COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
Catalytic Converter Monitoring	**P0420**	Time for Rear O2 sensor signal to go low. Catalyst monitoring performed at idle. Wait for throttle closed period, then a number of front O2 sensor oscillations to measure average fuel trim value. Then rich fueling to purge oxygen, wait for high rear O2 sensor value to indicate purged cat - or max time, then lean fueling and measure time for rear O2 sensor signal to fall. Time measurement in phase 3 begins when front O2 sensor output goes below 450 mV and stops when rear O2 sensor output goes below 450 mV	Time for rear O2 to go low. Value corrected to standard flow and catalyst temperature.	< 1400 msec	Delta load	-2 < delta load < I112	13 - 30 sec,	Statistical treatment, up to 6 DCY, after limit is reached: immediate MIL illumination	
					Vehicle speed	< 15,5 mph	Once / DCY		
					Engine speed	900 +200/-100 rpm			
					Load MAF	3,5 – 9 g/s			
					Min time after engine start	> 230 s			
					Fuel control	Closed loop - then rich - then lean			
					Catalyst temperature	450 - 700 °C, modeled			
					Throttle	Closed			
					Nr of Front O2 oscillations for averaged integrator value.	2			
					Rich fuelling time	1,5 to 10 seconds			
					Evaporative canister purge	Not active			
					Rear O2 sensor voltage before switch to lean	Time according to value in matrix, examples: 640 mV + 5 sec, 870 mV + 0 sec			
					Lambda integrator	0 ± 15%			
					Brake switch status changes	Max 3			
					No DTC set, pending or confirmed	Front O2 sensor P0131, P0132, P0133, P0134, P0030, P0031, P0032			
						Rear O2 sensor P0137, P0138, P0140, P0036, P0037, P0038			
						MAF sensor, P0101, P0102, P0103			
					Battery voltage	11 to 18 V			
Synchronization error	**P0340**	Rationality, Sync error, high due to soot	Ignition	Not synchronized	Engine speed	Running	600 revs	Two DCY	
					Revolutions	>500 after start phase	Once / DCY		
	P1340	Rationality, Sync error low	Ignition	Not synchronized	Engine speed	Running	600 revs	Two DCY	
					Revolutions	>500 after start phase	Once / DCY		
Misfire Detection	**P0300 to P0304**	Ionization detection At idle: combination of ionization- and crankshaft speed evaluation	Misfire counter 1000 revs	> 3%	Engine speed	> idle rpm at warm engine – 150 rpm	1000 OR 200 revs	Two DCY	
			Misfire counter 200 revs	See separate map	Load change transient MAP (for Man Transmission)	< ± 3,0 kPa/combustion	Continuous	MIL flashing	
					Torque	> 0 and not in disable			
					Fuel cut	Not active			
					Battery voltage	> 10.0 V			
					Enabling delay when Coolant temp is below –7 °C at start	Delayed until Coolant temp > 21 °C			
Misfire Detected With Low Fuel	**P0313**	Same as above	Misfire counter 200 revolutions	See separate map	Same as above	Same as above	200 revolutions	MIL blink	
					Fuel level	< 8% (5 liters)	Continuous		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
Detect signals	**P1312**	Signal high during fuel cut OR at start OR compared to defined window	Detect signal	High	Engine speed	Engine started	125 revolutions	Two DCY	
					Engine synchronization	During or after	Continuous		
	P1341 to P1344	Combustion signal cyl 1 OR 2 OR 3 OR 4 missing	Detect signal	Low	Engine speed	Engine started	45 revolutions	Two DCY	
					Engine synchronization	During or after	Continuous		
					No DTC set, pending or confirmed	Powertrain relay rationality, P0685			
Ion detection system error	**P1315**	Ion Detect Module connector disconnected	Combustion AND ignition signals	= 0 for more than 25 revs	Engine speed	Running > 400 rpm	25 revolutions	Two DCY	
					Fuel cut	Not active	Continuous		
					Load	> 10 mg/combustion			
Ion detect module ignition trig input	**P1350 to P1354**	All or single cylinder ignition trig input to ion detect module missing	Knock signal information	= 0 at combustion stroke	Engine speed	Running > 400 rpm	8 revolutions	Two DCY	
					Fuel cut	Not active	Continuous		
					Load	> 10 mg/combustion			
Knock signal	**P0325**	Faulty knock signal	Knock signal	No knock pulses	Accelerator pedal	Not released	8 revolutions	Two DCY	
					Engine speed	Engine started	Continuous		
					Coolant temperature	> 60°°C			
Injector Circuit	**P0201 to P0204**	El. Check – Min, max, open circuit	Short cut OR open circuit	Short cut to ground, battery or not connected	Battery voltage	> 6.0 V	1 sec	Two DCY	
					Engine speed	Engine moving OR running	Continuous		
					No DTC set, pending or confirmed	Powertrain relay rationality, P0685			
Ignition coil trigs 1, 2, 3 & 4	**P2300, P2303, P2306, P2309**	Control circuit range check min	Short-cut	To ground or not connected	Engine speed	Engine running	1 sec	Two DCY	
					Supply voltage	> 11 V	Continuous		
	P2301, P2304, P2307, P2310	Control circuit range check max	Short-cut	To battery voltage	Engine speed	Engine running	1 sec continuous	Two DCY	
					Supply voltage	> 11 V	Continuous		
EVAP Canister Vent Valve	**P0498**	Circuit continuity check	Short-cut	To ground or not connected	Engine speed	Running	6 sec, Continuous	Two DCY	
					Battery voltage	> 11 V			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS		TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
	P0499		Short-cut	To battery voltage	Purge	Not active		At engine start		
					No DTC set, pending or confirmed	Purge valve, P0441, P0444, P0445				
						Powertrain relay, P0685, P0686, P0687				
	P0446	Rationality check	Fuel tank pressure raise after EVAP leak check	Not raised 400 Pa within 8 sec	Fuel tank pressure	< -800 Pa		Once per DCY	Two DCY	
					EVAP test	Not active		Leak check time + 8 sec		
					Canister Vent Valve	Not active				
					Fuel tank pressure sensor	Adaption performed				
					Diagnostic ran and passed for	Canister Vent Valve circuit, P0498, P0499				
					IAT	> +4 °C				
					No DTC set, pending or confirmed	Purge valve, P0441, P0444, P0445				
