Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		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	4 sec	two drivi
	P2088	circuit continuity -				battery voltage	>	10	V		continuous	continuou	cycles e
	P2089	ground circuit continuity -				battery voltage	<	18.1	V			or 50 sec	with: 4 s
Bank 1 Exhaust	P0013	voltage circuit continuity -				output	activated					cumulativ	continuo
		,					and						
							deactivated						
							for complete						
		open					checking					е	
	P2090	circuit continuity -					oncolling						or 50 se
		ground											
	P2091	circuit continuity -											cumulati
Bank 2 Intake	P0020	voltage circuit continuity -											
Dank 2 inlake	P0020	open											
	P2092	circuit continuity -											
		ground											
	P2093	circuit continuity - voltage											
Bank 2 Exhaust	P0023	circuit continuity - open											
	P2094	circuit continuity - ground											
	P2095	circuit continuity -											
		voltage											
System - Control				1	1		1	1		1		1	1
Bank 1 Intake	P0011	rationality low / high	difference to start test	6.0	degrees	engine speed	>	480	rpm	approx.	0.01 sec	4 sec	two drivi
			(filtered actual	11.0	- T								
Bank 1 Exhaust	P0014		angle versus filtered desired	KFDWNWD		engine run time	>	1.8	sec	20 sec	continuous	continuou	cycles e
Donk O Intoko	D0024		angle) >	MXE / 2		samabalt santral	a a man lata					S == 50 aaa	with 4 a
Bank 2 Intake	P0021		(desired must	KFDWNWD		camshaft control	complete	-	-			or 50 sec	with: 4 s
			remain above value	MXA / 2		circuit test							
Bank 2 Exhaust	P0024		to test to complete			error: camshaft	not set	-	-	(2 times		cumulativ	continuo
			the evaluation)			control circuit						е	
			same as above, but	0	degrees	coolant temperature	<	143	° C	for 2.5			or 50 se
			offset added to the							sec			
			difference, during			coolant temperature	>	-48	° C	each)	·		cumulati
			cold start only: filtered actual angle			engine oil temperature	<	143	° C				
			< filtered desired			engine oil temperature	>	-48	° C				
			angle from test start										
			within time	2.5	sec	cam-crank alignment	complete	-	-				
						adaptation							
			(detects 5 sec			αυαριατίστ			1				
			slow [time										
			constant])										
			for multiple activation	10	count								
			occurrences										
			(decrements upon	(same as					1				
			,======================================	stated in									
				"time									
				required"									
			activations where	column)									

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
			no difference is seen between										
			desired	ļ									
			and actual) same as above, but	1	count								
			during cold start	7	Count								
			only:										
			difference (filtered	1.5	degrees								
			actual angle max										
			versus actual at test start) >										
			(to detect slow										
			(
			response versus	<u> </u>									
			stuck cam if										
			above this limit)										
			above this limit) at time	2.5	sec								
			(overlaps with time	0	300			1					
			to detect above)										
			, ,										
			(passes after multiple good										
			activations										
			in both cam phase										
			· ·										
			rotation directions)										
System - Cam - Crank							1					1	
Alignment													
Bank 1 Intake	P0016	cam-crank adapted angle	adapted angle >	14.5	degrees	engine run time >	>	50	sec	approx.	0.2 sec	4 sec	two driv
Bank 1 Exhaust	P0017	limit check	or adapted angle <	14.5	degrees	engine coolant temp >	>	0	°C	600 sec	continuous	continuou	cycles e
Bank 2 Intake	P0018	(applies for each camshaft)	or actual angle with parked cams >	20	degrees	engine coolant temp <	<	95.25	°C			or 50 sec	with: 4
Bank 2 Exhaust	P0019		and <	25	degrees	model: engine oil temp <	<	120	° C	fail after		cumulativ e	continu
		1	1		1.				,	1_			
Bank 1 / Idler Sprocket	P0008		adapted angle for	10.5	degrees	error: camshaft	not set	-	-	2			or 50 se
			both cams >			sensor				adaptatio			
Bank 2 / Idler Sprocket	P0009		adapted angle for			error: camshaft	not set	-	-	cycles -			cumula
			both cams <			control circuit				,			
										required			
Air / Eugl Patio Sancar		T											
Air / Fuel Ratio Sensor Heating and Oxygen Sensor Heating													
heater circuits - electrical				-				 					
bank 1 sensor 1 (primary)	P0030	circuit continuity -	Voltage	IC Internal	-	engine	running	1		0.01 sec	0.01 sec	4 sec	two driv
		open						<u> </u>					
	P0031	circuit continuity -				battery voltage	>	10.5	V		continuous	continuou	cycles e
	Doogo	ground		<u> </u>		h-HP		40.1				S 50	
	P0032	circuit continuity -				battery voltage	<	18.1	V			or 50 sec	with: 4
bank 2 sensor 1 (primary)	P0050	voltage circuit continuity -		 		output	activated	1				cumulativ	continu
Jank 2 Johnson i (primary)	. 5555	S. Out Continuity				Caipui	and					Jamaily	oo.minu
							deactivated						
							for complete						
	i e	opon	1	1	1	1	checking	1	1	1		е	
	P0051	open circuit continuity -					oncoming		_		+		or 50 se

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks		MIL Illuminat
	P0052	circuit continuity -											cumulat
		voltage											
bank 1 sensor 2	P0036	circuit continuity -	Voltage	IC Internal	-	engine speed	>	80	rpm	0.01 sec	0.01 sec	4 sec	two driv
(secondary)	D0007	open				h-ttt		40	V				
	P0037	circuit continuity - ground				battery voltage	>	10	V		continuous	continuou s	cycles 6
	P0038	circuit continuity -				battery voltage	<	18.1	V			or 50 sec	with: 4
bank 2 sensor 2	P0056	voltage circuit continuity -				secondary O2 sensor	ready		+		+	cumulativ	continu
(secondary)	P0057	open circuit continuity -				heating secondary O2 sensor	reached		—		-	е	or 50 se
	F0057	ground				dew point	reached						01 30 8
	P0058	circuit continuity -				output	activated			0.5sec			cumula
							and						
							deactivated for complete						
		voltage					checking						
		vollago					or root arrig						
A/F Sensor Heating heater performance									₩				
bank 1 sensor 1	P0053	correction value for	absolute value of	15	Ohms	battery voltage	>	10.5	V	40 sec	0.1 sec	4 sec	two driv
hl-0	Pooso	A/F sensor	correction value for					40.4					
bank 2 sensor 1	P0059	internal resistance	A/F sensor internal			battery voltage	<	18.1	V		continuous	continuou	cycles
		measurement	resistance >									s	
		too much				engine starting	complete	-	-			or 50 sec	with: 4
									-		+	cumulativ	continu
									₩			е	or 50 s
													cumula
Mana air flaur annan	P0101	rongo ob ogly lovy	mass air flow <	4.4	2/222	hottonivaltone	1.	10.5	V	2 sec	0.01.000	4 sec	المالية المالية
Mass air flow sensor	POTOT	range check low	mass air now <	-1.4 77.0	g/sec	battery voltage	>	10.5	V	2 Sec	0.01 sec	4 Sec	two driv
		or		KFMLDMN		time after start	>	0.3	sec		continuous	continuou	cycles (
	_	fuel trim limits	> delta lambda	0.2	factor	crankshaft revolution	>	150	rev			or 50 sec	with: 4
		exceded	correction			counter			<u> </u>				
							not set	-	-			cumulativ e	continu
		range - multiplicative				error: throttle position sensor							
		multiplicative and				sensor engine speed	>	320	rpm				
		multiplicative and correction factor	< correction factor air	0.7	factor	sensor	>	320 11.1	rpm g/s				
		multiplicative and	< correction factor air mass	0.7	factor	sensor engine speed	> >						
		multiplicative and correction factor (modeled air mass at throttle / air mass		0.7	factor	sensor engine speed air mass ratio: MAP to Baro	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air		0.7	factor	sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter)	mass			sensor engine speed air mass ratio: MAP to Baro	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air		31.9	factor g/sec	sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter)	mass	31.9 276 KFMLDMX		sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits	mass air flow >	31.9 276		sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits exceded	mass air flow >	31.9 276 KFMLDMX	g/sec	sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits exceded range - multiplicative	mass air flow >	31.9 276 KFMLDMX	g/sec	sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits exceded range - multiplicative and	mass air flow > < delta lambda correction	31.9 276 KFMLDMX -0.2	g/sec factor	sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits exceded range - multiplicative	mass air flow > < delta lambda correction	31.9 276 KFMLDMX	g/sec	sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits exceded range - multiplicative and correction factor (modeled air mass at throttle / air	mass air flow > < delta lambda correction > correction factor	31.9 276 KFMLDMX -0.2	g/sec factor	sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits exceded range - multiplicative and correction factor (modeled air mass at throttle / air mass	mass air flow > < delta lambda correction > correction factor	31.9 276 KFMLDMX -0.2	g/sec factor	sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1					
		multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits exceded range - multiplicative and correction factor (modeled air mass at throttle / air	mass air flow > < delta lambda correction > correction factor	31.9 276 KFMLDMX -0.2	g/sec factor	sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1					
	Dodge	multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits exceded range - multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter)	mass air flow > < delta lambda correction > correction factor air mass	31.9 276 KFMLDMX -0.2	g/sec factor factor	sensor engine speed air mass ratio: MAP to Baro long term fuel trim active	> >	11.1	g/s				or 50 secumula
	P0102	multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits exceded range - multiplicative and correction factor (modeled air mass at throttle / air mass measured by air	mass air flow > < delta lambda correction > correction factor	31.9 276 KFMLDMX -0.2	g/sec factor	sensor engine speed air mass ratio: MAP to Baro long term fuel trim	> >	11.1	g/s	3			

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL
Intake air temperature	P0111	response check	max intake air			drive period - count	>=	16	count	2 sec	0.1 sec	4 sec	two drivin
mano an temperature		responde entent	temperature -			diivo ponoa oddiii			oount	2 000	0.1 000		
sensor			min intake air temperature >	1.5	° C	each with					continuous	continuou	cycles ea
			·			vehicle speed	>=	34.375	mph			or 50 sec	with: 4 se
						mass flow	<	42.2	g/				continuo
						mass flow	>	11.1	sec g/			е	or 50 sec
						coolant temperature	<=	60	° C				cumulati
						1							
				-		at start no fuel shut-off							
				_		idle period - count	>=	5	count				
						lale period count		Ü	oount				
						each with							
						vehicle speed	<=	6.25	mph				
						coolant temperature	<=	48	° C				
						at start coolant temperature	>	60	° C				
						ECT decrease since	>	0	° C				
						prior shutdown							
	P0112	range check low	intake air	132	° C								
			temperature >										
	P0113	range check high	Temperature for closed loop control	-42	° C	time after start	>	180	sec				
						then time in idle	>	10	sec				
						and intake air	<	-42	° C				
						temperature then IAT change	<=	3.6	° C				
						(abs value) while	-	5.0	Ŭ				
						integrated air mass	>=	1000	g				
						increases							
Engine coolant	P0116	difference from intake air	filtered difference			key up IAT - previous min IAT	<	2.25	° C	300 sec	0.2 sec	4 sec	immedia
temperature sensor		temperature after soaking	(ECT at key on - IAT at key on) >	10	° C	key up IAT - previous min IAT	>	-30	° C	for block	continuous	additional	once cod
		- commig				previous accumulated	>	4000	g	heating		after	has
						air mass						block	
						previous accumulated	>	4000	g				been set
						air mass							
			or			previous engine run time	>	600	sec	check	one filter	heater	
						or					update per	check	approx.
			filtered difference			ECT at shut down	>	84.75	° C		cold start	when filtered	6 test
			(ECT at key on -	-10	° C	Controller Shut Down	last cycle	-	-			difference	e average
			IAT at key on) <			at end of Strong Wind / Open	not detected	-	-			exceeds	run leng
						Hood based on IAT rise at							(15°C de
						shut down Block Heater	not detected					201.014	(0 ac
						DIOCK FIERIEI	not detected	[-				
		plausibility check	or calculated coolant	9.8	° C	the model temperature				approx.		or 50 sec	two drive
		plausibility CHECK	calculated COOldHI	3.0		ine moder temperature				арріох.		01 00 860	two univi
			temperature model			increases	1	1	1	1			1

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminat
			minus measured temperature >			depending on air flow				500 sec		cumulativ e	1
													with: 4 s
											+		sec cum
Engine coolant	P0117	range check low	coolant temperature	140.3	° C	If Startup IAT	>	72	° C	0.1 sec	0.1 sec	4 sec	two driv
temperature sensor			2			hot restart timer	>=	60	sec		continuous	continuou	cycles e
	P0118	range check high	coolant temperature	-42	° C	If Startup ECT	<	-42	° C			or 50 sec	with: 4 s
			_			ECT-Startup ECT	<=	2.25	°C			cumulativ	cont. or
						(abs value) integrated air mass	>=	0	g		+	е	sec cun
						increases and air mass timer	>=	2	sec	+-		+	
										+		+	
										1		+	
	P0119	intermittent (delta coolant	-3.75	° C					approx.	0.01 sec		
		discontinuity)	temperature < delta coolant	3.75	° C					300 sec	continuous	+	
			temperature > weighted counter >	60000	count					+	 	+	
			(up 10000 w/jump; down 1 with steady							1			
)							\bot	\vdash		
Throttle Position	P0121	range check poti voltage	sensor difference >	9	%	battery voltage	>	7	V	continuou	0.1 sec	4 sec	two driv
Sensor 1 (primary)	P0122	plausibility to other poti	sensor circuit low voltage <	0.176	V						continuous	continuou	cycles e
	P0123		sensor circuit high voltage >	4.629	V							or 50 sec	with: 4
			ronage r									cumulativ e	cont. or
Sensor 2 (redundant)	P0221	range check poti	sensor difference >	9	%	battery voltage	>	7	V	continuou	0.1 sec		sec cun
	P0222	voltage, plausibility to other poti	sensor circuit low voltage <	0.156	V					S	continuous		
	P0223	pou	sensor circuit high voltage >	4.883	V								
Engine Coolant	P0128	Coolant	(calculated reference	10.5	° C	debouncing time	>	20	sec	approx.	0.1 sec	4 sec	two driv
Thermostat Monitoring		Temperature Below Thermostat	model coolant temp minus measured			error: engine coolant	not set	-	-	900 sec	continuous	continuou	ı cycles e
•		Regulating	coolant temperature) >			temp						s	
		Temperature	1 2 2 2 2 2 2 2			error: vehicle speed	not set	-	-			or 50 sec	with: 4 s
		(plausibility check)	reference model	89.25	° C	sensor est. ambient	>	-10.5	°C	+	+	cumulativ	continu
			calculation limit			temperature est. ambient	<	70	°C	+	-	е	or 50 se
				1	1	temperature	1		1				
			(development vehicles indicated			vehicle speed	>=	9.375	mph				cumula

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
			temperatures of 89°C, as measured			coolant temperature a start	t <	70.5	°C				
			by the engine			integrated air mass	>	3000	g				
			coolant temp. sensor.			flow							
			The thermostat opening temp.										
			is 82°C. The										
			thermostat is fully open										
			by 95°C. All critical										
			OBD and emission functions										
			are enabled										
			above 60°C.)										
										<u> </u>			
Air / Fuel Ratio Sensor (primary A/F)													
integrated circuit interface													
hank 4	D0420	A /F aggress valtage	abaduta value of A/F			hottonivaltono		40.4	V	0.1.000	0.1.000	4	tura deiu
	P0130	A/F sensor voltage	absolute value of A/F sensor voltage			battery voltage	<	18.1	-	0.1 sec	0.1 sec	4 sec	two driv
bank 2	P0150	IC correction too high	IC corrective value >	0.1	V	battery voltage	>	10.7	٧		continuous	continuou s	
						engine	running	-	-			or 50 sec	with: 4 s
						engine starting	complete	-	-			cumulativ	continu
												е	or 50 se
													cumula
Air / Fuel Ratio Sensor									1				
(primary A/F)													
reference ground circuit;													
reference voltage circuit; or													
measuring current circuit	D0101		10.0: ".0:	10.1 / 1				10.1	.,		0.4		
bank 1 sensor 1 - low volt	P0131	A/F sensor signal at VM	shorted low	IC Internal	-	battery voltage	<	18.1	V	2 sec	0.1 sec	4 sec	two driv
bank 2 sensor 1 - low volt	P0151	(reference ground				battery voltage	>	10.7	V		continuous	continuou	cycles e
) below lower limit										s	
		or A/F sensor	IC Circuit Status shorted low	IC Internal	-	engine	running	-	-			or 50 sec	with: 4 s
		signal at UN (reference voltage	Shorted low			engine starting	complete	-	-			cumulativ	continu
		[Nernst voltage])											
		below lower limit										e	
		or A/F sensor	IC Circuit Status	IC Internal	-								or 50 se
		signal at IA (measuring	shorted low										cumulat
		current trim circuit											Cumula
) below lower limit											
		,											
bank 1 sensor 1 - high volt	P0132	A/F sensor signal at VM	IC Circuit Status shorted high	IC Internal	-								
bank 2 sensor 1 - high	P0152	(reference ground	j										
volt) above upper limit											
		or A/F sensor signal at UN	IC Circuit Status	IC Internal	-								
		(reference voltage	shorted high				1	+			1		
		· ·											
		[Nernst voltage])											

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Jimo		Frequency of Checks	Criteria for Code	MIL Illumination
		or A/F sensor	IC Circuit Status	IC Internal	-								
		signal at IA	shorted high										
		(measuring											
		current trim circuit											
) above upper limit											
Air / Fuel Ratio Sensor													
(primary A/F) response		dynamic response	A/F sensor dynamic	0.4	ratio	fuel trim forced	active	-	-	2 sec			
Bank 1 Sensor 1	P0133	slow or low	value <			amplitude A/F sensor	ready	-	-		0.01 sec	4 sec	two drivi
Bank 2 Sensor 1	P0153	amplitude			(versus	short term fuel trim	< MAX	1.25	factor		continuous	continuou	cycles e
					reference	(o.k.) short term fuel trim	> MIN	0.75	factor			s or 50 sec	-
						(o.k.)							
					sensor)	measured A/F minus integral	<	1.06	lambd a			cumulativ e	continuo
						control of secondary O2			L	then			or 50 sec
						measured A/F minus integral	>	0.94	lambd a	dynamic			cumulati
						control of secondary O2				test			
						engine speed	<	2520	rpm	sample			
						engine speed	>	1480	rpm	count			
						volumetric efficiency	<	50	%				
						volumetric efficiency	>	16.5	%	>			
						volumetric efficiency	<	30	%/sec				
						gradient	<	570	°C	60			
						A/F sensor housing model temp	_	370		60			
						absolute value of	>	0.02	lambd	samples			
						forced amplitude			а				
						filtered purge HC	<	15	factor				
						conc. factor							
						or evap purge all fuel injectors active	not active TRUE						
						all fuel injectors active	IKUE						
						evap purge high HC conc.	FALSE	-	-				
						A/F pumping current circuit	checked OK	-	-				
						error: evap purge valve	not set	-	-				
						error: evap purge	not set	-	-				
						valve circuit scheduled by System	TRUE	-	-				
						Manager heater reached set	TRUE	L	_	-			-
						temperature	. AUL						
A/F Sensor Heating													
heater performance (primary A/F)													
bank 1 sensor 1	P0135	A/F sensor calculated temperature	A/F sensor temperature calculation <	650	°C	battery voltage	>	10.5	V	70 sec	0.1 sec	4 sec	two drivii
bank 2 sensor 1	P0155	too low				battery voltage	<	18.1	V		continuous	continuou	cycles ea
						internal resistance measurement	valid	-	-			or 50 sec	with: 4 s
						all injectors activated	TRUE	-	-			cumulativ	continuo
						A/F sensor internal	FALSE	-	-			е	or 50 sec
					1	resistance							

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumination
						excessive							cumulativ
						correction required							
						engine stop time	>	300	sec				
						engine temperature at	>	-9.75	° C				
						start							
						A/F sensor heating	TRUE	-	-				
						ready							
						A/F heater control	FALSE	-	-				
						shut off							
						scheduled by System Manager	TRUE	-	-				
heater performance									İ	Ì			ì
(primary A/F)													
bank 1 sensor 1	P0135	A/F sensor	A/F sensor	740	°C	A/F Heater at	TRUE			60 sec	0.1 sec	4 sec	two drivi
			temperature		_								
(primary)		calculated	calculation <			Maximum Power							
bank 2 sensor 1	P0155	temperature below		TKERDCMN		modeled exhaust	>	250	° C		continuous	continuou	cycles e
(primary)		threshold				temp. at sensor						s	
						timer expires after	>	25	sec			or 50 sec	with: 4 s
						either:							
						fuel shut off >= 3	-	-	-			cumulativ	continuo
						sec dur. ends						е	
						or initial A/F heater	-	-	-				or 50 se
						turn on		40.5					
						battery voltage	>	10.5	V				cumulati
						battery voltage A/F heater control	< FALSE	18.1	V				
						shut off		-	-				
						modeled exhaust	FALSE						
						temp. valid							
						scheduled by System	TRUE	-	-				
						Manager							
2					I				1				
Oxygen Sensor sensor circuit (secondary													
O2)													
bank 1 sensor 2	P0137	short circuit to	secondary O2 sensor	0.06	V	secondary O2 heating	TRUE		_	0.1 sec	0.1 sec	4 sec	two drivi
Dank i Schsol Z	10157	ground	voltage <	0.00	•	stable	IIKOL			0.1 300	0.1 300	4 300	two dilvi
bank 2 sensor 2	P0157	ground	voltage			and mod. exhaust	>	250	° C		continuous	continuou	cycles e
						gas temp.			-			s	,
						for time	>	90	sec			or 50 sec	with: 4 s
						engine running	TRUE	-	-			cumulativ	continuo
	+					battery voltage	_	10.5	V	+		е	or 50 se
						mod. exhaust-gas	<	800	°C				cumulati
						temp.		333					Jamaiat
						time after start	<	1	sec				
						engine temp at stop	>	60	° C				
						engine temp	<	40	°C				
						error: engine coolant	not set	-	-				
						temp							
									1				
bank 1 sensor 2	P0138	short circuit to	secondary O2 sensor	1.05	V	secondary O2 heating	TRUE	-	-	5.1 sec			
	D0455	battery voltage	voltage >			stable		055	0.6				
bank 2 sensor 2	P0158					and mod. Exhaust-	>	250	° C				
	-					gas temp.		00				1	
						for time	> TDUE	90	sec				
	-					engine running	TRUE	-	-			1	
	-					battery voltage	>	10.5	V			1	
						mod. exhaust-gas temp.	<	800	° C				
	1			1	1			_	1				
									1	1	1	1	
bank 1 sensor 2	P0140	sensor line disconnection	secondary O2 sensor	0.401	V	secondary O2 heating	TRUE	-	-	60 sec			

