

2004 3.6L (LY7) ENGINE DIAGNOSTIC PARAMETERS

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination
Camshaft Control													
Electrical													
Bank 1 Intake	P0010	circuit continuity - open	Voltage	IC Internal	-	engine speed	>	80	rpm	0.01 sec	0.01 sec	50 sec	two driving
	P2088	circuit continuity - ground				battery voltage	>	10	V			cumulative	cycles
	P2089	circuit continuity - voltage				battery voltage	<	18	V			50 sec	cumulative
Bank 1 Exhaust	P0013	circuit continuity - open				output	activated and deactivated for complete checking						cumulative
	P2092	circuit continuity - ground											
	P2093	circuit continuity - voltage											
Bank 2 Exhaust	P0020	circuit continuity - open											
	P2092	circuit continuity - ground											
	P2093	circuit continuity - voltage											
Bank 2 Exhaust	P0023	circuit continuity - open											
	P2092	circuit continuity - ground											
	P2093	circuit continuity - voltage											
System - Control													
Bank 1 Intake	P0011	rationality low / high	difference (filtered actual angle versus	range: 2 to 10	degrees	engine speed	>	1000	rpm	approx.	0.01 sec	50 sec	two driving
Bank 1 Exhaust	P0014		filtered desired angle) >			engine run time	>	1	sec	300 sec		cumulative	cycles
Bank 2 Intake	P0021		for multiple activation occurrences	5	count	camshaft control circuit test	complete	-	-				50 sec
Bank 2 Exhaust	P0024		up / down counter			error: camshaft control circuit	not set	-	-				cumulative
System - Cam - Crank Alignment													
Bank 1 Intake	P0016	cam-crank adapted angle limit check	adapted angle >	9.0	degrees	engine run time >	>	5	sec	approx.	0.2 sec	50 sec	two driving
Bank 1 Exhaust	P0017					engine coolant temp >	>	20.25	° C	600 sec.		cumulative	cycles
Bank 2 Intake	P0018					engine coolant temp <	<	90	° C				50 sec
Bank 2 Exhaust	P0019					model: engine oil temp <	<	95	° C	fail after			cumulative
Bank 1 Idler Sprocket	P0008		adapted angle for both cams >	7.0	degrees	cam-crank adaptation	stable	and	complete	2 adaptation			
Bank 2 Idler Sprocket	P0009					error: camshaft sensor	not set	-	-	cycles -			
						error: camshaft control circuit	not set	-	-	required			
Camshaft position sensor													
Bank 1 Intake	P0341	plausibility check	signal erratic or out of position	4	count	engine in synchronized mode	TRUE	-	-	continuous	1 per rev	50 sec	two driving
	P0342	circuit low	signal permanently low	5	count							cumulative	cycles
	P0343	circuit continuity or high	signal permanently high	5	count							50 sec	cumulative
Bank 2 Intake	P0346	plausibility check	signal erratic or out of position										
	P0347	circuit low	signal permanently low										
	P0348	circuit continuity or high	signal permanently high										
Bank 1 Exhaust	P0366	plausibility check	signal erratic or out of position										
	P0367	circuit low	signal permanently low										
	P0368	circuit continuity or high	signal permanently high										
Bank 2 Exhaust	P0391	plausibility check	signal erratic or out of position										
	P0392	circuit low	signal permanently low										
	P0393	circuit continuity or high	signal permanently high										
Air Fuel Ratio Sensor Heaters and Oxygen Sensor Heaters													
heater circuits - electrical													
bank 1 sensor 1 (primary)	P0030	circuit continuity - open	Voltage	IC Internal	-	engine speed	>	80	rpm	0.01 sec	0.01 sec	50 sec	two driving
	P0031	circuit continuity - ground				battery voltage	>	10	V			cumulative	cycles
	P0032	circuit continuity - voltage				battery voltage	<	18	V			50 sec	cumulative
bank 1 sensor 2 (secondary)	P0036	circuit continuity - open				output	activated and deactivated for complete checking						cumulative
	P0037	circuit continuity - ground											
	P0038	circuit continuity - voltage											
bank 2 sensor 1 (primary)	P0050	circuit continuity - open											
	P0051	circuit continuity - ground											
	P0052	circuit continuity - voltage											
bank 2 sensor 2 (secondary)	P0056	circuit continuity - open											
	P0057	circuit continuity - ground											
	P0058	circuit continuity - voltage											
heater performance													
bank 1 sensor 2 (secondary)	P0141	ceramic temperature	Measured rear O2 sensor internal	range: 100 to 300	Ohms	battery voltage	>	10.5	V	approx.	0.1 sec	50 sec	two driving
bank 2 sensor 2 (secondary)	P0161		resistance times degradation factor >	3.5	-	battery voltage	<	18	V	100 sec		cumulative	cycles
			for time	6	sec	engine running	TRUE	-	-				50 sec
						rear O2 power supply OK	TRUE	-	-				cumulative
						no fuel cut off	TRUE	-	-				
						no rear O2 disconnection	TRUE	-	-				
						rear O2 internal resistance	TRUE	-	-				
						measured							
						ambient temp.	>	-6.8	C				
						no error last trip otherwise							
						stop time	>	120	sec.				
						modeled exhaust temp.	in range	360<...<420	C				
heater performance (primary)													
bank 1 sensor 1	P0135	A/F sensor temperature below threshold	A/F sensor temperature <	range: 672 to 740	° C	max heating power reached	TRUE			60 sec	0.1 sec	50 sec	two driving
bank 2 sensor 1	P0155					modeled exhaust wall temp.	>	600	° C			cumulative	cycles
						time after fuel cutoff	>	50	sec				50 sec
						time after A/F sensor heating	>	50	sec				cumulative
						started							

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						engine speed	>	25	rpm				
						battery voltage	<	18	V				
						battery voltage	>	10.5	V				
						error: A/F sensor IC	not set	-	-				
						error: A/F sensor heater circuit	not set	-	-				
						error: A/F sensor circuit	not set	-	-				