						Fuel tank pressure sensor, P0451, P0452, P0453, P1451				
						Powertrain relay, P0685, P0686, P0687				
					Purge rationality diagnostic	Not active				
EVAP leak test General conditions						Enable	Disable			
					ECT & IAT	> +4 °C	< +4 °C			
					Ambient temperature	+ 35 deg C	+ 35 deg C			
					MAF D	-	±90 mg/comb			
					Fuel tank pressure	< 200 Pa	< 200 Pa			
					MAP	< -15 kPa	< -15 kPa (during pull-down)			
					Max number of vapor disables in DCY	2	2			
					Ramp 0: Slosh					
					Pressure change in expected direction		> 70 Pa			
					Pressure change in opposite direction		> 70 Pa			
					Ramp 0: ECT	> 40 °C				
					Ramp 1: Slosh					
					Pressure change in expected direction		> 300 Pa			
					Pressure change in opposite direction		> 160 Pa			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS		TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
					Ramp 2: Slosh					
					Pressure change in expected direction		> 111 Pa			
					Pressure change in opposite direction		> 80 Pa			
					Battery voltage	10 - 16 Volts				
					Fuel cut	Not active				
					Canister vent valve rationality test	Not active				
					No DTC set, pending or confirmed	Fuel tank pressure sensor, P0451, P0452, P0453, P1451				
						Tank pressure adaption, P1452, P1453, P1492, P1493				
						Vehicle speed sensor, P0501				
						Canister Vent Valve, P0446, P0498, P0499				
						Purge valve, P0441, P0444, P0445				
						Brake light switch, P0719, P0724				
						ECT sensor, P0115, P0117, P0118, P0119				
						IAT sensor, P0111, P0112, P0113				
						ABS communication, P1625				
					Time between test attempts	30 sec				
					at Vehicle speed (hot test)	> 27,3 mph				
					System power-up	In present DCY, or no test in previous DCY				
					Purge	Not active				
					Purge ramp	Finished, not required for cold start DCY (<40 °C)				
					Purge vapor HC content	Max. 50% of engine's fuel via purge				
					Fuel volume	15 to 85 %				
					Fuel level	Updated				
					Lambda control	Closed Loop				
					Catalyst diagnostic	Not active				
					AIR diagnostic	Not active				
					O2 sensor diagnostic	Not active				
						Enable	Disable			
Idle test					Vehicle speed	0	> 0	Once / DCY		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS		TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
					Brake activations	Max 2	max 2	25 sec		
					Purge adaption	**> -5% FWD** **> - 4,5% AWD**				
					Purge HC D vs. start		**> 20% FWD** **> 4 % AWD**			
					Lambda integrator D vs. start		**> 12,5% FWD** **> 4 % AWD**			
					Ambient pressure D	< 4kPa/3 min	> 4kPa/3 min			
					Fuel tank pressure	> -500 Pa	< -2100 Pa			
					Ramp 0 vapor generation		> 4 Pa/s			
Vehicle moving test Only active on FWD					Vehicle speed	43,5 – 80,8 mph		Once / DCY		
					Vehicle speed D vs. start		< ± 5 mph	35 s		
					Brake activations	Max 1	Max 1			
					Purge adaption	> -7%				
					Purge HC D vs. start		> 15,5%			
					Lambda integrator D vs. start		> 10%			
					Ambient pressure D	< 4kPa/3 min	> 4kPa/3 min			
					Fuel tank pressure	> -700 Pa	< -2750 Pa			
					Ramp 0 vapor generation		> 1,1 Pa/s			
Filler cap test, big leak / high vapor generation					Vehicle speed	31,1 – 93,2 mph		Max 50 times		
					Vehicle speed D vs. start		> ±7,5 mph	/DCY		
					Brake activations	Max 1	Max 1			
					Purge adaption	> -24%				
					Purge HC D vs. start		**> 30% FWD** **> 11% AWD**			
					Lambda integrator D vs. start		**> 25% FWD** **> 8% AWD**			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS		TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
					Ambient pressure D	**< 5kPa/3 min FWD < 9 kPa/3 min AWD**	**< 5kPa/3 min FWD < 9 kPa/3 min AWD**			
					Fuel tank pressure	> -700 Pa	< -2500 Pa			
					Ramp 0 vapor generation		**> 8 Pa/s FWD > 4 Pa/s AWD**			
EVAP large leak > 3 mm	**P0455**	Rationality check	Pressure does not reach specified level in specified time. See separate document						Two DCY	
	P1455	**When fuel level info is incorrect Only FWD**								
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 Only FWD**								
EVAP very small leak 0,5 < X < 1 mm	**P0456**	Rationality check	Pressure gradient check. See separate document	Average leak factor > 0 (valid values –3 to 3) 13 values in stack					Up to eight DCY	
	P1456	**When fuel level info is incorrect Only FWD**								
Fuel tank pressure sensor	**P0452**	Low end check	Short cut	To ground or not connected	Ignition on	>2 sec		3 sec	Two DCY	
	P0453	High end check	Short cut	To battery	Engine speed	Running		Continuous		
					Battery voltage	>11,0 V				
	P0451	Rationality	Number of flank shifts (of 25 Pa)	> 15 times in 5 sec	Ignition on	>2 sec		5 sec	Two DCY	
	P1451	**When fuel level info is incorrect Only FWD**	Same as above	Same as above	Engine speed	Running		Once / DCY		
					Battery voltage	>11,0 V				
					ECT & IAT	> +4°C				
					Fuel in tank	< 85% (53 liters)				
					No DTC set, pending or confirmed	Fuel tank pressure sensor circuit, P0452, P0453				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
						Canister Vent Valve, P0446, P0498, P0499			
						Purge valve, P0441, P0444, P0445			
						Tank pressure adaption, P1452, P1453, P1492, P1493			
					Fuel level	Updated			
Fuel tank pressure sensor	**Pressure adaption, general conditions**				BARO pressure	75 to 106 kPa			
					Vehicle speed	0			
					Engine speed	0			
					ECT	< +40°C			
					Fuel tank volume	< 80,5% (50 liter)			
					IAT	> 0°C			
					No DTC set, pending or confirmed	Fuel tank pressure sensor, P0451, P0452, P0453, P1451			
					ECU	First time after Power Up			
	P1452	Sensor Offset	Min failure	Adaption value < -750 Pa	Engine speed	Running	Ignition on + 5s	Two DCY	
	P1492	**When fuel level info is incorrect Only FWD**			Fuel tank pressure sensor adaption	Performed	Once / DCY		
					Fuel level	Updated			
					Battery voltage	> 11,0 V			
