System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
Catalyst Bank 1	P0420	oxygen storage of catalyst	normalized oxygen storage	<	1	factor	<1factor	exhaust gas mass flow	>	8.33	g/sec	>8.33g/sec	approx.	0.01 sec	0.4 sec	two driving
			less than normalized oxygen storage					exhaust gas mass flow	<	27.78	g/sec	<27.78g/sec	1000 sec		continuous	cycles each
			of a limit catalyst					catalyst temp. model	<	700	°C	<700° C	during	one	or 4 sec	with: 0.4 sec
								catalyst temp. model	>	390	°C	>390° C	active	completed	cumulative	continuous
								engine speed	>	1000	rpm	>1040rpm	driving	test per		or 4 sec
								engine speed	<	3520	rpm	<3520rpm		driving		cumulative
								engine load engine load	> <	14 17 4255	%	>14 17% <4255%	one test	cycle		
								modeled catalyst temp.	~ ~	2.5	° C / sec	<2.5° C / sec	( average			
								gradient					of 4			
								exhaust gas mass flow gradient	<	8.33	g/sec <sup>2</sup>	<8.33g/sec <sup>2</sup>				
								fuel system closed loop	active	-	-	active	checks)			
								time after engine start	>	235	sec	>235sec	per driving			
								ambient temperature	> TRUE	-48	°C	>-48° C TRUE	cycle			
								scheduled by System Manager		-	-					
								secondary O2 sensor	ready			ready				
								fuel adaptation fault	FALSE	4.05		FALSE				
								short term fuel trim ( < max )	<	1.25	factor	<1.25factor				
								short term fuel trim ( > min )	>	0.75	factor	>0.75factor				
								transient fuel control	FALSE			FALSE				
								critical misfire rate detected	FALSE			FALSE				
								cat. damaging misfire rate exceeded	FALSE			FALSE				
								cat oxygen storage neutralization	FALSE			FALSE				
Misfire		crankshaft speed	emissions relevant misfire rate	>	1.4	%	>1.4% (emission relevant misfire	engine speed	>	450	rpm	>450rpm	1000 revs	cylinder	immediate	Fault during
							rate = 1.5%)									
Emission Level		fluctuation cylinder 1 to	D					engine speed	<	6500	rpm	<6500rpm		firing		1st interval:
Multiple Cylinder	P0300	cylinder 6						indicated torque (idle, no	>	3.91	%	>3.91%		frequency		2 faults in
Cylinder #1	Beeck							drive)								
	P0301							drive) indicated torque (drive)	>	3.91	%	>3.91			After	2 different
Cylindor #2								indicated torque (drive) (MISALUN)		17.19		17.19%		continuous		
Cylinder #2	P0301 P0302							indicated torque (drive)	>		% rpm/sec	17.19% <12800rpm/sec		continuous	After detection,	2 different drive cycles.
Cylinder #2 Cylinder #3								indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency		17.19		17.19% <12800rpm/sec (not active) <768%/rev		continuous		
Cylinder #3	P0302 P0303							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient	<	17.19 12800 768	rpm/sec %/rev	17.19% <12800rpm/sec (not active) <768%/rev (not active)		continuous	detection,	drive cycles.
Cylinder #3 Cylinder #4	P0302 P0303 P0304							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start	<	17.19 12800 768 6	rpm/sec %/rev ignitions	17.19% <12800rpm/sec (not active) <768%/rev (not active) >6ignitions		continuous	detection, the diagnostic	drive cycles. Fault during
Cylinder #3	P0302 P0303							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp	<	17.19 12800 768	rpm/sec %/rev	17.19% <12800rpm/sec (not active) <768%/rev (not active)		continuous	detection,	drive cycles.
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C	< < > >	17.19 12800 768 6	rpm/sec %/rev ignitions	17.19% <12800rpm/sec (not active) <768%/rev (not active) >6ignitions >-7° C		continuous	detection, the diagnostic can only	drive cycles. Fault during remaining
Cylinder #3 Cylinder #4	P0302 P0303 P0304							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp	<	17.19 12800 768 6 -7	rpm/sec %/rev ignitions ° C	17.19% <12800rpm/sec (not active) <768%/rev (not active) >6ignitions		continuous	detection, the diagnostic	drive cycles. Fault during
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control olutch switch press /	<     <	17.19 12800 768 6 -7	rpm/sec %/rev ignitions ° C	17.19% <12800rpm/sec (not active) <768%/rev (not active) >6ignitions >-7° C not detected		continuous	detection, the diagnostic can only pass if	drive cycles. Fault during remaining intervals:
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control clutch switch press / release	<     < <tr>            &gt;           &gt;           not detected off</tr>	17.19 12800 768 6 -7 -7	rpm/sec %/rev ignitions ° C	17.19% <12800rpm/sec (not active) <768%/rev (not active) >6ignitions >-7° C not detected off-		continuous	detection, the diagnostic can only pass if similar	drive cycles. Fault during remaining intervals: 8 faults in 2 different
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control olutch switch press /	<     <	17.19 12800 768 6 -7 -7 -	rpm/sec %/rev ignitions ° C - -	17.19% <12800rpm/sec (not active) <768%/rev (not active) >6ignitions >-7° C not detected off transitionFALSE-		continuous	detection, the diagnostic can only pass if similar conditions	drive cycles. Fault during remaining intervals: 8 faults in 2
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control clutch switch press / release leak detection	<     < <tr>            &gt;           &gt;           off           off</tr>	17.19 12800 768 6 -7 -7 -	rpm/sec %/rev ignitions ° C - -	17.19% <12800rpm/sec (not active) <768%/rev (not active) >6ignitions >-7° C not detected off transitionFALSE- off		continuous	detection, the diagnostic can only pass if similar conditions are	drive cycles. Fault during remaining intervals: 8 faults in 2 different drive cycles
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control clutch switch press / release leak detection active handling ABS engine drag control	<     < <tr>         &lt;</tr>	17.19 12800 768 6 -7 -7 - -	rpm/sec %/rev ignitions ° C - - -	17.19% <12800rpm/sec (not active) <768%/rev (not active) >6ignitions >-7° C not detected off transitionFALSE- off not active not active not active		continuous	detection, the diagnostic can only pass if similar conditions are	drive cycles. Fault during remaining intervals: 8 faults in 2 different drive cycles with at least
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control clutch switch press / release leak detection active handling ABS engine drag control fuel cut off	<	17.19 12800 768 6 -7 -7 - - - - - - - - - - - - - - - -	rpm/sec %/rev ignitions ° C - - - - - - - -	17.19% <12800rpm/sec (not active) <768%/rev (not active) >6ignitions >-7° C not detected off transitionFALSE- off not active not active not active		continuous	detection, the diagnostic can only pass if similar conditions are	drive cycles. Fault during remaining intervals: 8 faults in 2 different drive cycles with at least 4 faults in
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control clutch switch press / release leak detection active handling ABS engine drag control fuel cut off fuel evel	<	17.19 12800 768 6 -7 -7 - - - - - - - - - - - - - - - -	rpm/sec %/rev ignitions ° C - - - - - - - - - - - - - - - - - -	17.19% <12800rpm/sec (not active) >6ignitions >-7° C not detected off transitionFALSE- off not active not active not active s 5.93 %		continuous	detection, the diagnostic can only pass if similar conditions are	drive cycles. Fault during remaining intervals: 8 faults in 2 different drive cycles with at least 4 faults in
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control clutch switch press / release leak detection active handling ABS engine drag control fuel cut off	<	17.19 12800 768 6 -7 -7 - - - - - - - - - - - - - - - -	rpm/sec %/rev ignitions ° C - - - - - - - -	17.19% <12800rpm/sec (not active) <768%/rev (not active) >6ignitions >-7° C not detected off transitionFALSE- off not active not active not active		continuous	detection, the diagnostic can only pass if similar conditions are	drive cycles. Fault during remaining intervals: 8 faults in 2 different drive cycles with at least 4 faults in
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control clutch switch press / release leak detection active handling ABS engine drag control fuel evel OR fuel level AND solid misfire MIL	<	17.19 12800 768 6 -7 -7 - - - - - - - - - - - - - - - -	rpm/sec %/rev ignitions ° C - - - - - - - - - - - - - - - - - - -	17.19% <12800rpm/sec (not active) <768%/rev (not active) >6ignitions >-7° C 		continuous	detection, the diagnostic can only pass if similar conditions are	drive cycles. Fault during remaining intervals: 8 faults in 2 different drive cycles with at least 4 faults in
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control clutch switch press / release leak detection active handling ABS engine drag control fuel cut off fuel cut off fuel evel OR fuel level ML OR fuel level error	<	17.19 12800 768 6 -7 - - - - - - - - - - - - -	rpm/sec %/rev ignitions ° C - - - - - - - - - - - - - - - - - - -	17.19% <12800rpm/sec (not active) >6ignitions >-7° C not detected off transitionFALSE- off not active not active not active not active s 5.93 % > 5.93 % on set		continuous	detection, the diagnostic can only pass if similar conditions are	drive cycles. Fault during remaining intervals: 8 faults in 2 different drive cycles with at least 4 faults in
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control clutch switch press / release leak detection active handling ABS engine drag control fuel level OR fuel level OR fuel level OR fuel level OR fuel level OR fuel level error error: throttle position	<	17.19 12800 768 6 -7 -7 - - - - - - - - - - - - - - - -	rpm/sec %/rev ignitions ° C - - - - - - - - - - - - - - - - - - -	17.19% <12800rpm/sec (not active) <66gnitions >60 active) >60 active >-7° C not detected off transitionFALSE- off not active not active not active not active not active set not set		continuous	detection, the diagnostic can only pass if similar conditions are	drive cycles. Fault during remaining intervals: 8 faults in 2 different drive cycles with at least 4 faults in
Cylinder #3 Cylinder #4 Cylinder #5	P0302 P0303 P0304 P0305							indicated torque (drive) (MISALUN) engine speed gradient volumetric efficiency gradient cylinder events after engine start Enabling delay when Coolant temp is below –7 °C at start Delayed until Coolant temp > 21 °C rough road traction control clutch switch press / release leak detection active handling ABS engine drag control fuel cut off fuel cut off fuel evel OR fuel level ML OR fuel level error	<	17.19 12800 768 6 -7 -7 - - - - - - - - - - - - - - - -	rpm/sec %/rev ignitions ° C - - - - - - - - - - - - - - - - - - -	17.19% <12800rpm/sec (not active) >6ignitions >-7° C not detected off transitionFALSE- off not active not active not active not active s 5.93 % > 5.93 % on set		continuous	detection, the diagnostic can only pass if similar conditions are	drive cycles. Fault during remaining intervals: 8 faults in 2 different drive cycles with at least 4 faults in

Component/	Fault	Monitor Strategy	Primary Malfunction	Threshold	Threshold	Threshold	Threshold	Secondary	Enable	Enable	Enable	Threshold	Time	Frequency	Criteria	MIL
System	Code	Description	Signal and Criteria	Logic	Value	Units	Conditions	Parameters	Logic	Value	Units	Conditions	Required	of Checks	for Code	Illum.