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumination
bank 2 sensor 2	P0160		and secondary O2	0.519	V	and mod. Exhaust-gas	>	250	° C				
			sensor voltage <			temp. for time	_	90	000				
			or			engine running	> TRUE	90	sec				
			secondary O2 sensor	40000	Ohm	battery voltage	I KUE	10.5	V				
				40000	Onni	battery voltage		10.5	V				
			internal resistance > when modeled	600	° C	mand authorized man	<	800	° C				
			exhaust gas	600	C	mod. exhaust-gas	_	800	C				
			temperature >			temp.							
			tomporataro			tomp:							
Oxygen Sensor (Secondary						deceleration fuel cut-	active	-	-	4sec			
O2 sensor)						off (DCFO)							
Slow response voltage	V					secondary O2 sensor	>	0.59	V				
during DCFO						voltage							
bank 1 sensor 2						since DCFO						4 sec	two driv
(secondary)													
bank 2 sensor 2	P0139	secondary O2	secondary O2 sensor	0.14	V	air mass integration	>	15	g			continuou	cycles e
(secondary)		sensor	voltage			from high						s	
	P0159	response to DFCO	since DCFO			voltage to low							
						voltage							
						during DFCO							
						battery voltage	>	10.5	V				
							TRUE	-	-				
						readiness							
						or secondary O2	TRUE	-	-				
						sensor failed							
						DFCO test in							
						DLSAHK function							
						secondary O2 sensor	reached	-	-				
						dew point							
						secondary O2 heating	TRUE	-	-				
						stable							
						primary A/F sensor	ready	-	-				
						primary A/F sensor	>	10	lambo				
						measured			а				
						A/F value							
	1				1			1		1			_
Oxygen Sensor Heating													
heater performance													
(secondary O2)	D04.44	dam. O2				h attan i valta sa		10.5	\ /		0.1.000	1	torra alabo
bank 1 sensor 2	P0141	secondary O2	measured secondary			battery voltage	>	10.5	V	approx.	0.1 sec	4 sec	two driv
(00										
(secondary)	D0404	sensor	O2 sensor internal			h attama a litera a		40.4		100			
bank 2 sensor 2	P0161	internal resistance	resistance >			battery voltage	<	18.1	V	100 sec	continuous	continuou	cycles e
(secondary)		ah ay a dhaa ah ah d		404	01		TDUE					S 50	and the Are
		above threshold	nominal internal	104	Ohms	engine running	TRUE	-	-			or 50 sec	with: 4 s
			resistance	296		annina atautina	a a man lata						
						engine starting	complete	-	-			cumulativ	continuo
			manulation of time of o	3.5 7.5	fastar	fuel cut off	EALCE					е	a. FO aa
			multipy times	3.5 7.5	ractor	ruei cut off	FALSE	-	-				or 50 se
	+		degradation factor			sec. O2 internal	valid				1		cumulat
							valid	-	-				cumulat
	+		for time	6	500	resistance		-9.75	С		+	+	
			IOI UIIIE	U	sec	intake air temperature		-9.75			1		
	+					engine off soak time	_	120	sec		+		
						modeled exhaust	in range	360	C		+		
			I			temp.	iii range	500			1		
					1		 	300	1	1		+	
						at secondary O2							
						sensor	EALOF						
						sensor suspicion of	FALSE						
						sensor suspicion of secondary	FALSE						
						sensor suspicion of secondary O2 sensor open	FALSE						
						sensor suspicion of secondary							

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
						from the deactivation for time	>	120	sec				
Total Indicator			ı										1
Fuel Injector circuit continuity													
Cylinder #1	P0201	circuit continuity - open	Voltage	IC Internal	-	engine speed	>	80	rpm	0.01 sec	0.01 sec	4 sec	two driv
	P0261	circuit continuity - ground				battery voltage	>	10	V		continuous	continuou	cycles e
	P0262	circuit continuity - voltage				battery voltage	<	18.1	V			or 50 sec	with: 4
Cylinder #2	P0202	circuit continuity -				output	activated					cumulativ	continu
							and						
							deactivated						
							for complete						
	P0264	open circuit continuity -					checking					е	or 50 se
	F0204	ground											01 30 56
	P0265	circuit continuity -											cumula
		voltage											
Cylinder #3	P0203	circuit continuity - open											
	P0267	circuit continuity - ground											
	P0268	circuit continuity - voltage											
Cylinder #4	P0204	circuit continuity - open											
	P0270	circuit continuity - ground											
	P0271	circuit continuity - voltage											
Cylinder #5	P0205	circuit continuity - open											
	P0273	circuit continuity - ground											
	P0274	circuit continuity - voltage											
Cylinder #6	P0206	circuit continuity - open											
	P0276	circuit continuity - ground											
	P0277	circuit continuity -											
		voltage							_				
Misfire		crankshaft speed	emissions relevant misfire rate	1.82	%	engine speed	>	420	rpm	1000 revs	cylinder	4 sec	Fault du
Emission Level		fluctuation cylinder 1 to				engine speed	<	7000	rpm		firing	continuou	1st inte
Multiple Cylinder	P0300	cylinder 6				indicated torque (idle, no drive)	>	10.2	%		frequency		2 faults
Cylinder #1	P0301					indicated torque (drive) (MISALUN)	>	10.5 29.3	%			After	2 differen
Cylinder #2	P0302					engine speed gradient	<	1200 . 3620	rpm/s ec		continuous	detection,	drive cy
Cylinder #3	P0303					volumetric efficiency gradient	<	225 1350	%/rev			the	
Cylinder #4	P0304					cylinder events after engine start	>	6	ignitio ns			diagnosti c	Fault du
Cylinder #5	P0305					air temperature	>	-30	° C			can only	remaini
Cylinder #6	P0306					rough road	not detected	-	-			pass if	interval
						traction control	off	-	-			similar	8 faults
						clutch switch press / release	transition	FALSE	-			condition s	
						leak detection	off	-	-			are	drive cy

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
						active handling	not active					encounter ed	with at le
						ABS	not active	-	-				4 faults i
						engine drag control	not active	-	-				each.
						fuel cut off	not active	-	-				
						fuel level	>	11.6	%				
						OR fuel level	<	11.6	%				
						AND solid misfire MIL	on	-	-				
						OR fuel level error	set	-	-				
						error: throttle	not set	-	-				
						position error: crankshaft	not set	-	-				
						sensor							
						error: ref.mark of crank sensor	not set	-	-				
Catalyst Damaging Level			OR Catalyst damaging			Includes all the above				1000 revs			First
	Dooo		misfire rate			with the							
Multiple Cylinder	P0300					following exceptions:				First interval			occuran
Cylinder #1	P0301					First interval extention				200 revs			immedia
Cylinder #2	P0302					engine coolant	<	47	°C	all			flashing
						temperature				remaining			
Cylinder #3	P0303					fuel level	>=	11.6	%	intervals			while err
Cylinder #4	P0304			18.1 5	%	OR fuel level	<	11.6	%				present,
Cylinder #5	P0305			see Misfire		AND blinking MIL	blinking	-	-				no MIL
Cylinder #6	P0306			supplementa I		AND NOT first blink event	-	-	-				with no
				data									
				(h) (2.5.1)									Second
				(11) (=1011)									occuran
													immedia
													flashing
													while en
													present,
													solid MII
													with no
Knock Control													
Circuit	P0324	zero test (part 1)	integrator voltage - 715 mV >	0.215	V	knock control	active	-	-	50 sec	every 510	4 sec	two drivi
			(absolute value)			engine speed gradient	<	2300	rpm / sec	cumulativ e	engine	continuou s	cycles e
			for consecutive events	2	count	manifold pressure gradient	<	50 100	kPa / sec		cycles	or 50 sec	with: 4 s
			or			test pulse fault assumption	not set	-	-		continuous	cumulativ	continuo
	_			1	1		1	1	1			9	
	P0324	zero test (part 2)	integrator gradient	60 40	V / sec	knock control	active	-	-				or 50 se
			(absolute value) > (absolute value)	DKROFN		engine speed gradient	<	2300	rpm /				cumulati
			for consecutive	2	count	manifold pressure	<	50	sec kPa /				
			events	1		gradient		100	sec				
						test pulse fault assumption	not set	-	-				
	1			1		engine speed	>	1000	rpm				
	+		+				<	4200	rpm	1	1	+	
						engine speed							

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
	P0324	test pulse	test pulse integral <	3.7	V	engine coolant temp.	>	60	° C				
			for consecutive events	2	count	engine speed gradient	<	2300	rpm / sec				
						engine load gradient	<	50 100	kPa / sec				
						zero test fault assumption	not set	-	-				
Bank 1	P0327	range check low	reference voltage <	0.7 2.2	V	engine coolant temperature	>	60	°C	approx.	0.1 sec	4 sec	two driv
Performance				UDKSNU		engine speed	>	2000	rpm	20 sec	continuous	continuou	cycles e
			for consecutive events	100	count	cylinder identification	correct	-	-			or 50 sec	with: 4 s
	P0328	range check high				engine speed	>	2000	rpm			cumulativ	continu
			reference voltage >	33 99	V	engine speed gradient	<	2300	rpm / sec				or 50 se
				UDKSNO		engine load gradient	<	50 100	kPa / sec				cumula
			for consecutive events	100	count	error: knock control circuit (IC)	not set	-	-				
						engine speed limp home	not active	-	-				
Bank 2	P0332	range check low	reference voltage <	0.7 2.2	V	engine coolant temperature	>	60	° C	approx.	0.1 sec	4 sec	two driv
Performance				UDKSNU		engine speed	>	2000	rpm	20 sec	continuous	continuou	cycles e
			for consecutive events	100	count	cylinder identification	correct	-	-			or 50 sec	with: 4
	P0333	range check high				engine speed	>	2000	rpm			cumulativ	continu
			reference voltage >	33 99	V	engine speed gradient	<	2300	rpm / sec				or 50 se
				UDKSNO		engine load gradient	<	50 100	kPa / sec				cumula
			for consecutive events	100	count	error: knock control circuit (IC)	not set	-	-				
						engine speed limp home	not active	-	-				
Crankshaft Position Sensor	P0335	circuit continuity	no engine signal	0	rpm	camshaft revolutions detected	>	12	count	approx.	0.01 sec	4 sec	immedi
			but phase signals available			detected				5 sec	continuous	continuou s	once co
		rationality check	reference gap missing >	3	gaps							or 50 sec	has
			(sensor signal but no reference)									cumulativ	been se
	P0336	rationality check	unexpected re-	6	count			1					with: 4 s
			synchronization > (loss of reference mark)										continu
		rationality check	intermittent loss of engine speed signal >	28	count								or 50 se
	P0338	rationality check	number of measured	8	count					approx.	1 per rev		cumula
			teeth per crankshaft										

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
			revolution deviates						Π	2 sec	continuous		
			from expected										
Camshaft Position Sensor													
Bank 1 Intake	P0341	plausibility check	signal erratic or out of position	120	count	engine in synchronized mode	TRUE	-	-	10	1 per rev	4 sec	two drivi
	P0342	circuit low	signal permanently			Synchronized mode				revolution	continuous	continuou	cycles e
	P0343	oirquit continuity or	low							s		s or FO coo	with: 4 o
	P0343	circuit continuity or high	signal permanently high									or 50 sec	with: 4 S
												cumulativ	continuo
Bank 2 Intake	P0346	plausibility check	signal erratic or out of									е	or 50 se
			position										
	P0347	circuit low	signal permanently low										cumulat
	P0348	circuit continuity or	signal permanently										
		high	high										
Bank 1 Exhaust	P0366	plausibility check	signal erratic or out of										
	D0007	ataunit Iann	position										
	P0367	circuit low	signal permanently low										
	P0368	circuit continuity or	signal permanently										
		high	high										
Bank 2 Exhaust	P0391	plausibility check	signal erratic or out of										
	P0392	circuit low	position signal permanently										
	1 0002		low										
	P0393	circuit continuity or	signal permanently										
		high	high										
gnition Coil													
circuit continuity Cylinder #1	P0351	circuit continuity -	Voltage	IC Internal	-	engine speed	>	600	rpm	20	1 per rev	4 sec	two driv
		open	ŭ								-		
	P2300	circuit continuity - ground				engine speed	<	5000	rpm	crankshaf	continuous	continuou	cycles e
	P2301	circuit continuity -				battery voltage	>	10	V	revolution		or 50 sec	with: 4 s
Cylinder #2	P0352	voltage circuit continuity -				hattory voltago	<	18.1	V	s		cumulativ	continuo
Cyllilder #2	F0352	open				battery voltage		10.1	V			e	Continue
	P2303	circuit continuity -											or 50 se
	P2304	ground circuit continuity -											cumulat
		voltage											
Cylinder #3	P0353	circuit continuity - open											
	P2306	circuit continuity -											
	P2307	ground circuit continuity -											
		voltage											
	P0354	circuit continuity -											
Cylinder #4	. 000 .												
Cylinder #4		open circuit continuity -											
Cylinder #4	P2309	circuit continuity - ground											
Cylinder #4		circuit continuity - ground circuit continuity -											
Cylinder #4 Cylinder #5	P2309	circuit continuity - ground circuit continuity - voltage circuit continuity -											
	P2309 P2310 P0355	circuit continuity - ground circuit continuity - voltage circuit continuity - open											
	P2309 P2310	circuit continuity - ground circuit continuity - voltage circuit continuity - open circuit continuity -											
	P2309 P2310 P0355	circuit continuity - ground circuit continuity - voltage circuit continuity - open circuit continuity - ground circuit continuity -											
	P2309 P2310 P0355 P2312	circuit continuity - ground circuit continuity - voltage circuit continuity - open circuit continuity - ground											

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	OTINO		Frequency of Checks	Criteria for Code	MIL Illumina
	P2315	circuit continuity -											
	P2316	circuit continuity - voltage											
Catalyst Bank 1	P0420	oxygen storage of catalyst	normalized oxygen storage	1	factor	exhaust gas mass flow	>	7.22	g/sec	approx.	0.01 sec	4 sec	two dri
Catalyst Bank 2	P0430		less than normalized			exhaust gas mass flow	<	15.56	g/sec	1000 sec		continuo	cycles
			oxygen storage									s	
			of a limit catalyst <			catalyst temp. model	<	750	° C	during	one		with: 4
						catalyst temp. model	>	500	° C	active	completed		continu
						engine speed	>	1040	rpm	driving	test per		or 50 s
						engine speed	<	3000	rpm		driving		cumula
						engine load	>	15	%	one test	cycle		
						engine load	<	25	%	,			
						modeled catalyst temp. gradient	<	1	° C / sec	(average			
						exhaust gas mass flow	<	3.89	g/sec	of 3			
						gradient			2				
						fuel system closed loop	active	-	-	checks)			
						time after engine start	>	450	sec	per			
						ambient temperature	>	-30	° C	driving cycle			
						error: secondary O2	not set	-	-				
						aging							
						error: fuel system	not set	-	-				
						error: cam control	not set						
						diagnosis scheduled by System	TRUE						
						Manager secondary O2 sensor	TRUE						
						readiness short term fuel trim at	not set						
						Upper limit							
						short term fuel trim at lower limit	not set						
						Evap. Leak detection	not active						
						transient	not set						
						compensation catalyst clear out	not set						
						catalyst monitoring							
						device control							
·						command	not set						
						primary A/F sensor response	set						
Evaporative System and													
Leak Monitor													
Small Leak - 0.020 "	P0442	natural	filtered fault index >	0.6	-	Eng. Running Vac.	not set	(see		approx.	0.1 sec	filtered	immed
								P0455					
								for					
		pressure/vacuum			1	pull down		details)					
		in tank				or vac. pulldown	0.020" leak	(see		600 sec	once per	value	
								P0455					
								for					
						suspect leak		details)					
			based on:			est amb air temp	>	1.5	°C	each test	engine off	exceeds	once c
			(peak pressure -	540	Pa	est amb air temp	<	32.25	°C		cycle	threshold	
	1	1	peak vacuum) <	1430	1	1	1	1	1	1	1 *		1

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Office		Frequency of Checks	Criteria for Code	MIL Illuminat
						Engine stop coolant temp	>	74.25	° C	approx.		then	been se
						engine run time	>	600	sec	6 test		4 sec	
						trip distance travelled	>	5.1	miles			continuou	approx.
						@ vehicle speed above	>	1.6	mph	run length			6 test
						evap fuel volatility factor	<	8	factor				average
						fuel level	>	11.6	%				run leng
						fuel level	<	88.4	%				
						fuel level change from keyoff	<	10.2	%				(The M
						error: vehicle speed	not set	-	-				actually
						error: engine coolant temp	not set	-	-				requeste
						error: purge valve	not set	-	-				during s
						error: fuel tank	not set	-	-				down so
						error: system voltage	not set	-	-				It becom
						error: air mass meter	not set						visible o
						error: intake air temp	not set						the
						error: canister vent	not set	-	-				following
						valve							
						altitude adaption	valid	-	-				drive.)
						tank vacuum out of	FALSE	-	-				
						range start (coolant - intake	<	9.75	° C				
						air) start engine coolant	<	42	° C				
						temp Start intake air temp		1.5	° C				
						Start intake air temp	<	32.3	°C				
						time since previous	>	0	sec				
						test		00					
						amb pressure	>	68	kPa				
						battery voltage	>	10.8	٧				
						vehicle odometer	>	12.5	miles				
Evaporative Emission													
System Purge Solenoid	P0443	circuit continuity -	Voltage	IC Internal	-	engine speed	>	80	rpm	0.01 sec	0.01 sec	4 sec	two drivi
Control Circuit	P0458	open circuit continuity -				battery voltage	>	10	V		continuous	continuou	cvcles e
		ground										s	-
	P0459	circuit continuity - voltage				battery voltage	<	18.1	V			or 50 sec	
						output	activated					cumulativ	continuo
	1						and		1				
				1	1		deactivated						
							1	l		1			
							for complete						1
							for complete checking					е	
												е	
Evanorative System and												e	
_eak Monitor												e	or 50 se cumulati
	P0446	underpressure in	tank pressure <	-800	Pa	fuel system status		-	-	approx.	0.1 sec	e 4 sec	
Evaporative System and Leak Monitor EVAP canister vent valve	P0446	underpressure in tank	tank pressure <	-800	Pa	fuel system status vehicle speed	checking	-	- mph	approx.	0.1 sec	4 sec	cumulati
_eak Monitor	P0446		tank pressure <	-800	Pa	vehicle speed	closed loop	1.9	- mph			4 sec	two drivi
_eak Monitor	P0446		tank pressure <	-800	Pa		checking closed loop	- 1.9 - 10.5	- mph	5 sec	0.1 sec	4 sec	cumulati

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminatio
						fuel tank pressure fuel tank pressure	> <	-2500 1000	Pa Pa	will be complete	driving cycle		cumulative
						ratio: (MAP Model / Baro)	<	0.555	-	d.			
						est amb air temp	>	1.5	° C	The test			
						est amb air temp	<	32.25	°C	will			
										attempt			
						fuel level fuel level	>	11.6	%	to run up			
							<	88.4	%	to 10 times			
						engine start temp - amb. temp	<	9.75	° C	until it			
						time after engine start	>	600	sec	successfu lly	I		
						or fuel mixture adaptation	stable	-	-	completes	8		
						amb pressure	_	68	kPa	a test			
						maximum number of	<	10	-	u toot			
						attempts							
						error: mass air flow	not set	-	-				
						error: coolant temp	not set	-	-				
						error: intake air temp error: fuel tank pres	not set not set	-	-				
						error: system voltage	not set	-	-				
						error: purge valve	not set	-	-				
						error: vehicle speed	not set	-	-				
						error: canister vent	not set	-	-				
						valve							
						error: purge valve flow	not set	-	-				
						error: accelerator pedal	not set	-	-				
	1	1	le e e	lia i i	1		1	1	,	1	1	1.	I
Evap Vent Solenoid	P0449	circuit continuity - open	Voltage	IC Internal	-	engine speed	>	80	rpm	0.01 sec	0.01 sec	4 sec	two driving
Control Circuit	P0498	circuit continuity - ground				battery voltage	>	10	V		continuous	continuou s	cycles ea
	P0499	circuit continuity - voltage				battery voltage	<	18.1	V	Only one		or 50 sec	with: 4 se
		remage				output	activated			test per		cumulativ	continuou
							and deactivated						
							for complete						
							checking					е	or 50 sec
													cumulativ
Fuel Tank	P0451	rationality - signal	delta pressure	813	Pa		>	-7	° C	25.5	0.1 sec	4 sec	two drivin
Pressure Sensor		oscillation	signal (= current pressure -		1	model vehicle speed >=	<=	18.75	mph	sec	continuous	continuo	cycles ea
			old pressure) >			·						s	-
						time after canister vent valve open	>	3	sec			OF SEC	with: 4 se
		or		4500	_					0.5		1	
		rationality - signal range check	sensor signal >=	1500	Pa	time after engine start	>	1	sec	25			
			sensor signal >=	-2970	Pa	time after canister vent valve open	>	3	sec	sec			
						vehicle speed >=	>=	6.25	mph	1			
						ambient temperature model	>	-7	° C				
			1	1	1		1	1		1	1	1	1
	P0452	circuit continuity - ground	sensor signal <	-3969	Pa	vehicle speed	=	0.0	mph	14 sec			or 50 sec

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	OTIKS		Frequency of Checks	Criteria for Code	MIL
	P0453	circuit continuity -	sensor signal >	1719	Pa	ambient pressure	>	68000	Pa				cumulati
		voltage				ambient temperature model	>	-7	° C				
						fuel level	>	11.6	%				
						fuel level	<	88.4	%				
Evaporative System and													
Leak Monitor Large leak	P0455	vacuum pulldown	absolute value			fuel system status	closed loop	-	-	11 sec	0.1 sec	4 sec	two driv
		slope				vehicle speed	<	1.9	mnh			continuou	
						·		1.9	mph			S	
			of vacuum	30 70	Pa	engine	idling	-	-	Only one	one		with: 4 s
			pulldown slope <										
				KLGGRTED 05		battery voltage	>	10.5	V	test per	completed		continuo
			OR			battery voltage	<	18.1	٧	driving cycle	test per		or 50 se
Stuck Closed Purge valve	P0455	vacuum pulldown				fuel tank pressure	>	-2500	Pa	complete	driving		cumulat
		slope	tank vacuum >	-1.221	Pa	fuel tank pressure	<	1000	Pa	d.	cycle		
						ratio: (MAP Model / Baro)	<	0.555	-	The test			
						est amb air temp	>	1.5	°C	will			
						est amb air temp	<	32.25	° C	attempt to run up			
						fuel level	>	11.6	%	to 10			
						fuel level	<	88.4	%	times until it			
						engine start temp -	<	9.75	° C	successfu			
						amb. temp		000		lly			
						time after engine start		600	sec	completes			
						or fuel mixture adaptation	stable	-	-	a test			
						amb pressure	>	68	kPa				
						error: mass air flow	not set	-	-				
						error: coolant temp error: intake air temp	not set not set	-	-				
						error: fuel tank pres	not set	-	-				
						error: system voltage	not set	-	-				
						error: purge valve	not set	-	-				
						error: vehicle speed	not set	-	-				
						error: canister vent valve	not set	-	-				
						error: purge valve flow	not set	-	-				
						error: accelerator	not set	-	-				
				L		pedal							
Fuel Level Sensor Circuit						electrical fuel level sensor(s)					0.1 sec	4 sec	no
fuel level sensor 1						without failure	TRUE	-	-		continuous	continuou	
	P0461	rationality	fuel level sensor signal movement <	1.5	%	battery voltage	>=	10.5	V			S	
			orginal movement <			battery voltage	<=	18.1	V				
						engine started	TRUE	-	-				
						fuel level state stable	TRUE	-	-				
						vehicle speed	>	0.0	mph				
						error: vehicle speed signal	not set	-	-				
			+		1	number of checks	1	1	1			1	