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bank 1 sensor 1	P0053	no A/F sensor heating	A/F sensor heating power <	0.1	%	modeled exhaust temperature at A/F sensor	<	400	° C	60 sec			
bank 2 sensor 1	P0059					modeled A/F sensor temperature	<	500	° C				
						critical misfire rate	not detected						
						engine speed	>	25	rpm				
						battery voltage	<	18	V				
						battery voltage	>	10.5	V				
						error: A/F sensor IC	not set	-	-				
						error: A/F sensor heater circuit	not set	-	-				
						error: A/F sensor circuit	not set	-	-				
bank 1 sensor 1	P0053	correction value for A/F sensor internal resistance measurement above threshold	absolute value of correction value for A/F sensor internal resistance measurement >	15	Ohms	battery voltage	<	18	V	40 sec			
bank 2 sensor 1	P0059					battery voltage	>	10.5	V				
						error: A/F sensor IC	not set	-	-				
						error: A/F sensor circuit	not set	-	-				
bank 1 sensor 1	P0135	A/F sensor internal resistance below threshold	measured internal resistance <	20	Ohms	battery voltage	<	18	V	15 sec			
bank 2 sensor 1	P0155					battery voltage	>	10.5	V				
						A/F sensor warm up control	complete	-	-				
						internal resistance measurement enabled	TRUE	-	-				
						A/F sensor internal resistance correction too big	FALSE	-	-				
						error: A/F sensor IC	not set	-	-				
						error: A/F sensor heater circuit	not set	-	-				
						error: A/F sensor circuit	not set	-	-				
bank 1 sensor 1	P0135	A/F sensor temperature exceeds threshold	A/F sensor temperature <	600	° C	battery voltage	<	18	V	120 sec			
bank 2 sensor 1	P0155					battery voltage	>	10.5	V				
						internal resistance measurement enabled	TRUE	-	-				
						all injectors activated	TRUE	-	-				
						A/F sensor internal resistance correction too big	FALSE	-	-				
						previous engine shut off time	>	300	sec				
						A/F sensor heating ready for operation	TRUE	-	-				
						error: A/F sensor IC	not set	-	-				
						error: A/F sensor heater circuit	not set	-	-				
						error: A/F sensor circuit	not set	-	-				
Air Fuel Ratio Sensor (primary) response		Response	A/F sensor dynamic value below threshold <	0.4	-	forced fuel trim amplitude	active	-	-				
Bank 1 Sensor 1	P0133					A/F sensor ready for operation	TRUE	-	-	approx.	0.01 sec	50 sec	two driving
Bank 2 Sensor 1	P0153					Max Trim	FALSE	-	-	600 sec		cumulative	cycles
						Min Trim	FALSE	-	-				50 sec
						measured A/F	<	1.06	lambda				cumulative
						measured A/F	>	0.94	lambda				
						engine speed	<	2520	rpm				
						engine speed	>	1520	rpm				
						relative air charge	<	45	%				
						relative air charge	>	15.8	%				
						relative air charge gradient	<	3	%				
						number of samples	>	80	count				
						error: evap canister purge valve	not set	-	-				
						error: evap canister purge valve circuit	not set	-	-				
						scheduled by System Manager	TRUE	-	-				
electrical													
wire to wire short circuit		sensor short to heater	air/fuel sensor voltage gradient >	range: 0.2 to 0.5		A/F sensor heater control switching	on and off	-	-	10 sec	0.01 sec	50 sec	two driving
bank 1 sensor 1	P2231					heater duty cycle	>	5	%			cumulative	cycles
bank 2 sensor 1	P2234					A/F sensor heated	TRUE	-	-	- additional			50 sec
						relative air charge gradient	<	3	% / sec ?	600 sec for			cumulative
						all injectors activated	TRUE	-	-	low fuel level			
						battery voltage	<	18	v				
						battery voltage	>	10.5	v				
						critical misfire rate detected	FALSE	-	-				
						catalyst warm up control	not active	-	-				

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						A/F sensor IC checked	TRUE	-	-				
						error: A/F sensor IC	not set	-	-				
						modeled exh. gas temp.	<	800	° C				
						# of hi gradients in 10 sec	>	18	count				
sensor voltage		A/F sensor voltage exceeds threshold	A/F sensor voltage >	3.7	V	A/F sensor heated	TRUE	-	-	10 sec	0.1 sec	50 sec	two driving
bank 1 sensor 1	P2297					engine started	TRUE	-	-			cumulative	cycles
bank 2 sensor 1	P2298					desired A/F	<	1.6	lambda				50 sec
						error: A/F sensor IC	not set	-	-				cumulative
						all injectors activated	TRUE	-	-				
						A/F sensor voltage below threshold	<	4.81	V				
integrated circuit interface	P0606	A/F sensor voltage corrective value above threshold	A/F sensor voltage corrective value >	0.1	V	A/F sensor heater control switching	on and off	-	-	10 sec	0.1 sec	50 sec	two driving
		A/F sensor IC operating voltage too low	A/F sensor IC operating voltage too low	TRUE	-	number of jumps coordinated with heater activation in 10 sec	>	4	count			cumulative	cycles
		A/F sensor IC SPI interface communication error	A/F sensor IC SPI interface communication error	TRUE	-	A/F sensor warm up control	complete	-	-				50 sec
		A/F sensor IC circuit write error at INIT register	A/F sensor ic circuit write error at INIT register	TRUE	-								cumulative
measurement ground circuit open		A/F sensor heater coupling occurs due to max heating control reached as a result of ground circuit disconnection	A/F sensor voltage gradient >	0.03	V	A/F sensor heater control switching	on and off	-	-	10 sec	0.1 sec	50 sec	two driving
bank 1 sensor 1	P2251					number of jumps coordinated with heater activation in 10 sec	>	4	count			cumulative	cycles
bank 2 sensor 1	P2254					A/F sensor warm up control	complete	-	-				50 sec
						error: A/F sensor heater circuit	not set	-	-				cumulative
						A/F sensor internal resistance	>	570	Ohms				
						A/F sensor voltage	<	1.53	V				
						A/F sensor voltage	>	1.47	V				
reference ground circuit open		A/F sensor voltage above upper threshold or below lower threshold	A/F sensor voltage <	0.2	V	error: A/F sensor heater circuit	not set	-	-	1 sec	0.1 sec	50 sec	two driving
bank 1 sensor 1	P2243		A/F sensor voltage >	2.4	V	A/F sensor internal resistance	>	570	Ohms			cumulative	50 sec
bank 2 sensor 1	P2247					A/F sensor warm up control	complete	-	-				cumulative
measuring current circuit open		A/F sensor voltage above threshold	A/F sensor voltage >			fuel cut off	TRUE	-	-	600 sec	0.1 sec	50 sec	two driving
bank 1 sensor 1	P2626					engine started	TRUE	-	-	if fuel level		cumulative	50 sec
bank 2 sensor 1	P2629					modeled exhaust temp	<TALSUSMX	750	° C	is low			cumulative
pumping current circuit open		lambda control factor change above threshold	absolute value of lambda control factor change >			A/F sensor voltage	<	1.52	V	1.5 sec	0.1 sec	50 sec	two driving
bank 1 sensor 1	P2237					A/F sensor voltage	>	1.48	V			cumulative	50 sec
bank 2 sensor 1	P2240					A/F sensor electrical trimming	not active	-	-				cumulative
						A/F sensor heated	TRUE	-	-				
						A/F sensor warm up control	complete	-	-				
						lambda closed loop control	TRUE	-	-				
						forced fuel trim amplitude	TRUE	-	-				
						absolute value of forced A/F amplitude	>	0.02	lambda				
						catalyst warm up control heating switching on or off	FALSE	-	-				
						rear O2 sensor trim switching on or off	FALSE	-	-				
						lean mixture inhibit switching on or off	FALSE	-	-				
						lambda closed loop control initialization	FALSE	-	-				
						start of lambda closed loop control	FALSE	-	-				
pumping current circuit open		A/F sensor voltage within upper and lower thresholds	A/F sensor voltage <	1.52	V	target lambda above upper limit	>	1.03	lambda		0.1 sec	50 sec	two driving
bank 1 sensor 1	P2237		and A/F sensor voltage >	1.48	V	or below lower limit	<	0.97	lambda			cumulative	cycles
bank 2 sensor 1	P2240					closed loop control	TRUE	-	-				50 sec
						A/F sensor response test complete	TRUE	-	-				cumulative
						error: A/F sensor response	not set	-	-				
						A/F sensor heated	TRUE	-	-				
						A/F sensor electrical trimming active	FALSE	-	-				
						error: A/F sensor heating	not set	-	-				
						integrated exhaust gas mass	>	200	g				