										-	-					
										-	-					
			OR							-	-					
Catalyst Damaging			Catalyst damaging misfire	>	16.2	%	>16.2	Includes all the above with					1000 revs			First
Level			rate	-	6.8	, .	6.8%	the								
Multiple Cylinder	P0300				see Misfire		see Misfire	following exceptions:					First			occurance:
													interval			
Cylinder #1	P0301				supplementa		supplemental	First interval extention					200 revs			immediate
Cylinder #2	P0302				data		data	engine coolant temperature	<	-48	°C	<-48°C	all			flashing
Cyllfider #2	F 0302				uala		uala	engine coolant temperature	<	-40	C	<-40 C	remaining			nasning
Cylinder #3	P0303				(h) (2.5.1)		(h) (2.5.1)	fuel level	>=	6.19	%	> 6.19 %	intervals			while error
Cylinder #4	P0304							OR fuel level	<	6.19	%	> 6.19 %				present, then
Cylinder #5	P0305							AND blinking MIL	blinking	-	-	blinking				no MIL
Cylinder #6	P0306							AND NOT first blink	-	-	-					with no error.
								event								
																Second
																Second occurance:
	1															immediate
	1														1	flashing
																while error
	1			·												present, then
																solid MIL
	I	l	l	l						l		l		l	L	with no error.
evaporative system canister ventilation	P0446	monitoring of tank	tank pressure too low	<	-10.50049	hPa	< -10.50049		>=	-9.8	°C	>= -9.8 °C	< 20 sec	once per dcy	2,6 secs	2 dcy
valve (AAV)	1 0440	pressure while	because	-	-10.30043	in a	hPa	ambient temperature	/-	-3.0	Ŭ	23.0 0	< 20 360	once per dey	2,0 3003	2 009
valve (/v/v/		AAV is open and CPV	canister vent. defective &				in a	ambient temperature	<=	45	°C	<= 45 °C				
		is closed	closed													
								ambient pressure	>=	680.00	hPa	>= 680.00 hPa				
								vehicle speed	<=	1,86	mph	<= 1,86 mph				
								engine is in idle mode	true			true				
								unfiltered tank pressure	>=	-18.00	hPa	>= -18.00 hPa				
								and unfiltered tank	<=	10.00	hPa	<= 10.00 hPa				
canister purge valve	P0496	monitoring of tank	final pressure too low	<		hPa	< -1 00008 bPs	pressure battery voltage	>=	10.45	V	>= 10.45 V	ca 10 sec	once per dcy		
(CPV)	1 0430	pressure while	because	-	-1.00098	in a	< -1.00030 m a	ballery voltage	/-	10.45	v	>= 10.45 V	ca. 10 360	once per dey		
(0) 1)		CPV and AAV are	CPV defective and open					and battery voltage	<=	18.00	V	<= 18.00 V				
		closed						,								
								lambda control is active	true			true				
								secondary air pump	true			true				
								inactive								
								secondary air diagnosis	true			true				
								inactive air bag hasn't been	true			true				
								triggered	liue			liue				
	1							no torque reduction (e.g.	true			true				1
								resulting from switched-off								
								cylinder)								
	P0497	monitoring of tank	purge control stuck					critical misfire rate	false			false				
		pressure while	closed													
		CPV and AAV are						ratio intake manifold	<	0.602		< 0.602				
		closed						pressure /ambient pressure								
								fault of canister purge valve	false			false				1
								in actual driving cycle	10.00							
tank leak large	P0455	AAV is closed and CPV	vacuum pressure built up	<	0.450039	hPa/s	< 0.450039	fault of canister ventilation	false			false	ca. 18 sec	once per dcy		
-		is open	gradient too low		0.750065		0.750065	valve in actual driving cycle								
	1						hPa/s					-				
			because of large tank					tank fuel level	>=	3.900		>= 3.900 l				
			leakage					and teals first to all		FF 100						
			(for example: open gas filler cap)					and tank fuel level	<=	55.100	1	<= 55.100 l			1	
			mier capj					enabled by diagnostic	true			true				1
	1	1						scheduler	uue							
								00.00000						1		-
								fuel system adaptation has	true			true				

Component/	Fault	Monitor Strategy	Primary Malfunction		Threshold		Threshold	Secondary	Enable	Enable	Enable	Threshold	Time	Frequency	Criteria	MIL
System	Code	Description	Signal and Criteria	Logic	Value	Units	Conditions	Parameters	Logic	Value	Units	Conditions	Required	of Checks	for Code	Illum.
								or time since engine start exceeds threshold	>	600	sec	> 600 sec				
el Evaporative	P0456	Monitor fuel tank's						Engine off natural vacuum	true				100ms in	once per dcy	2.6 secs	2dcy
stem		pressure after engine shutdown						diagnosis has not been performed in this driving cyle.								
								Fuel evaporative system monitor (at engine on)	true				afterrun			
								didn't run nor detect large leak nor a tight system.								
								Engine coolant temperature at start.		42.0	°C 2°	true				
								engine coolant temp. At start - intake air temp. intake air temperature	<=	6.8 35.3	°C	true				
								intake air temperature	>=	3.8	°C	true				
								ambient air temperature	<	36.8	°C	true				
	-							ambient air temperature	>	2.3	°C	true				
								engine has been running for a cal. min. time	>	600.00	s	true				
								engine coolant temp. at engine stop driving distance (in current	>=	59.3 8100.0	°C m	true				
								dcy) covered charcoal canister load	<	10.00	-	true				
								factor								
								ambient pressure driving distance (for vehicle lifetime) covered	>=	680.0 20	hPa Km	true true				
								the fuel tank's level isn't at its minimum	true							
								the fuel tank's level isn't at ist maximum	true							
								battery's voltage	>	11.00	V	true				
								no refueling activity the fuel tank pressure is within cal. range	true true							
								no intake air temperature faults	true							
								no the purge control system faults								
								no faults of the purge control valve's power stage	true							
								no vehicle speed sensor faults	true							
								no engine coolant temperature sensor faults	true							
								no tank pressure sensor rationality faults no tank pressure sensor	true							
								range faults no power supply voltage	true							
								faults no main load sensor faults	true							
								no canister vent valve faults	true							
								no canister ventilation valve's power stage faults	true							
								no ambient pressure sensor faults	true							
		Close canister ventilation														
		valve. Look for maximum pressure.														
		Abort if: - max. pressure >=														

Component/				1			<u> </u>						_		
System	Fault Monitor Strategy Code Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
System	Code Description	Signal and Criteria	Logic	Value	Units	Conditions	Farameters	Logic	Value	Units	Conditions	Required	of Checks	Tor Code	mum.
	threshold.	max. pressure	>=	volume &	hPa	·									
				ambient											
				temperature											
				dependent											
	- max. pressure -														
	current														
	pressure >= threshol	d. max. pressure - current	>=		hPa	>= 0.30029 hPa									
	·	pressure		0.30029											
	- pressure stays in	pressure	>=		hPa	>= -0.69946									
	range			-0.69946		hPa									
	near zero for	pressure	<=	+ +	hPa	<= 0.69946 hPa									
				0.69946											
	a specific time.	-		500	s	500 s									
	- pressure <=	-													
	threshold	pressure	<=	1	hPa	<= -0.74951									
				-0.74951		hPa									
	for a specific time	-	-	30.00	S	30.00 s									
	(vacuum build-up														
	instead														
	of pressure build-up)	-	+	++		+			1						
	- pressure-phase-tim		+	++		+			1						
	>= threshold.	pressure phase time	>=	2400.00	S	>= 2400.00 s			1					1	
	- diagnostic-time >=		+	2-100.00	3	- 2700.00 3			1						
	threshold	diagnostic time	>=	2900.00	S	>= 2900.00 s		-	1						
	an conord		+	2000.00	3	2000.00 3		-	1					1	
	correct max. pressur	e	+	++		+		-	1						
	concor max. pressu	~													
			+	++		+		-	1						
	open canister		+	++		+		-	1						
	ventilation														
	valve for a calibrated			400.00	S	400.00 s									
	time.			400.00	5	400.00 5									
	ume.			+											
	Look for minimum			+											
	Look for minimum														
	pressure														
	Abort if:														
	- min pressure <=														
	threshold	min. pressure	<=			<=									
				┥────┤											
	- diagnostic time >=														
	threshold	diagnostic time	>=	2900.00	S	>= 2900.00 s									
	current pressure - mi	n.													