	P1453	Sensor Offset	Max failure	Adaption value >1000 Pa	Engine speed	Running	Ignition on + 5s	Two DCY	
	P1493	**When fuel level info is incorrect Only FWD**			Fuel tank pressure sensor adaption	Performed	Once / DCY		
					Fuel level	Updated			
					Battery voltage	> 11,0 V			
EVAP Purge Valve	**P0441**	Valve leaking	Tank pressure drop when valve is commanded closed	> 30 Pa/sec	Vehicle speed	0	3 sec	Two DCY	
					Fuel volume	15 - 85 %	Once / DCY		
					Engine speed	Running			
					Purge	Not active			
					IAT & ECT at engine start	+4 to +40 °C			
					Battery voltage	11 to 16 Volts			
					MAP	< -15 kPa			
					No DTC set, pending or confirmed	Canister Vent Valve, P0446, P0498, P0499			
						ECT sensor, P0115, P0117, P0118, P0119			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
						Vehicle speed sensor, P0501			
						Tank pressure adaption, P1452, P1453, P1492, P1493			
						ABS communication, P1625			
						Powertrain relay, P0685, P0686, P0687			
					Diagnostic ran and passed for	Purge Valve circuit, P0444, P0445			
					ECU	First time after Power Up			
	P0444	Circuit continuity check	Short-cut	Short cut to ground or not connected	Engine speed	Running	1 sec	Two DCY	
	P0445		Short-cut	Short cut to battery voltage	Battery voltage	> 11,0 V	Continuous		
					Purge valve	Active (ECT > 40°C)			
					No DTC set, pending or confirmed	Powertrain relay, P0685, P0686, P0687			
Fuel level **FWD only**	**P0462**	Min signal	AD value	< 2000	Engine speed	Running	1 sec	No MIL, will set alternate DTC for EVAP rationalities Sets fuel volume to default: 64,5 % (40 liters)	
	P0463	Max signal	AD value	> 25000	Battery voltage	> 11,0 V			
	P0460	Rationality, no activity	Fuel level info change	< 1,6% (1 liter)	Engine speed	Running	15,5 miles		
					Battery voltage	> 11,0 V			
					No DTC set, pending or confirmed	Fuel level circuit, P0462, P0463			
					If the volume increases with more than 16% (10 liters) during DCY, refueling is assumed, and a new reference will be taken.	When volume reference > 85% (53 liters) OR < 3,2% (2 liters), driving distance for evaluation is increased to 93,2 miles.			
	P0461	Rationality, fuel consumption	Fuel level change	Fuel consumption less than 0,8% (0,5 liters). 5 checks done for fault setting. Results saved in buffer, also between DCY:s.	Reference volume updated when Vehicle speed	> 24,9 mph	5 X 21,7 miles	No MIL, will set alternate DTC for EVAP rationalities Sets fuel volume to	
					Evaluation distance	21,7 miles			
					Evaluation distance when fuel level >90%	43,5 miles			
					Diagnostic ran and passed for	Fuel tank level sensor,			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
Fuel level **AWD only** Primary sensor	**P0462**	Min signal	AD value	< 50	Engine speed	Running	1 sec	Two DCY	
	P0463	Max signal	AD value	> 626	Battery voltage	> 11,0 V			
	P0460	Rationality, no activity	Fuel level info change	< 2 liters	Engine speed	Running	37,3 miles		
			In distance	37,3 miles	Battery voltage	> 11,0 V			
			Distance accumulated over DCYs. Reset at refueling and after State change		No DTC set, pending or confirmed	Fuel level circuit, P0462, P0463			
					State 3 Primary fuel sensor reading AND Secondary fuel sensor reading	In measurement range, 0,3 - 24 liters In measurement range, 3 - 24 liters			
					State 4 Primary fuel sensor reading AND Secondary fuel sensor reading	In measurement range, 0,3 - 24 liters Empty, < 3 liters			
Fuel level **AWD only** Secondary sensor	**P2067**	Min signal	AD value	> 814	Engine speed	Running	1 sec	Two DCY	
	P2068	Max signal	AD value	< 50	Battery voltage	> 11,0 V			
	P2065	Rationality, no activity	Fuel level info change	< 2 liters	Engine speed	Running	37,3 miles / 248,6 miles		
			In distance	37,3 miles, State 1 & 3	Battery voltage	> 11,0 V			
				248,6 miles, State 5	No DTC set, pending or confirmed	Fuel level circuit, P2067, P2068			
			Distance accumulated over DCYs. Reset at refueling and after State change		State 1 Primary fuel sensor reading AND Secondary fuel sensor reading	Full, > 24 liters In measurement range, 3 - 24 liters			
					State 3 Primary fuel sensor reading AND Secondary fuel sensor reading	In measurement range, 0,3 - 24 liters In measurement range, 3 - 24 liters			
					State 5 Primary fuel sensor reading AND Secondary fuel sensor reading	Full, > 24 liters Full, > 24 liters			
Fuel level **AWD only** Primary AND Secondary Sensors	**P0460 AND P2065**	Illogical sensor information, monitor cannot isolate faulty sensor, two DCYs will be set	Stuck at State 2		Engine speed	Running	31 miles	Two DCY	
			For distance	31 miles	Battery voltage	> 11,0 V			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
					No DTC set, pending or confirmed	Fuel level circuit P0462, P0463, P2067, P2068			
					State 2 Primary fuel sensor reading AND Secondary fuel sensor reading	Full, > 24 liter Empty, < 3 liters			
Fuel transfer pump **AWD only**	**P2636**	Min signal	AD value	< 2000	Engine speed	Running	120 sec	Two DCY	
					Battery voltage	> 11,0 V			
					No DTC set, pending or confirmed	Fuel level circuit P0462, P0463, P2067, P2068			
					State 6 Primary fuel sensor reading AND Secondary fuel sensor reading	Empty, < 0,3 liters In measurement range, > 15 liters			
Fuel trim, long term	**P0171**	System lean	Long term	<-24,6%	Engine speed	Running	1 sec	Two DCY	
	P0172	System rich	Long term	>+24,6%	Lambda control	Active	Continuous		
		Fuel trim matrix with 20 load/rpm cells. Diagnostic will fail if the trim value in present cell is above threshold		**<-24% AWD**	Fuel trim	6 updates in actual load/rpm cell (100 msec cycle time)			
				>+24% AWD	Coolant temperature	> 71 deg C			
					Diagnostic ran and passed for	MAF, P0101, P0102, P0103			
						ECT sensor, P0115, P0117, P0118, P0119			
						Front O2 sensor, P0131, P0132, P0134			
Front O2 sensor	**P0132**	Range check high	Voltage	>1200 mV	Engine speed	Running	5 sec	Two DCY	