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL
						difference between fuel consumed							
						by engine and							
						change in fuel level							
						signal	>	45.6	%				
						for time	>	300.0	sec				
	P0462	range check low	voltage <	0.25	V	battery voltage	>=	10.5	V	60 sec	0.1 sec	4 sec cont.	no
						battery voltage	<=	18.1	V		continuous	or 50 sec	
						engine started	TRUE	-	-			cumulativ e	
	P0463	range check high	voltage >	3.2	V	battery voltage	>=	10.5	V	60 sec	0.1 sec	4 sec	no
						battery voltage	<=	18.1	V		continuous	or 50 sec	
						engine started	TRUE	-	-			cumulativ e	
Cooling fan 1 relay	P0480	circuit continuity -	Voltage	IC Internal	-	engine speed	>	80	rpm	0.01 sec	0.01 sec	4 sec	two driv
Control Circuit	P0691	open circuit continuity -				battery voltage	>	10	V		continuous	continuou	
	P0692	ground circuit continuity -				battery voltage	<	18.1	V			s or 50 sec	
		voltage										cumulativ e	continue
Cooling fan 2 relay	P0481	circuit continuity -	Voltage	IC Internal	-							6	or 50 se
Control Circuit	P0693	open circuit continuity - ground											cumulat
	P0694	circuit continuity - voltage											
		vollage											
Evaporative System and Leak Monitor													
Leaking purge valve	P0496	underpressure in tank	tank pressure loss gradient <	-60	Pa	fuel system status	closed loop	-	-	about 4 sec	0.1 sec	4 sec	two driv
						vehicle speed	<	1.9	mph			continuou s	1
						engine	idling	-	-	Only one			with: 4 s
						battery voltage battery voltage	>	10.5 18.1	V	test per driving	completed test per		or 50 se
						fuel tank pressure	>	-2500	Pa	cycle complete			cumulat
						fuel tank pressure	<	1000	Pa	d.	cycle		
						ratio: (MAP Model / Baro)	<	0.555	-	The test	3,010		
						fuel level	>	11.6	%	will attempt			
						fuel level	<	88.4	%	to run up			
						engine start temp - amb. temp	<	9.75	° C	to 10 times			
						time after engine start		600	sec	until it			
						or fuel mixture adaptation	stable	-	- IrDe	lly			
						amb pressure	>	68	kPa	completes	5		
						maximum number of attempts	<	10	-	a test			
						est amb air temp	>	1.5	°C				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
Cyclom -	0000	Becompaign	oignar and ontone	raido	OTILO	7 diametero	Condition	Value		rtoquirou	or orroons	ioi oodo	marrimax
						est amb air temp	<	32.25	° C				
						error: mass air flow	not set	-	-				
						error: coolant temp	not set						
						error: intake air temp	not set						
								-	-				
						error: fuel tank pres	not set	-	-				
						error: system voltage	not set	-	-				
						error: purge valve	not set	-	-				
						error: vehicle speed	not set	-	-				
						error: canister vent	not set	-	-				
						valve							
						error: purge valve flow	not set	_	-				
						onon pargo varro non							
						error: accelerator	not set						
							not set	-	-				
						pedal							
	1	1										1	
Idle Speed System													
(disabled during cold start)	P0506	functional check	desired rpm - actual	100	rpm	load (for underspeed	<	2 35	%	10 sec	0.1 sec	4 sec	two driv
			rpm >			only)							
						coolant temp.	>	-10.5	° C		continuous	continuou	cycles
												S	
	P0507		desired rpm - actual	-200	rpm	intake air temp	>	-10.5	° C			or 50 sec	with: 4
			rpm <										
			or			vehicle	at idle					cumulativ	continu
												е	
			fuel cut off due to	3	count	altitude factor (sea	_	0.656	factor				or 50 se
			overspeed >		oodiii	level = 1.0)		0.000	idotoi				01 00 0
							_	0					
			during this idle			time after engine start	>	U	sec				
						evap purge (high HC	FALSE						cumula
						conc.)							
						cold start idle speed	FALSE						
						control							
						intrusive evap test	not active						
						error: throttle position	not set						
						on an amorphism production							
						error: vehicle speed	not set						
						error: verricle speed	1101 301						
						error: coolant	not set						
						temperature							
						error: intake air	not set						
						temperature							
						error: evap system	not set						
						error: evap purge	not set						
						valve							
Idle Speed System													
(enabled during cold start)	P050A	functional check	desired rpm - actual	100	rpm	load (for underspeed	<	35	%	5 sec	0.1 sec	4 sec	two driv
, , , , , , , , , , , , , , , , , , , ,			rpm >		1	only)					1	1	
	1		during catalyst			Engine coolant start	>	-10	° C		continuous	continuou	cycles
			heating on			temp.	ľ	+40	_		25	e	5,5103
	+	+	desired rpm - actual	-200	rnm		ot idlo	T4U				or 50 sec	with: 4
				-200	rpm	vehicle	at idle					OF 50 SEC	with: 4
	1		rpm <	1		- Minus - for the first		0.050			1		
			during catalyst			altitude factor (sea	>	0.656	factor			cumulativ	continu
			heating on			level = 1.0)						е	
						Engine coolant start	<	80	° C				or 50 s
						temp.							
						catalyst heating	TRUE	-	-				cumula
							FALSE	-	-				1
						conc.)							
							1	1			1	1	1
							TDIIE	_	_				
						idle speed control	TRUE	-	-				
						idle speed control catalyst heating		-					
						idle speed control catalyst heating intrusive evap test	not set	-	-				
						idle speed control catalyst heating		-					
						idle speed control catalyst heating intrusive evap test error: throttle position	not set not set		-				
						idle speed control catalyst heating intrusive evap test	not set	-	-				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Offics		Frequency of Checks	Criteria for Code	MIL Illumina
						error: coolant temperature	not set	-	-				
						error: intake air temperature	not set	-	-				
						error: evap system	not set	-	-				
						error: evap purge	not set	-	-				
						valve							
System Voltage								1					
-,	P0560	rationality	powertrain supply			engine speed	>	80	rpm	2 sec	0.1 sec	4 sec	no
			relay feedback input	2.54	V						aantinaa		
			voltage <	2.54							continuous	continuou	
	P0562	range check low	voltage <	10	V	time after engine start	>	180	sec			or 50 sec	:
												cumulativ e	′
	P0563	range check high	voltage >	18	V	time after engine start	>	180	sec				
						vehicle speed	>	3.1	mph				
ECM monitoring													
	P0601	rationality	wrong ROM checksum	-	-	checksum calculation at power	TRUE	-	-	30 sec	0.01 sec	4 sec	code s
						down in the last driving cycle					at key off	continuou	then 5
						completely finished						5	
		rationality	wrong cyclic ROM checksum of	-	-	partial checksum on critical				30 sec	0.01 sec	4 sec	code s
			critical regions			variables					at key on	continuou	then 5
										1		ļo	1
	P0602	rationality -	service ECU bit set in calibration	service ECU bit set	-	-	-	-	-	1 sec	0.01 sec	4 sec	code s
		programming incomplete	ouns and it	Dit Got							at key on	continuou	then 5
	Docos	FTC manitaring	CW internal	CM internal	l	la accesa dacces	a a man la th r		1	le	0.01.000	14 000	landa a
	P0603	ETC monitoring controller reset	SW internal	SW internal		power down calculation	completly	-		5 sec	0.01 sec	4 sec	code s
						in the last driving cycle	finished				continuous	continuou s	
												or 50 sec	:
												cumulativ e	1
												1	
	P0604	functional check	RAM writeability			power down	completly	-	-	5 sec	0.01 sec	4 sec	code s
			read and write test			calculation in the last driving	finished				at key off	continuo	u then 5
		ovolio BAM sheet	uritoobility abank of			cycle	1				1	s	
		cyclic RAM-check	writeability check of RAM										
	P0606	Electronic Throttle	SW internal	SW internal		power down	completly	-	-	5 sec	0.01 sec	4 sec	code s
		Control (ETC) checks				calculation							
		ETC monitoring				in the last driving	finished				continuous	continuo	then 5
		torque comparison				cycle			<u>L</u>			s	
		ETC monitoring										or 50 sec	:
		engine speed signal		1					1				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumina
	1	ETC monitoring										cumulativ	
		volumetric										Cumulativ	
		efficiency signal										е	
		ETC mon. vol. Eff.,											
		spark advance,											
		A/D conv. grp. A,											
		reaction											
		crosscheck											
		ETC monitoring											
		throttle crosscheck											
		ETC monitoring											
		A/D conv group B,											
		A/D converter											
		supply voltage											
		crosscheck ETC monitoring											
		redundant pedal											
		signal											
		Signal											
Electronic Throttle Control	P0638	motor control range	circuit duty cycle >	80	%	battery voltage	>	7	V	0.6 sec	0.01 sec	4 sec	code s
		check				, ,							
		short term	(absolute value)								continuous	continuou	then 5
										ble)		S	
												or 50 sec	
		motor control range								5.0 sec		cumulativ	
		check								5.0 360		e	
		long term								(latched)		C	
		in the second second								(
5V reference voltage										3 sec	0.01 sec	4 sec	code s
monitoring	P0641	circuit continuity - open	Voltage	IC Internal	-	ignition key on	TRUE	-	-			continuou s	then 5
	P0642	circuit continuity -				ECM power relay	TRUE	-	-				
		ground											
	P0643	circuit continuity -											
		voltage											
	P0651	circuit continuity -	Voltage	IC Internal	-								
	DOCEO	open									1		
	P0652	circuit continuity -											
	P0653	ground circuit continuity -									-		
	1.0033	voltage											
		voltage			1								
	P0697	circuit continuity -	Voltage	IC Internal	-								
		open											
	P0698	circuit continuity -											
		ground											
	P0699	circuit continuity -			_								
		voltage							1				
MIL Control Circuit	P0650	circuit continuity -	Voltage	IC Internal	-	engine speed	>	80	rpm	0.01 sec	0.01 sec	4 sec	no
		open									1		
		circuit continuity -				battery voltage	>	10	V		continuous	continuou	(but is
		ground						10 (.,			S	
		circuit continuity -				battery voltage	<	18.1	V			or 50 sec	shown
		voltage			+	output	activated					cumulativ	Mode
							and					Jamaily	
							deactivated						
							for complete						
							checking					е	

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL
Fransmission Control Module	P0700	OBD emission fault	signal input	-	-	-	-	-	-	0.01 sec	0.01 sec	4 sec cont.	code set
MIL Illumination Request		detected by the TCM									continuous	or 50 sec	then 5 s
	(Specific TCM DTC shown in freeze frame)											cumulativ e	
/ehicle speed sensor													
Manual Transmission	P0501	rationality (high range check)	vehicle speed	171.9	mph	-	-	-	-	2 sec	0.1 sec continuous	4 sec continuou s	two driving
	P0502	rationality	vehicle speed	3.1	mph	engine speed	>	1800	rpm	3 sec		or 50 sec	with: 4 se
		(low range check)				engine speed	>	3520	rpm			cumulativ	continuo
						fuel shut off	TRUE	-	-				or 50 sec
						coolant temperature	>	40	° C				cumulativ
Clutch Pedal Switch	P0833	rationality -	detected clutch pedal	6	count -	gear changes detected	>	20	count	approx.	0.1 sec	4 sec	two drivii
Manual Transmission		input switch state changes	press count <		switch	(ratio of engine speed to				500 sec	continuous	continuou	cycles ea
					presses	vehicle speed range change)						or 50 sec	
					detected	with brake pedal	not applied	-	-			cumulativ e	continuo
						Delay between shift detections	>	4	sec				or 50 sec
						vehicle speed between gear change detects	>	9.4	mph				cumulati
Engine Metal													
Overtemperature Protection	P1258	engine coolant temperature	engine coolant temperature >	129	° C	engine run time	>	30	sec	1 sec	0.1 sec	4 sec cont.	code set
(Limp Home Function Active)		too high				error: engine coolant temp	not set	-	-		continuous	or 50 sec	then 5 s
												e	
Rough Road Signal	P1380	signal missing	signal missing	-	-	no error: misfire	- TRUE	-	-	5 sec	0.1 sec continuous	4 sec or 50 sec	no
						monitoring						cum	
Electronic Throttle Control													code set
	P1551	limp-home throttle position	throttle position <	1.8	%	vehicle speed	<=	0	mph	5 sec	0.01 sec	4 sec	then 5 s
		out of range	OR			engine speed	<	40	rpm		at key on	continuou s	with: 4 s
			throttle position >	13.1	%	engine coolant temperature	>=	5.25	° C			or 50 sec	
						engine coolant temperature	<=	84.75	° C			cumulativ e	or 50 sec
						intake air temperature	>=	5.25	° C				cumulati
						intake air temperature	<=	60	° C				
						battery voltage accelerator pedal	> <	10.0 14.9	V %				
						position							
Air / Fuel Ratio Sensor													

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Offics		Frequency of Checks	Criteria for Code	MIL
integrated circuit interface													
bank 1	P167A	A/F sensor IC	low voltage	TRUE	-	battery voltage	>	10.7	V	10 sec	0.1 sec	4 sec	two driv
bank 2	P167B	operating voltage too low				battery voltage	<	18.1	V		continuous	continuou	cycles e
		A/F sensor IC SPI	communication error	TRUE	-	engine	running	-	-	0.1 sec		or 50 sec	with: 4 s
		interface communication										cumulativ	
		error A/F sensor IC circuit	write error	TRUE	-	engine starting	TRUE	-	-	0.1 sec		е	or 50 se
		write error at INIT register											cumulat
Fuel Level Capper Circuit				1		alactrical fuel level	1	1	1	300 sec	0.1 sec	4 000	no
Fuel Level Sensor Circuit						electrical fuel level sensor(s)				300 Sec	U. I Sec	4 sec	no
fuel level sensor 2						without failure	TRUE	-	-		continuous	continuou s	
	P2066	rationality	fuel level sensor signal movement <	1.5	%	battery voltage	>=	10.5	V				
						battery voltage	<= TDUE	18.1	V				
						engine started fuel level state stable	TRUE TRUE	-	-				
						vehicle apped		0.0	mnh				
						vehicle speed error: vehicle speed	not set	-	mph -				
						signal							
						number of checks difference between	>	1	-				
						fuel consumed							
						by engine and	>	45.6	%				
						change in fuel level signal	<	-45.6	%				
						for time	>	300.0	sec				
	P2067	range check low	voltage <	0.25	V	battery voltage	>=	10.5	V	approx.	0.1 sec	4 sec cont.	no
						battery voltage	<=	18.1	V	60 sec	continuous	or 50 sec	
						engine starting	TRUE	-	-			cumulativ e	
	P2068	range check high	voltage >	3.2	V	battery voltage	>=	10.5	V	approx.	0.1 sec	4 sec	no
						battery voltage	<=	18.1	V	60 sec	continuous	or 50 sec	
						engine starting	TRUE	-	-			cumulativ	
												е	
Oxygen Sensor (secondary													
O2) Trim of Air / Fuel Ratio													
Sensor (primary A/F) primary A/F signal RICH /													
secondary O2 signal LEAN													
Bank 1	P2096	A/F sensor long term secondary	secondary O2 sensor trim	-0.03	lambda	engine starting	TRUE	-	-	2 sec	0.1 sec	4 sec	two driv
Bank 2	P2098	trim - rich shift	integral control <			secondary O2 trim active	TRUE	-	-		continuous	continuou	cycles e
		- correction below threshold				and secondary O2 oscillation	TRUE	-	-			or 50 sec	with: 4
		niieziiold				check finished						cumulativ	continue
primary A/F signal LEAN /						then timer	>	40	sec			е	or 50 se
					1	I	1	1					

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumina
Bank 1	P2097	A/F sensor long term secondary	secondary O2 sensor trim	0.03	lambda	scheduled by System Manager	TRUE						cumulat
Bank 2	P2099	trim - lean shift	integral control >			sec. O2 trim - fast lean correction	FALSE						
		 correction above threshold 				sec. O2 trim - fast rich correction	FALSE						
						suspicion A/F sensor lean shift	FALSE						
						secondary O2 oscillation test	checked OK						
Electronic Throttle Control	P2100	circuit switch-off	output circuits not	_	_	_	_	_	-	0.1 sec	0.01 sec	4 sec	code se
	12100	on out ownor on	deactivated							0.1 000	0.01 000	4 300	0000 00
			as commanded								at key on	continuou s	then 5
	P2101	difference between set and	difference between set and	4 50	%	electronic throttle adaptation	not active	-	-	0.5 sec	0.01 sec	4 sec cont.	code se
		actual position of	actual position of	dep. on rate		battery voltage	>	7	V		continuous	or 50 sec	then 5
		throttle blade	throttle blade >	of change									
												cumulativ e	
	P2105	Electronic Throttle				power down	completly	-	-	5 sec	0.01 sec	4 sec	code se
		Control (ETC) checks				processing							
		ETC monitoring watchdog				in the last driving	finished				at key on	continuou	then 5
		shutdown path				cycle						s	
	P2119	functionality of return spring	throttle blade return response	0.56	sec	vehicle speed	<=	0	mph	0.56 sec	0.01 sec	4 sec	code se
						engine speed	<	40	rpm		at key on	continuou s	then 5
						engine coolant temperature	>=	5.25	°C	once			
						engine coolant temperature	<=	84.75	°C	per			
						intake air temperature	>=	5.25	°C	ignition			
						intake air temperature	<=	60	° C	on			
						battery voltage	>	10.0	V				
						accelerator pedal position	<	14.9	%				
accelerator Pedal Position	P2122	range check low	voltage	0.84	V	battery voltage	>	7	V	0.2 sec	0.01 sec	4 sec cont.	code se
Sensor 1	P2123	range check high		4.82	V						continuous	or 50 sec	then 5
												cumulativ e	
Accelerator Pedal Position	P2127	range check low	voltage	0.66	V	battery voltage	>	7	V	0.2 sec	0.01 sec	4 sec cont.	code se
Sensor 2	P2128	range check high		4.82	V						continuous	or 50 sec	then 5
												cumulativ e	
Accelerator Pedal	P2138	plausibility	voltage difference >	0.21	V	-	-	-	- -	0.24 sec	0.01 sec	4 sec	code se
Position 1 versus Position 2		,	idle range	0.27	V						continuous	continuou	
			voltage difference	0.27	V	1		1	1	t	1	or 50 sec	1

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
			pedal partially pressed >									cumulativ e	
			voltage difference >	1.07	V								
			pedal fully pressed										
		plausibility when leaving idle range	votage pedal 1 >	1.17	V								
		, , , , , , , , , , , , , , , , , , ,	voltage difference pedal 2 >	0.04	V								
Electronic Throttle Control	D0170	4 4									0.04		
	P2176	throttle exchange detection	range check poti1 value at lower stop			vehicle speed	<=	0	mph	1 sec	0.01 sec	4 sec	code se
		learn fail	throttle potentiometer 1 voltage <	0.212	V	engine speed	<	40	rpm		at key on	continuou	then 5
		or	or			engine coolant temperature	>=	5.25	° C	once			
		initial throttle learn	throttle potentiometer 1	0.865	V	engine coolant	<=	84.75	° C	per			
		failed	voltage >			temperature							
		or				intake air temperature		5.25	° C	ignition			
		learning prohibited due to	range check poti2 value at lower stop		0	intake air temperature	<=	60	° C	on			
		secondary parameters not met	throttle potentiometer 2 voltage <	4.14	V	battery voltage	>	10.0	V				
		or	or			accelerator pedal position	<	14.9	%				
		minimum throttle	throttle potentiometer 2 voltage >	4.84									
		out of range											
Fuel System Lean/Rich						air mass flow	>=	7.5	g/sec	approx.	0.1 sec	4 sec	two driv
Multiplicative						air mass flow	<=	83.3	g/sec	300 sec	continuous	continuou s	cycles e
						engine load	>=	17.0	%	from engine		or 50 sec	with: 4
Bank 1	P2177	fuel trim limits exceded	delta lambda correction >	1.23	factor	engine load	<=	45.0	%	start (after		cumulativ e	continu
	P2178	range - multiplicative	or delta lambda correction <	0.78	factor	engine speed	>=	1200.0	rpm	adaptatio n			or 50 se
		(load > threshold and air				engine speed	<=	3400.0	rpm	has		After	cumula
		flow > threshold)											
Bank 2	P2179	2 4.100.1014	delta lambda correction >	1.23	factor	closed loop control	TRUE	-	-				
	P2180		or delta lambda correction <	0.78	factor	throttle angle	<=	99.6	99.6				
						engine coolant temperature	>	60	°C				
						intake air temperature	<=	60	°C				
						primary A/F sensor 1 readiness	TRUE	-	-				
							TRUE	-	-				
						command lambda	<	1.2	-				
						command lambda		0.83	_				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumina
						critical misfire rate detected	not set	-	-				
						deceleration fuel cut- off	not set	-	-				
						transient compensation	not set	-	-				
						wide open throttle	not set	-	-				
						integrated fuel mass	>	700.0	g				
						and empty-valid fuel level	not set	-	-				
						error: cam control diagnosis	not set	-	-				
						error: inection value fault	not set	-	-				
						error: catalyst damaging misfire	not set	-	-				
Fuel System Lean/Rich													ľ
additive													
										0.01 sec	0.01 sec	4 sec	two driv
Bank 1	P2187	range - additive	delta fuel load correction >	7.0	%	air mass flow	>=	1.4	g/sec		continuous	continuou s	
	P2188	low speed and low load	or delta fuel load correction <	-7.0	%	air mass flow	<=	6.7	g/sec			or 50 sec	with: 4 s
						engine load	>=	7.5	%			cumulativ e	
Bank 2	P2189		delta fuel load correction >	7.0	%	engine load	<=	24.8	%				or 50 se
	P2190			-7.0	%	engine speed	>=	520.0	rpm				cumula
						engine speed	<=	1000.0	rpm				
						closed loop control	TRUE	-	-				
						engine coolant	>	60	°C				
						temperature intake air temperature	<=	60	°C				
						primary A/F sensor 1	TRUE	-	-				
						readiness primary A/F sensor 2	TRUE	-	-				
						readiness		4.0					
						command lambda	<	1.2 0.83	-				
						catalyst heating	not set	-	-				
						critical misfire rate	not set	-	-				
						detected deceleration fuel cut-	not set	-	-				
						off transient	not set	-	-				
						compensation							
			-		-	wide open throttle	not set	-	-				
		+	+		+	integrated fuel mass and empty-valid fuel	> not set	700.0	g -				
						level							
						error: cam control diagnosis	not set	-	-				
						error: inection value fault	not set	-	-				
						error: catalyst damaging misfire	not set	-	-				
Oxygen Sensor (secondary													
O2) Trim of Air / Fuel Ratio													
,													
Sensor (primary A/F) Bank 1	P2195	secondary O2	secondary O2 sensor	0.85	V	A/F sensor measured	>	1.08		approx.	0.1 sec	4 sec	two driv
Bank 2	D0407	sensor operation	voltage >			lambda	MAN	4.05	a	100			aa.l
Hank 7	P2197	too rich - strong	1		1	short term fuel trim	= MAX	1.25	ractor	100 sec	continuous	continuou	cycles 6