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pumping current circuit open		A/F sensor not lean enough after fuel cut off	A/F sensor voltage <	1.7	V	time after fuel shut off	>	3 + 2	sec	5 sec	0.1 sec	50 sec	two driving cycles
bank 1 sensor 1	P2237					A/F sensor heated	TRUE					cumulative	50 sec
bank 2 sensor 1	P2240					A/F sensor response test complete	TRUE						cumulative
measurement ground circuit; reference ground circuit; or measuring current circuit		A/F sensor signal at VM above upper limit A/F sensor signal at VM below lower limit A/F sensor signal at UN above upper limit									0.1 sec	50 sec	two driving cycles
bank 1 sensor 1 - low voltage	P0131	A/F sensor signal at UN below lower limit											50 sec
bank 1 sensor 1 - high voltage	P0132	A/F sensor signal at IA above upper limit											cumulative
bank 2 sensor 1 - low voltage	P0151	A/F sensor signal at IA below lower limit											
bank 2 sensor 1 - high voltage	P0152												
Oxygen Sensor (secondary) Trim of Air Fuel Ratio Sensor (primary)													
primary LEAN / secondary RICH													
Bank 1	P2096	A/F sensor long term rich shift correction below threshold	rear O2 sensor trim integration part <	-0.029	-	rear O2 sensor aging checked	TRUE			2 sec	0.1 sec	50 sec	two driving cycles
Bank 2	P2098					rear O2 sensor aging fault	FALSE					cumulative	50 sec
						engine started	TRUE						cumulative
Bank 1	P2097	A/F sensor long term lean shift correction above threshold	rear O2 sensor trim integration part >	0.029	-	rear O2 sensor aging checked	TRUE			2 sec	0.1 sec	50 sec	two driving cycles
Bank 2	P2099					rear O2 sensor aging fault	FALSE					cumulative	50 sec
						suspicion A/F sensor lean shift	FALSE						50 sec
						engine started	TRUE						cumulative
Bank 1	P2096	Rear O2 sensor measured too rich	rear O2 sensor voltage >	0.85	V	A/F sensor measured lambda	>	1.08	lambda		0.1 sec	50 sec	two driving cycles
Bank 2	P2098					richest fuel trim	TRUE	-	-			cumulative	50 sec
						A/F sensor ready for operation	TRUE	-	-				cumulative
						rear O2 sensor ready for operation	TRUE	-	-				
			rear O2 sensor voltage >	0.85	V	A/F sensor measured lambda	>	1.08	lambda				
						rear O2 fuel trim P portion (as dominating portion)	>	0.003	lambda				
						A/F sensor ready for operation	TRUE	-	-				
						rear O2 sensor ready for operation	TRUE	-	-				
			rear O2 sensor voltage >	0.85	V	target lambda	>	1.08	lambda	2 sec			
						A/F sensor ready for operation	TRUE	-	-				
						rear O2 sensor ready for operation	TRUE	-	-				
						lambda closed loop control activated	TRUE	-	-				
						Rear O2 sensor diagnosed	TRUE	-	-				
						leanest fuel trim	FALSE	-	-				
			rear O2 sensor voltage >	0.85	V	rear O2 fuel trim P portion (as dominating portion)	>	0.003	lambda	2 sec			
						A/F sensor ready for operation	TRUE	-	-				
						rear O2 sensor ready for operation	TRUE	-	-				
						leanest fuel trim	FALSE	-	-				
Bank 1	P2097	Rear O2 sensor measured too lean	rear O2 sensor voltage <	0.1523	V	A/F sensor measured lambda	<	0.92	lambda		0.1 sec	50 sec	two driving cycles
Bank 2	P2099					leanest fuel trim	TRUE	-	-			cumulative	50 sec
						A/F sensor ready for operation	TRUE	-	-				cumulative
						rear O2 sensor ready for operation	TRUE	-	-				
			rear O2 sensor voltage <	0.1523	V	A/F sensor measured lambda	<	0.92	lambda				
						rear O2 fuel trim P portion (as dominating portion)	<	-0.003	lambda				
						A/F sensor ready for operation	TRUE	-	-				
						rear O2 sensor ready for operation	TRUE	-	-				
			rear O2 sensor voltage <	0.1523	V	target lambda	<	0.96	lambda	2 sec			
						A/F sensor ready for operation	TRUE	-	-				
						rear O2 sensor ready for operation	TRUE	-	-				
						lambda closed loop control activated	TRUE	-	-				
						Rear O2 sensor diagnosed	TRUE	-	-				