				1 1											
	- pressure >= thresh	old current pressure - min.	>=		hPa	>= 0.30029 hPa									
		old current pressure - min. pressure	>=	0.30029	hPa	>= 0.30029 hPa									
	AND		>=	0.30029	hPa	>= 0.30029 hPa									
	AND min. pressure <=	pressure		0.30029											
	AND		>=		hPa hPa	<= -0.69946									
	AND min. pressure <=	pressure		0.30029											
	AND min. pressure <= threshold	pressure			hPa	<= -0.69946 hPa									
	AND min. pressure <=	pressure		-0.69946		<= -0.69946 hPa >= -0.69946									
	AND min. pressure <= threshold - pressure stays in	pressure min. pressure pressure pressure	<=		hPa hPa	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa</pre>									
	AND min. pressure <= threshold	pressure min. pressure	<=	-0.69946	hPa	<= -0.69946 hPa >= -0.69946									
	AND min. pressure <= threshold - pressure stays in ambient range for a	pressure min. pressure pressure pressure	<=	-0.69946 -0.69946 0.69946	hPa hPa	<= -0.69946 hPa >= -0.69946 hPa <= 0.69946 hPa									
	AND min. pressure <= threshold - pressure stays in	pressure min. pressure pressure pressure	<=	-0.69946	hPa hPa	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa</pre>									
	AND min. pressure <= threshold - pressure stays in ambient range for a	pressure min. pressure pressure pressure	<=	-0.69946 -0.69946 0.69946	hPa hPa hPa	<= -0.69946 hPa >= -0.69946 hPa <= 0.69946 hPa									
	AND min. pressure <= threshold - pressure stays in ambient range for a	pressure min. pressure pressure pressure pressure	<=	-0.69946 -0.69946 0.69946	hPa hPa hPa	<= -0.69946 hPa >= -0.69946 hPa <= 0.69946 hPa									
	AND min. pressure <= threshold - pressure stays in ambient range for a specific time - canister vent valve	pressure min. pressure pressure pressure pressure	<=	-0.69946 -0.69946 0.69946	hPa hPa hPa	<= -0.69946 hPa >= -0.69946 hPa <= 0.69946 hPa									
	AND min. pressure <= threshold - pressure stays in ambient range for a specific time - canister vent valve	pressure min. pressure pressure pressure pressure re-	<= >= <= <=	-0.69946 -0.69946 0.69946 500.00	hPa hPa hPa	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa &lt;= 0.69946 hPa 500.00 s</pre>									
	AND min. pressure <= threshold - pressure stays in ambient range for a specific time - canister vent valve opened for a more th	pressure  min. pressure  pressure  pressure  re- an no. canister vent valve openings	<= >= <= <=	-0.69946 -0.69946 0.69946 500.00 2	hPa hPa hPa	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa &lt;= 0.69946 hPa 500.00 s</pre>									
	AND min. pressure <= threshold - pressure stays in ambient range for a specific time - canister vent valve opened for a more th N times	pressure min. pressure pressure pressure re- no. canister vent valve openings e	<= >= <= <=	-0.69946 -0.69946 0.69946 500.00	hPa hPa hPa	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa &lt;= 0.69946 hPa 500.00 s</pre>									
	AND min. pressure <= threshold - pressure stays in ambient range for a specific time - canister vent valve opened for a more th N times because the pressur	pressure min. pressure pressure pressure re- no. canister vent valve openings e	<= >= <= <=	-0.69946 -0.69946 0.69946 500.00 2	hPa hPa hPa s	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa &lt;= 0.69946 hPa     500.00 s &gt;2</pre>									
	AND min. pressure <= threshold - pressure stays in ambient range for a specific time - canister vent valve opened for a more th N times because the pressur	pressure min. pressure pressure pressure re- no. canister vent valve openings e	<= >= <= <=	-0.69946 -0.69946 0.69946 500.00 2	hPa hPa hPa s	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa &lt;= 0.69946 hPa     500.00 s &gt;2</pre>									
	AND min. pressure <= threshold - pressure stays in ambient range for a specific time - canister vent valve opened for a more th N times because the pressur exceeds a threshold Calculate difference	pressure min. pressure pressure pressure re- no. canister vent valve openings e	<= >= <= <=	-0.69946 -0.69946 0.69946 500.00 2	hPa hPa hPa s	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa &lt;= 0.69946 hPa     500.00 s &gt;2</pre>									
	AND min. pressure <= threshold - pressure stays in ambient range for a specific time - canister vent valve opened for a more th N times because the pressur exceeds a threshold	pressure min. pressure pressure pressure re- no. canister vent valve openings e	<= >= <= <=	-0.69946 -0.69946 0.69946 500.00 2	hPa hPa hPa s	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa &lt;= 0.69946 hPa     500.00 s &gt;2</pre>									
	AND min. pressure <= threshold threshold  - pressure stays in ambient range for a specific time - canister vent valve opened for a more th N times because the pressur exceeds a threshold Calculate difference between corrected max.	pressure min. pressure pressure pressure re- no. canister vent valve openings e	<= >= <= <=	-0.69946 -0.69946 0.69946 500.00 2	hPa hPa hPa s	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa &lt;= 0.69946 hPa     500.00 s &gt;2</pre>									
	AND AND min. pressure <= threshold  - pressure stays in ambient range for a specific time  - canister vent valve opened for a more th N times because the pressur exceeds a threshold Calculate difference between corrected max. pressure and min.	pressure min. pressure pressure pressure re- no. canister vent valve openings e	<= >= <= <=	-0.69946 -0.69946 0.69946 500.00 2	hPa hPa hPa s	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa &lt;= 0.69946 hPa     500.00 s &gt;2</pre>									
	AND min. pressure <= threshold threshold  - pressure stays in ambient range for a specific time - canister vent valve opened for a more th N times because the pressur exceeds a threshold Calculate difference between corrected max.	pressure min. pressure pressure pressure re- no. canister vent valve openings e	<= >= <= <=	-0.69946 -0.69946 0.69946 500.00 2	hPa hPa hPa s	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa &lt;= 0.69946 hPa     500.00 s &gt;2</pre>									
	AND AND min. pressure <= threshold  - pressure stays in ambient range for a specific time  - canister vent valve opened for a more th N times because the pressur exceeds a threshold Calculate difference between corrected max. pressure and min.	pressure  min. pressure  pressure  pressure  pressure  re- openings  pressure  pressure pre	<= >= <= <=	-0.69946 -0.69946 0.69946 500.00 2	hPa hPa hPa s	<pre>&lt;= -0.69946     hPa &gt;= -0.69946     hPa &lt;= 0.69946 hPa     500.00 s &gt;2</pre>									

Symm         Code         Descreption         Symmutic frame         Framework         Loge         Note         Descreption         Regard of Code         Symmutic framework         Note	ry Enable Enable Enable Threshold Time Frequency Criteria	Enable	Secondary	Threshold	Threshold	Threshold	Threshold	Primary Malfunction	Monitor Strategy	Fault	Component/
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beak mase box, hase forw, have from mase by pressure mase by pressure 	hasting active	active	start with catalvet heating	< 0.844		0.844		relative secondary air	passive functional	P0/11	acondary air system
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Image: Instruction of the secondary air system       P2432       circuit continuity - low       measured sensor voltage       <		>	mass airflow								
Image: condex sensorP2432circuit continuity - liopmeasured sensor voltage $<$ 0.498V $< 0.498$ V $< 0.498$						<b>⊢</b>	<sup> </sup>				
P2432       cirtcuit continuity - low       measured sensor voltage       <       0.498       V       < 0.498 V           0.5 sec       continuous       0.2 sec         scondary air system       P2432       cirtcuit continuity - low       measured sensor voltage       >       4.501       V       > 4.501       V       > 4.501 V       Image: continuity - low       Image: continuity -	уврен <= 0 % <= 0 %	<=									
P2433       circuit continuity - high or open       measured sensor voltage or open       >       4.501       V       > 4.501       V       P											
or open	0.5 sec continuous 0.2 sec			< 0,498 V	V	0.498	<	measured sensor voltage	cirtcuit continuity - low	P2432	essure sensor
P2431       rationality -       during ECU init-       <       -50       hPa       <-50 hPa       Barometric pressure signal VALID       TRUE       TRUE </td <td></td> <td></td> <td></td> <td>&gt; 4,501 V</td> <td>V</td> <td>4.501</td> <td>&gt;</td> <td>measured sensor voltage</td> <td></td> <td>P2433</td> <td>condary air system</td>				> 4,501 V	V	4.501	>	measured sensor voltage		P2433	condary air system
Image: Comparison between:     difference SAI pressure vs BARO pressure     50     hPa     >50 hPa     secondary air injection during CAT heat executed     TRUE     TRUE       SAI system pressure signal &     Sai system pressure     Sai system pressure     Sai system pressure     Sai system pressure     TRUE     TRUE       Barometric pressure     Sai system pressure     Sai system pressure     Sai system pressure     Sai system pressure     TRUE     TRUE											
comparison between:     difference SAI pressure vs BARO pressure     >     50     hPa     > 50 hPa     secondary air injection during CAT heat executed     TRUE     TRUE       SAI system pressure signal &     SAI system pressure     Barometric pressure     Image: Sai system pressure     Image: Sai	Ire signal TRUE TRUE	TRUE			hPa	-50	<	during ECU init-	rationality -	P2431	
SAI system pressure signal &     secondary air injection     TRUE     TRUE       Barometric pressure     during CAT heat finished     H     H	ction TRUE TRUE TRUE	TRUE	secondary air injection	> 50 hPa	hPa	50	>		comparisson between:		
signal &     during CAT heat finished       Barometric pressure	traction TRUE TRUE	TRUE	secondary air injection			ł	{	VO DAILO PIESSUIE			
	inished		during CAT heat finished			µ]			signal &		
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Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
System	Code	Description	Signal and Criteria	Logic	Value	Units	Conditions	Parameters	Logic	value	Units	Conditions	Required	of Checks	for Code	mum.