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
						A/F sensor	ready	-	-			or 50 sec	with: 4 s
		A/F sensor measured too lean	or			secondary O2 sensor	ready	-	-			cumulativ	continuo
						suspicion A/F sensor not mounted	FALSE	-	-				or 50 se
						and not confirmed	FALSE	-	-				cumulat
						A/F sensor not mounted	FALSE	-	-				
						then accumulated exhaust		200	g				
						gas mass			9				
			secondary O2 sensor voltage >	0.85	V	A/F sensor measured lambda	>	1.08	lambo				
			- Tanaga			secondary O2 sensor fuel trim	>	0.003	lambo				
						proportional trim dominating							
						secondary O2 aging diagnosis	complete	-	-				
						secondary O2 circuit diagnosis	complete	-	-				
						secondary O2 fuel trim active	TRUE	-	-				
						A/F sensor secondary O2 sensor	ready ready	-	-				
						•	FALSE		_				
						not mounted and not confirmed							
						A/F sensor	I ALGE						
						not mounted	FALSE	-	-				
						then accumulated exhaust	>	200	g				
						gas mass							
			secondary O2 sensor voltage >	0.85	V	target lambda	>	1.04	lambo a	2 sec			
						A/F sensor secondary O2 sensor	ready ready	-	-				
						lambda closed loop	active		_				
						control secondary O2 circuit	complete						
						diagnosis short term fuel trim	> MIN	0.75	facto-				
						(o.k.)		0.15	factor				
						suspicion A/F sensor not mounted	FALSE	-	-				
						and not confirmed	FALSE	-	-				
					+	A/F sensor not mounted	FALSE	-	-				
						secondary O2 circuit error	FALSE	-	-				
						secondary O2 aging error	FALSE	-	-				
						then accumulated exhaust	>	800	g				
						gas mass		300	я				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumination
Oxygen Sensor (secondary	1												
O2) Trim of Air / Fuel Ratio													
Sensor (primary A/F)													
Bank 1	P2196	secondary O2	secondary O2 sensor	0.15	V	A/F sensor measured	<	0.92	lambd	approx.	0.1 sec	4 sec	two drivii
D 10	Double	sensor operation	voltage <			lambda			a	400			
Bank 2	P2198	too lean - strong correction				short term fuel trim	= MIN	0.75	tactor	100 sec	continuous	continuo	cycles ea
						A/F sensor	ready	-	-			or 50 sec	with: 4 s
		A/F sensor measured too rich				secondary O2 sensor	ready	-	-			cumulativ	continuo
		modelied too non				suspicion A/F sensor not mounted	FALSE	-	-				
						and not confirmed	FALSE	-	-				
						A/F sensor not mounted	EALCE						
						then	FALSE		-				or 50 sec
						accumulated exhaust	>	200	g				cumulati
						gas mass			ا ا				
			secondary O2 sensor	0.15	lv	A/F sensor measured	L	0.92	lambd				
			voltage <	0.15	v	lambda	`	0.92	a				
			Vollago			secondary O2 sensor	<	-0.003	lambd				
						fuel trim			a				
						proportional trim							
						dominating	complete						
						secondary O2 aging diagnosis	complete	-	-				
						secondary O2 circuit	complete	-	-				
						diagnosis							
						secondary O2 fuel	TRUE	-	-				
						trim active							
						A/F sensor secondary O2 sensor	ready ready	-	-				
						Secondary O2 Sensor	reauy	-	-				
						suspicion A/F sensor	FALSE	-	-				
						not mounted							
						and not confirmed	FALSE	-	-				
						A/F sensor	EALCE						
						not mounted then	FALSE	-	-				
						accumulated exhaust	>	200	g				
						gas mass			J				
			accondary O2 concer	0.15	lv	torget lembde	l .	0.06	lambd	2 000			
			secondary O2 sensor voltage <	0.15	V	target lambda	<	0.96	a	2 Sec			
			voltage <			A/F sensor	ready	-	-				
						secondary O2 sensor	ready	-	-				
						lambda closed loop	active	-	-				
						control secondary O2 circuit	complete	+	-				
						diagnosis	Complete						
						short term fuel trim	< MAX	1.25	factor				
						(o.k.)	E41.0=						
						suspicion A/F sensor not mounted	FALSE	-	-				
						and not confirmed	FALSE	-	-				
						A /F							
						A/F sensor not mounted	FAI SE		_				
						secondary O2 circuit	FALSE	-	-				
						error	. ,						
							FALSE	-	-				
													1

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value			Frequency of Checks	Criteria for Code	MIL
						then							
						accumulated exhaust	>	800	g				
						gas mass							
Barometric Pressure Sensor													
Rationality													
tationality	P2227	range check high	sensor signal >	115	KPa	error : barometric	not set	-	-	2 sec	continuous	4 sec	two driv
			· ·			pressure sensor							
						electrical							cycles
			or			for time	>	0.2	sec				with: 4
		range check low	sensor signal <	50	KPa	error : barometric	not set	-	-	2 sec	continuous	4 sec	continu
						pressure sensor							50 -
			or			electrical for time	_	0.2	sec				or 50 s
			OI .			ioi unie		0.2	300				Cumuic
		sensor offset / jump	sensor output change	5	KPa	error : barometric	not set	-	-	2 sec	continuous	4 sec	
		test low	within 20 sec period >			pressure sensor							
			OR			electrical							
				30	KPa	time since engine start	<	5	sec				
	1		signal pressure		1			1		1			
			jump from previous			error : barometric	not set	-	-				
			leave off .			pressure sensor							
			key off >		1	electrical	 	1		1		1	
				2	KPa	air mass flow over	>	11.1	g/sec	-		1	
			THRESHOLD	_	111 4	throttle	-		9,300				
			< pressure model			pressure ratio over	<	0.75	-			1	
				<u></u>		throttle		1		<u> </u>		<u> </u>	<u>L</u>
-						engine running time	>	1	sec				
						Evap. Leak detection	not set	-	-				
					1	active							
						error: throttle position	not set	-	-				
						sensor	not set			-		1	
						error: air flow mass meter	not set	Ī	-				
					1	error : barometric	not set	-	-	 		+	
						pressure sensor							
						electrical							
			or										
		sensor offset / jump	sensor output change	5	KPa	error : barometric	not set	-	-	2 sec	continuous	4 sec	
						pressure sensor							
		test high	within 20 sec period >		-	electrical		1		-		1	
	-		OR	20	KDo.	time since engine start		E	000				
			barometric pressure	30	KPa	time since engine start	<	5	sec				
			signal pressure										
			jump from previous			error : barometric	not set	-	-				
			,. ,			pressure sensor							
			key off >			electrical						<u> </u>	<u></u>
			AND										
				2	KPa	air mass flow over	>	11.1	g/sec				
			THRESHOLD		1	throttle		0.77				1	
			> pressure model			pressure ratio over	<	0.75	-				
			-		1	throttle engine running time	_	1	sec	1		1	
	1		<u> </u>			Evap. Leak detection	not set	1	5 0 0				
						active							
						error: throttle position	not set	-	-				
						sensor							
						error: air flow mass	not set	-	-				
						meter							
			voltage <	0.2	V	1		1.		L			
	P2228	range check low				enabled by scheduler			sec	2 sec	1	1	1

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminat
	P2229	range check high	voltage >	4.87	V	enabled by scheduler for time	>	1	sec				
Air / Fuel Ratio Sensor (primary A/F)													
electrical wire to wire short circuit		sensor short to heater	A/F sensor voltage gradient	0.08	V	within time after heating on/off	<	0.01	sec	10 sec	0.01 sec	4 sec	two driv
bank 1 sensor 1	P2231	lieatei	at heater	KLSDULSU		heater duty cycle	>	4	%		continuous	continuou	cycles
bank 2 sensor 1	P2234		control turn on >			A/F sensor fully heated for	>	10	sec	additional		or 50 sec	with: 4
			A/F sensor voltage gradient	-0.08 0.2	V	volumetric efficiency gradient	<	30	% / sec	time if		cumulativ e	continu
			at heater control switch off <	KLSDULSU N		all injectors activated	TRUE	-	-	fuel level			or 50 s
			(magnitude greater +/- compare)			battery voltage	<	18.1	V	is low and			cumula
						battery voltage	>	10.5	V	not failed			
			total of above occurrences	35	count	critical misfire rate detected	FALSE	-	-				
			within 10 second			catalyst heating	FALSE	-	-	600 sec			
			monitoring periods			activated A/F sensor IC	complete	-	-				
						diagnosis							
						error: A/F sensor IC modeled exh. gas	not set	800	° C				
						temp.							
Oxygen Sensor					1			_			1	1	
sensor circuit (secondary													
O2) bank 1 sensor 2	P2232	sensor line short	secondary O2 sensor			secondary O2 heating stable	TRUE	-	-	10 sec	0.01 sec	4 sec	two driv
bank 2 sensor 2	P2235	to heater output line	voltage gradient >	2	V	and mod. Exhaust- gas temp.	>	250	° C		continuous	continuou	cycles
		inte	within time after heater turn off <	0.04	sec	for time	>	90	sec			or 50 sec	with: 4
			for occurrences >	4	count	engine running	TRUE	-	-			cumulativ e	continu
			out of heater turn offs	6	count	battery voltage	>	10.5	V				or 50 se
						mod. exhaust-gas temp.	<	800	°C				cumula
						time after dew point exceeded	>	10	sec				
Air / Fuel Ratio Sensor													
(primary A/F) pumping current circuit open		lambda control factor	absolute value of	0.1	lambda	battery voltage	<	18.1	V	1.5 sec	0.1 sec	4 sec	two driv
		change	lambda control factor										
bank 1 sensor 1	P2237	above threshold	change from the point when the			battery voltage	>	10.7	V		continuous	continuou s	•
bank 2 sensor 1	P2240		secondary conditions are met			engine	running	-	-			or 50 sec	with: 4
			>			engine starting	complete	-	-			cumulativ	continu
						A/F sensor voltage	<	1.52	V			е	or 50 se
						A/F sensor voltage	>	1.48	V				cumula
						A/F sensor electrical trimming	not active	-	-				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Office		Frequency of Checks	Criteria for Code	MIL
						A/F sensor heater at op.temp.	TRUE	-	-				
						A/F sensor warm up control	complete	-	-				
						lambda closed loop	TRUE	-	-				
						control forced fuel trim	TRUE	-	-				
						amplitude fuel trim forced	>	0.02	lambd				
						amplitude catalyst warm up	stable	-	a -				
						control sec. O2 sensor	stable	-	-				
						proportional trim							
						lean mixture inhibit lambda closed loop	stable FALSE	-	-				
						control init	FALSE	-	-				
						startup							
Air / Fuel Ratio Sensor (primary A/F)													
pumping current circuit open		A/F sensor voltage within upper	A/F sensor voltage <		V	battery voltage	<		V	approx.	0.1 sec	4 sec	two drivi
bank 1 sensor 1	P2237	and lower thresholds	and A/F sensor voltage >	1.48	V	battery voltage	>	10.7	V	8 sec	continuous	continuou s	cycles e
bank 2 sensor 1	P2240	and desired				engine	running	-	-	once the		or 50 sec	with: 4 s
		lambda is outside of upper or lower				engine starting	complete	-	-	driving		cumulativ	continuo
		threshold				target lambda above	>	1.03	lambd	condition		е	or 50 se
						upper limit or below lower limit	<	0.97	a lambd	is met			cumulati
								0.07	а	io mot			oumaiai
						closed loop control A/F sensor heater	TRUE TRUE	-	-				
						at operating temperature							
						A/F sensor electrical	active	-	-				
						trimming A/F sensor dynamic	not slow	-	-				
						response error: A/F sensor	not set	_	_				
						heating							
						integrated exhaust gas mass	>	200	g				
Air / Fuel Ratio Sensor (primary A/F)													
pumping current circuit		A/F sensor not lean enough	A/F sensor voltage <	1.7	V	battery voltage	<	18.1	V	2 sec	0.1 sec	4 sec	two drivi
open bank 1 sensor 1	P2237	during fuel shut off operation				battery voltage	>	10.7	V		continuous	continuou	cycles e
bank 2 sensor 1	P2240	.,				engine	running	-	-			or 50 sec	with: 4 s
						engine starting	complete	-	-			cumulativ e	continuo
						time after fuel shut off	>	3	sec			-	or 50 se
						A/F sensor heater at operating	TRUE	-	-				cumulat
						temperature							
						evap purge cycle flag	TRUE	-	-				
						error: evap purge valve	TRUE	-	-				
	_1	1	1	1			1		1		1	1	1

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Office		Frequency of Checks	Criteria for Code	MIL
Air / Fuel Ratio Sensor													
(primary A/F)													
reference voltage circuit open		A/F sensor voltage	A/F sensor voltage <	0.2	V	battery voltage	<	18.1	V	2 sec	0.1 sec	4 sec	two drivir
bank 1 sensor 1	P2243	above upper	A/F sensor voltage >	4.7	V	battery voltage	>	10.7	V		continuous	continuou	cycles ea
h 0 4	D00.47	threshold										S	itle 4
bank 2 sensor 1	P2247	or below lower threshold				engine	running	-	-			or 50 sec	with: 4 se
						engine starting	complete	-	-			cumulativ e	continuo
			for time	1	sec	A/F sensor heating	>	20	sec			Ü	or 50 sec
						normal operation range for							cumulativ
						time							oumulativ
						error: A/F sensor	not set	-	-				
						heater circuit		570	01				
						A/F sensor internal resistance	>	570	Ohms				
						Toolotanoo							
Air / Fuel Ratio Sensor (primary A/F)													
reference ground circuit		A/F sensor heater	A/F sensor voltage	0.010	V	battery voltage	<	18.1	V	10 sec	0.1 sec	4 sec	two drivin
open bank 1 sensor 1	P2251	coupling occurs due to	gradient > for number of times	20	count	battery voltage	>	10.7	V		continuous	continuou	cycles ea
bank 2 sensor 1	P2254	max heating	monitored in 10 sec			engine	running					s or 50 sec	with: 4 se
Dank 2 Sensor 1	1 2204	control reached	intervals			erigine	running					01 30 300	With 4 30
		due to reference	with monitoring			engine starting	complete	-	-			cumulativ	continuo
		ground circuit disconnection	within 0.05 sec of each heater circuit			modeled exhaust gas	<	900	°C			е	or 50 sec
						J							
			activation event			temperature at A/F							cumulativ
						sensor							Cumulativ
						A/F sensor voltage	<	1.53	V				
						A/F sensor voltage	>	1.47	V				
						A/F sensor heating normal	>	20	sec				
						operation range for							
						time			01				
						A/F sensor internal resistance	>	570	Ohms				
						error: A/F sensor	not set						
						heater circuit							
						A/F sensor heating ready	TRUE	-	-				
						and engine	running	-	-				
						and A/F heater	FALSE	-	-				
						control shut off							
						and finished fuel cutoff for >	>	2	sec				
						and battery	>	11	V				
						voltage for time	>	30	sec				
	<u> </u>			<u>'</u>				1		1	'		<u>'</u>
Oxygen Sensor						engine running	TRUE	-	-				
sensor response (secondary O2)						battery voltage	>	10.5	V				
bank 1 sensor 2	P2270	oscillation check low	secondary O2 sensor	0.582 0.661	V	secondary O2 sensor	ready	-	-	approx.	0.1 sec	4 sec	two drivin
bank 2 sensor 2	P2272		voltage < for time >	100	sec	for time	>	10	sec	600 sec	continuous	continuou	cycles ea
			di									S 50	and the state of
			then			secondary O2 closed loop control	active	-	-			or 50 sec	with: 4 se
			ramping in	0.3	lambda	DFCO	FALSE	-	-	additional		cumulativ	continuo
			enrichment by at gradient	0.017	λ/sec	engine air flow	>	5.56	g/sec	time if		е	or 50 sec

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
			for time (after enrichment limit reached)	10	sec	and engine air flow	<	33.33		fuel level			cumulativ
						for time	>	3	sec	is low and			
						engine air flow (passive monitor)	>	9.72	g/sec	not failed			
						sec. O2 trim - fast lean correction	FALSE			600 sec			
						sec. O2 trim - fast rich correction	FALSE						
						sec. O2 trim - slow correction	FALSE						
						sec. O2 aging DFCO	FALSE						
						test failed engine	running						
						scheduled by System Manager	TRUE						
bank 1 sensor 2	P2271	oscillation check	secondary O2 sensor voltage >	0.582 0.661	V	engine running	TRUE	-	-		0.1 sec	4 sec	two driv
bank 2 sensor 2	P2273	- ringiri	for time >	100	sec	battery voltage	>	10.5	V		continuous	continuou	cycles 6
			then			secondary O2 sensor	ready	-	-			or 50 sec	with: 4
			ramping in enleanment by	0.07	lambda	for time	>	10	sec			cumulativ	continu
			at gradient	0.017	λ/sec	secondary O2 closed loop control	active						or 50 se
			for time (after enleanment limit reached)	10	sec	DFCO	FALSE						cumula
						engine air flow (intrusive test)	>	5.56	g/sec				
						and engine air flow	<	33.33	g/sec				
						for time	>	3	sec				
						engine air flow (passive monitor) sec. O2 trim - fast	> FALSE	9.72	g/sec				
						lean correction sec. O2 trim - fast rich							
						correction sec. O2 trim - slow	FALSE						
						correction sec. O2 aging DFCO							
						test failed	running						
						engine scheduled by System							
						Manager							
bank 1 sensor 2	P2271	fuel cut off check high	secondary O2 sensor voltage >		V	engine running	TRUE	-	-	0.2 sec	0.1 sec	4 sec	two driv
bank 2 sensor 2	P2273		time after fuel cut off >	4	sec	battery voltage	>	10.5	V		continuous	continuou s	cycles 6
						secondary O2 heating stable		-	-			or 50 sec	
						secondary O2 sensor dew point	reached	-	-			cumulativ e	
						for time air passed after fuel cut off	>	30 15	sec g				or 50 se
						modeled exhaust temp	>	350	° C				
						at secondary O2 sensor							
						scheduled by System Manager	TRUE	-	-				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
						error: evap canister purge sys.	not set	-	-				
						error: evap purge valve ckt	not set	-	-				
						error: battery voltage	not set	-	-				
						error: misfire error: fuel system	not set	-	-				
						monitoring							
						leak detection	not active	-	-				
Air / Fuel Ratio Sensor (primary A/F)													
sensor voltage		A/F sensor voltage	A/F sensor voltage >	3.7	V	A/F sensor heater	TRUE	-	-	10 sec	0.1 sec	4 sec	two drivi
bank 1 sensor 1	P2297	exceeds threshold	and			at operating temperature					continuous	continuou s	cycles ea
bank 2 sensor 1	P2298	but not out of full range	A/F sensor voltage <	4.81	V	engine starting	complete	-	-	additional		or 50 sec	with: 4 s
						desired A/F	<	1.6	lambd a	time if		cumulativ e	continuo
			or			all injectors activated	TRUE	-	-	fuel level			or 50 se
						scheduled by System Manager	TRUE	-	-	is low and			cumulati
			AF sensor voltage >	2.5	V	A/F sensor	ready	-	-	not failed			
			and			suspicion A/F sensor lean shift	FALSE	-	-	600 sec			
			A/F sensor voltage <	3.06	V								
			(if using rich calibration										
			curve characteristic)										
Air / Fuel Ratio Sensor													
(primary A/F) measuring (trim) current		A/F sensor voltage	A/F sensor voltage >	4.81	V	battery voltage	<	18.1	V	4 sec	0.1 sec	4 sec	two drivi
circuit open		above threshold				battery voltage	>	10.7	V		continuous	continuou	
bank 1 sensor 1	P2626					engine	running	-	_	additional		s or 50 sec	-
bank 2 sensor 1	P2629					engine starting	complete	-	-	time if		cumulativ	
											1	е	
	1			1		fuel cut off modeled exhaust temp	TRUE <	750	° C	fuel level is low and	1		or 50 sec
	1					,							
	1			-		in front of catalyst A/F sensor heater	TRUE	-	_	not failed	1		
	+					at operating	INOL		-	600 sec			
						temperature							
Fuel Level Sensor Circuit													
fuel transfer pump	P2636	transfer pump failure		10.6	%	sensor signal without failure		-	-	240 sec	0.1 sec	4 sec cont.	no
			and				TRUE	-	-		continuous	or 50 sec	
			fuel level 2 >	22.8	%	engine starting	complete	-	-			cumulativ e	
OBD ISO-15765													
Communication Bus	U0073	ISO-15765 Bus Error	Invalid Message			CAN Bus	initialized			1 sec	0.01 sec	4 sec	code set
			Received or Dual Port Ram			consisting of:	and ready			0.01 sec	continuous	continuou	
	1		Hardware Error;	1	1	Johnstoning Or.	and roddy		I	5.01 360	Sommuous	Johnmadu	1

	Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumination
				or No Communication / Bus Off			ignition on for	>	3	sec	0.02 sec		or 50 sec	
				Bus On			battery voltage	>	10.5	V			cumulativ	
							battery voltage	< .	18.1	V			e	
							normal bus communication	running	-	-				
		U0101	Communication with		message		Automatic	equipped	-	-	2.5 sec	0.01 sec	4 sec	code set
		P0864	TCM	or Invalid Message	missing,		Transmission CAN Bus	initialized	-	-		continuous		then 5 sec
				Content	delayed,		consisting of:	and ready					or 50 sec	
					or		ignition on for	>	3	sec			cumulativ	
					invalid		battery voltage	>	10.5	V			е	
					content		battery voltage normal bus	< running	18.1	V -				
							communication							
	Calibration Tak	Dies												
	Common to all													
	applications													
	Maximum Allowed Deviation - Intake Camshaf Position	t												
	degrees crank	Modeled Engine Oil Temperature (° C)												
	Engine Speed (rpm)	0	60	80	100	130								
	800 1200	6.00 6.00	6.00 6.00	7.00 6.00	9.00 6.00	11.00 7.00								
	1600		6.00	6.00	6.00	7.00								
	2000	6.00	6.00	6.00	6.00	6.00								
	2500	6.00	6.00	6.00	6.00	6.00								
	4000	6.00	6.00	6.00	6.00	6.00								
P0101	KFMLDMN	(internal manufacturer cross												
	Mass Air Flow Threshold - Minimum	reference)												
	Mass Air Flow (kg / h)	Percent Throttle (1				
	Engine Speed (rpm)	0	5	15	25	40	50	60	100	1				
	320	-	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	1				
	560	1.0	1.0	5.2	8.5	12.2	13.9	14.9	14.9					
	1000	1.0	2.4	8.0	19.3	28.2	31.2	32.7	34.5					
	1520	1.3	3.6	10.9	28.8	47.2	54.6	56.0	57.9				1	
	2000	1.7	4.4	14.0	36.3	61.7	71.0	75.1	78.4	1			1	
	3000	2.6	4.8	19.0	53.0	99.0	123.8	127.9	134.8	I				
	4000 5000	2.8 3.0	5.0 5.0	23.8 27.3	72.0 81.5	138.0 168.0	165.8 206.3	173.0 218.5	187.8 236.9	1			1	
	6000		5.0	30.4	81.5	192.0	238.1	255.3	277.1	1			1	
				,		.02.0				1				
	Mass Air Flow (g / sec)	Percent Throttle (%)												
	Engine Speed (rpm)		5	15	25	40	50	60	100					
	320	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4					

