	Disable		
General conditions					ECT & IAT	> +5 °C	> +5 °C		
					MAF	100-375 mg/s	-		
					MAF Δ		± 135 mg/s/s		
					Fuel tank pressure	< 200 Pa	< 200 Pa		
					MAP	< -20 kPa	< -20 kPa (during pull-down)		
					Max number of vapor disables in DCY	3			
					Slosh in Ramp 0				
					Pressure change		< ± 60 Pa		
					Slosh in Ramp 1				
					Pressure change in expected direction		> -255/		
					Pressure change in opposite direction		< +140 Pa		
					Slosh in Ramp 2				
					Pressure change in expected direction		< +85 Pa		
					Pressure change in opposite direction		< -70 Pa		
					Battery voltage	10 - 16 Volts	-		
					No DTC set, pending or confirmed	EVAP pressure sensor, P0452, P0453, P1451, P1452, P1453, P1491, P1492, P1493 Vehicle speed sensor, P0501, P0502 Canister vent valve, P1444, P1445 Purge valve, P0441, P0444, P0445, P1441 Brake light switch, P1576, P1577 ECT sensor, P0115, P0116, P0117, P0118, P0119, P011B, P0126 IAT sensor, P0111, P0112, P0113			
					Time between test attempts	30 - 60 s			
					at Vehicle speed	> 28 mph			
					System power-up	In present DCY, or no test in previous DCY			
					Purge ramp	Finished, not required for cold start DCY			
					Fuel volume	15-85% (11-60 liters)			
Idle test						Enable	Disable	Once / DCY	
					Vehicle speed	-	-	25 s	
					Vehicle speed Δ vs. start	-	-		
					Brake activations	-	max 2		
					Purge adaption	> -7%	-		
					Purge HC Δ vs. start	-	< 15,5%		
					Lambda integrator Δ vs. start	-	> -7%		
					Ambient pressure Δ	< 4kPa/3 min	-		
					Fuel tank pressure	-	> -2000 Pa		
					Ramp 0 vapor generation	-	< 4 Pa/s		
					Variation between parts in decay measurement	-	-		
Vehicle moving test					Vehicle speed	43 - 81 mph	-	Once / DCY	
					Vehicle speed Δ vs. start	-	< ± 4,4 mph	35 s	
					Brake activations	-	max 1		
					Purge adaption	> -6%	-		
					Purge HC Δ vs. start	-	< 15,5%		
					Lambda integrator Δ vs. start	-	> -8%		
					Ambient pressure Δ	< 4kPa/3 min	-		
					Fuel tank pressure	-	> -2800 Pa		
					Ramp 0 vapor generation	-	< 2 Pa/s		
					Variation between parts in decay measurement (slosh)	-	-3%/-19%		

Component/System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions		Time Required	MIL Illumin.