					Battery voltage	11,0 < U < 18,0V	Continuous		
					Front O2 sensor heater	Active - sensor			
					Closed-loop fueling	Active			
	P0131	Range check low	Voltage	< 100 mV in 30 sec	Engine speed	Running	30 sec	Two DCY	
					Rear sensor signal	> 700 mV	Continuous		
					Front O2 sensor heater	Active - sensor			
					Battery voltage	> 11,0V			
					Lambda control	Active > 5 sec			
					Load	> 0			
					AIR	Not active			
					EVAP leak test	Not active			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
					Fuel cut	Not active			
	P0134	Circuit Continuity check	Voltage For time	300 to 600 mV 30 sec	Engine speed	Running	30 sec	Two DCY	
			OR		Battery voltage	> 11,0V	Continuous		
			Short term fuel trim AND Rear O2 sensor signal For time	Rich, corrects -24,5 % < 200 mV 3 sec	Sensor heater	Active			
					Sensor heater active time from engine starting, depending on IAT or ECT at start.	<-9°C for 570 sec			
						-8 to 8°C for 270 sec			
						>8°C for 80 sec			
					EVAP leak test	Not active			
					No DTC set, pending or confirmed	IAT sensor, P0111, P0112, P0113			
					Lambda control	Closed loop			
	P0133	Response rate	Signal switches, O2 sensor passing integrator switch voltage in either direction	< 4 in 140 revolutions FWD	Engine speed	1200 – 3000 rpm	135 revolutions	Two DCY	
				< 4 in 130 revolutions FWD	Lambda control	Closed loop	Once / DCY		
			OR		Battery voltage	> 11,0 V			
			Revolutions	> 100 for 4 switches	Engine load	210 - 350			
					Lambda Integrator	Within ±15%			
					ECT	> 70°C			
					Time from engine starting	> 180 sec			
					Purge fuel factor	> -10%			
					No DTC set, pending or confirmed	O2 Sensor Switch Point, P1131, P1132			
						MAF, P0101, P0102, P0103			
O2 Sensor Switch Point	**P1131**	Switch point trim delays short term shift based on O2 sensor switch point drift. DTC sets when emissions correlated limit is reached	**Lean AWD**	> 15 revolutions	Engine speed	1400 - 2800 rpm	15 revolutions	Two DCY	Steady-state at 56 mph for 5 minutes
	P1132		**Lean FWD**	> 11,5 revolutions	Coolant temp	> 71ºC	Continuous		
			Rich AWD	> 12,5 revolutions	Delta load	< 50			
			Rich FWD	> 11,5 revolutions	Load	125 - 475			
					Fuel control	Closed loop			
					Rear sensor voltage for trim activation	> 635 mV or < 575 mV			
					Stable time	15 sec			
					Additional stable time if after fuel-cut	60 sec			
					Time between adaptions	30 sec			
					No DTC set, pending or confirmed	MAF, P0101, P0102, P0103			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
					Diagnostic ran and passed for	Rear O2 Sensor, P0137, P0138, P0140			
Front O2 sensor heater	**P0031**	Range check min	Short cut	To ground or not connected	Engine speed	Running	6 sec	Two DCY	
					Battery voltage	> 11,0 V	Continuous		
					O2 heater frequency	10 % < PWM < 85 %			
	P0032	Range check max	Short cut	To battery voltage	Engine speed	Running	6 sec	Two DCY	
					Battery voltage	> 11,0 V	Continuous		
					O2 heater frequency	10 % < PWM < 85 %			
	P0030	Rationality	Heater current	< 300 mA for > 10 sec	Engine speed	Running	10 sec	Two DCY	
				> 2300 mA for > 10 sec	Battery voltage	> 11,0 V	Continuous		
					PWM Duty Cycle	10 to 85 %			
					No DTC set, pending or confirmed	Front O2 sensor heater circuit, P0031, P0032			
						Fuel pump relay, P0628, P0629			
Rear 02 sensor	**P0137**	Signal low	Voltage	< 100 mV for > 30 sec	Engine speed	Running	6 sec	Two DCY	
					Battery voltage	> 11,0 V	Continuous		
					Rear O2 sensor heater	Active - sensor			
					Lambda closed loop	> 5 sec			
					Lambda integrator	Within -20 to +20 %			
					Load	> 170 mg			
						No EVAP leak test			
						AIR not active			
						No Fuel Cut			
					No DTC set, pending or confirmed	MAF, P0101, P0102, P0103			
	P0138	Signal high	Voltage	>1200 mV	Engine speed	Running	5 sec	Two DCY	
					Battery voltage	> 11,0 V	Continuous		
					Rear O2 sensor heater	Active - sensor			
	P0140	Activity	Sensor voltage	>400 mV	Engine speed	Running	200 msec	Two DCY	Unified cycle demo
					Fuel cut	Active for > 6,5 sec	Once/DCY		
					Battery voltage	> 11,0 V			
					Lambda control	Active for > 20 sec			
					Rear O2 sensor heater	Active - sensor			
	P0139	Response check	Time for rear O2 sensor voltage: 570 mV to 150 mV during fuel-cut	> 3000 msec	Engine speed	Running	3 sec	Two DCY	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
					Battery voltage	> 11,0 V	Once / DCY		
					Coolant temperature	> 60 deg C			
					Rear O2 sensor heater	Active > 4 sec			
					Fuel cut	Active in all cylinders			
					Delta load before fuel cut	< 15 mg/combustion for 4 seconds			
					Misfire detect level	No combustions detected during test			
					Sensor voltage before test	> 590 mV			
					Closed loop before fuel cut	> 15 sec			
					No DTC set, pending or confirmed	MAF sensor, P0101, P0102, P0103			
						O2 sens pre heat, P0030, P0031, P0032			
						O2 sens pre, P0131, 0132, P0133,			
						O2 sens post heat, P0036, P0037, P0038			
						O2 sens post, P0137, P0138, P0140			
						ECT sensor, P0115, P0117, P0118, P0119			
						AIR			
						Purge valve, P0441, P0444, P0445			
						Canister Vent Valve, P0446, P0498, P0499			
						EVAP leak check,			
						P0455, P1455, P0442, P1442, P0456, P1456			
Rear O2 sensor heater	**P0037**	Range check min	Short cut	To ground or not connected	Engine speed	Running	6 sec	Two DCY	
					Battery voltage	> 11,0 V	Continuous		
					Sensor heater	Active			
					O2 heater frequency	10 % < PWM < 85 %			
	P0038	Range check max	Short cut	To battery voltage	Engine speed	Running	6 sec	Two DCY	
					Battery voltage	> 11,0 V	Continuous		
					Sensor heater	Active			
					O2 heater frequency	10 % < PWM < 85 %			
	P0036	Rationality	Heater current	< 200 mA for > 10 sec > 2300 mA for > 10 sec	Engine speed	Running	10 sec	Two DCY	
					Battery voltage	> 11,0 V	Continuous		
					Sensor heater	Active			