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			rear O2 sensor voltage <	0.1523	V	richest fuel trim rear O2 fuel trim P portion (as dominating portion)	FALSE <	- -0.003	- lambda	2 sec			
						A/F sensor ready for operation	TRUE	-	-				
						rear O2 sensor ready for operation	TRUE	-	-				
						richest fuel trim	FALSE	-	-				
Oxygen sensor (secondary)											0.1 sec	50 sec cumulative	two driving cycles 50 sec cumulative
bank 1 sensor 2	P2270	oscillation check low	sensor voltage <	0.74	V	rear O2 sensor ready							
bank 2 sensor 2	P2272		for time >	100	sec.	for time	>	10	sec.				
			then ramping in enrichment by	0.3	lambda	rear closed loop control active							
			at gradient	0.005	λ / σ_{CY}	all injectors activated							
			for time (after enrichment limit reached)	10	sec.	engine air flow	>	8.33	g/sec				
			for additional time for low fuel level	600	sec.	engine air flow	<	33.33	g/sec				
			with no fuel level sensor error			engine air flow	>	9.72	g/sec				
bank 1 sensor 2	P2270	enrichment check low	sensor voltage <	0.499	V	rear O2 sensor enough heated							
bank 2 sensor 2	P2272		at lambda <	0.85	lambda	rear O2 sensor over dew point							
			for time >	5	sec.	for time	>	30	sec.				
			then ramping in enrichment by	0.3	lambda	engine air flow	>	16.67	g/sec				
			at gradient	0.005	λ / σ_{CY}	heater powerstage checked OK							
			for time (after enrichment limit reached)	10	sec.	O2 sensor wiring checked OK							
						no O2 sensor heater error							
bank 1 sensor 2	P2271	oscillation check high	sensor voltage >	0.74	V	rear O2 sensor ready							
bank 2 sensor 2	P2273		for time >	100	sec.	for time	>	10	sec.				
			then ramping in enleanment by	0.07	lambda	rear closed loop control active							
			at gradient	0.005	λ / σ_{CY}	all injectors activated							
			for time (after enleanment limit reached)	10	sec.	engine air flow	>	5.56	g/sec				
						engine air flow	<	33.33	g/sec				
						engine air flow	>	9.72	g/sec				

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bank 1 sensor 2	P2271	fuel cut off check high	sensor voltage >	0.202	V	rear O2 sensor enough heated							
bank 2 sensor 2	P2273		time after fuel cut off >	4	sec.	rear O2 sensor over dew point							
						for time	>	30	sec.				
						air passed after fuel cut off	>	15	g				
						heater powerstage checked OK							
						O2 sensor wiring checked OK							
						no O2 sensor heater error							
Oxygen sensor (secondary)													
bank 1 sensor 2	P0137	short circuit to ground	sensor voltage <	0.06	V	rear sensor enough heated and mod. Exhaust-gas temp.	>	250	C		0.1 sec	50 sec	two driving
bank 2 sensor 2	P0157		for time >	0.1	sec	for time	>	90	sec			cumulative	cycles
						engine running	TRUE	-	-				50 sec
						battery voltage	>	10.5	V				cumulative
						mod. exhaust-gas temp.	<	800	C				
						time duration after start	<	1	sec				
						error: engine coolant temp	not set	-	-				
						engine temp at stop	>	60	C				
						engine temp	<	40	C				
bank 1 sensor 2	P0138	short circuit to battery voltage	sensor voltage >	1.5	V	rear sensor enough heated and mod. Exhaust-gas temp.	>	250	C				
bank 2 sensor 2	P0158		for time >	5.1	sec.	for time	>	90	sec				
						engine running	TRUE	-	-				
						battery voltage	>	10.5	V				
						mod. exhaust-gas temp.	<	800	C				
bank 1 sensor 2	P0140	sensor line disconnection	sensor voltage >	0.4	V	rear sensor enough heated and mod. Exhaust-gas temp.	>	250	C				
bank 2 sensor 2	P0160		and sensor voltage <	0.5	V	for time	>	90	sec				
			for time >	60	sec.	engine running	TRUE	-	-				
			or			battery voltage	>	10.5	V				
			sensor internal resistance >	40000	Ohm	mod. exhaust-gas temp.	<	800	C				
			when modeled exhaust gas temperature :	600	° C								
bank 1 sensor 2	P0136	sensor line short circuit to heater output line	sensor voltage gradient >	2	V	rear sensor enough heated and mod. Exhaust-gas temp.	>	250	C				
bank 2 sensor 2	P0156		within time after heater turn off <	0.04	sec.	for time	>	90	sec				
			for occurrences >	4	count	engine running	TRUE	-	-				
			out of heater turn offs	6	count	battery voltage	>	10.5	V				
						mod. exhaust-gas temp.	<	800	C				
						purge control	-	-	-				
Mass air flow sensor	P0102	circuit check low	mass air flow <	-15.02777778	g/sec	battery voltage	>	10.5	V	2 sec	0.01 sec	50 sec	two driving
		range check low	mass air flow <	range: -1.4 to 78.6		time after start	>	0.3	sec			cumulative	cycles
	P0103	circuit check high	mass air flow >	305.5555556	g/sec	cam revolution counter	>	120	rev				50 sec
		range check high	mass air flow >	range: 26.7 to 278		error: throttle position sensor	not set	-	-				cumulative
						engine speed	>	320	rpm				
Intake air temperature sensor	P0112	range check low	air temperature >	132	° C	time in idle	>	10	sec	3 sec	0.1 sec	50 sec	two driving
	P0113	range check high	air temperature <	-37.5	° C	time after engine start	>	180	sec			cumulative	cycles
													50 sec cum
Engine coolant temperature sensor	P0117	range check high	coolant temperature >	140.25	° C		-	-	-	3 sec	0.1 sec	50 sec	two driving
	P0118	range check low	coolant temperature <	-42	° C							cumulative	cycles
	P0125	Signal check	Temperature for closed loop control not reached after time	120 < . . . < 300	sec	engine speed							50 sec
	P0125	plausibility check	calculated reference coolant temperature - limit >	9.8	° C								cumulative
Engine Coolant Thermostat Monitoring	P0128	Coolant Temperature Below Thermostat Regulating Temperature (plausibility check)	(calculated reference coolant temperature - coolant temperature) > Delta	10.5	° C	debouncing time	>	20	sec	approx.	0.1 sec	50 sec	two driving
			Calculated reference coolant model Limit			fuel cut-off	not active	-	-	900 sec		cumulative	cycles
						error: engine coolant temp	not set	-	-				50 sec
						error: vehicle speed sensor	not set	-	-				cumulative
						est. ambient temperature	>	-10.5	°C				
						est. ambient temperature	<	45	°C				
						vehicle speed	>	9.375	mph				
						engine speed	>	960	rpm				
						coolant temperature at start	<	50.3	°C				
						integrated air mass flow	>	3000	g				
						engine soaking time	>	600	sec				