Filler cap test, big leak/ high vapor generation					Vehicle speed	44 – 93 mph	-	Max 50 times /DCY Fault sets at key-off if two or more failures	
					Vehicle speed Δ vs. start	-	< ± 6 mph		
					Brake activations	-	max 1		
					Purge adaption	> -24%	-	15 s	
					Purge HC Δ vs. start	-	< 25%		
					Lambda integrator Δ vs. start	-	> -12%		
					Ambient pressure Δ	<10kPa/3 min	-		
					Fuel tank pressure	-	> -2000 Pa		
					Ramp 0 vapor generation	-	< 8 Pa/s		
					Variation between parts in decay measurement	-	-		
EVAP large leak > 3 mm	P0455	Rationality check	Pressure does not reach specified level in specified time. See separate document	Leakage factor > 1000					Two DCY
	P1455	When fuel level info is incorrect							
EVAP small leak 1 mm < X < 3 mm	P0442	Rationality check	Pressure gradient check. See separate document	Leakage factor 4					Two DCY
	P1442	When fuel level info is incorrect							
EVAP very small leak 0,5 < X < 1 mm	P0456	Rationality check	Pressure gradient check. See separate document	Leakage factor 1, 2, 3					Up to eight DCY
	P1456	When fuel level info is incorrect							
EVAP pressure sensor	P0452	Low end check	Min failure or not connected	< 300 mV	Ignition on	>2 sec		5 sec	Two DCY
	P0453	High end check	Max failure	> 4950 mV	Engine speed	Running		Continuous	
	P1451	Rationality	Max amplitude & no. of shifts	>40Pa & >20	Engine speed	Idle		3,5 sec	Two DCY
	P1491	When fuel level info is incorrect			Vehicle speed	0 mph		Once / DCY	
					Brake status changes	Max one			
					Tank pressure readings	Unfiltered, unadapted			
					Fuel level	0 - 85%, if fuel level info OK			
					ECT & IAT	> +5°C			
					No DTC set, pending or confirmed	Fuel tank pressure sensor circuit, P0452, P0453			
						Canister vent valve, P1444, P1445			
						Purge valve, P0441, P0444, P0445, P1441			
						Brake light switch, P1576, P1577			
	P1452	Sensor Offset	Min failure	Adaption value < -1000 Pa	Engine speed	Running		Ignition on + 10s Once / DCY	Two DCY
	P1492	When fuel level info is incorrect			Fuel tank pressure sensor adaption	Done			
	P1453	Sensor Offset	Max failure	Adaption value >1000 Pa	Same as above	Same as above		Ignition on + 10s Once / DCY	Two DCY
	P1493	When fuel level info is incorrect							
Fuel tank pressure adaption					Ambient pressure	75 - 106 kPa			
					Vehicle speed	0			
					Engine speed	0			
					ECT	-10°C < X < + 40°C			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.
					Fuel tank volume	0 < X < 69% (50 liters)		
EVAP Purge Valve	P0441	Valve leaking	Tank pressure drop when valve is commanded closed	> 40 Pa/sec	Vehicle speed	0	3 sec	Two DCY
	P1441	When fuel level info is incorrect			Fuel volume	15 - 85 %	Once / DCY	
					Engine speed	Running		
					IAT & ECT at engine start	+5 - +40 °C		
					Battery voltage	10 - 16 Volts		
					MAP	< - 20 kPa		
	P0444	Circuit continuity check	Short-cut gnd or not connected	0V	Engine speed	Running	60 sec	Two DCY
	P0445		Short-cut Ubatt	12V	Battery voltage	> 10,0 V	Continuous	
Fuel level	No code	Min signal			Engine speed	Running		No MIL, will set alternate DTC for EVAP rationalities. Will also set fuel volume to default 69% (50 liters)
		Max signal			Engine speed	Running		
		No activity	Fuel level info change	< 0,3 liters	Engine speed	Running	15,5 miles	
		Rationality	Fuel level change	Fuel consumption less than 0,3 l in 20 miles. Five checks done for fault setting. Results saved in buffer, also between DCY:s.	Reference volume taken when:		5 X 15,5 miles	
					Vehicle speed	> 50 mph		
					Load	160 - 320 mg/combustion		
					Tank volume ripple	< 1,5 liters		
					Stable conditions during	17 sec		
					Vehicle speed decrease during stable period	< 3 mph		
					If the volume increases with more than 5 liters during DCY, refueling is assumed, and a new reference will be taken.			
					When volume reference is above 61 liters, driving distance for evaluation is increased to 40 miles.			