					No DTC set, pending or confirmed	Rear O2 sensor heater circuit, P0037, P0038			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
						Fuel pump relay, P0628, P0629			
MAP sensor	**P0106**	Rationality	MAP	> 50 kPa for 400 msec	Engine speed	Running > 1300 rpm	5 readings	Two DCY	
					Accelerator pedal	Released for > 400 msec	Once / DCY		
					Load	< 110 mg/combustion			
					No DTC set, pending or confirmed	MAP circuit, P0107, P0108			
						Crankshaft position sensor, P0337, P0339			
	P0106	Rationality, comparison of system pressure sensor readings before engine cranking	MAP - turbocharger boost pressure	> 12 kPa	Vehicle speed	0	3 readings, 25 msec cycle time	Two DCY	
			OR		Engine speed	0			
			MAP - AIR pressure	> 12 kPa	Ignition	On			
			AND AIR - turbocharger boost pressure		No DTC set, pending or confirmed	AIR pressure sensor circuit, P2432, P2433			
				< 8 kPa		Turbo boost pressure circuit, P0237, P0238			
			OR			MAP circuit, P0107, P0108			
			Turbocharger boost - AIR pressure	> 12 kPa					
			AND						
			MAP - turbocharger boost pressure	> 12 kPa					
			AND MAP - AIR pressure	> 12 kPa					
	P0109	Rationality	MAP	<10 kPa or >140 kPa for 2,0 sec	Engine speed	Cranking	Once / DCY	Two DCY	
	P0107	Range check min	Short-cut	To ground or not connected	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	
	P0108	Range check max	Short-cut	To sensor supply voltage	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	
Turbo boost pressure sensor	**P0237**	Range check min	Short-cut	To ground or not connected	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
	P0238	Range check max	Short-cut	To sensor supply voltage	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	
	P0236	Rationality, comparison of system pressure sensor readings before engine cranking	Turbocharger boost - AIR pressure	> 12 kPa	Vehicle speed	0	3 readings, 25 msec cycle time	Two DCY	
			OR		Engine speed	0			
			Turbocharger boost - MAP pressure	> 12 kPa	Ignition	On			
					No DTC set, pending or confirmed	AIR pressure sensor circuit, P2432, P2433			
			AND MAP - AIR pressure	< 8 kPa		Turbo boost pressure circuit, P0237, P0238			
			OR			MAP circuit, P0107, P0108			
			Turbocharger boost - AIR pressure	> 12 kPa					
			AND						
			Turbocharger boost - MAP pressure	> 12 kPa					
			AND						
MAF sensor	**P0102**	Range check, low signal	Short-cut	To ground or not connected	Engine speed	Running OR Moving	Continuous	Two DCY	
					No DTC set, pending or confirmed	Powertrain relay, P0685, P0686, P0687			
	P0103	Range check, high signal	Short-cut	To sensor supply voltage	Engine speed	Running OR Moving	Continuous	Two DCY	
					No DTC set, pending or confirmed	Powertrain relay, P0685, P0686, P0687			
MAF sensor, rationality	**P0101**	Comparison of measured MAF sensor signal with mass air flow calculated from throttle area, BARO, MAP and Turbo Boost sensors. Samples are taken in two load windows, below and above 15 g air/sec. To report fault, the average deviation in one of the windows has to be above the limit after 500 samples. To report pass, 500 samples have to be taken in both load windows with less deviation than the fault limit.	MAF deviation AND	> -24%	Engine speed	Running	500 samples or more	Two DCY	
			Fuel Trim	> -20%	Battery Voltage	> 11 Volts	Continuous		
			OR MAF deviation AND	> 24%	Coolant Temperature	67 - 115 °C			
			Fuel Trim	> 20%	Engine Speed	1400 – 4000 rpm			
			OR MAF deviation	> ±30%	Pressure quote, MAP vs. pressure before throttle	0,39 - 0,70			
					MAP deviation between samples	< ±2,5 kPa in 1500 msec			
					Calculated Mass Air Flow (from MAP)	> 7 g/s			
					Boost by-pass status change	No change for 500 ms			
					Vehicle speed to enable test	> 18,6 mph for 60 sec			
					Fuel cut	Inactive			
					Ambient pressure, modeled	> 72 kPa			
					ECT at start	> -7°C			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
					Diagnostic ran and passed for	MAP sensor, P0106, P0107, P0108			
						IAT sensor, P0111, P0112, P0113			
						Turbo boost pressure sensor, P0237, P0238, P0236			
IAT sensor	**P0112**	Range check min	Device driver detects min error	Circuit low	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	
	P0113	Range check max	Device driver detects max error	Circuit high	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	
	P0111	Rationality, no activity	IAT sensor output change	< 1 °C	Soak time	> 600 min	900 sec	Two DCY	
					Run time	> 900 sec	Once / DCY		
					Engine	Running			
					Load	> 270 mg/comb			
					For time	150 sec cumulative			
					ECM reset	Not allowed			
ECT sensor	**P0115**	Rationality, No activity	Temp. change	< 2 °C	Engine speed	Running	Load condition depandant	Two DCY	
					Load < 150 mg/combustion FWD < 180 mg/combustion AWD	180 sec	Once / DCY		
					AND > 270 mg/combustion	150 sec			
					ECT at start	=< 71 °C			
					Vehicle speed	> 0 mph			
					No DTC set, pending or confirmed	ECT circuit, P0117, P0118			
Thermostat / ECT rationality	**P0128**	Rationality	Sample period of 200 sec starts when modeled ECT reaches 80 °C. Comparison at end of sample period: Mean value of difference between ECT reading and modeled coolant temperature	> 30 °C above modeled ECT OR > Calculated limit below modeled ECT	Engine speed	Running	300 to 700 sec	Two DCY	
					ECT at start-up	< 52 °C	Once / DCY		
					Calculated coolant temp	> 80 °C			
					Idle portion of DCY	< 50 %			
					Fuel cut portion of DCY	< 50 %			
					Ambient pressure, modeled	> 72 kPa			
					ECT at start	> -7°C			
					Time after start	< 750 sec			
					Diagnostic ran and passed for	ECT sensor, P0115, P0117, P0118, P0119			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
						IAT sensor, P0111, P0112, P0113			
						Vehicle speed			
					Disables for remainder of DCY if Vehicle speed	> 87 mph for > 30 sec (accumulated time)			
					Block heater start	Not allowed			