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination
						engine block heating	not set or 25 sec	not set or 25 sec	not set or 25 sec				
Throttle Position	P0121	range check poti voltage	sensor difference >	> 9 %	%	battery voltage	> 7 V	> 7 V	> 7 V	continuous			yes
Sensor 1 (primary)	P0122	plausibility to other poti	sensor circuit low voltage <	< 0,176 V	V								
	P0123		sensor circuit high voltage >	> 4,629 V	V								
Sensor 2 (redundant)	P0221	range check poti voltage,	sensor difference >	> 9 %	%	battery voltage	> 7 V	> 7 V	> 7 V	continuous			yes
	P0222	plausibility to other poti	sensor circuit low voltage <	< 0,156 V	V								
	P0223		sensor circuit high voltage >	> 4,883 V	V								

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination
Fuel System Lean Multiplicative and Additive	P0171	fuel trim limits exceeded Range 1 (leakage air) low speed and low load	delta lambda > or delta lambda <	> +/- 25%	> +/- 25%	if limit exceeded and fuel				30 sec			two driving
	P0172					tank empty, calculated			continuous			cycles	
						air mass flow have to be higher than value					50 sec		
						closed loop control	-	-	-		cumulative		
						tmot	ca. 50 °C	ca. 50 °C	ca. 50 °C				
						purge control	-	-	-				
Fuel System Rich Multiplicative and Additive	P0174	fuel trim limits exceeded Range 2 (multipl. fault) load > threshold and air flow > threshold	delta lambda > or delta lambda <	> +/- 25%	> +/- 25%	if limit exceeded and fuel							
	P0175					tank empty, calculated							
						air mass flow have to be higher than value							
						closed loop control	-	-	-				
						tmot	ca. 50 °C	ca. 50 °C	ca. 50 °C				
						purge control	-	-	-				
Fuel Injector													
Cylinder #1	P0201	circuit continuity - open	Voltage	IC Internal	-	engine speed	>	80	rpm	50 sec	10 ms ?	50 sec	two driving
	P0261	circuit continuity - ground				battery voltage	>	10	V	cumulative		cumulative	cycles
Cylinder #2	P0262	circuit continuity - voltage				battery voltage	<	18	V				50 sec
	P0202	circuit continuity - open				output	activated and deactivated for complete checking						cumulative
	P0264	circuit continuity - ground											
Cylinder #3	P0265	circuit continuity - voltage											
	P0203	circuit continuity - open											
	P0267	circuit continuity - ground											
Cylinder #4	P0268	circuit continuity - voltage											
	P0204	circuit continuity - open											
	P0270	circuit continuity - ground											
Cylinder #5	P0271	circuit continuity - voltage											
	P0205	circuit continuity - open											
	P0273	circuit continuity - ground											
Cylinder #6	P0274	circuit continuity - voltage											
	P0206	circuit continuity - open											
	P0276	circuit continuity - ground											
	P0277	circuit continuity - voltage											
Misfire		crankshaft speed	Emissions relevant misfire rate	3	%	engine speed	>	430	rpm	1000 revs	continuously		Fault during
Multiple Cylinder	P0300	fluctuation cylinder 1 to				engine speed	<	6520	rpm		monitored		1st interval:
Cylinder #1	P0301	cylinder 6				indicated torque (idle, no drive)	>	12	%				2 faults in
Cylinder #2	P0302					indicated torque (drive)	>	4...30	%				2 different
Cylinder #3	P0303					engine speed change	<	4000	rpm/sec				drive cycles.
Cylinder #4	P0304					load change	<	900	%/rev				
Cylinder #5	P0305					ignitions after engine start	>	6	ignitions				Fault during
Cylinder #6	P0306					air temperature	>	-30	°C				remaining
						rough road	-	-	-				intervals:
						traction control	-	-	-				8 faults in 2
						leak detection	-	-	-				different
						active handling	-	-	-				drive cycles
						ABS	-	-	-				with at least
						engine drag control	-	-	-				4 faults in
						fuel cut off	-	-	-				each.
						fuel level	>	10	%				
						AND fuel level error	-	-	-				
						fuel level	<	10	%				
						AND solid misfire MIL	-	-	-				
						error: throttle position	-	-	-				
						error: crankshaft sensor	-	-	-				
						error: reference mark sensor	-	-	-				
						error: evap purge valve	-	-	-				
						error: camshaft control	-	-	-				
						error: camshaft power stage	-	-	-				
						error: camshaft alignment	-	-	-				
			OR										
			Catalyst damaging misfire rate			Includes all the above with the				1000 revs			First
						following exceptions:				First interval			occurrence:
						First interval extension	<	47	°C	200 revs			immediate
						fuel level	<	10	%	all remaining			flashing
						AND blinking MIL	-	-	-	intervals			while error
				range: 18.1 to 5	%	AND first occurrence fault	-	-	-				present, ther
													no MIL
													with no error.
													Second
													occurrence:
													immediate
													flashing
													while error
													present, ther
													solid MIL
													with no error.

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination
Rough Road Signal	P0318	signal missing	signal missing	-	-	no	-	-	-	12 sec	0.1 sec	50 sec cumulative	no
Knock Control Circuit	P0324	zero test (part 1)	integrator voltage - 715 mV > (abs. value) for consecutive events or	0.22 2	V count	knock control engine speed engine load test pulse fault assumption	active no dynamics no dynamics not set	active no dynamics no dynamics not set	active no dynamics no dynamics not set	50 sec cumulative	every 510 engine cycles	50 sec cumulative	two driving cycles 50 sec cumulative