Fuel trim, long term Multiplicative	P0171	System lean	Long term	<-25%	Engine speed	Running	30 sec	Two DCY
	P0172	System rich	Long term	>+25%	Lambda control	Active	Continuous	
					First multiplicative adaption	Done		
Fuel trim, long term Additive	P1181	System lean	Long term	<-5 mg/combustion	Engine speed	Running	30 sec	
	P1182	System rich	Long term	>+5 mg/combustion	Lambda control	Active	Continuous	
					First multiplicative adaption	Done		
Front O2 sensor	P0132	Range check high	Voltage	>2000 mV	Engine speed	Running	3 sec	Two DCY
					Battery voltage	> 10,0 V	Continuous	
					Sensor heater active	> 4 sec		
	P0131	Range check low	Voltage	< 70 mV	Engine speed	Running	15 sec	Two DCY
					Rear sensor signal	> 700 mV	Continuous	
					Sensor heater active	> 4 sec		
	P0134	Circuit Continuity check	Voltage	300 - 600 mV	Engine speed	Running	10 sec	Two DCY
					Battery voltage	> 10,0 V	Continuous	
					Sensor heater	Active		
					Closed loop active or Time from engine starting, depending on IAT or ECT at start.	< -10°C: 580 sec		
						-10 - +10°C: 145 sec		
						> +10°C: 55 sec		
	P0133	Response rate	Signal switches	< 2 in 180 combustions	Engine speed	1300-2300 rpm	95 combustions	Two DCY
			OR	or	Fuel control	Closed loop	Once / DCY	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.
			Combustions	> 135 for 2 switches	Delta load	-20 - 600 mg/comb/10 msec		
					Engine load	250 - 500 mg/combustion		
					Integrator	Stable, deviation < 12%		
					Coolant temperature	> 70°C		
					Time from engine starting	> 180 sec		
					Purge valve	Not closing, no ramping		
	P1133	Short to heater ground	Voltage	50 - 300 mV	Engine speed	Running	30 sec	Two DCY
					Sensor heater active	> 4 sec	Continuous	
					Rear sensor signal	> 700 mV		
					Battery voltage	> 10,0 V		
Integrator Switch Point	P1131	Switch point trim value	Lean	> 35 combustions	Coolant temp	>70°C	Continuous	Two DCY
	P1132		Rich	> 35 combustions	Throttle	Open		
					Delta load, positive	< 60 mg/combustion/s		
					Delta load, negative	< - 15 mg/combustion/s		
					Engine speed	1250 - 2600 rpm		
					Load	200 - 400 mg/combustion		
					Time after engine start	>200 s		
					Fuel control	Closed loop		
					Catalyst temperature	>350 C, calculated		
					Rear sensor voltage for trim activation	> 650 mV or < 300 mV		
					Purge adaption	< ±3%		
					Stable time	2 sec		
Front O2 sensor heater	P1135	Range check min	Short-cut gnd or not connected	0 V	Engine speed	Running	5 sec	Two DCY
	P1136	Range check max	Short-cut Ubatt	12 V	Battery voltage	> 10,0 V	Continuous	
	P1135	Heater current	min	< 300 mA	Engine speed	Running	5 sec	Two DCY
	P1136		max	> 2300 mA	Battery voltage	> 10,0 V	Continuous	
					Sensor heater	Active		
Rear 02 sensor	P0137	Signal low	Voltage	< 70 mV	Engine speed	Running	60 sec	Two DCY
					Coolant temperature	> 60°C	Continuous	
					Sensor heater active	> 4 sec		
					Closed loop	> 5 sec		
					Integrator	-20 to +20		
	P0138	Signal high	Voltage	>2000 mV	Engine speed	Running	3 sec	Two DCY
					Sensor heater active	> 4 sec	Continuous	
	P0140	Activity	Voltage	>350 mV	Engine speed	Running	2 sec	Two DCY
					Fuel cut	Active for > 2 sec	Once/DCY	
					Coolant temp.	>70 °C		
					Fuel control	Closed loop for 5 sec before fuel cut		
					Time from start	> 30 sec		
					Sensor heater	Active		
	P1137	Short to heater ground	Voltage	50 - 300 mV	Engine speed	Running	90 sec	Two DCY
					Closed loop	> 5 sec	Continuous	
					Coolant temp.	> 60 °C		
					Integrator	> -20%		
					Battery voltage	> 10,0 V		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.