Low sided ECT rationality	**P0126**	Rationality	Sample period of 60 sec starts when modeled ECT reaches 10 °C. Comparison at end of sample period: Mean value of ECT reading is compared with threshold	ECT < 5 ° C	Engine speed	Running	150 to 300 sec	Two DCY	
					ECT at start-up	< 0 °C	Once / DCY		
					IAT or ECT sensor	Below -7 deg C			
					Idle portion of DCY	< 50 %			
					Fuel cut portion of DCY	< 50 %			
					Ambient pressure, modeled	> 72 kPa			
					Time after start	< 800 sec			
					No DTC set, pending or confirmed	ECT sensor circuit, P0117, P0118			
						IAT sensor, P0112, P0113			
					Diagnostic ran and passed for	ABS communication, P1625			
						Vehicle speed, P0501			
						ECT sensor rationality, P0115 P0119			
						IAT sensor rationality P0111			
					Disables for remainder of DCY if Vehicle speed	> 87 mph for > 30 sec (accumulated)			
					Block heater start	Not allowed			
ECT sensor	**P0117**	Range check min	Device driver detects min error	Circuit low	Engine speed	Not moving OR running	1 sec Continuous	Two DCY	
	P0118	Range check max	Device driver detects max error	Circuit high	Engine speed	Not moving OR running	1 sec Continuous	Two DCY	
	P0119	Too quick change	Mean value in stack (of 5 values)	> 10 °C	Engine speed	Running	5 readings, time base 100 msec	Two DCY	
					Comparison of each ECT reading, insert into stack when diff. from previous reading	> 5 °C	Continuous		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
	P0119	Too quick change	Difference between consecutive values	> 60 °C	Engine speed	Running	Continuous	Two DCY	
			When the threshold has been exceeded, the monitor waits for 2 secs before setting to allow for a possible circuit fault to set		No DTC set, pending or confirmed	ECT sensor circuit, P0117, P0118			
ECT sensor stuck above lowest maximum enable / ECT vs. IAT comparison	**P011B**	Rationality	ECT vs IAT reading at engine start	ECT > 20 deg C above IAT OR	Engine speed	Running	45 sec	Two DCY	
				IAT > 30 deg C above ECT	Engine off time	> 480 min	Once / DCY		
					Engine run time	45 sec			
					ECT drop after 45 sec	< 2 deg C			
					Block heater start	Not allowed			
					ECM reset	Not allowed			
Turbocharger bypass valve	**P0034**	Control circuit Low	Device driver detects valve error	Circuit low	Engine speed	Running	Continuous	Two DCY	
					Turbo bypass valve	Active			
	P0035	Control circuit High	Device driver detects valve error	Circuit high	Engine speed	Running	Continuous	Two DCY	
					Turbo bypass valve	Active			
	P0033	Rationality	Mean value of 50 MAF pulsations at Accelerator released	> 1.90 mg/sec	Engine speed	Running < 3500 rpm	600 msec,	Two DCY	US06 demo
					Turbo bypass valve	Commanded Open	> 1 time		
					Turbo boost pressure	> Ambient pressure +	Continuous		
			AND		Ambient pressure model	Updated			
			Mean value of 50 Turbo Boost Pressure pulsations at Accelerator released	> 1.1kPa	Ambient pressure, modeled	> 72 kPa			
					ECT at start	> -7°C			
					No DTC set, pending or confirmed	MAP sensor, P0106, P0107, P0108			
						Powertrain relay, P0685, P0686, P0687			
					Mean value of Throttle during pulsation period	< 2,6 %			
Turbocharger wastegate solenoid	**P0245**	Control circuit Low	Device driver detects min error	Circuit low	Engine speed	Running	Continuous	Two DCY	
					No DTC set, pending or confirmed	Powertrain relay functional test, P0685			
	P0246	Control circuit High	Device driver detects max error	Circuit high	Engine speed	Running	Continuous	Two DCY	
	P0244	Functional test	Turbo boost pressure decrease slope	+ 12 to - 10 kPa/sec	Engine speed	> 2200 rpm & < 5000 rpm	1,0 sec	Two DCY	US06 demo
					Turbo boost pressure	> Ambient pressure + 39 kPa	Continuous		
			AND Mean pressure diff over	> 23 kPa	Ambient pressure model	Updated			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
			throttle	> 30 kPa when BARO > 85 kPa	Ambient pressure, modeled	> 72 kPa			
					ECT	> 71°C			
					Accelerator position	5 - 50%			
					Max throttle change during sample period vs. start value	< 10%			
					ECT at start (out of limits)	> -7°C			
					Boost adaption	Done (also in earlier DCY)			
					No DTC set, pending or confirmed	Wastegate circuit, P0245, P0246			
					Diagnostic ran and passed for	Turbo boost pressure sensor, P0237, P0238, P0236			
						MAP sensor, P0106, P0107, P0108			
		Functional test	Pressure difference over throttle	< -300 mg/comb	Same as above		500 msec		US06 demo
							Continuous		
Time to closed loop	**P0125**	Rationality	Time before entering closed loop	> 600 sec	Engine speed	Running	600 sec	Two DCY	
					Start Temperature, lowest of ECT/IAT	< -7°C	Once / DCY		
			Time before entering closed loop	>150 sec	Engine speed	Running	300 sec	Two DCY	
					Start Temperature, lowest of ECT/IAT	-7°C < T < 10°C	Once / DCY		
			Time before entering closed loop	> 60 sec	Engine speed	Running	120 sec	Two DCY	
					Start Temperature, lowest of ECT/IAT	>10°C	Once / DCY		
Crankshaft position sensor	**P0337**	Sensor circuit low	Engine speed at cranking	< 100 rpm	Cranking defined by		3,5 sec	Immediately	
					Battery voltage	D > 0,6 V	Once / DCY		
					AND MAP vs. Ambient pressure diff.	> 2 kPa			
					IF above conditions not met:	For 2 sec			
					THEN Close throttle	For 1,5 sec			
					MAP vs. Ambient pressure diff.	> 5 kPa			
					AND check engine speed				
	P0339	Rationality	Lost position in same DCY	Position found then lost during 10 msec, > 7 times	Vehicle speed	= 0 mph	3 sec	Two DCY	
					Engine speed	Cranking OR Running < 3 sec	Continuous		
					Ignition	On			
			Lost position in same DCY	Position found then lost during 10 msec, > 3 times	Vehicle speed	> 18,6 mph	Error occurs 3 times	Two DCY	
					Brake	Not active	Continuous		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
					Engine speed	Running > 3 sec			
					Ignition	On			