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination
	P0324	zero test (part 2)	integrator gradient (absolute value) for consecutive events	range: 60 to 40 2	V / sec count	knock control engine speed engine load test pulse fault assumption engine speed engine speed	active no dynamics no dynamics not set > <	active no dynamics no dynamics not set 2000 4240	active no dynamics no dynamics not set rpm rpm	50 sec cumulative	every 510 engine cycles		
	P0324	test pulse	test pulse integral < for consecutive events	3.7 2	V count	engine coolant temp. engine speed engine load zero test fault assumption	> no dynamics no dynamics not set	40 no dynamics no dynamics not set	°C no dynamics no dynamics not set	50 sec cumulative	every 510 engine cycles		
Bank 1 Performance	P0327	range check low	reference voltage < for consecutive events	range: 0.9 to 2.2 20	V count	engine coolant temp. engine speed cylinder identification	> > possible	40 2000 -	°C rpm -	approx. 10 sec	0.1 sec	50 sec cumulative	two driving cycles 50 sec cumulative
	P0328	range check high	reference voltage > for consecutive events	see table 20	V count	engine speed engine speed engine load knock control circuit (IC) engine speed limp home	> no dynamics no dynamics no error not active	1200 no dynamics - - -	rpm no dynamics - - -				
Bank 2 Performance	P0332	range check low	reference voltage < for consecutive events	range: 0.9 to 2.2 20	V count	engine coolant temp. engine speed cylinder identification	> > possible	40 2000 possible	°C rpm possible	approx. 10 sec	0.1 sec	50 sec cumulative	two driving cycles 50 sec cumulative
	P0333	range check high	reference voltage > for consecutive events	range: 5 to 60 20	V count	engine speed engine speed engine load knock control circuit (IC) engine speed limp home	> no dynamics no dynamics no error not active	1200 no dynamics no dynamics no error not active	rpm no dynamics no dynamics no error not active				
Crankshaft position sensor	P0335	circuit continuity	no engine signal but phase signals available	0	rpm	camshaft revolutions detected	>	12	counts	approx. 5 sec	0.01 sec	50 sec	two driving
	P0335	rationality check	reference gap missing > sensor signal but no reference	3	gaps	-	>	3	counts			cumulative	cycles 50 sec cumulative
	P0336	rationality check	unexpected re-synchronization > loss of reference mark	-	-	-	>	6	counts				cumulative
	P0338	rationality check	difference in counted teeth between reference gap position events >	8	teeth	tooth count error occurrences	>	8	counts	approx. 2 sec	1 per rev		
Ignition Coil													
Cylinder #1	P0351	circuit continuity - open	Voltage >	20	revs	engine speed	>	480	rpm	approx.	1 / 2 rev	50 sec	two driving
	P2300	circuit continuity - ground		20	revs	engine speed	<	5000	rpm	1 sec		cumulative	cycles
	P2301	circuit continuity - voltage		20	revs	battery voltage	>	10.5	V				50 sec
Cylinder #2	P0352	circuit continuity - open				battery voltage	<	18	V				cumulative
	P2303	circuit continuity - ground											
	P2304	circuit continuity - voltage											
Cylinder #3	P0353	circuit continuity - open											
	P2306	circuit continuity - ground											
	P2307	circuit continuity - voltage											
Cylinder #4	P0354	circuit continuity - open											
	P2309	circuit continuity - ground											
	P2310	circuit continuity - voltage											
Cylinder #5	P0355	circuit continuity - open											
	P2312	circuit continuity - ground											
	P2313	circuit continuity - voltage											
Cylinder #6	P0356	circuit continuity - open											
	P2315	circuit continuity - ground											
	P2316	circuit continuity - voltage											
Catalyst Bank 1	P0420	oxygen storage of catalyst	normalized Oxgen storage	1	factor	Exhaust gas mass flow	>	6.94	g/sec	approximately	0.01 sec	50 sec	two driving
Catalyst Bank 2	P0430		less than normalized oxygen storage of a limit catalyst			Exhaust gas mass flow	<	19.44	g/sec	1000 sec		cumulative	cycles
						catalyst temp. model	≤	750	° C	during active			50 sec
						catalyst temp. model	≥	400	° C	driving			cumulative
						catalyst temp. model change	<	3	° C / sec				
						Exhaust gas mass flow change	<	4.17	g/sec ²	average of			
						fuel system status	closed loop	-	-	4 checks			
						lambda controller	active	-	-				
						engine start temp.	>	-30	° C	one test			
						error: secondary HO2S signal changing check	not set	-	-	with 4 checks			
						error: fuel system	not set	-	-				
						scheduled by System Manager	TRUE	-	-	per driving cycle			
Evaporative system and leak monitor Small Leak - 0.020 "	P0442	natural pressure/vacuum in tank	filtered fault index >	0.75	-	estimated ambient air temp	>	1.5	° C	approximately	0.1 sec	immediate	immediate
			based on:			estimated ambient air temp	<	32	° C	600 sec			
			pressure detected >	30	Pa	engine coolant temp at shut of	>	80	° C	in a driving			
						engine run time	>	600	sec	cycle			once filter
						distance travelled	>	5	miles				value
						above vehicle speed	>	1.5625	mph	approximately			has
			then			fuel volatility	<	7	-	6 driving			been
			vacuum detected <	30	Pa	fuel level	>	14	%	cycles			exceeded

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination
						fuel level	<	85	%	average run			
						current fuel level - initial key off	>	10	%	length			
						error: vehicle speed sensor	not set	-	-	to exceed			
						error: engine coolant temp	not set	-	-	failure			
						error: purge valve	not set	-	-	threshold			
						error: tank pressure sensor	not set	-	-				
						error: power supply voltage	not set	-	-				
						error: canister vent valve	not set	-	-				
						condition: altitude adaption val	set	-	-				
						condition: tank vacuum out of f	not set	-	-				
						vacuum pull down suspect sma	set	-	-				
						Vacuum pull down incomplete	not set	-	-				
						intake air temp - engine coolan	<	10	° C				