Rear O2 sensor heater	P1141	Range check min	Short-cut gnd or not connected	0 V	Engine speed	Running	5 sec	Two DCY
	P1142	Range check max	Short-cut Ubatt	12 V	Battery voltage	> 10,0 V	Continuous	
	P1141	Heater current	min	< 500 mA	Engine speed	Running	5 sec	Two DCY
	P1142		max	> 2300 mA	Battery voltage	> 10,0 V	Continuous	
					Sensor heater	Active		
MAP sensor	P0106	Rationality, MAP vs.BARO	Pressure difference	> 15 kPa	Engine speed	0	3 readings	Two DCY
					Pressure diff. BARO vs. intake	< 10 kPa	Once / DCY	
					Vehicle speed	0		
	P0106	MAP vs. BARO, BARO vs. Intake & Intake vs. MAP	All pressure differences	> 15 kPa	Engine speed	0	3 readings	Two DCY
					Vehicle speed	0	Once / DCY	
	P0106	Rationality, at engine overrun	MAP	> 50 kPa	Engine speed	> 1300 rpm	5 readings	Two DCY
					Load	< 110 mg/combustion	Continuous	
					Accelerator	Released + 400 msec		
	P0107	Range check min	Short-cut gnd or not connected	0 V	Ignition	On	10 sec	Two DCY
	P0108	Range check max	Short-cut voltage	5 V	Ignition	On	Continuous	
Barometric pressure sensor	P1631	Rationality, BARO vs. MAP OR BARO vs. Intake	Pressure difference	>15 kPa	Engine speed	0	3 readings	Two DCY
					Pressure diff. MAP vs. intake	< 10 kPa	Once / DCY	
					Vehicle speed	0		
	P1632	Range check min	Short-cut gnd or not connected	0 V	Ignition	On	1 sec	Two DCY
	P1633	Range check max	Short-cut voltage	5 V			Continuous	
Intake air pressure sensor, upstream throttle	P1106	Rationality, intake vs. BARO	Pressure difference	> 15 kPa	Engine speed	0	3 readings	Two DCY
					Pressure diff. BARO vs. MAP	< 10 kPa	Once / DCY	
					Vehicle speed	0		
	P1106	MAP vs. BARO, BARO vs. Intake & Intake vs. MAP	All pressure differences	> 15 kPa	Engine speed	0	3 readings	Two DCY
					Vehicle speed	0	Once / DCY	
	P1107	Range check min	Short-cut gnd or not connected	0 V	Ignition	On	10 sec	Two DCY
	P1108	Range check max	Short-cut voltage	5 V			Continuous	
	P1105	No activity	Intake air pressure vs. BARO	< 5 kPa	Engine speed	> 1500 rpm	3 sec	Two DCY
					MAP vs. BARO	> 5 kPa	Continuous	
					Pressure sensor adaptions	Done		
MAF sensor	P0100	No signal	Short-cut gnd or not connected	0 V	Engine speed	> 400 rpm for 0,5 sec	1 sec	Two DCY
	P0102	Range check, low signal	Frequency	< 500 Hz	Battery voltage	> 10,0 V	Continuous	
	P0103	Range check, high signal	Frequency	> 15000 Hz				
MAF sensor, rationality	P0101	Comparison of measured MAF sensor signal with mass air flow calculated from throttle area, BARO, MAP and intake air pressure (before throttle) Samples are taken in two load windows, below and above 16 g air/sec. To report fault, the average deviation in one of the	MAF deviation & Multiplicative Fuel Trim	> -12% > -17%	Coolant and intake air temperatures	> -7 °C	400 samples or more (100 msec)	Two DCY
					Altitude	< 2500 meters	Continuous	
			MAF deviation & Multiplicative Fuel Trim	> 12% > 17%	Engine speed	Running		
			MAF deviation	> -30%	Battery Voltage	> 10 Volts		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.