Vehicle speed	**P0501**	Fault reported from ABS	Wheel Angular Velocity Front Left Validity bit AND	Not received within 1 sec	Ignition	On for > 3 sec	1 sec, continuous	Two DCY	
					Battery voltage	6.0 V to 16.0 V			
			Wheel Angular Velocity Front Right Validity bit		Nodes on HS CAN	Not in sleep mode OR programming mode			
					No DTC set, pending or confirmed	Lost communication with ABS module, P1625			
Brake light switch	**P0719**	Rationality - low	Vehicle speed	4 times decreases from 24,9 to 1,9 mph within 2 to 12 sec	Engine speed	Running	Once / DCY	Two DCY	
					Brake	Not active			
	P0724	Rationality - high	Vehicle speed	4 times increases from 1,9 to 24,9 mph within 2 to 12 sec	Engine speed	Running	Once / DCY	Two DCY	
					Brake	Active			
Accelerator position sensor 1	**P2122**	Range check min	Short cut	To ground OR open circuit (< 10%)	Ignition	Off OR On	100 msec	Immediately	
	P2123	Range check max	Short cut	To battery (> 93%)	Engine speed	Moving, not moving, running, stopping	Continuous		
	P2121	Rationality check	Detected by MCP if Main processor faulty	Signal out of range (< 10%, > 93%)	Ignition	Off OR On	100 msec	Immediately	
				Min or max fault not possible to determine	Engine speed	Moving, not moving, running, stopping	Continuous		
					No DTC set, pending or confirmed	Accel. pos 1 circuit, P2122, P2123			
Accelerator position sensor 2	**P2127**	Range check min	Short cut	To ground OR open circuit (< 5%)	Ignition	Off OR On	100 msec	Immediately	
	P2128	Range check max	Short cut	To battery (> 50%)	Engine speed	Moving, not moving, running, stopping	Continuous		
	P2126	Rationality check	Detected by MCP if Main processor faulty	Signal out of range (< 5%, > 50%)	Ignition	Off OR On	100 msec	Immediately	
				Min or max fault not possible to determine	Engine speed	Moving, not moving, running, stopping	Continuous		
					No DTC set, pending or confirmed	Accel. pos 2 circuit, P2127, P2128			
Accelerator position sensors 1 & 2	**P2138**	Rationality check, correlation fault	Difference between 1 & 2	> 5,2%	Ignition	Off OR On	200 msec	Immediately	
			OR difference between adaptation values of 1 & 2	> 3,4% for 192 msec	Engine speed	Moving, not moving, running, stopping	Continuous		

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
Throttle position sensor 1	**P0122**	Range check min	Short cut	To ground OR open circuit (< 5,5%)	Ignition	Off OR On	100 msec	Immediately	
	P0123	Range check max	Short cut	To battery (> 94,5%)	Engine speed	Moving, not moving, running, stopping	Continuous		
	P0121	Rationality check	Detected by MCP if Main processor faulty	Signal out of range (< 5,5%, > 94,5%)	Ignition	Off OR On	100 msec	Immediately	
				Min or max fault not possible to determine	Engine speed	Moving, not moving, running, stopping	Continuous		
					No DTC set, pending or confirmed	Throttle pos 1 circuit, P0122, P0123			
Throttle position sensor 2	**P0222**	Range check min	Short cut	To ground OR open circuit (< 5,5%)	Ignition	Off OR On	100 msec	Immediately	
	P0223	Range check max	Short cut	To battery (> 94,5%)	Engine speed	Moving, not moving, running, stopping	Continuous		
	P0221	Rationality check	Detected by MCP if Main processor faulty	Signal out of range (< 5,5%, > 94,5%)	Ignition	Off OR On	100 msec	Immediately	
				Min or max fault not possible to determine	Engine speed	Moving, not moving, running, stopping	Continuous		
					No DTC set, pending or confirmed	Throttle pos 2 circuit, P0222, P0223			
Throttle position sensors 1 & 2	**P2135**	Rationality check, correlation fault	Difference between 1 & 2	> 4%	Ignition	Off OR On	200 msec	Immediately	
			OR difference between adaptation values of 1 & 2	> 4% for 192 msec	Engine speed	Moving, not moving, running, stopping	Continuous		
Throttle motor	**P2176**	Rationality check, throttle min pos learning fault	Throttle movement	No movement after 10 alternations	Ignition	Off OR On	1,5 sec	Immediately	
					Engine speed	Moving, not moving, running, stopping	Continuous		
	P0638	Rationality check, throttle position fault	Throttle movement	In wrong direction OR	Ignition	Off OR On	400 msec	Immediately	
				Does not follow calculated movement test pattern OR	Engine speed	Moving, not moving, running, stopping	Continuous		
				> Calculated limit in Bowden cable mode					
	P1523	Rationality check, throttle default position fault	Throttle position	> 41% detected by Main OR	Ignition	Off OR On	1 sec	Immediately	
				Not within 27% to 41% detected by MCP OR	Engine speed	Moving, not moving, running, stopping	Continuous		
			MAF Air flow	> 23 g/s	Throttle motor power	Disabled			
	P1681	Sensor switching fault	Transistor to pull one throttle sensor to ground does not toggle within OR	700 msec	Engine speed	Not moving, moving, running, stopping	700 msec	Immediately	
			TPS1 is grounded like TPS2	TPS1 changes > 20% when grounding TPS2	Ignition	On	Continuous		
			TPS2 is not grounded like it should be	TPS2 > 25%					

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
ECM int ROM	**P0601**	ROM checksum control	Checksum	Faulty for 200 msec	Ignition	On	200 msec	Immediately	
					Engine speed	Running, moving, not moving, stopping	Continuous		
ECM int RAM	**P0604**	RAM check	RAM	Faulty for 200 msec	Ignition	On	200 msec	Immediately	
					Engine speed	Running, moving, not moving, stopping	Continuous		
ECM int comm	**P0606**	Internal communication supervision	ECM CPU Internal serial communication	Faulty for 200 msec	Ignition	On	200 msec	Immediately	
					Engine speed	Running, moving, not moving, stopping	Continuous		
ECM CPU fault	**P0607**	CPU control	CPU	Faulty for 200 msec	Engine speed	Ignition off, not moving, moving, running, stopping	200 msec	Immediately	
End Of Line programming fault	**P0602**	ECU programming supervision	CAN vehicle configuration	Unprogrammed	Ignition	On	Continuous	Two DCY	
	P0610		Variant data	Unprogrammed			200 msec		
	P0630		VIN	Unprogrammed					
	P0632		Wheel circumference	Unprogrammed					