Mas	000 000 000 000 000 000 000 000 000 00	0.3 0.3 0.4 0.5 0.7 0.8 0.8 0.8 MIN	0.3 0.7 1.0 1.2 1.3 1.4 1.4	1.4 2.2 3.0 3.9 5.3 6.6	2.4 5.4 8.0 10.1 14.7	3.4 7.8 13.1 17.1	3.9 8.7 15.2	4.1 9.1	4.1 9.6	Re	equired of Checks	for Code	Illumination
1000 1522 2000 3000 4000 5000 6000 P0101 KFM	00 00 00 00 00 00 00 00 00 00 00 00 00	0.3 0.4 0.5 0.7 0.8 0.8 0.8 MIN	0.7 1.0 1.2 1.3 1.4	2.2 3.0 3.9 5.3 6.6	5.4 8.0 10.1	7.8 13.1	8.7	9.1	9.6				
1000 1522 2000 3000 4000 5000 6000 P0101 KFM	00 00 00 00 00 00 00 00 00 00 00 00 00	0.3 0.4 0.5 0.7 0.8 0.8 0.8 MIN	0.7 1.0 1.2 1.3 1.4	2.2 3.0 3.9 5.3 6.6	5.4 8.0 10.1	7.8 13.1	8.7	9.1	9.6				
1520 2000 3000 4000 5000 6000 P0101 KFM	00 00 00 00 00 00 00 00 00 00 00 00 00	0.4 0.5 0.7 0.8 0.8 0.8 MIN	1.0 1.2 1.3 1.4 1.4	3.0 3.9 5.3 6.6	8.0 10.1	13.1							
2000 3000 4000 5000 6000 P0101 KFM	00 00 00 00 00 00 00	0.5 0.7 0.8 0.8 0.8 MIN	1.2 1.3 1.4 1.4	3.9 5.3 6.6	10.1			156	16.1				
9000 4000 5000 6000 P0101 KFM	00 00 00 00 00 MLDMX	0.7 0.8 0.8 0.8 0.8 MIN	1.3 1.4 1.4	5.3 6.6		117.1	19.7	15.6 20.9	21.8				
90101 KFM	MLDMX	0.8 0.8 MIN	1.4 1.4	6.6		27.5	34.4	35.5	37.4				
P0101 KFM	MLDMX	0.8 MIN			20.0	38.3	46.1	48.1	52.2				
P0101 KFM	MLDMX	MIN	1.4	7.6	22.6	46.7	57.3	60.7	65.8				
Mas	MLDMX			8.4	22.6	53.3	66.1	70.9	77.0				
Mas			-1.4					MAX	77.0				
		(internal manufacturer cross reference)											
IVIAX	ss Air Flow Threshold - ximum												
		Percent Throttle (
Enai	gine Speed (rpm)	%) 0	5	15	25	40	50	60	100	_			
320			300.0	300.0	300.0	300.0	300.0	300.0	300.0				
560		115.0	126.0	142.0	154.0	163.0	165.0	185.0	206.0				
1000		139.0	149.0	173.0	184.5	195.0	199.0	201.3	215.0				
1520		173.0	190.0	223.0	250.0	274.0	281.0	282.0	284.9				
2000		206.0	229.0	282.0	321.0	364.0	381.0	384.0	385.0				
3000	00	208.0	230.0	328.0	450.0	546.0	583.0	590.0	592.0				
4000		217.0	243.0	372.0	529.0	674.0	741.0	745.0	750.0				
5000			249.0	403.0	570.0	778.0	865.0	868.0	871.4				
6000	00	230.0	271.0	428.0	600.0	819.0	927.0	940.4	992.8				
Man	Air Fl (/)	Danasat Thankla /											
	, ,	Percent Throttle (%)											
	gine Speed (rpm)		5	15	25	40	50	60	100				
320				83.3	83.3	83.3		83.3	83.3				
560		31.9	35.0	39.4	42.8	45.3	45.8	51.4	57.2				
1000 1520			41.4 52.8	48.1 61.9	51.3 69.4	54.2 76.1	55.3 78.1	55.9 78.3	59.7 79.1				
2000			63.6	78.3	89.2	101.1	105.8	106.7	106.9				
3000			63.9	91.1	125.0	151.7	161.9	163.9	164.4				
4000			67.5	103.3	146.9	187.2	205.8	206.9	208.3				
5000			69.2	111.9	158.3	216.1	240.3	241.1	242.1				
6000	00	63.9	75.3	118.9	166.7	227.5	257.5	261.2	275.8				
		MIN	31.9					MAX	275.8				
P0141, KFR		(internal manufacturer cross reference)											
Sens	nsor Element (Ceramic)]								
Impe	oedance, Nominal Value -												
	condary O2 Sensor												
Ohm	ms	Modeled Exhaust											
 		Gas Temperature											
 		at Secondary O2											
		-											
02.6		Sensor (°C) 360	400	440	480	520							
0.7			232	200	192	168				29	96		
0.8		208	168	152	144	144				28	,,,		
1.0			120	112	104	104							
FRIN		(internal manufacturer cross reference)											

	Component/	Fault	Monitor Strategy	Primary Malfunction	Threshold	Specified	Secondary	Enable	Enable	Units		Frequency	Criteria	MIL
	System	Code	Description	Signal and Criteria	Value	Units	Parameters	Condition	Value		Required	of Checks	for Code	Illumination
	Multiplication Factor for													
	Internal Resistance													
	KFRINH Nominal Value -													
	Secondary O2 Sensor													
		Modeled Exhaust												
		Gas Temperature												
		at Secondary O2												
		Sensor (°C)	100	140	400	500								
	factor	360 7.50	400 6.50	440 5.50	480 4.50	520 3.50								
	ractor	7.00	0.00	0.00		0.00								
P0324	DKROFN	(internal												
		manufacturer cross	:											
	Voltage Gradient Limit of	reference)											1	
	Knock Sensor Integrator													
	Rise for zero test													
	11100 101 2010 1001	Test Period (1											
		microseconds)												
	Voltage Rise (V / sec)	1000 60.0	1500 50.0	2000 45.0	3000 40.0	4000 40.0	5000 40.0	-						
	Voltage INISe (V / Sec)	00.0	30.0	45.0	40.0	40.0	40.0							
		Test Period (sec)												
		0.001	0.0015	0.002	0.003	0.004	0.005							
	Voltage Rise (V / sec)	60.0	50.0	45.0	40.0	40.0	40.0							
	voltage (v / see)	00.0	00.0	40.0	40.0	10.0	40.0							
D0007	HDKOMI	(internal												
P0327,	UDKSNU	(internal manufacturer cross	:											
P0332		reference)												
	Reference voltage													
	threshold for knock sensor													
	diagnosis - Lower Limit													
		Engine Speed (
		rpm) 400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200
	Peak RMS Voltage (V)	0.53	0.53	0.53	0.57	0.66	0.74	0.90	1.00	1.09		1.31	1.50	1.76
													1	
P0328,	UDKSNO	(internal												
		manufacturer cross	;											
P0333	Reference voltage	reference)											1	
	threshold for knock sensor													
	diagnosis - Upper Limit	Engine Speed (+							1	
		rpm)												
	D 1 D140 1/ F 200	400	800	1200	1600	2000	2400	2800	3200	3600		4400	4800	5200
	Peak RMS Voltage (V)	33	33	33	33	33	33	33	33	33	47	47	67	82
P0442	KFEONVPT	(internal												
		manufacturer cross reference)	Ί											
	Vacuum / Pressure													
	Threshold for Fuel Tank													
l	Leak Detection		1			1			1				1	

I	Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
- 1	Vacuum / Pressure (hPa)	Ambient	1		1	1	1		1		l	1		
	vacuum / i ressure (iii a)	Temperature												
		(Model) (C)												
ŀ	Fuel Level (%)	0	6.8	9.8	15	19.5	23.3	27	31.5	36	39.8			
ŀ	F	10.65	12.34	12.67	11.26	10.06	9.73	10.87	12.83	14.12	14.30	1		
ŀ	14	10.65	12.34	12.67	11.26	10.06	9.73	10.87	12.83	14.12	14.30	1		
ŀ	23	9.82	12.21	12.60	11.20	10.00	9.70	10.46	12.03	13.29	13.70	ł		
	32	7.25	8.59	8.99		9.53	8.00	8.00		10.89		1		
	32 41			8.19	9.15			7.60	9.40			1		
		7.25	8.50		8.44	9.38	8.00		8.30	8.80	8.80	-		
	50	7.25	7.37	6.32	6.40	7.37	6.05	6.05	8.30	8.80	8.80	1		
	59	7.25	7.37	6.82	6.49	6.05	6.05	6.05	8.30	8.80	8.80	1		
	68	5.67	5.73	6.38	6.95	6.31	6.31	6.31	8.30	8.80	8.80	1		
	77	5.38	5.38	5.38	6.98	6.41	6.41	6.41	8.30	8.80	8.80			
	86	5.38	5.38	5.38	6.83	6.10	6.10	6.10	8.30	8.80	8.80			
	95	5.38	5.38	5.38	6.83	6.10	6.10	6.10	8.30	8.80	8.80			
		Tank Capacity	65.8	Liters								1		
ľ	Vacuum / Pressure (Pa)	Ambient												
	, ,	Temperature												
		(Model) (C)	1								1			
ŀ	Fuel Level (%)	0	6.8	9.8	15	19.5	23.3	27	31.5	36	39.8	1		
ŀ	5	1065	1234	1267	1126	1006	973	1087	1283	1412	1430	1	1	1
ŀ	14											1	+	1
ŀ	14	1065	1234	1267	1126	1006	973	1087	1283	1412	1430	1	1	1
	23	982	1221	1260	1120	1000	970	1046	1219	1329	1370	1	-	-
	32	725	859	899	915	953	800	800	940	1089	1192	.		1
	41	725	850	819	844	938	800	760	830	880	880		1	1
	50	725	737	632	640	737	605	605	830	880	880			
	59	725	737	682	649	605	605	605	830	880	880			<u></u>
Ī	68	567	573	638	695	631	631	631	830	880	880]		
	77	538	538	538	698	641	641	641	830	880	880			
- 1	86	538	538	538	683	610	610	610	830	880	880			
	95	538	538	538	683	610	610	610	830	880	880			
L	**													
5	KLGGRTED05	(internal manufacturer cross												
	Vacuum Gradient Threshold for Fuel Tank Leak Detection	reference)												
	Fuel Level liters	0	10	20	30	40	50	60	70	75	80			
	hPa / sec	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.675				
	IIF a / Sec	Tank Capacity	65.8	Liters	0.450	0.300	0.550	0.000	0.030	0.073	0.700			
- 1	E111 (0/)	rank Capacity			45.0	00.0	70.0	04.0	400.4	4440	404.0			
	Fuel Level (%)	0	15.2	30.4	45.6	60.8	76.0	91.2	106.4	114.0		4		
	Pa / sec	30.0	35.0	40.0	45.0	50.0	55.0	60.0	65.0	67.5	70.0			
									_					
1	DWDKSBAMX	(internal manufacturer cross reference)												
	Maximum Throttle Angle Deviation per computation													
	Maximum Throttle Angle	manufacturer cross												
	Maximum Throttle Angle Deviation per computation	manufacturer cross reference)												
	Maximum Throttle Angle Deviation per computation	manufacturer cross reference) Percent Throttle Opening (%)		1	5	15								
	Maximum Throttle Angle Deviation per computation cycle	manufacturer cross reference) Percent Throttle Opening (%)	0.3	1	5	15								
	Maximum Throttle Angle Deviation per computation cycle	manufacturer cross reference) Percent Throttle Opening (%)		1 11	5 20	15 50								
	Maximum Throttle Angle Deviation per computation cycle Percent Throttle Delta (%)	manufacturer cross reference) Percent Throttle Opening (%) 0	0.3											
	Maximum Throttle Angle Deviation per computation cycle	manufacturer cross reference) Percent Throttle Opening (%) 0 4 (internal	0.3											
1,	Maximum Throttle Angle Deviation per computation cycle Percent Throttle Delta (%)	manufacturer cross reference) Percent Throttle Opening (%) 0 4 (internal manufacturer cross	0.3											
1,	Maximum Throttle Angle Deviation per computation cycle Percent Throttle Delta (%) KLSDULSUN	manufacturer cross reference) Percent Throttle Opening (%) 0 4 (internal manufacturer cross reference)	0.3											
1,	Maximum Throttle Angle Deviation per computation cycle Percent Throttle Delta (%)	manufacturer cross reference) Percent Throttle Opening (%) 0 4 (internal manufacturer cross reference)	0.3											
1,	Maximum Throttle Angle Deviation per computation cycle Percent Throttle Delta (%) KLSDULSUN Sensor Voltage Delta Down	manufacturer cross reference) Percent Throttle Opening (%) 0 4 (internal manufacturer cross reference)	0.3											
1,	Maximum Throttle Angle Deviation per computation cycle Percent Throttle Delta (%) KLSDULSUN Sensor Voltage Delta Down Threshold - Maximum per	manufacturer cross reference) Percent Throttle Opening (%) 0 4 (internal manufacturer cross reference)	0.3											
, ,	Maximum Throttle Angle Deviation per computation cycle Percent Throttle Delta (%) KLSDULSUN Sensor Voltage Delta Down	manufacturer cross reference) Percent Throttle Opening (%) 0 4 (internal manufacturer cross reference)	0.3											

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illum
	11	13	15	17									
Delta Voltage (V)	-0.078	-0.078	-0.117	-0.200	1								
KLSDULSUP	(internal manufacturer cross												
Sensor Voltage Delta Up	reference)												
Threshold - Maximum per													
Computation Cycle													
	Battery Voltage (V												
) 11	13	15	17									
Delta Voltage (V)	0.078	0.078	0.117	0.200									
, ,													
Additional diag	nostic cod	06											
Component/	Fault	Monitor Strategy	Primary Malfunction	Threshold	Specified	Secondary	Enable	Enable	Units	Time	Frequency	Criteria	MIL
System	Code	Description	Signal and Criteria	Value	Units	Parameters	Condition	Value			of Checks	for Code	
Engine coolent	D0116	difference from	filtered difference			Engine coclerative del		50	° C	100 000	0.2.005	4.000	ine
Engine coolant	P0116	difference from	filtered difference			Engine coolant model	_	50	°C	100 sec	0.2 sec	4 sec	imme
		Engine				(cooled down)							
temperature sensor		temperature model	(ECT at key on -	10	° C	Soaking time after	>	12600	sec	for block	continuous	additional	once
		after soaking	ECTmod at key on)			shut down							
(w/ real time clock)										heating		after	has
						previous accumulated	_	6000	g			block	
						previous accumulated		0000	9				
						air mass							
			or			previous engine run time	>	600	sec	check	one filter	heater	been
						or					update per	check	
			filtered difference			ECT at shut down	_	75	° C		cold start	when filtered	appro
								75	C		cold Start		appro
			-(ECT at key on -	11.25	° C	Controller Shut Down	last cycle	-	-			difference	6 test
			ECTmod at key on)			at end of							
						Engine Off Timer	not detected	-	-			exceeds	avera
						value valid	not detected					threshold	run le
						Block Heater	not detected	_	_				(15°C
							11 11100100						(
Primary O2 Sensor Heating									1				
heater circuits - electrical bank 1 sensor 1	P0030	circuit continuity -	Voltage	IC Internal	-	engine speed		80	rpm	0.01 sec	0.01 sec	4 sec	two di
		open	Vollage	10 IIICIIIal					ľ	0.01 300			
(primary)	P0031	circuit continuity - ground				battery voltage	>	10.5	V		continuous	continuou	cycles
	P0032	circuit continuity -				battery voltage	<	18.1	V			or 50 sec	with: 4
		voltage											
bank 2 sensor 1	P0050	circuit continuity -				output	activated					cumulativ	contin
							and						
							deactivated for complete						
		open					checking					е	
(primary)	P0051	circuit continuity -					oriconing						or 50
	1	ground		1		1	1	1	1	1	1	1	1

Mass air flow sensor P0101	or fuel trim limits exceded range - multiplicative and correction factor (modeled air mass at throttle / air mass flow meter) range check high	measured mass air flow * threshold < Maximum modeled mass air flow > delta lambda correction < correction factor air mass measured mass air flow * threshold < minimum modeled mass air flow	0.15	factor factor factor factor	battery voltage for time Airbag not deployed time after start crankshaft revolution counter ambient pressure valid desired cam angle valid long term fuel trim air flow mass air flow change gradient throttle angle change gradient engine running engine coolant temperature engine running time	TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE	0.3 0.3 150 - 1.39 0.25	sec sec rev - g/sec -		0.01 sec continuous	4 sec continuou s or 50 sec cumulativ e	with
P0100	or fuel trim limits exceded range - multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits	flow * threshold < Maximum modeled mass air flow > delta lambda correction < correction factor air mass measured mass air flow * threshold < minimum modeled	0.15	factor	for time Airbag not deployed time after start crankshaft revolution counter ambient pressure valid desired cam angle valid long term fuel trim air flow mass air flow change gradient throttle angle change gradient engine running engine coolant temperature	TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE	0.1 0.3 150 - - 1.39	sec sec rev -			continuou s or 50 sec	with con
	fuel trim limits exceded range - multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high	< Maximum modeled mass air flow > delta lambda correction < correction factor air mass measured mass air flow * threshold < minimum modeled	0.15	factor	Airbag not deployed time after start crankshaft revolution counter ambient pressure valid desired cam angle valid long term fuel trim air flow change gradient throttle angle change gradient engine running engine coolant temperature	TRUE > TRUE TRUE TRUE	0.3 150 - - 1.39	sec rev		continuous	s or 50 sec	with
	fuel trim limits exceded range - multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high	> delta lambda correction < correction factor air mass measured mass air flow * threshold < minimum modeled	0.8	factor	time after start crankshaft revolution counter ambient pressure valid desired cam angle valid long term fuel trim air flow mass air flow change gradient throttle angle change gradient engine running engine roolant temperature	> TRUE TRUE TRUE > CONTROL TRUE TRUE > CONTROL TRUE	150 - - - 1.39 0.25	rev				con
	fuel trim limits exceded range - multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high	correction < correction factor air mass measured mass air flow * threshold < minimum modeled	0.8	factor	crankshaft revolution counter ambient pressure valid desired cam angle valid long term fuel trim air flow mass air flow change gradient throttle angle change gradient engine running engine coolant temperature	TRUE TRUE TRUE TRUE TRUE TRUE TRUE	150 - - - 1.39 0.25	rev			cumulativ e	or 5
	fuel trim limits exceded range - multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high	correction < correction factor air mass measured mass air flow * threshold < minimum modeled	0.8	factor	counter ambient pressure valid desired cam angle valid long term fuel trim air flow mass air flow change gradient throttle angle change gradient engine running engine coolant temperature	TRUE TRUE TRUE TRUE TRUE TRUE TRUE	- - 1.39 0.25	-				
	exceded range - multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high	correction < correction factor air mass measured mass air flow * threshold < minimum modeled	0.8	factor	ambient pressure valid desired cam angle valid long term fuel trim air flow mass air flow change gradient throttle angle change gradient engine running engine coolant temperature	TRUE TRUE	0.25	- - g/sec -				cun
	multiplicative and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits	measured mass air flow * threshold < minimum modeled			valid long term fuel trim air flow mass air flow change gradient throttle angle change gradient engine running engine coolant temperature	TRUE > < < TRUE	0.25	- g/sec -				
	correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits	measured mass air flow * threshold < minimum modeled			air flow mass air flow change gradient throttle angle change gradient engine running engine coolant temperature	> < < < TRUE	0.25	g/sec				
	mass at throttle / air mass measured by air mass flow meter) range check high or fuel trim limits	measured mass air flow * threshold < minimum modeled	1.05	factor	gradient throttle angle change gradient engine running engine coolant temperature	< TRUE		-				
	measured by air mass flow meter) range check high or fuel trim limits	flow * threshold < minimum modeled	1.05	factor	throttle angle change gradient engine running engine coolant temperature	TRUE	2	-				
	or fuel trim limits	flow * threshold < minimum modeled	1.05	factor	engine coolant temperature		-	1				
	or fuel trim limits	flow * threshold < minimum modeled	1.05	factor	temperature	>	0.0	- 0				-
	fuel trim limits		1.00	lactor	engine running time	>	9.8	° C				
	fuel trim limits						ľ	366				
					Air flow meter readiness	TRUE	-	-				
	exceded		0.45		pressure ratio over throttle	<	0.8	-				
	range - multiplicative and	delta lambda correction <	-0.15	factor	for time error: air flow meter	> not set	0.5	sec				
	correction factor				(internal) error: throttle position	not set	-	-				
	(modeled air mass at throttle / air	correction factor air	1.2	factor	sensor error: intake air temp.	not set	-	-				
	mass measured by air	mass >			sensor							-
	mass flow meter) open circuit check	sensor frequency =	0.0	Hz	battery voltage	>	10.5	V	0.1s			
1	open circuit check	Sensor frequency =	0.0	112	Engine is running Key on	TRUE TRUE	10.5	V	0.13			F
P0102	range check low	sensor frequency <	1035	Hz	time after start	>	0.3	sec				
P0103	range check high	sensor frequency >	15152	Hz								
Oxygen Sensor				1	1		1			4		
sensor circuit (primary O2)												
bank 1 sensor 1 P0131	short circuit to ground	primary O2 sensor voltage <	0.06	V	engine running	TRUE	-	-	0.1 sec	0.1 sec	4 sec	two
bank 2 sensor 1 P0151		and secondary O2 sensor voltage >	0.5	V	battery voltage	>	10.5	V		continuous	continuou	
		or			commanded lambda mod. exhaust-gas	=	800	0 ° C			or 50 sec	
		primary O2 sensor	0.06	V	temp. primary O2 heater	>	5	sec			e	or 5
		voltage <			active for no injector circuit fault		0	0				cun

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Oimo		Frequency of Checks	Criteria for Code	MIL
						time after start	<	1	sec				
							>	60	°C				
						engine temp	< not set	40	° C				
						error: engine coolant temp	not set		-				
bank 1 sensor 1	P0132	short circuit to	primary O2 sensor	1.08	V	engine running	TRUE	-	-	5.1 sec	0.1 sec	4 sec	two dr
bank 2 sensor 1	P0152	battery voltage	voltage >			battery voltage	>	10.5	V		continuous	continuou	cycles
						commanded lambda	=	1	0			or 50 sec	with: 4
						mod. exhaust-gas	<	800	° C			cumulativ	continu
						primary O2 heater active for	>	5	sec			е	or 50 s
						no injector circuit fault	not set	0	0				cumula
						time ofter start	_	1	200				
						time after start engine temp at stop	>	60	sec ° C				
						engine temp at stop	-	40	°C	1			
							not set	-	-				
						temp	not out						
Primary O2 sensor slow						closed loop control	active						
response Bank 1	P0133	slow response	Continuously filtered			engine speed	>	2400	rpm		0.1 sec	4 sec	two dr
Bank 2	P0153		normalized switching cycle duration	3	s	engine speed	>	1800	rpm		continuous	continuou	cycles
						engine load	<	70	%			or 50 sec	with: 4
			20 valid closed loop switching cycles			engine load	>	40	%			cumulativ	contin
			Switching Gyoles			exhaust gas temperature model	>	350	° C				or 50 s
			(note: normalization of			purge off or has been on	>	10	sec				cumula
			cycle duration			for time							
			revised with new			scheduled by System	set						
			enable window and										
			failure			Manager							
			threshold)			Primary O2 heater							
						diagnosis							
						finished	set						
						high purge vapor concentration	not set						
							not set						
						error: fuel adaptation	not set						
						error: purge valve error: misfire	not set						
						error: primary O2 heater	not set						
							not set						
							not set						
						error: secondary O2 sensor	not set						
Oxygen Sensor													
sensor circuit (primary O2)													
bank 1 sensor 1	P0134	sensor line disconnection	primary O2 sensor voltage >	0.4	V	primary O2 heater duty cycle >	>	0.68		5 sec	0.1 sec	4 sec	two dri
bank 2 sensor 1	P0154		and primary O2	0.6	V		>	600	° C		continuous	continuou	cycles