		average deviation in one of the windows has to be above the limit after 400 samples. To report pass, 400 samples have to be taken in both load windows with less deviation than the fault limit.	MAF deviation	> 30%	Pressure Sensor Adaption	Completed once after battery disconnect or reprogramming		
					Coolant Temperature	78 - 115 °C		
					Engine Speed	700 - 4000 rpm		
					Pressure quote, MAP vs. pressure before throttle	0,20 - 0,70		
					Throttle Area	50 - 500 mm^2		
					MAP deviation between samples (100 msec)	< ±12% (test abortion)		
						< ±12% in 1500 msec (test enablement)		
					Throttle area deviation between samples (100 msec)	< ±12% (test abortion)		
						< ±12% in 1500 msec (test enablement)		
					Boost by-pass status change	No change (test abortion)		
						No change for 500 ms (test enablement)		
					Vehicle speed to enable test	> 28 mph for 60 sec		
					Throttle area adaption	Done, or conditions for adaption fulfilled		
					EVAP purge	Active		
					Fuel cut	Inactive		
IAT sensor	P0112	Range check min	Short-cut	< 70 ohm	Engine speed	Running	10 sec	Two DCY
	P0113	Range check max	Not connected	> 38000 ohm			Continuous	
IAT sensor, rationality	P0111	No activity	Change less than	2 deg C	Engine speed	Running	900 sec	Two DCY
					Coolant and intake air temperatures	> -7 °C	Once / DCY	
					Altitude	< 2500 meters		
					ECM power-down, engine-off time	> 15 minutes		
					Engine run time	900 sec		
ECT sensor / Thermostat	P0116	Comparison between Coolant temperature model and ECT sensor reading. Model calculated based mainly on mass air flow, with corrections for IAT, engine speed and ECT at start,	Comparison done when the model temperature has reached 83 °C, fault report if ECT	< 78 °C or > 130 °C	Coolant and intake air temperatures	> -7 °C	400 - 800 sec	Two DCY
					Altitude	< 2500 meters	Once / DCY	
					ECT at start	< 65 °C		
	P0115	Rationality	Temperature change	< 1°C	Engine speed	Running	8000 combustions	Two DCY
					Vehicle speed	> 15,5 mph	Continuous	
	P0117	Range check min	Short-cut	< 47 ohm	Engine speed	Running	1 sec	Two DCY
	P0118	Range check max	Not connected	> 54520 ohm			Continuous	
	P0119	Too quick change	Mean value in stack	> 10 °C	Engine speed	Running	10 readings, time base 100 msec.	Two DCY
					Comparison of each ECT reading, insert into stack when diff. from previous reading	> 5 °C	Continuous	
	P0126	Comparison between Coolant temperature model and ECT sensor reading. Model calculated based mainly on mass air flow, with corrections for IAT, engine speed and ECT at start,	Comparison done when the model temperature has reached 25 °C, fault report if ECT	< 20 °C or > 100 °C	ECT at start	< -7 °C	300 sec	Two DCY
					Engine speed	Running	Once / DCY	
	P011B	High sided coolant rationality diagnostic, comparison between IAT and ECT sensor reading after an engine off period, check done after 20 secs engine	ECT vs IAT	ECT > 15 deg C above IAT OR IAT > 15 deg C above ECT	Engine speed	Running	20 sec	Two DCY
					ECM power-down, engine-off time	> 15 minutes	Once / DCY	
					Block heater start	Not allowed		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.