uel System Rich/Lean	P2191	fuel trim limits	delta lambda correction	>	1.175	factor	>1.175factor	fuel system status	closed loop	-	-	closed loop	approx.	0.1 sec	0.4 sec	two driving
		exceeded						-				-				
Multiplicative	P2192	range - multiplicative	or delta lambda correction	<	0.825	factor	<0.825factor	long term fuel trim status	active	-	-	active	300 sec	continuous	continuous	cycles each
and Additive		( load > threshold and						engine coolant temperature	>	50.3	°C	>50.3°C	from		or 4 sec	with: 0.4 sec
	P2187	air flow > threshold ) range - additive	delta fuel load correction	>	5.25	%	>5.25%	purge control	not active		-	not active	engine start ( after		cumulative	continuous
		-														
	P2188	low speed and low load	or delta fuel load correction	<	-5.25	%	<-5.25%	intake air temperature	<=	65.3	°C	<=65.3°C	adaptation			or 4 sec
								fuel level	>	6.19	%	> 5.92 %	has		After	cumulative
								or fuel level error	set	-	-	set	stabilized)		detection,	
								integrated air mass	>=	2800	g	>=2800g			diagnostic	
															can only pass if	
															similar	
															conditions	
															are	
															encountered	
demand controlled fuel																
supply (DECOS)	P0088	difference between	fuel rail pressure	<	- 150	kPa	< - 150 kPa	DECOS fuel pump is active	true			true	5 sec	continuous	0.2 sec	2 dcy
(22000)	1 0000	measured	difference		100	in a	< 100 Ki d						0.000	oonanuouo	0.2 300	2 009
		and set-point fuel rail						DECOS fuel control is	true			true				
		pressure						enabled time after engine start	>	1	sec	> 1 sec				
	P0089	difference between		<	-25	%	< -25 %	time after hot start	>	6	sec	> 6 sec				
			duty cycle difference					no foult of								
		necessary and pre- control						no fault of								
		duty cycle						- fuel pressure sensor								
								(DECOS)	true			true				
								- power stage of demand								
								controlled fuel pump	true			true				
	P0087	difference between	fuel rail pressure	>	150	kPa	> 150 kPa	DECOS fuel pump is active	true			true				
		measured and set-point fuel rail	difference					DECOS fuel control is	true			true				
		pressure						enabled	uue			lide				
								time after engine start	>	1	sec	> 1 sec				
	P0089	difference between		>	25	%	> 25 %	time after hot start	>	6	sec	> 6 sec				
		actual necessary and pre-	duty cycle difference					no fault of								
		control						no rauli or								
		duty cycle						- low pressure fuel sensor								
								(DECOS)	true			true				
								- power stage of demand								
								controlled fuel pump	true			true				
								no empty or almost empty fuel tank	true			true				
								ainost empty idei tank	liue			liue				
fuel pressure sensor																
(DECOS)																
	P0193		measured sensor voltage	>	4.7	V	> 4.7 V	fuel supply system is active	true			true	0.5 sec	continuous	0.2 sec	2 dcy
	P0192	or open cirtcuit continuity - low	measured sensor voltage	<	0.3	V	< 0.3 V									
			sizzi zz zsilosi tolidigo		5.0											
	P0193	range check - high	measured fuel pressure	>	680	kPa	> 680 kPa						5 sec			
	10100	nango oncok - nign	incloured ruer pressure		000	in a	> 000 Ki d						0.000			
	P0192	range check - low		<	60	kPa	< 60 kPa	fuel supply system is active	true			true	5 sec			
			measured fuel pressure					time ofter neuro-foil		200	0.55	. 200				
								time after power fail	>=	360	sec	>= 360 sec				

						1										
Component/	Fault Code	Monitor Strategy	Primary Malfunction Signal and Criteria		Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable	Enable Value	Enable Units	Threshold Conditions	Time	Frequency of Checks	Criteria for Code	MIL Illum.
System	Code	Description	Signal and Criteria	Logic	value	Units	Conditions	Parameters	Logic	value	Units	Conditions	Required	of Checks	Tor Code	mum.
Diagnosis of Power								general enabling					0.6 sec	continuous	0.2 sec	2 dcy
Control Module								conditions		10	V	40.1/				
								battery voltage	< >	18 10	V	< 18 V > 10 V				
								locking request immobilizer	false			false				
	P0092	diagnosis short circuit						special enabling								
		to battery voltage only active if	backward powerstage	>	3.9014	V	> 3.9014 V	condition condition output duty cycle	true			true				
		powerstage on	voltage of	-	0.0011			PCM								
			fuel pump diagnosis					for power on diagnosis								
			and		0 7070	v	0.7070.1/									
			backward powerstage voltage of	>	2.7979	v	> 2.7979 V									
			fuel pump diagnosis	-												
			and													
		Provide the standard standard	duty cycle PCM	<	100	%	< 100 %	and the second state of the second	6.1			(a) a				
		diagnosis short circuit to battery voltage						condition output duty cycle PCM	false			false				
		only active if	backward powerstage	>	3.9014	V	> 3.9014 V	for power off diagnosis								
		powerstage off	voltage of													
	50001		fuel pump diagnosis													
	P0091	diagnosis short circiut to ground						condition output duty cycle PCM	true			true				
		only active if	backward powerstage	<=	2.3486	V	<= 2.3486 V	for power on diagnosis								
		powerstage on	voltage of													
			fuel pump diagnosis													
			and duty avala DCM	>	0	%	> 0 %									
	P0090	diagnosis wire	duty cycle PCM	-	U	70	> 0 %	condition output duty cycle	true			true	-			
		interruption						PCM								
		only active if	backward powerstage	>	2.4414	V	> 2.4414 V	for power on diagnosis								
		powerstage on	voltage of													
			fuel pump diagnosis and													
			duty cycle PCM	<	100	%	< 100 %									
			and													
			max-fault; powerstage	false			false									
		diagnosis wire	diagnosis backward powerstage	>	2.4414	V	> 2.4414 V	condition output duty cycle	false			false				
		interruption	voltage of	-	2.4414	v	2.4414 V	PCM	18136			10130				
		only active if	fuel pump diagnosis					for power off diagnosis								
		powerstage off														
			and backward powerstage	<	3.9014	V	< 3.9014 V									
			voltage of	,	3.5014	v	< 3.9014 V									
			fuel pump diagnosis													
	P0090	powerstage locked	condition fault message	true			true									
			of PCM powerstage is locked													
		l 	powersidge is looked					l 							I	
Air / Fuel Ratio Sensor																
(primary A/F)		A/E concerturation	A/E concerturations		27			A/E concer bester	TDUE			TDUE	10	01	0.4	two datations
sensor voltage bank 1 sensor 1	P0130	A/F sensor voltage exceeds threshold	A/F sensor voltage and	>	3.7	V	>3.7V	A/F sensor heater at operating temperature	TRUE	-	-	TRUE	10 sec	0.1 sec continuous	0.4 sec continuous	two driving cycles each
		but not out of full range		<	4.81	V	<4.81V	engine starting	complete	-	-	complete	additional	55.1.10000	or 4 sec	with: 0.4 sec
			-													
			or					desired A/F	<	1.6	lambda	<1.6lambda	time if		cumulative	continuous
			or					all injectors activated scheduled by System	TRUE TRUE	-	-	TRUE TRUE	fuel level is low and			or 4 sec cumulative
								Manager					und			54.10101010
			AF sensor voltage	>	2.5	V	>2.5V						not failed			
			and A/E concer voltage		2.00	V	-2.001/						600 sec			
			A/F sensor voltage ( if using rich calibration	<	3.06	v	<3.06V				+					
			curve characteristic )													
Air (Eval Dation Court				1	1		1			1						
Air / Fuel Ratio Sensor																
		1			1	1										
(primary A/F) integrated circuit																

				1	1											
Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
bank 1	P0130	A/F sensor voltage	A/F sensor voltage IC corrective value	>	0.1	V	>0.1V	battery voltage	<	18	V	<18V	10 sec	0.1 sec	0.4 sec	two driving
		IC correction too high	conective value					battery voltage	>	10.7	V	>10.7V		continuous	continuous	cycles each
								engine	running	-	-	running	<b>├</b> ───┤		or 4 sec	with: 0.4 sec
								engine starting	complete	-	-	complete	t		cumulative	continuous or 4 sec
					70115							10 50 (				cumulative
		A/F sensor IC operating voltage	low voltage	=	TRUE	-	=TRUE-	battery voltage	>	10.7	V	>10.7V	10 sec			
		too low						battery voltage	<	18	V	<18V				
						-	-	engine	running	-	-	running	┝────			
						-	-	engine starting	complete	-	-	complete			+	
													L			
		A/F sensor IC SPI interface	communication error	=	TRUE		=TRUE		>	10.7	V	>10.7V				
		communication error							<	18	V	<18V				
		A/F sensor IC circuit write error	write error	=	TRUE		=TRUE		running	-	-	running				
		at INIT register							complete	-	-	complete				
												!	<u>├</u> ───┤			
Air / Fuel Ratio Sensor (primary A/F)																
pumping current circuit open		lambda control factor change	absolute value of lambda control factor	>	0.025	lambda	>0.025lambda	battery voltage	<	18	V	<18V	1.5 sec	0.1 sec	0.4 sec	two driving
bank 1 sensor 1	P2239	above threshold	change from the point when the					battery voltage	>	10.7	V	>10.7V		continuous	continuous	cycles each
			secondary conditions are met					engine	running	-	-	running			or 4 sec	with: 0.4 sec
								engine starting	complete	-	-	complete			cumulative	continuous
								A/F sensor voltage A/F sensor voltage	<	1.51 1.49	V	<1.51V >1.49V	<b>├</b> ─── <b>├</b>			or 4 sec cumulative
								A/F sensor electrical	not active	-	-	not active				cumulative
								trimming	TDUE			TOUE	───			
								A/F sensor heater at op.temp.	TRUE	-	-	TRUE				
								A/F sensor warm up control	complete	-	-	complete				
								lambda closed loop control	TRUE	-	-	TRUE				
								forced fuel trim amplitude	TRUE	-	-	TRUE				
								fuel trim forced amplitude	>	0.015	lambda	>0.015lambda				
								catalyst warm up control	stable	-	-	stable				
								sec. O2 sensor proportional trim	stable	-	-	stable				
								lean mixture inhibit	stable	-	-	stable				
								lambda closed loop control init	FALSE	-	-	FALSE				
								closed loop control startup	FALSE	-	-	FALSE				