Component/ System	Fault Code	Monitor Strategy Description		Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Office		Frequency of Checks	Criteria for Code	MIL
						and dew point end exceeded	TRUE					or 50 sec	with:
			or			and no error detected prev.	not set					cumulativ e	conti
			primary O2 sensor	20000	Ohm	for time	>	90	sec				or 50
			internal resistance >										
			and when modeled exhaust gas temperature >	600	°C	engine running	TRUE	-	-				cumu
			temperature >			battery voltage	>	10.5	V				
			or			commanded lambda	=	1					
				0.2	V	mod. exhaust-gas	<	800	° C				
			voltage > and secondary O2	0.2	V	temp. primary O2 heater	>	5	sec				
			sensor voltage >	0.2	-	active for		3	300				
			and fuel cutoff	600	° C	error: injector circuit	not set						
		1	achieved for time			fault time after start	<	1	sec				
						engine temp at stop	>	60	°C				
						engine temp	<	40	° C				
						error: engine coolant temp	not set	-	-				
Oxygen Sensor Heating						1		7	1				1
heater performance													
(primary O2) bank 1 sensor 1 (primary)	P0135	primary O2 sensor	measured primary O2			battery voltage	>	10.5	V	approx.	0.1 sec	4 sec	two d
bank 2 sensor 1 (primary)	P0155	internal resistance	sensor internal resistance >			battery voltage	<	18.1	V	100 sec	continuous	continuou	cycle
		above threshold		88 392	Ohms	engine running	TRUE	-	-			or 50 sec	with:
			resistance	KFRINH /		engine starting	complete	-	-			cumulativ	conti
			multipy times	5 63	factor	fuel cut off	FALSE	-	-			е	or 50
			degradation factor >										
				FRINH1 / 2		pri. O2 internal	valid	-	-				cumu
			for time	6	sec	resistance intake air temperature	>	-6.8	С				
						engine off soak time	>	120	800				
						modeled exhaust	>	550	sec C				
						temp.							
						suspicion of primary O2 sensor open	FALSE						
						circuit							
						primary O2 voltage supply	ON						
						scheduled by System							
						Manager for time	>	12	sec				-
							>	10	sec				
						dewpoint exceeded for							
						no fault clear request							
						during drive cycle							
Knock Control						engine coolant temp.	>	60	° C				
Circuit	P0324	test pulse	test pulse integral <	4	V	knock control	active	-	-		0.1 sec	4 sec	two c
	-			2	count		1				continuous	continuou	
			events									s	

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumin
						zero test , parity fault assumptions	not set	-	-			cumulativ e	contin
		or				measuring window	>	1	ms				or 50 s
		null test (zero test)	absolute value	200	V / sec	angina applant tomp	>	60	° C				cumul
		nuii test (zero test)	(integrator gradient)	200	v / sec	engine coolant temp.	>	60					
			>			knock control	active	-	-				
			for consecutive events	2	count								
		or				test pulse , parity fault assumptions	not set	-	-				
		novity obsole	coefficient RAM	5	anunt.	anning applent town	I.	60	° C				
		parity check	errors in knock IC, per 250 working	5	count	engine coolant temp.	>	60					
			cycles			taat andaa fandt							
		or				test pulse fault assumption	not set						
		SPI communication	check word errors in	25	count								
		011001111101110111011	knock IC, per 250		oou								
			working cycles										
Bank 1						engine coolant temperature	>	60	°C				
circuit check	P0326	short circuit to B+ or	faults detected on	25	count	engine speed	>	2200	rpm	approx.	0.1 sec	4 sec	two di
			knock sensor pins, per 250 working										
		GND	cycles (zkrks) >										
Performance	P0327	range check low	reference voltage <	0.088	V	engine speed gradient	<	1500	rpm /	20 sec	continuous	continuou	cycles
- Circiniano	. 5527	Tango oncon ion	Totologo Voltago V	0.331 UDKSNU		engine load gradient	<	2500	sec kPa/	20 000	oo: iiii dodo	s or 50 sec	
						error: knock control	not set	100	sec			cumulativ	
						circuit (IC)	not set					е	or 50
			for consecutive events	100	count								cumul
			events		1								
	P0328	range check high											
			reference voltage >	5.7 30.8	V								
			for consecutive	UDKSNO 100	count								
			events	100	Count								
		short circuit to B+ or	faults detected on knock sensor pins,										
		GND	per 250 working cycles (zkrks) >										
Donk 2			1			langing aggless	l.	co	l. C				1
Bank 2						engine coolant temperature	>	60	°C				
	P0331	short circuit to B+ or	faults detected on	25	count	engine speed gradient	<	1500	rpm /	approx.	0.1 sec	4 sec	two dr
			knock sensor pins, per 250 working										
		GND	cycles (zkrks) >					2500	sec				
Performance	P0332	range check low	reference voltage <	0.088	V	engine load gradient	<	50	kPa /		continuous	continuou	cycles
			-	0.331		error: knock control	not set	100	sec -			s or 50 sec	
		1	1	1	1	circuit (IC)		1	1	1	1	23 550	1

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	J11110		Frequency of Checks	Criteria for Code	MIL Illumi
												cumulativ	conti
			for consecutive	100	count							е	or 50
			events										
	P0333	range check high											cum
			reference voltage >	5.7	V								
				30.8 UDKSNO									
			for consecutive	100	count								
			events										
Catalyst Bank 1	P0420	oxygen storage of	EWMA filtered	0.2	factor	exhaust gas mass flow	4.	5.00	a/200				
Catalyst Ballk 1	F0420	oxygen storage or	EVVIVIA lillered	0.2	iacioi	exhaust gas mass now	/>	5.00	g/sec				
Catalyat Bank 2	D0420	catalyst	catalyst aging factor			aubauat saa maaa flau		FF FC	~/~~~		0.2.000	1.000	:
Catalyst Bank 2	P0430		less than catalyst aging factor			exhaust gas mass flow	<	55.56	g/sec	approx.	0.2 sec	4 sec	imme
			of a limit catalyst <			catalyst temp. model	<	850	°C	1000 sec	continuous	additional	once
						catalyst temp. model	>	400	°C	during		after	has
						engine speed	>	1040	rpm	active		block	been
						engine speed	<	2760	rpm	driving			
						engine load	>	15	%	0 -11			
						engine load	<	50	%	3 checks per			appro
						modeled catalyst	<	6	°C/	driving			3 tes
						temp. gradient relative exhaust gas	<	0.60	sec %	cycle 3 checks			avera
						mass flow gradient		0.00	,,,	per			
						fuel system closed loop	active	-	-	driving cycle			run le
						<u> </u>	>	10 40	sec	1 check			(9 sa
						O2 sensor exceeded				per			
						dewpoint				driving cycle			
						ambient temperature	>	-10	°C	сусіе			
						catalyst damaging	set	-	_				
						misfire rate exceeded error: fuel system	not set	_	_				
						closed loop control at		-	-				
						limit strong transient	set						
						compenstation	361		1				
						intervention	aat	1					
						catalyst clear out active (after fuel	set	-	-				
						cutoff) fast mixture	set	-	-				
						adaptation completed Trigger condition for							
						step change							
Secondary O2 Trim of primary O2 Sensor						engine speed	<	2920	sec	200 sec	0.1 sec	4 sec	two o
primary O2 sensor primary O2 sensor signal RICH / secondary O2						engine speed	>	1200	°C		continuous	continuou	cycle
sensor signal LEAN												s	
	P2096	secondary O2	secondary O2 sensor			engine load	<					or 50 sec	with:
Bank1	F 2090	sensor fuel	trim			9							

Company Organization	Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumir
Secondary Comment eignated Secondary Comment Secondary Comme			- correction				closed loop control	TRUE	0	0				or 50 s
Description								TROL	O					01 30 3
Communication Communicatio		+	above unconcid					>	3	sec				cumula
Primary Colorano rignal LEAN scording OZ service rignal LEAN scordin		†						>	300					
Controlled							model							
							controller							
LEAN rescondary Q2									-	-				
Bank 1	primary O2 sensor signal						at lower limit	not set	-	-				
Bank 1	LEAN / secondary O2													
Bank 1	•													
Bank 2 P209		D2007	accondent O2	accorder O2 coreer	0.0	000	accondent O2 concer	not not						
Bank 2 2009	вапк і	P2097			-0.8	sec		not set	-	-				
### after DCPG ### correction billow threshold ### correction billow threshold ### correction billow ### corre	Bank 2	P2000						not set	_	1_				
- correction below threshold with th	Dank 2	1 2000	tiiii - ican siiit	integral control <				not set	_					
Membrane		+	- correction below					not set	-	-				
Secondary CZ Seco		1						not set	-	-				
Sensor S														
Company Comp														
Meater M							response	not set	-	-				
Part							error: primary O2	not set	-	-				
March Marc														
Company Comp								not set	-	-				
March Marc														
Continuous Con								not set	-	-				
Daysgen Sensor Daysgen Sensor Daysgen Sensor Daysgen Sensor circuit (primary O2) Daysgen Sensor circuit (primary O2) Daysgen Sensor circuit (primary O2) Daysgen Sensor Daysgen S														
Doxygen Sensor P2231									-	-				
Sensor circuit (primary O2) Sensor line short Secondary O2 sensor Sensor line short Secondary O2 sensor luve Sensor							error : air flow meter	not set	-	-				
Sensor circuit (primary Q2) Sensor line short Secondary Q2 sensor Sensor line short Secondary Sensor line short Sensor line short Secondary Sensor line short Sensor	Ovugan Sanoar	-										1		
bank 1 sensor 1 P2231 sensor line short circuit secondary O2 sensor		+												
Dank 2 sensor 1	sensor circuit (primary O2)													
Dank 2 sensor 1	hank 1 concor 1	D2221	concor line chort	eocondary O2 concor			primary O2 hoater	_			0.1.000	0.1.000	4 000	two dri
Dank 2 sensor 1	bank i sensoi i	1 2231		Secondary OZ Serisor							0.1 300	0.1 300	7 300	two an
Seesor voltage Sees	hank 2 sensor 1	P2234		voltage gradient >	2	V		>	600	° C		continuous	continuou	cycles
within time after heater turn off <	Barnt E derider .	. 220 .		Tollago gradioni	_	,			000			oo mii adad	s	0,0.00
heater turn off <		+		within time after	0.04	s		TRUE					or 50 sec	with: 4
for occurrences > 4						_								
Out of heater turn offs 6 Count					4	count		not set					cumulativ	continu
Company Comp														
Desire D				out of heater turn offs	6	count	for time	>	90	sec				or 50 s
battery voltage														
							engine running	TRUE	-	-				cumula
Voltage >								>	10.5	V				
and primary O2 sensor voltage < 0.1 V mod. exhaust-gas temp. and secondary O2 sensor voltage < 0.1 V primary O2 heater active for no injector circuit fault not set					0.6	V	commanded lambda	=	1					
Sensor voltage < temp. Sensor voltage < temp. Sensor voltage < temp. Sensor voltage < sensor		4												
and secondary O2 sensor voltage < 0.1 V primary O2 heater active for no injector circuit fault not set					1.08	V		<	800	° C				
sensor voltage < active for no injector circuit fault not set														
no injector circuit fault not set					0.1	V		>	5	sec				
Company Comp		+		sensor voltage <										1
Primary O2 sensor voltage > 0.06 V engine temp at stop > 60 ° C							no injector circuit fault	not set						
Primary O2 sensor voltage > 0.06 V engine temp at stop > 60 ° C		+					time a after - tt		4					
Voltage >		+		Drimon, O2 cocce	0.06	V			1 60	sec				
and primary O2 sensor voltage < 0.4 V engine temp < 40 °C					0.06	V	erigine temp at stop	>	ьυ	٠٠				
Real time clock Engine off timer Signal check Signal chec		+		vuitage >	0.4	V	ongino tomo	_	40	۰ ۲				-
Real time clock Engine off timer signal check (engine off timer is (SPI bus failure or continuous c					0.4	v	engine temp	`	40					
Real time clock Engine off timer P2610 engine off timer engine off timer IC signal check feedback (engine off time is (SPI bus failure or continuous conti					0.5	V	orror: ongino coclont	not cot	-	-				1
Real time clock Engine off timer Signal check (engine off timer is (SPI bus failure or service)) P2610 P3610		-			0.5	v		not set	-	[
Engine off timer P2610 engine off timer engine off timer IC failed engine running TRUE 0.1 sec 0.1 sec 4 sec two descriptions is gignal check (engine off time is (SPI bus failure or continuous).						1	uemp	1	1	1		1	1	
Engine off timer P2610 engine off timer signal check feedback (engine off timer is							tomp							
signal check feedback Seedback	Peal time also						, comp		T		T	T		
(engine off time is (SPI bus failure or continuous cont		D2610	onging off times	sensor voltage <	failed			TDUE			0.1.000	0.1.000	4.000	ture d
		P2610		sensor voltage < engine off timer IC	failed			TRUE	-	-	0.1 sec	0.1 sec	4 sec	two dri
provided by s		P2610	signal check	sensor voltage < engine off timer IC feedback	failed			TRUE	-	-	0.1 sec			two dri

Component/ System	Fault Code	Monitor Strategy Description		Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units			Criteria for Code	MIL Illum
		the main micro processor clock)	internal IC power supply or									or 50 sec	with:
			hardware failure)										conti
		_											or 50 cumu
Component/	Fault	Monitor Strategy		Threshold		Secondary	Enable		Units			Criteria	MIL
System	Code	Description	Signal and Criteria	Value	Units	Parameters	Condition	Value		Required	of Checks	for Code	Illumi
Turbocharger Bypass Valve													
Actuator Circuit Continuity													
Onoun Continuity	P0033	circuit continuity -	voltage	IC Internal	V	engine speed	>	80	rpm	0.01 sec	continuous	4 sec	two d
	P0034	open circuit continuity -				battery voltage	<	18.1	٧				cycle
	P0035	ground circuit continuity -				battery voltage	>	10	V				with:
		voltage				, ,							contir
	+	+											or 50
													cumu
A/F Sensor Heating													
heater performance	+	+											
(secondary O2)	Dooro		-bb	45	Observe	h - 11 11		40.5	V	40	0.4	4	
bank 1 sensor 1	P0053	correction value for A/F sensor	absolute value of correction value for	45	Ohms	battery voltage	>	10.5	V	40 sec	0.1 sec	4 sec	two d
		internal resistance	A/F sensor internal			battery voltage	<	18.1	V		continuous	continuou	cycles
		measurement	resistance >									s	
		too much				engine starting	complete	-	-			or 50 sec	with:
												cumulativ e	contin
												6	or 50
													cumu
High Pressure Fuel Control System													
Rationality													
	P0087	pressure deviation	difference (desired	1500	Kpa	error: electrical	not set	-	-	5 sec	continuous	4 sec	imme
			versus actual fuel rail			diagnosis of fuel							
	+	from desired - under pressure	pressure) >			volume control valve tester request for	FALSE						once code l
		under pressure				open fuel flow control valve	ALGE						been
				1	1	error: electrical	not set	-	-	5 sec	continuous	4 sec	20011
	P0088	pressure deviation	difference (desired	-2000	Kpa						1	1	1
	P0088	from desired -	difference (desired versus actual fuel rail pressure) <	-2000	Кра	diagnosis of fuel rail pressure sensor							
		from desired -	versus actual fuel rail pressure) <			diagnosis of fuel rail pressure sensor airbag deployed	FALSE	-	- V	5 sec	continuous	4 sec	
	P0088	from desired - over pressure C/L controller output	versus actual fuel rail pressure) < Controller output value ("p" part plus	3000	Кра	diagnosis of fuel rail pressure sensor	FALSE <	- 18.1	- V	5 sec	continuous	4 sec	
		from desired -	versus actual fuel rail pressure) < Controller output			diagnosis of fuel rail pressure sensor airbag deployed battery voltage			- V	5 sec	continuous	4 sec	
	P0089	from desired - over pressure C/L controller output value - above expected	versus actual fuel rail pressure) < Controller output value ("p" part plus "j" part) >	3000	Кра	diagnosis of fuel rail pressure sensor airbag deployed battery voltage relative injected fuel mass	>	5.016	%				
		from desired - over pressure C/L controller output value - above expected C/L controller output	versus actual fuel rail pressure) < Controller output value ("p" part plus ";" part) > Controller output value ("p" part plus			diagnosis of fuel rail pressure sensor airbag deployed battery voltage relative injected fuel mass relative injected fuel	<			5 sec		4 sec	
	P0089	from desired - over pressure C/L controller output value - above expected C/L controller output value - below	versus actual fuel rail pressure) < Controller output value ("p" part plus "j" part) > Controller output Controller output	3000	Кра	diagnosis of fuel rail pressure sensor airbag deployed battery voltage relative injected fuel mass relative injected fuel mass	> <	5.016	%				
	P0089	from desired - over pressure C/L controller output value - above expected C/L controller output	versus actual fuel rail pressure) < Controller output value ("p" part plus ";" part) > Controller output value ("p" part plus	3000	Кра	diagnosis of fuel rail pressure sensor airbag deployed battery voltage relative injected fuel mass relative injected fuel	>	5.016	%				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumi
						syncronisation reference mark detected	TRUE						
						engine start temperature	>	-48	С				
High Pressure Fuel Volume Control Valve													
Circuit Continuity													
	P0090	circuit rationality -	voltage test pulse - off command within	1.001 < x <	V	battery voltage	>	6	V	0.5 sec	continuous	4 sec	imme
	P0091	open circuit rationality - ground	window voltage test pulse - off command <	4.502 1.001	V	battery voltage	<	18.1	V				code been
	P0092	circuit rationality -	voltage test pulse -	4.502	V	battery voltage	<	off comman	V				20011
		voltogo	on command t					d					
		voltage	on command >			circuit switched off due to 5 volt supply	not set	voltage -	-				
						fault							
										_		_	
Intake Air Temperature Sensor 2 (Boost Pressure Temperature Sensor)													
Rationality													
	P0096	response check	max intake air temperature - min intake air	1.5	° C	drive period - count	>=	7	count		0.1 sec	4 sec	two d
			temperature			each with					continuous	continuou	cycles
						coolant temperature at start	<=	66	°C			3	with:
						Intake Air						or 50 sec	contin
						Temperature Sensor 2 Electrical Failure	FALSE					cumulativ	or 50
								1				е	
						Mass Air Flow	>	11.1	g/ sec				cumul
						Mass Air Flow	<	138.9	g / sec				
						Vehicle speed	>	25	mph				
						idle period - count	>=	7	count				
						each with coolant temperature at start Intake Air	<=	66	°C				
						Temperature Sensor 2	FALSE						
							<	7.8	g / sec				
						Vehicle speed	<	6.25	mph				
						engine coolant temperature	>	60	° C				
	1	_	1	1	-	1			1	1			+