		operation			ECM reset	Not allowed		
					Previous DCY minimum run	> 40000 combustions (20000 revs)		
					Intake air temperature change 20 secs after engine start vs temp at start	< 2 deg C		
					ECT at start	> -7 deg C		
					IAT rise after previous DCY engine shut-off	Minimum rise between 100 secs and 250 secs after shut-off: 7 deg C		
Time to closed loop	P0125	Rationality	Time	> 600 sec	Engine speed	Running	600 sec	Two DCY
					Start Temperature, lowest of ECT/IAT	< -7°C	Once / DCY	
					No DTC set, pending or confirmed	Front O2 sensor, P0131, P0132, P0134, P1133		
						ECT, P0115, P0117, P0118, P0119		
			Time	>150 sec	Engine speed	Running	300 sec	Two DCY
					Start Temperature, lowest of ECT/IAT	< 10°C	Once / DCY	
					No DTC set, pending or confirmed	Front O2 sensor, P0131, P0132, P0134, P1133		
						ECT, P0115, P0117, P0118, P0119		
			Time	> 60 sec	Engine	running	120 sec	Two DCY
					Start Temperature, lowest of ECT/IAT	>10°C	Once / DCY	
					No DTC set, pending or confirmed	Front O2 sensor, P0131, P0132, P0134, P1133		
						ECT, P0115, P0117, P0118, P0119		
Crankshaft position sensor	P0336	Sensor activity	Output at cranking	No signal	MAP	3,0 kPa below BARO	4 sec	Immediately
					Battery voltage	Δ > 0,8 V	Once / DCY	
					Throttle	Closed		
					Pressure sensor adaption	Done		
	P0337	Rationality	Lost position twice in same DCY	Position found then lost	Vehicle speed	> 19 mph	10 msec	Two DCY
					Brake	Not active	Continuous	
Vehicle speed	P0501	High change	Derivative	From >31 to 0 mph or D>+75 mph in two readings	Engine speed	Running	2 readings	Two DCY
					Vehicle speed	31 - 127 mph for 10 sec	Continuous	
					Brake	Not active (speed decrease determination)		
	P0501	Signal high	Vehicle speed	>168 mph	Engine speed	Running	20 readings	Two DCY
							Continuous	
	P0502	Signal missing	Vehicle speed	=0 mph	Gear (automatic)	Not in neutral	1000 sec	Two DCY
					Engine speed	>1750 rpm	Continuous	
					Engine load	> 480 mg/c		
					Brake	Not active		
					Above conditions fulfilled	5 sec		
Brake switch	P1577	Rationality - low	Signal	Always low	Vehicle speed change	25 mph to zero, 5 times	2 - 12 sec each	Two DCY
	P1576	Rationality - high	Signal	Always high	Engine speed	Running	Once / DCY	
ECM internal	P0605	General internal ECM fault					Continuous	Immediately
ECM internal stack 1	P1621	Stack overflow			Ignition	On	4 calculations	Immediately
					System	Not in mechanical Limp-home	Continuous	
ECM internal stack 2	P1602	Stack overflow			Ignition	On	4 calculations	Immediately
					System	Not in mechanical Limp-home	Continuous	
ECM internal ROM 1	P1604	Checksum	Faulty		Ignition	On	4 calculations	Immediately

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.