Air / Fuel Ratio Sensor																
(primary A/F) pumping current circuit		A/F sensor voltage	A/F sensor voltage	<	1.51	V	<1.51V	battery voltage	<	18	V	<18V	approx.	0.1 sec	0.4 sec	two driving
open bank 1 sensor 1		within upper	and A/F sensor voltage	>	1.49	V	>1.49V	battery voltage	>	10.7	v	>10.7V	8 sec	continuous	continuous	cycles each
Sank i Sonsoi i	1 2201	and desired lambda is		-	1.40	*	×1.43V	engine	running	-	-	running	once the	3011110003	or 4 sec	with: 0.4 sec
		outside of upper or lower						ongine starting	complete	-	-	complete	driving		cumulative	continuous
		threshold						engine starting	complete	-	-	-	unving		cumulative	conunuous
								target lambda above upper limit	>	1.01	lambda	>1.01lambda	condition			or 4 sec
								or below lower limit	<	0.99	lambda	<0.99lambda	is met			cumulative
	-			-				closed loop control	TRUE	-	-	TRUE	+			-
								A/F sensor heater	TRUE	-	-	TRUE	+		4	
								at operating temperature				Ι				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
								A/F sensor dynamic response	not slow	-	-	not slow				
								error: A/F sensor heating	not set	-	-	not set				
								integrated exhaust gas	>	400	g	>400g				
ir / Fuel Ratio Sensor								mass								
primary A/F) pumping current circuit			A/F sensor voltage	<	1.7	V	<1.7V	battery voltage	<	18	V	<18V	5 sec	0.1 sec	0.4 sec	two driving
open oank 1 sensor 1	P2238	enough during fuel shut off						battery voltage	>	10.7	V	>10.7V		continuous	continuous	cycles each
		operation						engine	running	-	-	running			or 4 sec	with: 0.4 sec
								engine starting	complete	-	-	complete			cumulative	continuous
								time after fuel shut off A/F sensor heater	> TRUE	3	sec -	>3sec TRUE				or 4 sec cumulative
								at operating temperature								
Air / Fuel Ratio Sensor primary A/F)																
eference voltage		A/F sensor voltage	A/F sensor voltage	<	0.2	V	<0.2V	battery voltage	<	18	V	<18V	2 sec	0.1 sec	0.4 sec	two driving
circuit open bank 1 sensor 1	P2243	above upper threshold	A/F sensor voltage	>	4.7	V	>4.7V	battery voltage	>	10.7	V	>10.7V		continuous	continuous	cycles each
		or below lower threshold						engine	running	-	-	running			or 4 sec	with: 0.4 sec
								engine starting	complete	-	-	complete			cumulative	continuous
			for time	>	1	sec	>1sec	A/F sensor heating normal	>	10	sec	>10sec				or 4 sec
								operation range for time error: A/F sensor heater	not set	-	-	not set				cumulative
								circuit			Ohms	>1500Ohms				
								A/F sensor internal resistance	>	1500	Onms	>15000nms				
Air / Fuel Ratio Sensor primary A/F)																
reference ground circuit open			A/F sensor internal resistance	>	1500	Ohms	>1500Ohms	battery voltage	<	18	V	<18V	5 sec	0.1 sec	0.4 sec	two driving
bank 1 sensor 1	P2251	resistance above upper threshold						battery voltage	>	10.7	V	>10.7V		continuous	continuous	cycles each
								engine	running	-	-	running			or 4 sec	with: 0.4 sec
			for time	>	5	sec	>5sec	engine starting A/F sensor voltage	complete <	- 1.48	- V	<1.48V			cumulative	continuous
								A/F sensor voltage	>	1.46	V	>1.36V				
								error: A/F sensor heater circuit	not set			not set				
								A/F sensor pump voltage	FALSE	-	-	FALSE				
								shut off A/F sensor warm up control	complete	-	-	complete				
								A/F sensor heater	>	28	sec	>28sec				
								operation time engine run time	>	28	sec	>28sec				
								battery voltage below								
								heater switch off voltage for time	>	28	sec	>28sec				
								fuel cut in time	>	28	sec	>28sec				
								for a fuel cut off time	>	10	sec	>10sec				
								battery voltage exceed 11V time	>	28	sec	>28sec				
Air / Fuel Ratio Sensor			·		I										1	
primary A/F)																
measuring (trim) current			A/F sensor voltage	>	4.81	V	>4.81V	battery voltage	<	18	V	<18V	2 sec	0.1 sec	0.4 sec	two driving
circuit open	Dacac	above threshold						battery voltage	>	10.7	V	>10.7V	odditi	continuous	continuous	cycles each
bank 1 sensor 1	P2626							engine engine starting	running complete	-	-	running complete	additional time if		or 4 sec cumulative	with: 0.4 sec continuous
		1						fuel cut off	TRUE	-	-	TRUE	fuel level		Jamalative	or 4 sec
								modeled exhaust temp in front of catalyst	<	750	°C	<750° C	is low and not failed			cumulative
								A/F sensor heater	TRUE	-	-	TRUE				
				L	l			at operating temperature		L			600 sec		L	

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
Air / Fuel Ratio Sensor				1						1			1			
(primary A/F) general error	P0130	general A/F sensor	A/F sensor internal	>	1500	Ohms	>1500Ohms	A/F sensor heater	>	15	sec	>15sec	15 sec	0.1 sec	immediate	two driving
general error	F0130	electrical fault	resistance		1300	Onins	>1300011115	operation time	,		Sec		10 Sec	0.1 560	Inneulate	two unving
causing open loop								fuel cut in time for a fuel cut off time	>	15 3	Sec	>15sec >3sec		continuous		cycles
								battery voltage	>	10.7	sec V	>3sec >10.7V				
								battery voltage	<	18	V	<18V				
								A/F sensor	ready			ready				
								A/F sensor heater pwr. stage err.	FALSE			FALSE				
								A/F sensor IC internal error	FALSE			FALSE				
								A/F sensor pin short circuit error	FALSE			FALSE				
								modeled exhaust gas temp. invalid	FALSE			FALSE				
								modeled exhaust gas	>	0	°C	>0°C				
								temperature								
			calculated A/F sensor temperature	<	640	°C	<640°C	A/F sensor heater operation time	>	15	sec	>15sec	15 sec			
			temperature					fuel cut in time	>	15	sec	>15sec				
								for a fuel cut off time	>	3	sec	>3sec				
								battery voltage	>	10.7	V	>10.7V				
								battery voltage	<	18	V	<18V				
								A/F sensor A/F sensor heater pwr.	ready FALSE			ready FALSE				
								stage err. A/F sensor IC internal error	FALSE			FALSE				
								A/F sensor pin short circuit error	FALSE			FALSE				
								modeled exhaust gas temp. invalid	FALSE			FALSE				
								modeled exhaust gas	>	0	°C	>0°C				
								temperature								
			A/F sensor pin UN error set	=	TRUE		=TRUE									
			561	=	TRUE		=TRUE									
			A/F sensor pin VM error set	=	TRUE		=TRUE									
				=	TRUE		=TRUE									
			A/F sensor heater error	_	TRUE		=TRUE									
			A/F sensor neater error set by	=	TRUE		=IRUE									
			after engine start	=	TRUE		=TRUE									
			diagnosis													
			A/F sensor heater error	=	TRUE		=TRUE									
			set by maximum heater	=	TRUE		=TRUE									
			output diagnosis	-	INDE		-1702									
Air / Fuel Ratio Sensor																
(primary A/F)																
reference ground																
circuit; reference																
voltage circuit; or measuring current																
circuit																
bank 1 sensor 1 - low volt	P0131	A/F sensor signal at VM	IC Circuit Status shorted low	=	TRUE	-	=TRUE-	battery voltage	<	18	V	<18V	25 sec	0.1 sec	0.4 sec	two driving
		( reference ground ) below lower limit						battery voltage	>	10.7	V	>10.7V		continuous	continuous	cycles each
		or A/F sensor signal at UN	IC Circuit Status shorted low	=	TRUE	-	=TRUE-	engine	running	-	-	running			or 4 sec	with: 0.4 sec
		( reference voltage [Nernst voltage] )						engine starting	complete	-	-	complete			cumulative	continuous
		below lower limit														

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
System	Code		Signal and Onteria	Logic	value	Units	conditions	T drameters	Logic	Value	Units	conditions	Requireu	Of Offecks	IOI COde	
		or A/F sensor signal	IC Circuit Status shorted	=	TRUE	-	=TRUE-									or 4 sec
		at IA ( measuring current	low													cumulative
		trim circuit ) below														cumulative
		lower limit														
hanlı 4 annan 4 hinh	D0400		IO Circuit Otatus abortad		TOUE		TOUE									
bank 1 sensor 1 - high volt	P0132	A/F sensor signal at VM	IC Circuit Status shorted high	=	TRUE	-	=TRUE-									
Volt		( reference ground )														
		above upper limit														
		or A/F sensor signal at UN	IC Circuit Status shorted high	=	TRUE	-	=TRUE-									
		( reference voltage	Ingri													
		[Nernst voltage] )														
		above upper limit			TOUE		TOUE									
		or A/F sensor signal at IA	IC Circuit Status shorted high	=	TRUE	-	=TRUE-									
		( measuring current	Ingit													
		trim circuit ) above														
		upper limit														
Air / Fuel Ratio Sensor											+					
(primary A/F)																
response		dynamic response	A/F sensor dynamic value	<	0,2	ratio	< 0.2ratio	fuel trim forced amplitude	active	-	-	active				
Deals 4 Conserved	D0400	alaus an laus anna liteada						A/F	an a du			an e du		0.01.555	0.4.555	turn alabeia a
Bank 1 Sensor 1	P0133	slow or low amplitude				( versus	( versus	A/F sensor short term fuel trim (o.k.)	ready < MAX	- 1.25	- factor	ready < MAX1.25factor	dynamic test	0.01 sec continuous	0.4 sec continuous	two driving cycles each
						( 101000	( voisus			1.20	idotoi	< 10/ 01120100101	1001	continuous	continuous	eyeles each
						reference	reference	short term fuel trim (o.k.)	> MIN	0.75	factor	> MIN0.75factor	sample		or 4 sec	with: 0.4 sec
						sensor)	sensor)	measured A/F minus	<	1,05	lambda	<1.05lambda	count		cumulative	continuous
								integral control of secondary O2								or 4 sec
								measured A/F minus	>	0,95	lambda	>0.95lambda	>			cumulative
								integral								
								control of secondary O2		0000		0000	05			
								engine speed engine speed	< >	2800 1160	rpm rpm	<2800rpm >1160rpm	35 samples			
								volumetric efficiency	<	45	%	<45%	oumpiee			
								volumetric efficiency	>	17.25	%	>17.25%	then			
								volumetric efficiency gradient	<	30	%/sec	<30%/sec	2 sec			
								A/F sensor housing model	<	570	°C	<570°C				
								temp								
								filtered purge HC conc.	<	15	factor	<15factor	total time			
								factor or evap purge	not active			not active	= approx.			