Vref 1	**P0641**	Voltage supply 1 out of range	Voltage supply 1	Not within 87,75 to 92,25%	Ignition	On	100 msec	Immediately	
					Engine speed	Running, moving, not moving, stopping	Continuous		
Vref 2	**P0651**	Voltage supply 2 out of range	Voltage supply 2	Not within 87,75 to 92,25%	Ignition	On	100 msec	Immediately	
					Engine speed	Running, moving, not moving, stopping	Continuous		
ECM int A/D	**P1680**	Comparison A/D conversion of Pedal Position sensor	Main processor vs. MCP A/D conversion difference of Pedal position sensor	> 3%	Ignition	On	200 msec	Immediately	
					Engine speed	Running, moving, not moving, stopping	Continuous		
TCM CAN data	**P1623**	Transmission controller data missing on CAN BUS	Message TCM general status	Not received within 1 sec	Ignition	On (3 sec since power up)	1 sec	Two DCY	
					Battery voltage	6 – 18 V	Continuous		
					Communication	Normal			
					Gear box	Automatic			
					Recover from a reset, over or under voltage condition				

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
TCS/ABS CAN data	**P1625**	TCS/ABS controller data missing on CAN BUS	Message ABS general status	Not received within 1 sec	Ignition	On for more than 3 sec	3 sec	Two DCY	
			OR		Battery voltage	6 – 18 V	Continuous		
			message response to Wheel Angular Velocity Front Right Validity bit check	Not received within 1 sec	HS CAN	All nodes not in sleep mode			
Fuel pump relay	**P0628**	Circuit continuity check	Short-cut	To ground or not connected	Engine speed	Not moving OR Running	1 sec	Two DCY	
					Battery voltage	> 11,0 V	Continuous		
	P0629		Short-cut	To battery voltage	Ignition	On			
Powertrain relay	**P0686**	Circuit continuity check	Short-cut	To ground or not connected	Engine speed	Not moving OR Running	0,5 sec	Two DCY	
					Battery voltage	> 11,0 V	Continuous		
	P0687		Short-cut	To battery voltage	Ignition	On			
	P0685	Functional test	Powertrain relay	Activated	Engine speed	Not moving OR Running	0,5 sec	Two DCY	
			AND BoostControl	Reports low fault			Continuous		
			AND PurgeValve	Reports low fault					
			Injector 1	Reports low fault					
			Injector 2	Reports low fault					
			Injector 3	Reports low fault					
			Injector 4	Reports low fault					
			Combustion detect signals	0					
Idle Rpm Control	**P0506**		Engine idle	Nominal – 100 rpm	Vehicle speed	0	10 sec	Two DCY	
			AND Load	< 225 mg/comb	Battery voltage	> 11,0 V	Continuous		
			AND Air to raise idle rpm	Reached maximum	Accelerator pedal	Released			
			AND all of the above during	10 sec	Throttle limphome, P0606, P0638, P1681, P0121, P0641, P0221, P0651, P2138	Not active			
					Ambient pressure, modeled	> 72 kPa			
	P0507		Engine idle	Nominal + 200 rpm	Vehicle speed	0	10 sec	Two DCY	
			AND Air to raise idle rpm	Reached minimum	Battery voltage	> 11,0 V	Continuous		
			AND all of the above during	10 sec	Accelerator pedal	Released			
					Throttle limphome, P0606, P0638, P1681, P0121, P0641, P0221, P0651, P2138	Not active			
					Ambient pressure, modeled	> 72 kPa			
Cold start emission reduction strategy diagnostic	**P1400**		Timing retard	< 5 degrees	Cold start strategy	Enabled	10 sec cumulative	Two DCY	
			or		Load	< 380 mg/comb	Once / DCY		
			Idle speed increase	< 75 rpm	Load stable	< 10 mg/comb/100			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
Ignition off timer diagnostic	**P2610**	Verification of ignition off timer. 1. Checks that timer starts at igntion off with a test after 60 secs and 2. That it measures correctly for 600 secs	Comparison of ECM clock timer with ignition off timer after 60 secs ignition off time	Diff more than 6 secs	ECM reset	No	660 secs	Two DCY	
					Ignition off time	60 secs	Once / DCY		
			Comparison of monitor timer and ignition off timer. Check done att 600 secs on monitor timer	Diff more than 60 secs	Engine	Has run in this driving cycle			
Secondary air injection relay	**P2257**	Circuit continuity check	Short-cut	To ground or not connected	Engine speed	Not moving OR	1 sec	Two DCY	
					Battery voltage	> 11,0 V	Continuous		
	P2258		Short-cut	To battery voltage	Ignition	On			
					No DTC set, pending or confirmed	Powertrain relay, P0685, P0686, P0687			
Secondary air injection pressure sensor	**P2432**	Circuit continuity check	Low voltage	< 0,3 V	Engine speed	Not moving, moving OR running	1 sec	Two DCY	
	P2433		High voltage	> 4,7 V	Battery voltage	> 11,0 V	Continuous		
					Ignition	On			
	P2431	Rationality, comparison of system pressure sensor readings before engine cranking	AIR - turbocharger boost pressure	> 12 kPa	Vehicle speed	0	3 readings, 25 msec cycle time	Two DCY	
			OR		Engine speed	0			
			AIR - MAP pressure	> 12 kPa	Ignition	On			
			AND		No DTC set, pending or confirmed	AIR pressure sensor circuit, P2432, P2433			
			MAP - turbocharger boost pressure	< 8 kPa		Turbo boost pressure circuit, P0237, P0238			
			OR			MAP circuit, P0107, P0108			
			AIR - turbocharger boost pressure	> 12 kPa					
			AND						
			MAP - turbocharger boost pressure	> 12 kPa					
			AND						
			AIR - MAP pressure	> 12 kPa					
Secondary air injection flow	**Flow fault P0411 Valve stuck closed P2443 Pump**	Verification of secondary air pressure at normal AIR operation. Comparison of modeled and measured pressure	Flow restriction vs emission threshold, pressure ratio	> 1,4	AIR status	Active	15 secs	Two DCY	
					Load MAF	1 - 20 g/second	Once / DCY		
			System leakage, one of three pipes disconnected at exhaust manifold, pressure ratio	< 0,8	Engine speed	Running			
					Time after engine start	> 8 sec			
					No DTC set, pending or confirmed	MAF sensor, P0101, P0102, P0103			

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.	SPECIAL PREP
	Stuck on P2444					AIR pressure sensor, P2431, P2432, P2433			
						IAT sensor, P0111, P0112, P0113			
						ECT sensor, P0115, P0117, P0118, P0119			
						Vehicle speed sensor, P0501			
						Air relay, P2257, P2258			