Component/	Fault	Monitor Strategy	Primary Malfunction	Threshold Value	Units	Secondary	Enable Condition	Enable	UTIILS		Frequency of Chacks	Criteria for Codo	MIL
System	Code	Description	Signal and Criteria	value	OTHIS	Parameters	Condition	Value		required	of Checks	for Code	mumma
Intake Air Temperature	$\overline{}$				1			T				1	
Sensor 2 (Boost Pressure													
Temperature Sensor)													
Circuit Continuity Check	-										0.01 sec	4 sec	two driv
	P0097	circuit continuity -	Intake Air	0.156	V	Engine Coolant	>	-10.5	° C			continuou	
			Temperature Sensor										
		low	2 Voltage <			Temperature						s	
	P0098	circuit continuity -	Intake Air	4.66	V							or 50 sec	with: 4 s
			Temperature Sensor										
		high	2 Voltage >									1.0	
												cumulativ	continu
-	P0099	intermittent	Intake Air									е	or 50 se
	P0099	mermittent											01 50 86
			Temperature Sensor										
		(discontinuity)	2 Raw Voltage -										
	_	(discontinuity)	Intake Air	0.3	V	Intermittent	>	1	sec	2 sec			
				0.0		THO THE COLUMN			000	2 000			
			Temperature Sensor										
			2 Filtered Voltage			(discontinuous) time							
			Ŭ										
	المساحب												
Mass Air Flow (MAF) Senso	r												
D										1			1
Ratoinality	Podot		MAE	4.050010	1			0.0		0.4	0.4	4	to a second
	P0101	range check low	MAF sensor mass air	1.050018	-	min / max MAP sensor	<	0.3	-	2.1 sec	0.1 sec	4 sec	two driv
			flow * THRESHOLD <	:									
			model			air flow ratio							
-	+	comparison to	model			battery voltage	>	10.5	V				cycles
		MAP based model				battery voltage		10.5	•				Cycles (
						for time	>	0.1	sec				with: 4
							TRUE						continu
						time after start	>	0.3	sec				or 50 se
						crankshaft revolution	>	150	rev				cumula
						counter							
			or			turbocharger bypass	FALSE	-	-				
						valve closed							
		fuel trim limits	delta lambda	15	%	no boost pressure	FALSE	-	-				
		exceded	correction >			oscillation							
		range -				error - intake air	not set	-	-				
		and the line of the											
		multiplicative				temperature sensor #2			_				
		multiplicative and				error : ambient	not set	-	-				
						error : ambient pressure sensor		-	-				
		and	correction factor air	80	%	error : ambient pressure sensor electrical	not set	-	-				
			correction factor air	80	%	error : ambient pressure sensor electrical error : ambient		-	-				
		and		80	%	error : ambient pressure sensor electrical error : ambient pressure sensor	not set	-	-				
		and correction factor	correction factor air	80	%	error : ambient pressure sensor electrical error : ambient	not set	-	-				
		correction factor (modeled air mass at throttle / air mass		80	%	error : ambient pressure sensor electrical error : ambient pressure sensor rationality error : throttle position sensor	not set not set	-	-				
		correction factor (modeled air mass at throttle / air		80	%	error : ambient pressure sensor electrical error : ambient pressure sensor rationality error : throttle position	not set not set	-	-				
		correction factor (modeled air mass at throttle / air mass measured by air		80	%	error : ambient pressure sensor electrical error : ambient pressure sensor rationality error : throttle position sensor error : boost pressure	not set not set	-	-				
		correction factor (modeled air mass at throttle / air mass		80	%	error: ambient pressure sensor electrical error: ambient pressure sensor rationality error: throttle position sensor error: boost pressure sensor electrical	not set not set not set	-	-				
		correction factor (modeled air mass at throttle / air mass measured by air		80	%	error : ambient pressure sensor electrical error : ambient pressure sensor rationality error : throttle position sensor error : boost pressure	not set not set not set	-	-				
		correction factor (modeled air mass at throttle / air mass measured by air		80	%	error : ambient pressure sensor electrical error : ambient pressure sensor rationality error : throttle position sensor error : boost pressure sensor electrical error : boost pressure	not set not set not set	-	-				
		and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter)	mass <		%	error: ambient pressure sensor electrical error: ambient pressure sensor rationality error: throttle position sensor error: boost pressure sensor electrical error: boost pressure sensor rationality	not set not set not set not set	-	-				
		and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter)			%	error: ambient pressure sensor electrical error: ambient pressure sensor rationality error: throttle position sensor error: boost pressure sensor electrical error: boost pressure sensor rationality	not set not set not set	-	-				
		and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter)	mass <		%	error: ambient pressure sensor electrical error: ambient pressure sensor rationality error: throttle position sensor error: boost pressure sensor electrical error: boost pressure sensor rationality	not set not set not set not set	-	-				
		and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter)	mass < MAF sensor mass air flow * THRESHOLD >		%	error : ambient pressure sensor electrical error : ambient pressure sensor rationality error : throttle position sensor error : boost pressure sensor electrical error : boost pressure sensor rationality error : MAP pressure	not set not set not set not set	-	-				
		and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high -	mass < MAF sensor mass air		%	error : ambient pressure sensor electrical error : ambient pressure sensor rationality error : throttle position sensor error : boost pressure sensor electrical error : boost pressure sensor rationality error : MAP pressure	not set not set not set not set not set	-	-				
		and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter)	mass < MAF sensor mass air flow * THRESHOLD >		-	error : ambient pressure sensor electrical error : ambient pressure sensor rationality error : throttle position sensor error : boost pressure sensor electrical error : boost pressure sensor rationality error : MAP pressure	not set not set not set not set	-	-				
		and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high -	mass < MAF sensor mass air flow * THRESHOLD >		-	error : ambient pressure sensor electrical error : ambient pressure sensor rationality error : throttle position sensor error : boost pressure sensor electrical error : boost pressure sensor rationality error : MAP pressure	not set not set not set not set not set	-	-				
		and correction factor (modeled air mass at throttle / air mass measured by air mass flow meter) range check high - comparison to MAP based model	mass < MAF sensor mass air flow * THRESHOLD >		%	error : ambient pressure sensor electrical error : ambient pressure sensor rationality error : throttle position sensor error : boost pressure sensor electrical error : boost pressure sensor rationality error : MAP pressure	not set not set not set not set not set	-	-				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illuminati
		fuel trim limits exceded	delta lambda correction <	-15	%	Long term fuel trim enabled	TRUE	-	-				
		range - multiplicative	OUTGORIOTI V			Fuel trim stabilized	TRUE	-	-				
		and				MAF sensor signal valid (until detection)	TRUE	-	-				
		correction factor (modeled air	correction factor air mass >	120	%	Air flow error gradient	<	0.4	-				
		mass at throttle / air mass				Throttle position gradient	<	2	-				
		measured by air mass flow meter)				Engine coolant temperature	>	9.8	°C				
						Engine running time Pressure ratio across	> <	1 0.8	sec -				
						throttle for time	>	0.5	sec				
Manifold Absolute Pres Sensor	sure												
Rationality	P0106	range check high	sensor signal >	255	KPa	error : MAP sensor	not set	-	-	2 sec	continuous	4 sec	two driv
						electrical							cycles e
		range check low	or sensor signal <	15	KPa	error : MAP sensor	not set	-	-	2 sec	continuous	4 sec	with: 4 s
						electrical							or 50 se
		rationality check low	or -sensor signal + THRESHOLD <	15	KPa	error : initial throttle	not set	-	-	2 sec	continuous	4 sec	cumulat
		model	model			learn failed error : throttle	not set	-	_				
			or			potentiometer fault error : intake air	not set	-	-				
						temperature sensor fault							
		rationality check low	THRESHOLD <	20	KPa	error : under pressure	not set	-	-				
		baro comparison	ambient pressure (baro)			in fuel tank							
						error : intake / exhaust	not set	-	-				
			or			camshaft control error : intake / exhaust	not set	-	-				
						camshaft electrical							
		rationality check high	THRESHOLD >	15	KPa	error : ambient pressure sensor	not set	-	-				
		- model	model			electrical error : ambient	not set	-	-				
						pressure sensor rationality	not sot						
						error : boost pressure sensor electrical	ווטנ אפנ						
					1	error : boost pressure	not set	-	-				
						sensor rationality error : MAP sensor	not set	_	_				
						electrical	>	200	count				
						counter since engine		200	s				
						block diagnosis if : start-up coolant	<	-7.5	C				
						temperature until	-	1					

		rationality check high - 3 sensor check rationality check low - 3 sensor check	THRESHOLD > mean sensor output or sensor signal + THRESHOLD < mean	8.5	KPa	temperature conditions met once during drive cycle throttle position engine speed MAP sensor reading change	<	25	C % rpm KPa				
Sensor Electrical		- 3 sensor check rationality check low -	sensor signal - THRESHOLD > mean sensor output or -sensor signal + THRESHOLD < mean		КРа	conditions met once during drive cycle throttle position engine speed MAP sensor reading change	>	1500	rpm				
Sensor Electrical		- 3 sensor check rationality check low -	sensor signal - THRESHOLD > mean sensor output or -sensor signal + THRESHOLD < mean		KPa	throttle position engine speed MAP sensor reading change	>	1500	rpm				
Sensor Electrical		- 3 sensor check rationality check low -	sensor signal - THRESHOLD > mean sensor output or -sensor signal + THRESHOLD < mean		КРа	engine speed MAP sensor reading change	>	1500	rpm				
Sensor Electrical		- 3 sensor check rationality check low -	sensor signal - THRESHOLD > mean sensor output or -sensor signal + THRESHOLD < mean		KPa	MAP sensor reading change	>						-
Sensor Electrical		- 3 sensor check rationality check low -	sensor signal - THRESHOLD > mean sensor output or -sensor signal + THRESHOLD < mean		KPa	change		10	кРа				
Sensor Electrical		- 3 sensor check rationality check low -	sensor signal - THRESHOLD > mean sensor output or -sensor signal + THRESHOLD < mean		KPa	engine speed	_			+	+		1
Sensor Electrical		- 3 sensor check rationality check low -	THRESHOLD > mean sensor output or sensor signal + THRESHOLD < mean				_	400	rpm	200 ms	during	4 sec	two dr
Sensor Electrical		rationality check low -	or -sensor signal + THRESHOLD < mean								engine		
Sensor Electrical		,	sensor signal + THRESHOLD < mean			engine off timer	>	4	sec	-	cranking		cycles
Sensor Electrical		,	THRESHOLD < mean	8.5	KPa		not set	-	-		only		with: 4
Sensor Electrical		3 sensor check				pressure sensor							
Sensor Electrical			sensor output			electrical							
Sensor Electrical						error : boost pressure	not set	-	-				contin
Sensor Electrical						sensor electrical							
Sensor Electrical							not set	-	-				or 50 s
Sensor Electrical					1	electrical							cumula
Sensor Electrical													cumula
Sensor Electrical									l				
Electrical P0:													
P0 ⁻		+								1			
PO	0107	circuit continuity - ground	MAP sensor output voltage <	0.1855	V	engine speed	>	80	rpm	1.0 sec	continuous	4 sec	two dri
	0108	circuit continuity -	MAP sensor output	4.805	V								cycles
		voltage	voltage >								-		
													with: 4
		+								 	†		or 50 s
													cumul
Intake Air Temperature					Ī								
Sensor 1 (MAF Intake Air													
Temperature Sensor)										 	0.04	4	6 T
Electrical	0112	circuit continuity	Intake Air	4.66	V	Engine Coolant	_	-10.5	° C	 	0.01 sec		two dri
	UIIZ	circuit continuity -	Temperature Sensor	4.00	v		>	-10.5					cycles
	0440		1 Voltage <	0.470		Temperature				 	 	<u> </u>	
P0 ⁻	0113	circuit continuity -	Intake Air Temperature Sensor	0.176	V								with: 4
		high	1 Voltage >		1					<u> </u>		<u> </u>	1
DO.	0114	intermittent	Intake Air	0.3	V	Intermittent	_	1	sec	2 sec	 		or 50 s
Po	0114		Temperature Sensor	0.5	V	intermitent		[sec	2 300			01 00 8
		(discontinuity)	1 Raw Voltage -			(discontinuous) time							
			Intake Air				-						cumula
			Temperature Sensor										
			1 Filtered Voltage										
Fuel Rail Pressure Sensor Electrical													
	0192	circuit continuity -	Fuel pressure sensor	0.30029	V					0.5 sec	0.01 sec	4 sec	immed
		low	output voltage										ones
Pn	0193	low circuit continuity -	output voltage < Fuel pressure sensor	4 70001	V					0.5 sec	0.01 sec		once code h
l l	0.00				,				l	3.0 360	3.01 360	. 555	3000
		high	output voltage >	1		1		1	l	1			1

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumina
	1		1			1				1		1	
High Pressure Fuel Injection Valve													
Circuit Continuity - Low Side													
Cylinder #1	P0201	circuit continuity -	Voltage	IC Internal		engine speed	>	80	rpm	0.01 sec	0.01 sec	4 sec	two dri
	Dogg4	open				h - 11 11		8					and a
	P0261	circuit continuity - ground				battery voltage	>	8	V				cycles
	P0262	circuit continuity -				battery voltage	<	18.1	v				with: 4
		voltage				, , , , , ,							
													continu
Cylinder #2	P0202	circuit continuity -											or 50 s
	P0264	open circuit continuity -											cumula
	0204	ground											Cumule
	P0265	circuit continuity -											
		voltage											
Cylinider #3	P0203	circuit continuity -											
	P0267	open circuit continuity -											
	1 0207	ground											
	P0268	circuit continuity -											
		voltage											
0 " 1 "4	Door 4												
Cylinder #4	P0204	circuit continuity - open											
	P0270	circuit continuity -											
	. 02.0	ground											
	P0271	circuit continuity -											
		voltage											
SPI Communication	P062B	Internal SPI		IC Internal		angina angad	>	80	rnm	1.10 sec	0.01 sec	4 sec	
3FI Communication	F002B	Communication		ic internal		engine speed		80	rpm	1.10 Sec	0.01 Sec	4 Sec	
		Fault											
		or				battery voltage	>	8	٧				
		Internal ADC Voltage		IC Internal		battery voltage	<	18.1	V	0.50 sec	0.01 sec	4 sec	
		Decetes Fellows											
		Booster Failure											
Circuit Continuity - High Side													
Cylinder #1	P2146	circuit continuity -	Voltage	IC Internal		engine speed	>	80	rpm	0.01 sec	0.01 sec	4 sec	two dri
	P2147	open circuit continuity -				battery voltage	>	8	v				cycles
		ground				ballery reliage			ľ				0,0.00
	P2148	circuit continuity -				battery voltage	<	18.1	v				with: 4
		voltage											
Cylinder #2	P2149	circuit continuity -											or 50 s
Cymruer #2	F Z 149	open											OI DU S
	P2150	circuit continuity -					1	+					cumula
		ground											1
	P2151	circuit continuity -											
		voltage						1		1			
Cylinider #3	P2152	circuit continuity -						+					1
Symmoor no	. 2102	open											
	P2153	circuit continuity -											
		ground											
	P2154	circuit continuity -											
		voltage											
Cylinder #4	P2155	circuit continuity -					-						
Cymruor n 1	1 2 100	open											
	P2156	circuit continuity -											
	1	ground	I	1	1	1	1	1	1	1	1	1	1

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Ullits		Frequency of Checks	Criteria for Code	MIL Illumination
	P2157	circuit continuity - voltage											
Turbocharger boost control system													
Rationality	P0234	actual boost pressure above desired	difference (desired versus actual boost pressure) <	-12820	kPa	error : electrical diagnosis of boost	not set	-	-	3.2 sec	continuous	4 sec	two drivi
		uesireu	pressure / C	KLDLUL		pressure sensor error : rationale diagnosis of boost pressure sensor	not set	-	-				cycles e
													with: 4 s
	P0299	actual boost pressure below desired	difference (desired versus actual boost pressure) >	20	kPa	error : electrical diagnosis of boost pressure sensor	not set	-	-	0.1 sec	continuous	4 sec	continuo
						error : rationale diagnosis of boost pressure sensor	not set	-	-				or 50 se
						error : turbocharger boost control system	not set	-	-				cumulat
						error : limp home mode activated	not set	-	-				
						error : limp home mode activated with	not set	-	-				
						safety fuel cut-off engine speed	>	26003 520	rpm				
						desired manifold pressure > base boost	>	11013	KPa				
						pressure ambient barometric pressure	>	0 75	KPa				
Boost Pressure Sensor													
Rationality													
	P0236	range check low	sensor signal <	50	KPa	error : boost pressure sensor electrical	not set	-	-	3 sec	continuous	4 sec	two driv
						Serisor electrical							cycles e
		rationality check low -	or sensor signal + THRESHOLD < baro	23	KPa	crankshaft revolution counter since engine	>	3	count				with: 4 s
		baro comparison	pressure			start error : throttle	not set	-	s -				or 50 se
			or			potentiometer fault error : limp home	not set						cumulat
		rotionality should be to		10	KDo.	mode						1	Cumulat
		rationality check high - baro comparison	THRESHOLD > baro	18	KPa	error : boost pressure	not set	-	-				
+		- baro companson	pressure			sensor electrical error : ambient pressure sensor	not set	-	-				
					1	electrical error : ambient	not set	-	-				
						pressure sensor							
						rationality							
						rationality engine speed	<	1000	rpm				
			Or .			rationality	< <	1000	rpm %				
		rationality check high	or sensor signal - THRESHOLD > mear sensor output	4	KPa	rationality engine speed				200 ms	during	4 sec	two drivi

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumin
			or			error : ambient pressure sensor	not set	-	-		only		with: 4
						electrical							
		rationality check low	sensor signal + THRESHOLD < mean	4	KPa	error : boost pressure	not set	-	-				contir
		3 sensor check	sensor output			sensor electrical error : MAP sensor	not set	-	-				or 50
						electrical							cumu
Boost Pressure Sensor													
Electrical													
	P0237	circuit continuity - ground	Boost sensor output voltage <	0.1855	V	engine speed	>	80	rpm	0.20 sec	continuous	4 sec	two d
	P0238	circuit continuity - voltage	Boost sensor output voltage >	4.85	V								cycles
													with: 4
													or 50
													cumul
Turbocharger Boost Control													
Actuator													<u> </u>
Circuit Continuity	P0243	circuit continuity -	voltage	IC Internal	V	engine speed	>	80	rpm	0.01 sec	continuous	4 sec	two dr
	P0245	circuit continuity -				battery voltage	<	18.1	V				cycles
	P0246	circuit continuity - voltage				battery voltage	>	10	V				with: 4
		Tomago											contin
													or 50 cumul
Diagnosis of Stuck Open													
Fuel Injector													
Rationality	P029D	fuel injector stuck	fuel managemen			misfire monitor active				200 ms		1	immed
	P029D		fuel pressure deviation from	set						200 ms	continuous	4 sec	
		open - cylinder #1	desired - under pressure ((see P0300 details) engine speed	>	240	rpm				once code l
			P0087) and			engine speed	<	6000	rpm				been
			camshaft revolution	80	rev	relative engine load	<	99.8	%				
			period < and		+			1				+	
			cylinder # 1 misfire counts >	100	counts								
													1.
	P02A1	fuel injector stuck	fuel pressure deviation from	set						200 ms	continuous	4 sec	immed
		open - cylinder #2	desired - under pressure (once code l
			P0087) and										been
			camshaft revolution	80	rev								
			period < and					<u> </u>					
			cylinder # 2 misfire counts >	100	counts								
	DOOAE	fuel injector atual:		oot						200	continuous	4.000	im
	P02A5	fuel injector stuck open - cylinder #3	fuel pressure deviation from desired -	set						200 ms	continuous	4 sec	immed
		open - cylliluel #3	under pressure (once code l
4		1	P0087)										been

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Office		Frequency of Checks	Criteria for Code	MIL Illumin
			and										
			camshaft revolution	80	rev	1						+	
			period <										
			and										
			cylinder # 3 misfire	100	counts								
			counts >										
	P02A9	fuel injector stuck	fuel pressure	set						200 ms	continuous	4 sec	imme
			deviation from										
		open - cylinder #4	desired -										once
			under pressure (code l
			P0087)										been:
			and										
			camshaft revolution	80	rev								
			period <									+	
			and	400									
			cylinder # 4 misfire	100	counts								
			counts >									_	
Brake Booster Pressure													
Sensor					1	1						 	
Rationality	P0556	range check - low	Brake Booster	0	kPa					4.0 sec	0.01 sec	4 sec	two dr
	Docto	and the state of the state	Pressure <	400	L.D.								
	P0556	range check - high	Brake Booster	100	kPa							continuou	cycles
			Pressure >									or 50 sec	with: 4
												01 00 000	WILLIA.
	P0556	barometric Pressure	Brake Booster	15	kPa							cumulativ	continu
			Pressure - Ambient										
		Check	Pressure >									е	
													or 50 s
		or											
			D 1 D 1	00		5 1 6 1 1 4 1	E41.0E						
		Manifold Pressure	Brake Booster	20	kPa	Brake Switch Active	FALSE						
		Ob I	Pressure - manifold										
		Check	absolute pressure			Darley Ossitely France	FALSE						
						Brake Switch Error Main Load Sensor	FALSE					+	
						Error	FALSE						
						Ambient Pressure	FALSE					+	
						Sensor Error	I ALOL						
		or				Ambient Pressure -							
		01				Manifold Absolute							
						Pressre	<	25	kPa			+	
		System Leak Check	Brake Booster	10	kPa	Time Between	=	2	sec				
			Pressure - Brake										
			Booster Pressure			Measuring Points							
			after a period of time			Brake Swirch Off	FALSE						
						1							
						for a period of time	>=	1	sec				
					1	Brake Switch Error	FALSE		1			 	
					1								
Brake Booster Pressure												T	
Sensor													
Circuit Continuity													
	P0557	circuit continuity	Brake Booster	0.1953	V					2.0 sec	0.01 sec	4 sec	two dr
			pressure sensor										
		check - low	voltage <										
	P0558	circuit continuity	Brake Booster	4.8	V							continuou	cycles
			pressure sensor										
		check - high	voltage >		-				1			S	
												or 50 sec	with: 4
							-		-		1	cumulativ	oont:-

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value			Frequency of Checks	Criteria for Code	MIL Illumi
													or 50
ECM manitoring	1				ı	1					I	—	1
ECM monitoring	P0606	Electronic Throttle	SW internal	SW Internal						0.01 sec	0.01	4 sec	imme
	. 5555	Control (ETC)	orr internal	orr intomar						0.01 000	0.01	. 555	
		checks											once
		Same as E55 P0606 data PLUS									continuous		code been
		SPI failure of											been
		throttle output stage											
Ignition Coil Driver Circuit Serial Communication													
	P167D	Internal SPI		IC Internal		battery voltage	<	18.1	v	0.01 sec	0.01 sec	4 sec	two d
		communication fault											
		John Maria and Maria				battery voltage	>	9	v				cycle
						engine speed	<	6000	rpm	$\perp =$			with:
										 		 	continuous
										 		+	cumu
Ovugon Conser (seeses!													
Oxygen Sensor (secondary													
O2) Trim of Air / Fuel Ratio													
Sensor (primary A/F)		,										 	
Bank 1	P2195	secondary O2 sensor operation	secondary O2 sensor voltage >	0.85	V	A/F sensor measured lambda	>	1.06	lambo	approx.	0.1 sec	4 sec	two d
		too rich - strong	voilage >			short term fuel trim	= MAX	1.25	ŭ	100 sec	continuous	continuou	cycle
		correction						-				s	
						A/F sensor	ready	-	-			or 50 sec	with:
		A/F sensor	or			secondary O2 sensor	ready	_	-	 		cumulativ	conti
		measured too lean			<u> </u>							e	3311111
						suspicion A/F sensor	FALSE	-	-				or 50
			1			not mounted and not confirmed	EALSE		-	-			cumu
						and not confirmed	TALSE	-	-				cumit
						A/F sensor							
						not mounted	FALSE	-	-				
			1			then accumulated exhaust	>	200	g			+	
						gas mass			9				L
				lo or	h.,				1,				
			secondary O2 sensor voltage >	0.85	V	A/F sensor measured lambda	>	1.06	lambo a	1			
			vollage /			secondary O2 sensor	>	0.003	lambo	1		+	
						fuel trim			а			1	
						proportional trim							
			 			dominating secondary O2 aging	complete	-	-	+		+	
						diagnosis	Sopioto						
						secondary O2 circuit	complete	-	-				
						diagnosis secondary O2 fuel	TRUE					+	
						trim active	IKUE	-	-				
						A/F sensor	ready	-	-			<u> </u>	
						secondary O2 sensor	ready	-	-				
						suspicion A/F sensor	FALSE						

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL
						and not confirmed	FALSE	-	-				
						A/F sensor	E41.0E						
						not mounted then	FALSE	-	-				
							>	200	g				
						gas mass							
			secondary O2 sensor	0.85	V	target lambda	>	1.04		2 sec			
			voltage >			A/F sensor	ready		a -	-			
						secondary O2 sensor	ready	-	-				
						, , , , , , , , , , , , , , , , , , , ,	,						
						lambda closed loop	active	-	-				
						control							
						secondary O2 circuit diagnosis	complete	-	-				
						short term fuel trim	> MIN	0.75	factor				
						(o.k.) suspicion A/F sensor	FALSE	-	-	-	1		
			<u> </u>			not mounted							
						and not confirmed	FALSE	-	-				
						A/F sensor not mounted	EVICE			 			
							FALSE	-	-				
						error	17 ALOL						
						secondary O2 aging	FALSE	-	-				
						error							
						then		000					
						accumulated exhaust gas mass	>	600	g				
						yas mass							
			secondary O2 sensor	0.85	V	secondary O2 sensor	>	0.003	lambo	2 sec			
			voltage >			fuel trim			а				
						proportional trim dominating							
						A/F sensor	ready	-	-				
						secondary O2 sensor	ready	-	-				
						short term fuel trim	> MIN	0.75	factor				
						(o.k.) suspicion A/F sensor	FALSE						
						not mounted	FALSE	ľ	-				
						and not confirmed	FALSE	-	-				
						A/E consor							
						A/F sensor not mounted	FALSE	-	<u> </u>	 			
							FALSE	-	-	1			
						error							
						secondary O2 aging	FALSE	-	-				
			1			error			1	-			
			+			then accumulated exhaust	>	600	g	 	+		
						gas mass		000	9				
						J							
Oxygen Sensor (secondary									1				
O2) Trim of Air / Fuel Ratio													
Sensor (primary A/F)													
Bank 1	P2196	secondary O2	secondary O2 sensor	0.15	V	A/F sensor measured	<	0.94	lambo	approx.	0.1 sec	4 sec	two drivi
		sensor operation	voltage <			lambda	MIN	0.75	a for:-	100	a a mation		a al
ĺ		too lean - strong				short term fuel trim	= MIN	0.75	ractor	100 sec	continuous	continuou	cycles e
	1	correction	1	1	1	II.	1			1	1	5	
						A/F sensor	ready	_	1_			or 50 sec	with 1 a