								all fuel injectors active	TRUE			TRUE	600 sec			
								evap purge high HC conc.	FALSE	-	-	FALSE				
								A/F pumping current circuit	checked OK	-	-	checked OK				
								error: evap purge valve	not set	-	-	not set				
		1						error: evap purge valve	not set	-	-	not set				
								circuit								
								scheduled by System	TRUE	-	-	TRUE				
								Manager forced amplitude	>	0.01	lambda	>0.01lambda				
				·												
Oxygen Sensor																
(secondary O2) Trim of Air / Fuel Ratio Sensor																
(primary A/F)																
primary A/F signal																
RICH / secondary O2 signal LEAN																
signal LEAN Bank 1	P2096	A/F sensor long term	secondary O2 sensor trim	<	-0.03	lambda	<-0.03lambda	engine starting	complete	-	-	complete	2 sec	0.1 sec	0.4 sec	two driving
	000	secondary	-		100											
		trim - rich shift	integral control					secondary O2 trim active	TRUE	-	-	TRUE		continuous	continuous	cycles each
		<ul> <li>correction below threshold</li> </ul>						and secondary O2 oscillation	TRUE	-	-	TRUE			or 4 sec	with: 0.4 sec
		unesholu						check finished							cumulative	continuous
primary A/F signal								then timer	>	25	sec	>25sec				or 4 sec
LEAN / secondary O2																
signal RICH		1		1	1	1	1		1		1	1		1		1

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
Bank 1	P2097	A/F sensor long term secondary	secondary O2 sensor trim	>	0.03	lambda	>0.03lambda	scheduled by System Manager	TRUE			TRUE				cumulative
		trim - lean shift	integral control					sec. O2 trim - fast lean correction	FALSE			FALSE				
		- correction above						sec. O2 trim - fast rich	FALSE			FALSE				
		threshold						correction suspicion A/F sensor lean	FALSE			FALSE				
								shift								
								secondary O2 oscillation test	checked OK			checked OK				
Oxygen Sensor (secondary O2) Trim of Air / Fuel Ratio Sensor (primary A/F)																
Bank 1	P2195	secondary O2 sensor operation	secondary O2 sensor voltage	>	0.75	V	>0.75V	A/F sensor measured lambda	>	1.08008	lambda	>1.08008lambda	approx.	0.1 sec	0.4 sec	two driving
		too rich - strong correction						short term fuel trim	= MAX	1.25	factor	= MAX1.25factor	100 sec	continuous	continuous	cycles each
								A/F sensor	ready	-	-	ready			or 4 sec	with: 0.4 sec
		A/F sensor measured too lean	or					secondary O2 sensor	ready	-	-	ready			cumulative	continuous
								then accumulated exhaust gas mass	>	300	g	>300g				or 4 sec cumulative
			secondary O2 sensor voltage	>	0.75	V	>0.75V	A/F sensor measured lambda	>	1.08008	lambda	>1.08008lambda				
			,					secondary O2 sensor fuel trim	>	0.014008	lambda	>0.014008lambd a				
								proportional trim dominating	1			ŭ				
								secondary O2 aging diagnosis	complete	-	-	complete				
								secondary O2 circuit	complete	-	-	complete				
								diagnosis secondary O2 fuel trim	TRUE	-	-	TRUE				
								active A/F sensor	ready	-	-	ready				
								secondary O2 sensor	ready	-	-	ready				
								then accumulated exhaust gas mass	>	300	g	>300g				
			secondary O2 sensor	>	0.75	V	>0.75V	target lambda	>	1.04	lambda	>1.04lambda	0.9 sec			
			voltage					A/F sensor	ready	-	-	ready				
								secondary O2 sensor	ready	-	-	ready				
								lambda closed loop control	active	-	-	active				
								secondary O2 circuit diagnosis	complete	-	-	complete				
								short term fuel trim (o.k.) then	> MIN	0.75	factor	> MIN0.75factor				
								accumulated exhaust gas mass	>	800	g	>800g				
Oxygen Sensor (secondary O2) Trim of Air / Fuel Ratio Sensor (primary A/F)																
Bank 1	P2196	secondary O2 sensor operation	secondary O2 sensor voltage	~	0.2012	V	<0.2012V	A/F sensor measured lambda	<	0.92	lambda	<0.92lambda	approx.	0.1 sec	0.4 sec	two driving
		too lean - strong correction						short term fuel trim	= MIN	0.75	factor	= MIN0.75factor	100 sec	continuous	continuous	cycles each
		A/F sensor measured						A/F sensor secondary O2 sensor	ready ready	-	-	ready ready			or 4 sec cumulative	with: 0.4 sec continuous
		too rich						-	,							
								then accumulated exhaust gas	>	300	g	>300g				or 4 sec cumulative
			secondary O2 sensor	<	0.2012	V	<0.2012V	mass A/F sensor measured	<	0.92	lambda	<0.92lambda				
			voltage				-	lambda								

Component/	Foult	Monitor Stratomy	Drimony Molfunction	Threshold	Threshold	Threshold	Threshold	Secondary	Enchlo	Enchlo	Enable	Threshold	Time	Eroguopou	Critorio	MIL
Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Logic	Value	Units	Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	Illum.
								secondary O2 sensor fuel	<	0.014	lambda	<0.014lambda				
								trim		0.011	lambaa	dere i hambaa				
								proportional trim dominating								
															<u> </u>	
								secondary O2 aging diagnosis	complete	-	-	complete				
								secondary O2 circuit	complete	-	-	complete			++	
								diagnosis	-			-				
								secondary O2 fuel trim	TRUE	-	-	TRUE				
								active A/F sensor	roodu			roodu			<u> </u> ]	
								secondary O2 sensor	ready ready	-	-	ready ready			+	
								then	ioudy			Today			++	
								accumulated exhaust gas	>	300	g	>300g				
								mass								
			secondary O2 sensor	<	0.2012	V	<0.2012V	target lambda	<	0.96	lambda	<0.96lambda	0.9 sec			
			voltage		-	-		A/F sensor	ready	-	-	ready				
								secondary O2 sensor	ready	-	-	ready			++	
								lambda closed loop control	active	-	-	active			1 1	
								-							<u> </u> '	
								secondary O2 circuit	complete	-	-	complete				
								diagnosis	< MAX	1.05	factor	< MAX1.25factor			<u> </u>	
								short term fuel trim (o.k.)	< IVIAX	1.25	factor	< MAX1.25factor				
								then		1	1				<u>├</u> ───┤	
								accumulated exhaust gas	>	800	g	>800g			+	
								mass				-				
Air / Fuel Ratio Sensor																
(primary A/F)																
electrical															1	
wire to wire short		sensor short to heater	filtered maximum pump	v	0.00019	A	>0.00019A	all injectors activated	TRUE	-	-	TRUE	15 sec	0.01 sec	0.4 sec	two driving
circuit	D0004		current variation					h attan		40	N/	401/				
bank 1 sensor 1	P2231		within every 10ms					battery voltage battery voltage	<	18 10,7	V	<18V >10.7V		continuous	continuous or 4 sec	cycles each with: 0.4 sec
								A/F sensor IC diagnosis	complete	-	-	complete			cumulative	continuous
								error: A/F sensor IC	not set	-	-	not set				or 4 sec
								engine rpm	<	1800	rpm	<1800rpm				cumulative
								modeled exhaust gas	<	800	°C	<800° C				
								temperature		20	0/	>20%			ļ!	
								heater duty cycle heater duty cycle	>	80	%	<80%				
								A/F sensor heater at	TRUE	00	70	TRUE			++	
								op.temp.								
								after A/F sensor curve								
								switching		0.00		0.00				
								for time	>	0.06	Sec	>0.06sec				
Diagnosis of Heater															<b>1</b>	
upstream HO2S																
	P0032		Voltage	IC internal			IC internal	for time	>	5	sec	> 5 sec	5 sec	continous	0.2 sec	2 dcy
		voltage										1011				
								battery voltage via main relay	<=	18	v	<= 18 V				
	P0031	short circiut to ground	1					battery voltage via main	>=	10,7	V	>= 10,7 V			+	
		service of the servic						relay		. 0,7	, v					
								condition end of start	True	1		True			1	
	P0030	wire interruption						condition engine speed: n >	True			True				
								NMIN	1100	-		1100			<u> </u> !	