					System	Not in mechanical Limp-home	Continuous	
ECM internal ROM 2	P1603	Checksum	Faulty		Ignition System	On Not in mechanical Limp-home	4 calculations Continuous	Immediately
ECM internal communication 1	P1605	Internal serial communication	Faulty		Ignition System	On Not in mechanical Limp-home	Continuous	Immediately
ECM internal Watch Dog 1	P1606	SW monitor failure	Mismatch		Ignition System	On Not in mechanical Limp-home	4 calculations Continuous	Immediately
ECM internal communication 2	P1607	Internal serial communication	Faulty		Ignition System	On Not in mechanical Limp-home	Continuous	Immediately
ECM internal Watch Dog 2	P1608	SW monitor failure	Mismatch		Ignition System	On Not in mechanical Limp-home	4 calculations Continuous	Immediately
ECM internal TP power stage	P1609	Powerstage inhibit error	Test failed		Ignition System Engine speed Main relay	Off Not in mechanical Limp-home Not running On	Once / DCY	Six DCY
ECM int A/D	P1610	Comparison A/D conversion	Processor 1 vs. 2 difference	> 70 bits	Ignition System	On Not in mechanical Limp-home	Δ pedal >25%, 500 msec Δ pedal <25%, 760 msec Continuous	Immediately
ECM internal throttle current	P1611	Current too high in Limp-home	Powerstage current	> 300 mA	Ignition System DTC P1251 DTC P1610	On In mechanical Limp-home Present Not present	Throttle > 50%, 300 msec Throttle < 50%, 500 msec Continuous	Fuel shut off
ECM int airmass map	P1613	Airmass checksum	Faulty		Ignition System	On Not in mechanical Limp-home	2 failures Continuous	Immediately
H-bridge short-cut	P1240	Short- cut			Ignition System	On Not in mechanical Limp-home	3 minutes Continuous	Two DCY
Accel pedal pos 1-2 sum	P1530	Rationality check	Potentiometer sum	< 227 bit (4.45V) >283 bits (5.55V)	Ignition System	On Not in mechanical Limp-home	Δ pedal >25%, 500 msec Δ pedal <25%, 760 msec Continuous	Immediately
Accel pedal pos 1-2 adaption	P1531	Rationality check	Potentiometer sum	> adapted sum + 6% (Adapted at idle)	Ignition System Pedal position	On Not in mechanical Limp-home < 13 bits(250 mV) above adapted idle position	Δ pedal >25%, 500 msec Δ pedal <25%, 760 msec Continuous	Immediately
Accelerator pedal pos shorted	P1532	Potentiometers shorted	Testpulse on 1	Detected on 2, ≥ 4bits (78 mV)	Ignition System Pedal position	On Not in mechanical Limp-home < 75%	Δ pedal >25%, 500 msec Δ pedal <25%, 760 msec Continuous	Immediately
Throttle pot. 1-2 sum	P1230	Rationality check	Potentiometer sum	< 234 bit (4.59V) > 291 bit (5.70V)	Ignition System	On Not in mechanical Limp-home	280 msec Continuous	Immediately
Throttle closed	P1251	Rationality check, full PWM in closing direction	Throttle position	Actual > demanded	Ignition System Vehicle speed	On Not in mechanical Limp-home ≠ 0	280 msec Continuous	Immediately

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.
			Throttle position	Actual > demanded	Ignition System Vehicle speed Crankshaft position sensor Engine speed	On Not in mechanical Limp-home 0 Pulses present Not above 500 rpm, > 5 sec	280 msec Continuous	Immediately
Throttle motor, full PWM cranking	P1253	Throttle can not open during cranking, no engine start	Throttle position	Actual < demanded	Ignition System Engine speed Throttle area	On Not in mech. L-H Cranking (engine speed<500 rpm) < 17 mm^2	3000 msec Continuous	Immediately
Throttle return spring	P1260	Rationality check, broken spring	I-part of throttle pos. controller	Close to 0	Ignition System Throttle position Vehicle speed	On Not in mechanical Limp-home > mechanical block + 40 bits (of 1024 bit) > 3 mph	4000 msec Continuous	Two DCY
Throttle in limp-home, high torque	P1261	Rationality check	MAF air Flow	> calculated Air Flow	Ignition System DTC P1530 DTC P1531 DTC P1532 DTC P1610 Throttle control current	On In mechanical Limp-home Not present Not present Not present Not present < 300 mA	500 msec Continuous	Immediately Fuel shut off
Throttle controller, safety switch	P1264	Rationality check, accelerator at idle, throttle not closing	Throttle position	> calculated	Ignition System Cruise Control Acclerator pedal position	On Not in mechanical Limp-home Not active In idle position	800 msec Continuous	Immediately
Throttle limp-home solenoid relay	P1670	Range check min	Short-cut gnd or not connected	0 V	Ignition	On	1 sec	Two DCY
	P1671	Range check max	Short-cut Ubatt	12 V			Continuous	
Boost pressure control valve	P1549	Rationality, too high air mass	Difference actual vs. requested	> 0 mg/combustion	Engine speed Throttle control Pressure upstream throttle Negative throttle control Function is disabled when: Lowest of ECT or IAT Altitude Reenablement when: ECT IAT Altitude	Running Closed loop >200 kPa Min limit < -7°C > 2500 meters > 60°C > 5°C < 2000 meters	500 msec Continuous	Two DCY
	P1549	Rationality, too high air mass	Difference actual vs. requested	> 100 mg/combustion	Engine speed Boost control Requested boost or Boost throttle control Function is disabled when: Lowest of ECT or IAT Altitude Reenablement when: ECT	Running Closed loop Min Min limit < -7°C > 2500 meters > 60°C	300 msec Continuous	Two DCY

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.