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Specified Units	Secondary Parameters	Enable Condition	Enable Value	Units	Time Frequency Required of Checks	Criteria for Code	MIL Illumination
		A/F sensor measured too rich				secondary O2 sensor	ready	-	-		cumulativ	continuous
		modernou too non				suspicion A/F sensor not mounted	FALSE	-	-			or 50 sec
						and not confirmed	FALSE	-	-			cumulative
						A/F sensor not mounted	FALSE					
						then	TALOL					
						accumulated exhaust gas mass	>	200	g			
			secondary O2 sensor	0.15	V	A/F sensor measured	<	0.94	lambd			
			voltage <			lambda secondary O2 sensor	<	-0.003	a lambd			
						fuel trim proportional trim			а			
						dominating secondary O2 aging	complete	-	-			
						diagnosis secondary O2 circuit	complete	-	-			
						diagnosis secondary O2 fuel	TRUE	-	-		1	
						trim active						
						A/F sensor	ready	-	-			
						secondary O2 sensor	ready					
						suspicion A/F sensor not mounted	FALSE	-	-			
						and not confirmed	FALSE	-	-			
						A/F sensor not mounted	FALSE	-	-			
						then						
						accumulated exhaust gas mass	>	200	g			
			secondary O2 sensor	0.15	lv	torget lembde	<	0.96	lombd	2 sec		
			voltage <	0.15	V	target lambda	<	0.96	a	12 Sec		
						A/F sensor	ready	-	-			
						secondary O2 sensor	ready	-	-			
						lambda closed loop control	active	-	-			
						secondary O2 circuit diagnosis	complete	-	-			
						short term fuel trim (o.k.)	< MAX	1.25	factor			
						suspicion A/F sensor not mounted	FALSE	-	-			
						and not confirmed	FALSE	-	-			
						A/F sensor not mounted	FALSF	-	-		1	
						secondary O2 circuit error	FALSE	-	-		1	
						secondary O2 aging error	FALSE	-	-		1	
						then		200				
						accumulated exhaust gas mass	>	600	g			
			secondary O2 sensor	0.15	V	secondary O2 sensor	<	-0.003	lambd	2 sec		1
			voltage <			fuel trim proportional trim		-	а		-	
						dominating A/F sensor						

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL Illumina
						secondary O2 sensor	ready	-	-				
						short term fuel trim (o.k.)	< MAX	1.25	factor				
						suspicion A/F sensor	FALSE	-	-				
						not mounted and not confirmed	FALSE	-	-				
						A/F sensor not mounted	FALSE	-	-				
						secondary O2 circuit	FALSE	-	-				
						error secondary O2 aging	FALSE	-	-				
						error then							
						accumulated exhaust	>	600	g				
						gas mass							
Intake Air Temperature Sensor 1 (MAF Intake Air													
Temperature Sensor)													
Rationality	P2199	Intake Air	Intake Air		-						-		-
	. 2100	Temperature	Temperature Sensor										
		Correlation	1 - Intake Air										
		Check	Temperature Sensor	20	° C	Mass Air Flow	>	8.8889	g/	45 sec	0.01 sec	5	two dr
			2 >				<	50	sec g/			seconds after	cycles
							_		sec			enable	-
						Vehicle Speed	>	43.75	mph			condition	with: 4
						Boost Pressure to							continu
						Ambient Pressure Ratio	<	-	-				or 50 s
		Intake Air	Intake Air										
		Temperature	Temperature Sensor										
		Correlation Check	1 - Intake Air Temperature Sensor	20	° C								
			2 <										
Barometric Pressure Sensor													
Rationality													
	P2227	range check high	sensor signal >	115	KPa	error : barometric pressure sensor	not set	-	-	2 sec	continuous	4 sec	two dri
						electrical							
			or					1					cycles
		range check low	or sensor signal <	50	KPa	error : barometric	not set	-	-	2 sec	continuous	4 sec	with: 4
						pressure sensor electrical							
			or										or 50 s
		sensor offset / jump	or sensor output change	5	KPa	error : barometric	not set	-	-	2 sec	continuous	4 sec	cumula
		test low	within 20 sec period >			pressure sensor electrical							
		rest iom	OR										
			barometric pressure	10	KPa	time since engine start	<	5	sec				
			signal pressure										
			jump from previous			error : barometric	not set	-	-				
		i i	1	I .	1	pressure sensor	I	1	Ĥ.	1	1	1	1

Component/ System	Fault Code	Monitor Strategy Description		Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Jinto		Frequency of Checks	Criteria for Code	MIL
			AND					$\overline{}$	_			$\overline{}$	
	+			5	KPa	engine speed	<	1000	rpm			+	
			THRESHOLD < boost			3 - 1							
			pressure										
	+		sensor output			throttle position	<	23.99	%		+		
	+		or			error : barometric	not set	-	-		+		
						pressure sensor							
						electrical							
	<u> </u>											1	
	<u> </u>	sensor offset / jump	sensor output change	5	KPa	error : barometric	not set	-	-	2 sec	continuous	4 sec	
						pressure sensor							
		test high	within 20 sec period >			electrical							
			OR										
			barometric pressure	10	KPa	time since engine start	<	5	sec				
			signal pressure										
			jump from previous			error : barometric	not set	-	-				
						pressure sensor							
			key off >			electrical						1	
			AND										
		-		5	KPa	engine speed	<	1000	rpm				
			THRESHOLD > boost										
			pressure										
			sensor output			throttle position	<	23.99	%				
						error : barometric	not set	-	-				
						pressure sensor							
						electrical							
										,			
Barometric Pressure Sensor													
Electrical													
	P2228	range check low	voltage <	0.2	V	1	>	1	sec	2 sec	continuous	4 sec	
						for time							
										_	.	4	
	P2229	range check high	voltage >	4.87	V		>	1	sec	2 sec	continuous	4 sec	
						for time							
									_				
Air / Free Detic Occase								4	_		_	4	1
Air / Fuel Ratio Sensor													
(primary A/F)	+	A/F sensor voltage	A/F sensor voltage	1.480	V		<	18.1	V	1000	0.1.000	4 000	two dri
reference ground circuit				11.400	IV		<	10.1	V	4sec	0.1 sec	4 sec	two dri
	1		741 School Vollage			battery voltage		1	1				
open	D2054	within range	7VI GONGOI VOILAGO					40.7			a a matinu a u a	tin	a rala a
bank 1 sensor 1	P2251		7VI Seriser vertage			battery voltage	>	10.7	V		continuous	continuou	cycles
	P2251		7VI SCHOOL VOILAGE			battery voltage		10.7	V		continuous	s	-
	P2251		7vi School Vollage	1.4	V		> running	10.7	V -		continuous	continuou s or 50 sec	-
	P2251		7vi denser verage		V	battery voltage	running	10.7	V -		continuous	s or 50 sec	with: 4
•	P2251		7 Vi Gonda Vollage		V	battery voltage		10.7	V -		continuous	or 50 sec	with: 4
	P2251		707 conser votage		V	battery voltage engine engine starting	running	-	-		continuous	s or 50 sec cumulativ e	with: 4
	P2251		741 Genedi Voltage		V	battery voltage	running	10.7	V C		continuous	s or 50 sec cumulativ e	with: 4
	P2251		741 School Vollage		V	battery voltage engine engine starting modeled exhaust gas	running	-	-		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		741 Genedi Voltage		V	engine engine starting modeled exhaust gas temperature at A/F	running	-	-		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		741 Genedi Voltage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor	running complete	- 900	- ° C		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		741 Genedi Voltage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor The following	running	-	-		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		741 School Vollage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for	running complete <	900	- ° C		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		741 Genedi Voltage		V	engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating	running complete <	- 900	- ° C		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		741 Genedi Voltage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating normal	running complete <	900	- ° C		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		741 Genedi Voltage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating noperation range	running complete <	900	- ° C		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		741 Genedi Voltage		V	engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating normal operation range for time	running complete <	- - - 900 5 20	- ° C		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		74. Genedi Voltage		V	engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating normal operation range for time A/F sensor internal	running complete <	900	- ° C		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		7 Collect Voltage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating normal operation range for time A/F sensor internal resistance	running complete <	- - - 900 5 20	- ° C		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		7 Collect Voltage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating noperation range for time A/F sensor internal resistance error: A/F sensor	running complete <	- - - 900 5 20	- ° C		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		7 Control Voltage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating normal operation range for time A/F sensor internal resistance error: A/F sensor heater circuit	running complete < >> > not set	- - 900 5 20	- ° C sec sec Ohms		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		74. Genedi Voltage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating normal operation range for time A/F sensor internal resistance error: A/F sensor heater circuit The following	running complete <	- - - 900 5 20	- ° C		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		7 Collect Voltage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating normal operation range for time A/F sensor internal resistance error: A/F sensor heater circuit The following conditions met for	running complete < >> > not set >	- - 900 5 20	- ° C sec sec Ohms		continuous	or 50 sec cumulativ	with: 4 continu
	P2251		7 Collect Voltage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating normal operation range for time A/F sensor internal resistance error: A/F sensor heater circuit The following conditions met for A/F sensor heating	running complete < >> > not set >	- - 900 5 20	- ° C sec sec Ohms		continuous	or 50 sec cumulativ	with: 4 continu
-	P2251		7 Collect Voltage		V	battery voltage engine engine starting modeled exhaust gas temperature at A/F sensor The following conditions met for A/F sensor heating normal operation range for time A/F sensor internal resistance error: A/F sensor heater circuit The following conditions met for	running complete < >> > not set >	- - 900 5 20	- ° C sec sec Ohms		continuous	or 50 sec cumulativ	with: 4

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units			Criteria for Code	MIL
	1					and A/F heater	FALSE	-	-				
	1			1		control shut off		2			1		1
						and finished a DFCO longer than	>	2	sec				
	1					and battery	>	11	V				
						voltage							
Turbocharger Bypass Valve													
(mechanical)													
Rationality													
	P2261	induction system	detected pulsations >	7	counts	minimum time -	>	1.05	sec	200 ms	continuous	4 sec	two
		and a stine				bypass valve							
		pulsation				activation time							
	1	monitor				bypass valve							cycle
						command boost versus ambient	>	1.13.3	ratio				with
						pressure ratio							
	1					battery voltage	>	18.1	V				conti
						error : MAF electrical	not set	-	-				or 50
						error : MAF rationality	not set	-	-				cum
						,		1					
	1					error : ambient	not set	-	-				
	1					pressure sensor							
	+					electrical	not act	1			1		-
	1					error : ambient	not set	-	[
						pressure sensor							
						rationality error : battery voltage	not set	-	-				
	1					error : turbocharger	not set	-	-				
	1					bypass valve							1
	+					electrical	not act	1			1		1
	1					error : throttle valve	not set		[
						potentiometer error : boost pressure	not set	-	-				
	1					2o 2000t produite							
						sensor electrical							
						error : boost pressure	not set	-	-				
						sensor rationality							
						error : intake air	not set	-	-				
	1					temperature sensor 2		1					
	1					error : MAP sensor	not set	-	-				
	+				1	electrical error : MAP sensor	not act	1			+		-
						error : MAP sensor rationality	not set	-	[-				
						,							
Brake Booster Vacuum Pum	ıp												
Circuit Continuity	P258A	circuit continuity -	Voltage	IC Internal						0.01 sec	0.01 sec	4 sec	two
		open	vollage							0.01 360			
	P258C	circuit continuity -		IC Internal							continuous	continuou	cycle
	P258D	ground circuit continuity -		IC Internal					1			or 50 sec	with
	F200D	voltage		io internal									
												cumulativ	con
												е	or 5
	1										1		cum
													1
	_			1	1	1	1		-			1	

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Units		Frequency of Checks	Criteria for Code	MIL
Brake Booster Vacuum Pum	p												
,													
Rationality	Docop	Duelte Des -t D	Dumm on for a second	-						200-	0.04.655	4 04 :	4
	P258B	On no	Pump on for a period of time	5	sec					2.0 sec	0.01 sec	4 sec	two
		vacuum change	Delta between			Manifold Pressure	FALSE					continuou	cycle
			Previous Brake										
			Booster Pressure and Current Brake			(from MAP Sensor) < brake booster						or 50 sec	with
			Booster Pressure			Diake booster						01 30 300	witi i.
			after pump off			pressure plus							
			Intake Air	-10.5	С	no device control from	FALSE					cumulativ	cont
			Temperature			Scan-Tool						е	or 50
													01 00
Oalibratian tala	laa fan 577	TCO	tll									-	+
Calibration tab	ies for E//	and Eby Co	ntroner	1		T.		T					1
P0011, P0021												+	+
P0011, P0021	Maximum												+
	Allowed Deviation												
	- Intake Camshaft												
	Position												
degrees crank	•	Modeled Engine Oil											T
		T (00)											
Engine Speed (rpm)		Temperature (° C)	60	80	100	130						+	+
Engine Opeca (Ipini)	800	6.00	6.00	7.00	9.00	11.00						+	+
	1200	6.00	6.00	6.00	6.00	7.00							1
	1600	6.00	6.00	6.00	6.00	7.00							
	2000	6.00	6.00	6.00	6.00	6.00							
	2500 4000	6.00 6.00	6.00 6.00	6.00 6.00	6.00	6.00 6.00						+	+
	4000	0.00	0.00	0.00	0.00	0.00						+	+
B0440													1
P0116	Engine coolant											_	+
	temperature												
	model based on												
	ambient												
	temperature +												
	engine off timer												
	output											+	+
Time (seconds)	•	600	7200	10800	14400		21600	28800	####				
Coefficient:		0.988	0.395	0.301	0.203	0.156	0.109	0.055	0.000				1
P0135, P0155												-	+
1 0133, F0133	Sensor Element											+	+
	(Ceramic)												1
	Impedance,												
	Nominal Value -												1
	Secondary O2												
	Sensor												
1	Ohms	Modeled Exhaust											
	1	Gas Temperature at Secondary O2											
			1		1		I	1	l	1			
O2 Heater Power (watts)		Sensor (°C)	450	550	650	750						-	-

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Jinto		Frequency of Checks	Criteria for Code	MIL Illumii
	0.78	288	224	160	104	88							
	1.03	184	144	112	96	88		1				1	
	FRINV1 / 2												
	Multiplication												
	Factor for Internal	I											
	Resistance												
	KFRINH Nominal												
	Value - Secondary	'											
	O2 Sensor												
		Modeled Exhaust											
		Gas Temperature at Secondary O2											
		Secondary 02 Sensor (° C)											
		370	450	520	590	650						-	
	factor	63.00	16.00	7.00	5.00	5.00						+	
												1	
P0141, P0161													
	Sensor Element												
	(Ceramic)												
	Impedance,												
	Nominal Value -												
	Secondary O2												
	Sensor					1							
	Ohms	Modeled Exhaust											
		Gas Temperature at											
		Secondary O2											
0011 / D / ")		Sensor (° C)	000	400	500	550							
O2 Heater Power (watts)	0.620	200 2040	300 1504	400 904	500 504	550 448					296		
	0.800	1400	848	448	304	248					296	+	
	1.000	752	400	248	192	184						+	
	1.000	. 02	100	2.0	.02	101						+	
	Multiplication												
	Factor for Internal	ı											
	Resistance												
	KFRINH Nominal												
	Value - Secondary	'											
	O2 Sensor							<u> </u>	L	<u></u>			<u>L</u>
		Modeled Exhaust											
		Gas Temperature at											
		Secondary O2											
		Sensor (°C) 200	300	400	500	550						+	
	factor		300 50.00	30.00	14.00	550 14.00	_	1				+	
	iacioi	00.00	00.00	50.00	17.00	17.00						+	
†												+	
					1			1				1	
												1	
		1	1	1				1				 	
					1			1	1		1		
P0327, P0332, P0328,	RPM dynamic thres	shold for disabling kno	ck diagnosis										
P0327, P0332, P0328, P0333	·			4200.0	4000.0	2000 0	2400.0	2002	2200	2000	4000	4400	4000
	RPM dynamic thres	shold for disabling know 400.0 600.01	800.0 800.01	1200.0 1000.01	1600.0 1200.02	2000.0 1400.02	2400.0 1500.02	2800 1600	3200	3600 1800.02	4000 1900.02	4400 2000.03	4800

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Jillis		Frequency of Checks	Criteria for Code	MIL Illum
												+	+
		-											
P0327, P0332	Deference								<u> </u>				
	Reference voltage												
	threshold for												
	knock sensor												
	diagnosis - Lower												
	Limit												
		Engine Speed (rpm											
		400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800
Peak RMS Voltage (V)		0.040	0.040	0.053	0.074	0.084	0.100	0.128	0.144		0.229	0.254	0.339
Ü . ,													
													1
P0328, P0333	Potorones voltere											+	+
	Reference voltage												
	threshold for												
	knock sensor												
	diagnosis - Upper												
	Limit	Engine Speed (====		1				1				+	+
		Engine Speed (rpm)											
		400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800
Peak RMS Voltage (V)		1.450	1.450	1.459	1.577	1.906	2.121	2.574	3.049		4.751	5.149	6.193
													1
D0442												+	+
P0442	Vacuum /											+	+
	Pressure												
	Threshold for												
	Fuel Tank Leak												
Vacuum / Pressure (hPa)	Detection	Ambient		+	1			+	-			+	-
- acadin / i locodio (iii·a)		Temperature (Model)											
		(C)		<u> </u>				<u></u>					
Fuel Level (%)		-2.3	2.3	6	9.8	14.3	18	21.8	26.3	30	33.8		
	5	8.60	9.20	9.80	10.40	11.00	11.60	12.20	12.80		14.00	1	1
	14	8.46	9.02	9.58	10.14	10.70	11.26	11.82	12.38		13.50	↓	
	23 32	8.32 8.18	8.84 8.66	9.36 9.14	9.88 9.62	10.40 10.10	10.92 10.58	11.44 11.06	11.96 11.54	12.48 12.02	13.00 12.50	+	+-
	32 41	8.04	8.48	8.92	9.62	9.80	10.58	10.68	11.54	11.56	12.00	+	+
	50	7.90	8.30	8.70	9.10	9.50	9.90	10.30	10.70	11.10	11.50	1	+
	59	7.76	8.12	8.48	8.84	9.20	9.56	9.92	10.28	10.64	11.00	1	
	68	7.62	7.94	8.26	8.58	8.90	9.22	9.54	9.86	10.18	10.50		\perp
	77 96	7.48	7.76	8.04	8.32	8.60	8.88	9.16	9.44	9.72	10.00	+	₩
	86 95	7.34 7.20	7.58 7.40	7.82 7.60	8.06 7.80	8.30 8.00	8.54 8.20	8.78 8.40	9.02 8.60	9.26 8.80	9.50 9.00	+	+
	55	Tank Capacity	65.8	Liters	7.00	0.00	0.20	0.70	0.00	0.00	0.00	+	+
Vacuum / Pressure (Pa)	<u></u>	Ambient										1	+
, ,		Temperature (Model)											
Fuel Level (%)		(C) -2.3	2.3	6	9.8	14.3	18	21.8	26.3	30	33.8	1	+-
2010. (10)	5	860	920	980	1040	1100	1160	1220	1280	1340	1400	1	+
	14	846	902	958	1014	1070	1126	1182	1238	1294	1350	1	
	23	832	884	936	988	1040	1092	1144	1196	1248	1300	1	
	32	818	866	914	962	1010	1058	1106	1154	1202	1250		1
	41	804	848	892	936	980	1024	1068	1112	1156	1200	↓	1
1	50	790 776	830	870	910	950	990	1030	1070	1110	1150	+	-
	59	776	812 794	848 826	884 858	920 890	956 922	992 954	1028 986	1064 1018	1100 1050	+	+
	68			1020	000	000							+
	68 77	762 748			832	860	888	916	944	972	1000		
	68 77 86	762 748 734	776 758	804 782	832 806	860 830	888 854	916 878	944 902	972 926	1000 950	1	

System		Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Value	Units	Secondary Parameters	Enable Condition	Enable Value	Onits		Frequency of Checks	Criteria for Code	MIL
P0455	Vacuum Gradient												
	Threshold for												
	Fuel Tank Leak												
	Detection												
Fuel Level liters		0	10	20	30	40	45	50	55	60	70		
hPa / sec		0.20	0.22	0.24	0.26	0.28	0.29	0.30	0.31	0.32	0.34		
Fuel Level (%)		Tank Capacity	65.8 15.2	Liters 30.4	45.6	60.8	68.4	76.0	83.6	01.2	106.4	1	
Pa / sec		20	22	24	26	28	29	30	31	32	34		
P2101					-								₩
12101	Maximum Throttle		1										
	Angle Deviation												
	per computation												
	cycle												
	Cycle	Percent Throttle					1						
		Opening (%)											
		0	0.3	1	5	15							<u></u>
Percent Throttle Delta (%)		4	6	11	20	50	_						
Only for the LA	IE E60 cont	rollor											
Only for the LN	IF E69 cont	roller											
Only for the LN	IF E69 cont	roller											
Only for the LN	IF E69 cont	roller											
0	25	50	75	100	120								
			75 -30	100	120								
0	25	50											
0	25	50											
0	25	50											
0 -60	25 -42.5	50 -32.5	-30	-27.5	-20				1000		500		
0 -60	25 -42.5	50 -32.5 2000	2400	2800	-20	3600	4000	4400		5200	5600	6000	
0 -60	25 -42.5	50 -32.5	-30	-27.5	-20	3600 0.179	4000	4400		5200 0.297	5600 0.329	6000	
0 -60 1200	25 -42.5	50 -32.5 2000	2400	2800	-20								
0 -60 1200	25 -42.5	50 -32.5 2000	2400	2800	-20								
0 -60 1200	25 -42.5	50 -32.5 2000	2400	2800	-20								
1200 0.104	25 -42.5 -1600 0.120	50 -32.5 2000 0.130	2400 0.136	-27.5 2800 0.141	3200 0.156	0.179	0.208	0.234	0.260	0.297	0.329	0.352	0.36
0 -60 1200	25 -42.5 -1600 0.120	50 -32.5 2000	2400	2800	-20				4800	0.297		0.352	6400
1200 0.104	25 -42.5 -1600 0.120	50 -32.5 2000 0.130	2400 0.136	-27.5 2800 0.141	3200 0.156	0.179 3600	0.208	0.234	4800	5200	0.329	0.352	6400
1200 0.104	25 -42.5 -1600 0.120	50 -32.5 2000 0.130	2400 0.136	-27.5 2800 0.141	3200 0.156	0.179 3600	0.208	0.234	4800	5200	0.329	0.352	6400
1200 0.104	25 -42.5 -1600 0.120	50 -32.5 2000 0.130	2400 0.136	-27.5 2800 0.141	3200 0.156	0.179 3600	0.208	0.234	4800	5200	0.329	0.352	6400
1200 0.104	25 -42.5 -1600 0.120	50 -32.5 2000 0.130	2400 0.136	-27.5 2800 0.141	3200 0.156	0.179 3600	0.208	0.234	4800	5200	0.329	0.352	6400
1200 0.104	25 -42.5 -1600 0.120	50 -32.5 2000 0.130	2400 0.136	-27.5 2800 0.141	3200 0.156	0.179 3600	0.208	0.234	4800	5200	0.329	0.352	6400 0.36i 6400 24.2i