A/F Sensor Heating																
heater performance		1								1					1	
(primary A/F)																
	P0135		A/F sensor temperature	<	715	° C	<715° C	battery voltage	>	10,7	V	>10.7V	35 sec	0.1 sec	0.4 sec	two driving
bank 1 sensor 1		temperature	calculation							10		101/			<u> </u>	cycles each
bank 1 sensor 1																
bank 1 sensor 1		too low						battery voltage	< bild	18	V	<18V		continuous	continuous	
bank 1 sensor 1								internal resistance measurement	< valid	-	- -	<18V valid		continuous	or 4 sec	with: 0.4 sec

Component/	Fault	Monitor Strategy	Primary Malfunction		Threshold		Threshold	Secondary	Enable	Enable	Enable	Threshold	Time	Frequency	Criteria	MIL
System	Code	Description	Signal and Criteria	Logic	Value	Units	Conditions	Parameters	Logic	Value	Units	Conditions	Required	of Checks	for Code	Illum.
								A/F sensor internal	FALSE	-	-	FALSE				or 4 sec
								resistance excessive correction								cumulative
								required								cumulative
								engine stop time	>	5400	sec	>5400sec				
								engine temperature at start	>	-9,8	°C	>-9.8° C				
								A/F sensor heating ready	TRUE	-	-	TRUE				
								A/F heater control shut off	FALSE TRUE	-	-	FALSE TRUE				
								scheduled by System Manager	TRUE	-	-	TRUE				
heater performance																
(primary A/F)	DO405	A/E as a set as levilate d	A / -		745	°C	7459 0	A/E Lissten at Maximum	TOUE			TRUE	00	0.1	0.4	too alabitia a
bank 1 sensor 1 (primary)	P0135	A/F sensor calculated	A/F sensor temperature calculation	<	715	- 0	<715° C	A/F Heater at Maximum Power	TRUE			TRUE	60 sec	0.1 sec	0.4 sec	two driving
(F		temperature below						modeled exhaust temp. at	>	300	°C	>300° C		continuous	continuous	cycles each
		threshold						sensor		50		50				
								timer expires after either: fuel shut off >= 3 sec dur.	>	50	sec	>50sec			or 4 sec cumulative	with: 0.4 sec continuous
								ends								
								or initial A/F heater turn on	-	-	-					or 4 sec
								battery voltage	>	10,7	V	>10.7V				cumulative
								battery voltage	<	18	V	<18V				
								A/F heater control shut off	FALSE	-	-	FALSE				
								modeled exhaust temp. valid	TRUE			TRUE				
								scheduled by System	TRUE	-	-	TRUE				
								Manager								
A/F Sensor Heating																
heater performance																
(secondary O2)						01	1501						10			
bank 1 sensor 1	P0053	correction value for A/I sensor	absolute value of correction value for	>	45	Ohms	>45Ohms	battery voltage	>	10.7	V	>10.7V	40 sec	0.1 sec	0.4 sec	two driving
bank 2 sensor 1		internal resistance	A/F sensor internal					battery voltage	<	18	V	<18V		continuous	continuous	cycles each
		measurement	resistance													
		too much						engine starting	complete	-	-	complete			or 4 sec cumulative	with: 0.4 sec continuous
															cumulative	or 4 sec
																cumulative
Ovugan Sansar		1														
Oxygen Sensor sensor circuit																
(secondary O2)																
bank 1 sensor 2	P0137	short circuit to ground	secondary O2 sensor	<	0.06	V	<0.06V	secondary O2 heating stable	>	10	sec	> 10sec	0.1 sec	0.1 sec	0.4 sec	two driving
			voltage					and mod. exhaust gas	>	250	°C	>250° C		continuous	continuous	cycles each
								temp.			-					-,
								for time	>	90	Sec	>90sec			or 4 sec	with: 0.4 sec
								engine running battery voltage	TRUE	- 10.7	- V	TRUE >10.7V			cumulative	continuous or 4 sec
								mod. exhaust-gas temp.	· · ·	800	°C	<800° C				cumulative
				-				time after start	<	1	sec	<1sec		-		-
								engine temp at stop engine temp	> <	60 40	° C ° C	>60° C <40° C				
								error: engine coolant temp	not set	-	-	not set				
bank 1 sensor 2	P0138	short circuit to battery		>	1.08	V	>1.08V	secondary O2 heating stable	>	10	sec	> 10sec	5.1 sec			
	1	voltage	voltage >					and mod. Exhaust-gas	>	250	°C	>250° C				
								temp.								
								for time	> TRUE	90	sec	>90sec TRUE				
								engine running battery voltage	>	- 10.7	V	>10.7V				
								mod. exhaust-gas temp.	· · ·	800	°C	<800° C				
bank 1 sensor 2	P0140	sensor line	secondary O2 sensor	>	0.401	V	>0.401V	secondary O2 heating	>	10	sec	> 10sec	600 sec			
		disconnection	voltage and secondary O2 sensor	<	0.499	v	<0.499V	stable and mod. Exhaust-gas	>	250	°C	>250° C				
			voltage		0.400	*	~0. <del>1</del> 00 v	temp.		200	Ŭ	2200 0				
	1							for time	>	90	Sec	>90sec				
			or					engine running	TRUE	-	-	TRUE				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
			secondary O2 sensor internal resistance	>	40000	Ohm	>400000hm	battery voltage	>	10.7	V	>10.7V				
			when modeled exhaust gas temperature	>	600	°C	>600° C	mod. exhaust-gas temp.	<	800	°C	<800° C				
xygen Sensor	1	1					1				1					1
ensor circuit																
secondary O2)																
ank 1 sensor 2	P2232	sensor line short circuit	t secondary O2 sensor					secondary O2 heating stable	>	10	sec	> 10sec	10 sec	0.01 sec	0.4 sec	two driving
		to heater output line	voltage gradient	>	2	V	>2V	and mod. Exhaust-gas temp.	>	250	°C	>250° C		continuous	continuous	cycles each
			within time after heater turn off	۷	0.04	Sec	<0.04sec	for time	>	90	sec	>90sec			or 4 sec	with: 0.4 sec
			for occurrences	>	4	count	>4count	engine running	TRUE	-	-	TRUE			cumulative	continuous
			out of heater turn offs	=	6	count	=6count	battery voltage	>	10.7	V	>10.7V				or 4 sec
								mod. exhaust-gas temp.	<	800	°C	<800° C				cumulative
								time after dew point exceeded	>	10	Sec	>10sec				
Dxygen Sensor																
leating leater performance secondary O2)																
pank 1 sensor 2 (secondary)	P0141	secondary O2 sensor	measured secondary O2 sensor internal					battery voltage	>	10,7	V	>10.7V	6 sec	0.1 sec	0.4 sec	two driving
secondary		internal resistance	resistance					battery voltage	<	18	V	<18V		continuous	continuous	cycles each
		above threshold	nominal internal resistance	^	88 408	Ohms	>88 408Ohms	engine running	TRUE	-	-	TRUE			or 4 sec	with: 0.4 sec
					KFRINH		KFRINH	engine starting	complete	-	-	complete			cumulative	continuous
			multipy times degradation factor	>	3 20	factor	>3 20factor	fuel cut off	FALSE	-	-	FALSE				or 4 sec
					FRINH		FRINH	sec. O2 internal resistance	valid	-	-	valid				cumulative
			for time	>	6	sec	>6sec	intake air temperature	>	-9,8	С	>-9.8C				
								engine off soak time	>	120	sec	>120sec				
								modeled exhaust temp.	in range	350 550	С	in range350 550C				
								at secondary O2 sensor								
								suspicion of secondary	FALSE			FALSE				
								O2 sensor open circuit secondary O2 voltage	ON	-		ON				
								supply	011			011				
								scheduled by System								
								Manager								
								for time	>	120	Sec	>120sec				
sensor response										1						
secondary O2) bank 1 sensor 2	P2270	oscillation check low	secondary O2 sensor	<	0.499	V	<0.499	secondary O2 sensor	ready	-	-	ready	approx.	0.1 sec	0.4 sec	two driving
			voltage		0.603		0.603V									
			for time then	>	5	Sec	>5sec	for time secondary O2 closed loop	> active	10	sec -	>10sec active	600 sec	continuous	or 4 sec	cycles each with: 0.4 sec
			ramping in enrichment by	=	0.25	lambda	=0.25lambda	control all injectors activated	TRUE	-	-	TRUE	additional		cumulative	continuous
			at gradient	=	0.0513	I/sec	0,0513 I / sec	engine air flow (intrusive	>	9.72	g/sec	9.72g/sec	time if			or 4 sec
			for time (after enrichment	>	7	Sec	>7sec	test) and engine air flow	<	33.33	g/sec	33.33g/sec	fuel level			cumulative
			limit reached)													
								for time	>	3	sec	>3sec	is low and			
								engine air flow (passive monitor)	> FALSE	9.72	g/sec	9.72g/sec FALSE	not failed			
								sec. O2 trim - fast lean correction sec. O2 trim - fast rich	FALSE			FALSE	600 sec			
								correction				running				
								engine scheduled by System Manager	running TRUE			TRUE				
oank 1 sensor 2	P2271	oscillation check high	secondary O2 sensor voltage	>	0.499 0.603	V	>0.499 0.603V	secondary O2 sensor	ready	-	-	ready	approx.	0.1 sec	0.4 sec	two driving

Component/	Fault	Monitor Strategy	Primary Malfunction	Threshold	Threshold	Threshold	Threshold	Secondary	Enable	Enable	Enable	Threshold	Time	Frequency	Criteria	MIL
System	Code	Description	Signal and Criteria	Logic	Value	Units	Conditions	Parameters	Logic	Value	Units	Conditions	Required	of Checks	for Code	Illum.