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination
						engine start coolant temp	<	40	° C				
						intake air temp	>	1.5	° C				
						intake air temp	<	40	° C				
						accumulated time between EC	>	0	sec				
						ambient pressure	>	68	kPa				
						battery voltage	>	11	Volts				
						minimum vehicle mileage	>	12.4	miles				
						fuel tank pressure	<	10	hPa				
						fuel tank pressure	>	-25	hPa			The test will attempt to run up to 10 times until it successfully completes	
						estimated ambient temp	<	32	° C				
						estimated ambient temp	>	1.5	° C				
						fuel level	<	85	%				
						fuel level	>	15	%				
						engine start temp	<	ambient temp + 10	° C				
						time after start	>	1000	sec				
						or fuel mixture adapt stable							
						error: mass air flow sensor	not set	-	-				
						error: pedal position sensor	not set	-	-				
						error: engine coolant temp	not set	-	-				
						error: intake air temp sensor	not set	-	-				
						error: purge sol. Valve flow	not set	-	-				
						error: fuel tank pres sensor	not set	-	-				
						error: system voltage	not set	-	-				
						error: vehicle speed sensor	not set	-	-				
Tank pressure sensor	P0451	rationality - signal oscillation	sensor signal >=	810	Pa	time after start	>	3	sec	25.5	0.1 sec	50 sec	two driving
		rationality - signal increment check	sensor signal <=	94	Pa	vehicle speed <=	<=	18.75	mph	3 checks		cumulative	cycles
		rationality - signal range check	sensor signal >=	900	Pa	vehicle speed >=	>=	1.875	mph	10sec			50 sec
			sensor signal >=	-1800	Pa	manifold / vacuum pressure	<=	0.477		10sec			cumulative
	P0452	circuit continuity - ground	sensor signal <	-4000	Pa	engine start temp	<=	35	° C	10 sec			
	P0453	circuit continuity - voltage	sensor signal >	1750	Pa	engine	running						
						fuel level	<	85	%				
						fuel level	>	15	%				
						purge active	running						
Leaking purge valve	P0496	underpressure in tank	tank pressure loss gradient <	-7	Pa	fuel system status	closed loop			about 4 sec	0.1 sec	50 sec	two driving
						vehicle speed	<	1.875	mph			cumulative	cycles
						engine	idling			Only one			50 sec
						battery voltage	<	11	V	test per			cumulative
						battery voltage	>	18	V	driving cycle			
						calculated HC conc. of	>	26	%	will be			
						relative manifold pressure	<	0.55		completed.			
						estimated ambient pressure	<	680	kPa				
						fuel tank pressure	<	10	hPa	The test			
						fuel tank pressure	>	-25	hPa	will attempt to run up to 10 times until it successfully completes			
						estimated ambient temp	<	32	° C				
						estimated ambient temp	>	1.5	° C				
						fuel level	<	85	%	successfully			
						fuel level	>	15	%	completes			
						engine start temp	<	ambient temp + 10	° C				
						time after start	>	1000	sec	a test			
						or fuel mixture adapt stable							
						error: mass air flow sensor	not set	-	-				
						error: pedal position sensor	not set	-	-				
						error: engine coolant temp	not set	-	-				
						error: intake air temp sensor	not set	-	-				
						error: purge sol. Valve flow	not set	-	-				
						error: fuel tank pres sensor	not set	-	-				
						error: system voltage	not set	-	-				
						error: vehicle speed sensor	not set	-	-				
Large leak	P0455	underpressure in tank	tank pressure gradient			fuel system status	closed loop			10 sec	0.1 sec	50 sec	two driving
			vehicle speed			vehicle speed	<	1.875	mph			cumulative	cycles
			tank pressure		hPa	engine	idling			Only one			50 sec
						battery voltage	<	11	V	test per			cumulative
						battery voltage	>	18	V	driving cycle			
						calculated HC conc. of	>	26	%	will be			
						relative manifold pressure	<	0.55		completed.			
						estimated ambient pressure	<	680	kPa				
						fuel tank pressure	<	10	hPa	The test			
						fuel tank pressure	>	-25	hPa	will attempt to run up to 10 times until it successfully completes			
						estimated ambient temp	<	32	° C				
						estimated ambient temp	>	1.5	° C				
						fuel level	<	85	%	successfully			
						fuel level	>	15	%	until it			
						engine start temp	<	ambient temp + 10	° C	successfully			
						time after start	>	1000	sec	completes			
						or fuel mixture adapt stable				a test			
						error: mass air flow sensor	not set	-	-				

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination
						error: pedal position sensor	not set	-	-				
						error: engine coolant temp	not set	-	-				
						error: intake air temp sensor	not set	-	-				
						error: purge sol. Valve flow	not set	-	-				
						error: fuel tank pres sensor	not set	-	-				
						error: system voltage	not set	-	-				
						error: vehicle speed sensor	not set	-	-				

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination	
Cooling fan 1 relay Control Circuit	P0480 P0691 P0692	circuit continuity - open circuit continuity - ground circuit continuity - voltage	Voltage	IC Internal	-	engine speed battery voltage battery voltage output	> > <	80 10 18	rpm V V	0.01 sec	0.01 sec	50 sec cumulative 50 sec cumulative	two driving cycles 50 sec cumulative	
Cooling fan 2 relay Control Circuit	P0481 P0693 P0694	circuit continuity - open circuit continuity - ground circuit continuity - voltage	Voltage	IC Internal	-	engine speed battery voltage battery voltage	> > <	80 10 18	rpm V V	0.01 sec	0.01 sec	50 sec cumulative 50 sec cumulative	two driving cycles 50 sec cumulative	
Fuel Level Sensor Circuit fuel sender 1 signal stuck	P0461	rationality	fuel level sensor signal movement	< 1.0	L	difference between engine con and change of fuel level signal time sensor signal without failure fuel level state stable start ended	> > TRUE TRUE running	30 300 - - -	L sec - - -	300 sec	0.1 sec	300 sec	no	
signal low	P0462	range check low	voltage	0.25	V	battery voltage battery voltage	>= <=	10 18	V V	about 60 s	0.1 sec	about 60 s		
signal high	P0463	range check high	voltage	3.2	V	start ended fuel level state stable	running	-	-					
fuel sender 2 signal stuck	P2066	rationality	fuel level sensor signal movement	< 1	L	difference between engine con and change of fuel level signal time sensor signal without failure fuel level state stable start ended	> > TRUE TRUE running	30 300 - - -	L sec - - -	300 sec	0.1 sec	300 sec		
signal low	P2067	range check low	voltage	0.25	V	battery voltage battery voltage	>= <=	10 18	V V					
signal high	P2068	range check high	voltage	3.2	V	start ended fuel level state stable	running	-	-	about 60 s	0.1 sec	about 60 s		
fuel transfer pump	P2636	transfer pump failure	fuel level 1 < and fuel level 2 >	7 15	L L	sensor signal without failure fuel level state stable start ended	TRUE TRUE running	- - -	- - -	> 240 s	0.1 sec	> 120 s		
Idle Speed System	P0506 P0507	functional check	desired rpm - actual rpm > desired rpm - actual rpm < or fuel cut off due to overspeed > during this idle	100 -200 3	rpm rpm count	load (for underspeed only) coolant temp. intake air temp vehicle speed altitude correction factor evap purge (high HC conc.) intrusive evap test error: throttle position error: vehicle speed error: coolant temperature error: intake air temperature error: evap system error: evap purge valve	< > > Yes > FALSE not active not set not set not set not set not set not set	35 80.3 0 - 0.703	% ° C ° C - -	2.0 sec	0.1 sec	50 sec cumulative 50 sec cumulative	two driving cycles 50 sec cumulative	
System Voltage	P0560 P0562 P0563	rationality range check low range check high	powertrain supply relay feedback input voltage voltage	2.55 10 18.0	V V V	- time after engine start time after engine start vehicle speed	- > > >	- 180 180 3.125	- sec sec mph	2 sec	0.1 sec	50 sec cumulative	no	
ECM monitoring	P0601 P0602 P0603	rationality rationality rationality task sequence monitor rationality torque output	wrong ROM checksum wrong cyclic ROM checksum of function monitoring VIN not programmed; Service-ECU; security access not armed - count down wrong error counter value of the monitoring module torque out of range	- - -	- - -	power down calculation in the last driving cycle - - engine speed	completely finished - - >	- - -	- - -	- 30 sec 5 sec	once per driving cycle 0.01 sec	- 0.01 sec	5 sec 5 sec 5 sec	5 sec 5 sec