					IAT	> 5°C		
					Altitude	< 2000 meters		
	P1662	Range check min	Short-cut gnd or not connected	0 V	Ignition	On	60 sec	Two DCY
	P1663	Range check max	Short-cut Ubatt	12 V			Continuous	
Boost pressure by-pass control valve	P1110	Functional check, stuck closed	Pressure variation before throttle	>3 kPa amplitude	Δ MAP	> 3,0 kPA	0,75 sec	Two DCY
					Accelerator fully released	Within 0,1 sec afterΔ MAP	Continuous	
					Pressure before throttle	> 120 kPa		
					By-pass valve	Commanded open		
					Number of tests	Two, within 10 minutes		
					Function is disabled when:			
					Lowest of ECT or IAT	< -7°C		
					Altitude	> 2500 meters		
					Reenablement when:			
					ECT	> 60°C		
					IAT	> 5°C		
					Altitude	< 2000 meters		
	P1658	Range check min	Short-cut gnd or not connected	0 V	Ignition	On	1 sec	Two DCY
	P1659	Range check max	Short-cut Ubatt	12 V			Continuous	
Idle Speed	P0507	Functional check - high	Engine speed vs. nominal	> +200 rpm	Vehicle speed	= 0 mph	10 sec	Two DCY
					Accelerator pedal	Idle position	Continuous	
					Air reduced or throttle at min			
	P0506	Functional check - low	Engine Speed vs. nominal	< -100 rpm	Vehicle speed	= 0 mph	10 sec	Two DCY
					Accelerator pedal	Idle position	Continuous	
					Air added			
					Load	< 225 mg/combustion		
Main engine relay	P1640	Rationality	ECM system voltage	< 3 V	Main relay commanded	On	1 sec Continuous	Immediately
			ECM system voltage	> 8 V	Main relay commanded	Off		
	P1652	Control circuit range check min	Short-cut gnd or not connected	0 V	Ignition	On	0,5 sec Continuous	
	P1653	Control circuit range check max	Short-cut Ubatt	12 V				
TCM CAN data	P1623	Transmission data missing			Engine speed	Running	3 sec	Immediately
							Continuous	
TCS/ABS CAN data	P1625	TCS/ABS data missing			Engine speed	Running	3 sec	Two DCY
							Continuous	
Instrument cluster CAN data	P1622	Cluster data missing			Engine speed	Running	10 sec	Immediately
							Continuous	
Fuel pump relay	P1641	Rationality	Consecutive misfires	15 when RPM >1500	Engine speed	Running	1,5 sec	Immediately
				6 when RPM < 1500			Continuous	
			O2 Sensors, Heater Current	< 10 mA				
Cold Start Emission Strategy Reduction Diagnostic	P1400	Exhaust temperature model	Engine speed	< 850 RPM	Engine speed	Running	1500 engine revolutions	Two DCY
			AND Load	> 180 mg air / combustion	Vehicle speed	0	Once / DCY	
			FOR	275 revolutions	ECT	Between -30 and 90 deg C		