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination
		functional check	switching off of the output circuits										5 sec
		ETC monitoring	is not responding properly										
		shut down control											
	P0604	functional check	RAM writeability check			power down calculation in the last driving cycle	completely finished	-	-	5 sec	0.01 sec		5 sec
			read and write test										
		cyclic RAM-check	writeability check of										5 sec

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination
	P0606	monitor of torque				power down calculation	completely	-	-	5 sec	0.01 sec		5 sec
		monitor of air flow				in the last driving cycle	finished						
		monitor of variable valve timing											
		monitor of engine speed											
		monitor of accelerator pedal											
		monitor of A/D converter sequence				in the last driving cycle	finished						
		monitor of throttle valve lower limit											
		monitor of failsafe control											
		monitor of A/D converter for accelerator pedal signal											5 sec
		monitor of CAN communication				in the last driving cycle	finished						
						in the last driving cycle	finished						
Electronic Throttle Control													
	P0638	motor control range check low	powerstage (negative) duty cycle >	-80	%	battery voltage	>	7	V	0.6 sec	0.01 sec	0.6 sec	5 sec
		motor control range check high	powerstage (positive) duty cycle >	80	%	battery voltage	>	7	V	5.0 sec		5.0 sec	5 sec
	P1551	limp-home throttle position out of range	throttle position < OR throttle position >	0.3799 13.07	%	vehicle speed engine speed engine coolant temperature engine coolant temperature intake air temperature intake air temperature battery voltage accelerator pedal position	<= < >= <= >= <= > <	0 250 5.3 100.5 5.25 143 9.99 14.9	mph rpm ° C ° C ° C ° C V %	5 sec	0.01 sec	50 sec cumulative 50 sec cumulative	two driving cycles
	P2100	powerstage circuit switch-off	output circuits not deactivated as commanded	-	-		-			0.1 sec	0.01 sec	5 sec	5 sec
	P2101	difference between set and actual position of throttle blade	difference between set and actual position of throttle blade >	10	%	electronic throttle adaptation battery voltage	not active >	- 7	- V	0.5 sec	0.01 sec	5 sec	5 sec
torque - plausible limit	P2105	rationality	torque out of range high	-	-	engine speed	>	1120	rpm	5.5 sec	0.01 sec	5 sec	5 sec
	P2119	functionality of return spring	throttle blade return response	0.72	sec	vehicle speed engine speed engine coolant temperature engine coolant temperature intake air temperature intake air temperature battery voltage accelerator pedal position	<= < >= <= >= <= > <	0 250 5.3 100.5 5.25 143 9.99 14.9	mph rpm ° C ° C ° C ° C V %	0.72 sec	0.01 sec	5 sec	5 sec
MIL Control Circuit													
	P0650	circuit continuity - open	Voltage	IC Internal	-	engine speed	>	80	rpm	0.01 sec	0.01 sec	50 sec	no
		circuit continuity - ground				battery voltage	>	10	V			cumulative	(but is
		circuit continuity - voltage				battery voltage	<	18	V				shown in
						output	activated and deactivated for complete checking						Mode \$03)
Transmission Control Module MIL Illumination Request													
	P0700 (Specific TCM DTC shown in freeze frame)	OBD emission fault detected by the TCM	signal input	-	-		-	-	-	0.01 sec	0.01 sec	0.01 sec	5 sec
Intake Manifold Runner Control Solenoid Control Circuit													
	P2008	circuit continuity - open	Voltage	IC Internal	-	engine speed	>	80	rpm	0.01 sec	0.01 sec	50 sec	two driving
	P2009	circuit continuity - ground				battery voltage	>	10	V			cumulative	cycles
	P2010	circuit continuity - voltage				battery voltage	<	18	V				50 sec
						output	activated and deactivated for complete checking						cumulative
Accelerator Pedal Position Sensor 1													
	P2122	range check low	voltage	0.8398	V	battery voltage	>	7	V	0.14 sec	0.01 sec	5 sec	5 sec
	P2123	range check high		4.8242	V								
Accelerator Pedal Position Sensor 2													
	P2127	range check low	voltage	0.6641	V	battery voltage	>	7	V	0.14 sec	0.01 sec	5 sec	5 sec
	P2128	range check high		4.8242	V								
Accelerator Pedal Position 1 vs. 2													
	P2138	plausibility	voltage difference > idle range voltage difference pedal partially pressed > voltage difference > pedal fully pressed voltage pedal 1 > voltage difference pedal 2 >	0.2148 0.2734 0.2734 1.0574 1.1719 0.039	V V V V V V V	-	-	-	-	0.5 sec	0.01 sec	5 sec	5 sec

2004 3.6L (LY7) ENGINE DIAGNOSTIC PARAMETERS

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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Required	Frequency of Checks	Criteria for Code	MIL Illumination
Barometric Pressure Sensor	P2228	range check low	voltage <	0.195	V	engine	running	-	-	3 sec	0.1 sec	50 sec	two driving
			sensor signal <	30	KPa	error: MAF sensor	not set	-	-			cumulative	cycles
	P2229	range check high	voltage <	4.883	V								50 sec
			sensor signal <	120.5	KPa								
OBD ISO-15765 Communication Bus	U0001	ISO-15765 Bus Off or communication error	No communication or improper communication	-	-	-	-	-	-	5 sec	0.1 sec	50 sec	two driving
													cumulative
	U0101	Communication with TCM	TCM Messages	missing or delayed									50 sec cum
													two driving
													cycles
													50 sec cum
Vehicle speed sensor													
Automatic Transmission	U0402	signal missing	vehicle speed	missing	-	communication errors	FALSE	-	-	5 sec	0.1 sec	50 sec	two driving
						transmission communication	OK	-	-			cumulative	cycles