· ·									Ť							
			for time	>	5	Sec	>5sec	for time	>	10	sec	>10sec	600 sec	continuous	continuous	cycles each
			then					secondary O2 closed loop control	active			active			or 4 sec	with: 0.4 sec
			ramping in enleanment by	=	0.07	lambda	=0.07lambda	all injectors activated	TRUE			TRUE			cumulative	continuous
			······													
			at gradient	=	0,0513	I / sec	0,0513 I / sec	engine air flow (intrusive	>	9.72	g/sec	9.72g/sec				or 4 sec
			for time (after enleanment	-	7		. 7000	test)		22.22	<i>a</i> /200	22.222/222				ou mulativo
			limit reached)	>	1	sec	>7sec	and engine air flow	<	33.33	g/sec	33.33g/sec				cumulative
								for time	>	3	sec	>3sec				
								engine air flow (passive	>	9.72	g/sec	9.72g/sec				
								monitor) sec. O2 trim - fast lean	FALSE			FALSE				
								correction	TALOL			TALOL				
								sec. O2 trim - fast rich	FALSE			FALSE				
								correction								
								engine scheduled by System	running TRUE			running TRUE				
								Manager	INCL			INCL				
ank 1 sensor 2	P2271	fuel cut off check high	secondary O2 sensor	>	0.202	V	>0.202V	secondary O2 heating	>	10	sec	> 10sec	0.2 sec	0.1 sec	0.4 sec	two driving
			voltage		6-		0.5	stable				701-5				
			time after fuel cut off	>	2,5	sec	>2,5sec	secondary O2 dew point exceeded	TRUE	-	-	TRUE		continuous	continuous	cycles each
								for time	>	30	sec	>30sec			or 4 sec	with: 0.4 sec
								air passed after fuel cut off	>	15	g	>15g			cumulative	continuous
											-	-				
								modeled exhaust temp	>	350	°C	>350° C				or 4 sec
								at secondary O2 sensor scheduled by System	TRUE	-		TRUE				cumulative
								Manager	IntoL			INCE				
								error: cam sensor	not set	-	-	not set				
								error: evap canister purge	not set	-	-	not set				
								sys. error: evap purge valve ckt	not set	-	-	not set				
								error: battery voltage	not set	-	-	not set				
oank 1 sensor 2	P0139	fuel cut off check high	secondary O2 sensor	>	0,152	V	>0.152V	secondary O2 heating	>	10	sec	> 10sec	0.2 sec	0.1 sec	0.4 sec	two driving
			voltage					stable								
			time after fuel cut off	>	3,0	sec	>3,0sec	secondary O2 dew point exceeded	TRUE	-	-	TRUE		continuous	continuous	cycles each
			lambda actual value	>	2		lambda >2	for time	>	30	sec	>30sec			or 9,5 sec	with: 0.4 sec
					_			air passed after fuel cut off	>	15	g	>20g			cumulative	continuous
											-	-				
								bank 1 sensor 2 voltage				>0,6 V				or 9,5 sec
								for time battery voltage				> 3 sec > 10,7V				cumulative
								Sallery Vollage				10,11				
Camshaft Control																
System - Locking Pin Bank 1 Intake	P0011	rotionality high	average of estual angle	-	10	dograda	+ 10degraag	anging apoad		560		- E60mm	10 sec	0.01 sec	0.4 sec	two driving
Sank I make	PUUTI	rationality high	average of actual angle measurements	>	10	degrees	>10degrees	engine speed	>	560	rpm	>560rpm	TO Sec	0.01 Sec	0.4 Sec	cycles each
Bank 2 Intake	P0021		versus locked position					engine run time	>	1	sec	>1sec			continuous	with: 0.4 sec
			angle													
								camshaft control circuit test	complete	-	-	complete			or 4 sec	continuous
								error: camshaft control	not set			not set			cumulative	or 4 sec cum
								circuit	101 361	-	-	101 361			cumulative	01 4 360 0011
System - Control	P000A	rationality low / high	difference to start test	>	611	degrees	> 6 11	engine speed	>	560	rpm	>560rpm	approx.	0.01 sec	0.4 sec	two driving
			(filtered actual				degrees									
3ank 1 Intake	P000C		angle versus filtered desired angle)					engine run time	>	1	sec	>1sec	20 sec	continuous	continuous	cycles each
Bank 2 Intake			(desired must remain			1		camshaft control circuit test	complete	-	-	complete			or 4 sec	with: 0.4 sec
			above value													
			to test to complete the					error: camshaft control	not set	-	-	not set	(4 times		cumulative	continuous
			evaluation)			-		circuit		140	• •	- 1409 0	for 4			or 4
			filtered actual angle remains	<			<	coolant temperature	<	143	°C	< 143° C	for 4 sec			or 4 sec
			filtered desired angle from			1		coolant temperature	>	-48	°C	>-48° C	each)			cumulative
	1	1	test start													
			within time (detects 5 sec slow [time	=	3	sec	=3sec	engine oil temperature engine oil temperature	<	143 -48	°C °C	<143° C >-48° C				

							1					1				1
Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria		Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable	Enable Value	Enable Units	Threshold Conditions	Time	Frequency of Checks	Criteria for Code	MIL Illum.
System	Code	Description	Signal and Criteria	Logic	Value	Units	Conditions	Parameters	Logic	value	Units	Conditions	Required	of Checks	Tor Code	mum.
								cam-crank alignment	complete	-	-	complete				
			Constant of the second second second					adaptation								
			for multiple activation occurrences	>	4	count	>4count									
			(decrements upon				( same as									
			activations where				stated in "time									
							required"									
							column)									
			no difference is seen between desired													
			and actual)													
			difference (filtered actual	>	3	degrees	>3degrees									
			angle max			-	-									
			versus actual at test start)													
			( to detect slow response													
			versus													
			stuck cam if above this													
			limit )													
			at time	=	4	sec	=4sec									
			(overlaps with time to detect above)													
		1						1			1		1		1	
			(passes after multiple													
			good activations								L					
			in both cam phase													
			rotation directions)										+		+	
Queters Com Oracli																
System - Cam - Crank Alignment																
Bank 1 Intake	P0016	cam-crank adapted	adapted angle	>	10	degrees	>10degrees	engine run time >	>	2	sec	>2sec	approx.	0.2 sec	0.4 sec	two driving
		angle .				Ũ	Ũ	5								Ŭ
		limit check	or adapted angle	<	-18	degrees		engine coolant temp >	>	9.8	°C	>9.8° C	600 sec	continuous	continuous	cycles each
Bank 2 Intake	P0018	(applies for each camshaft)	or actual angle with parked cams	>	20	degrees	>20degrees	engine coolant temp <	<	105	°C	<105° C			or 4 sec	with: 0.4 sec
		camismany	and	<	25	degrees	<25degrees	model: engine oil temp <	<	140	°C	<140° C	fail after		cumulative	continuous
											-					
Bank 1 / Idler Sprocket	P0008		adapted angle for both	>	10	degrees	>10degrees	error: camshaft sensor	not set	-	-	not set	2			or 4 sec
	Daaaa		cams		10		40.1						adaptation			
Bank 2 / Idler Sprocket	P0009		adapted angle for both cams	<	-18	degrees	<-18degrees	error: camshaft control circuit	not set	-	-	not set	cycles -			cumulative
			cams					circuit					required			
Engine coolant	P0117	range check high	coolant temperature	>	138.8	°C	>138.8° C	hot restart timer after	>=	60	sec	>=60sec	0.1 sec	0.1 sec	0.4 sec	two driving
								engine start								
temperature sensor	P0118	range check low	coolant temperature	<	-38.3	°C	<-38.3° C	If Startup ECT+O155	<	-38.3	°C	<-38.3° C	1		continuous	cycles each
			in the point of		20.0			ECT-Startup ECT   (abs	<=	2.3	°C	<=2.3° C	1		or 4 sec	with: 0.4 sec
								value)								
								integrated air mass	>=	0	g	>=0g			cumulative	cont. or 4
								increases and air mass timer	>=	30	sec	>=30sec			+	sec cum.
		1								50	300		1		1	See Guin.
	P0119	intermittent (	delta coolant temperature	<	-20.25	°C	<-20.25° C	ignition	=	ON		=ON	approx.	0.01 sec	immediate	
		discontinuity )	tomporaturo			Ŭ	0		_			0.1				
													150 sec	continuous		
			or					1	1	1	1	1	1			1
			delta coolant temperature	>	20.25	°C	>20.25° C									
			delta coolant temperature													
			delta coolant temperature (between A/D read	>	20.25 3	° C count	>20.25° C =3count									
			delta coolant temperature (between A/D read sample count offset)			count										
Engine coolant	P0116	plausibility check (low	delta coolant temperature (between A/D read sample count offset) calculated coolant					the model temperature							or 0.4 sec	two driving
Engine coolant	P0116		delta coolant temperature (between A/D read sample count offset)	=	3	count	=3count	the model temperature increases depending on air flow							or 0.4 sec	two driving cycles each

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
		plausibility check (high	measured temperature		9.8	°C		measured temperature	<	93.8	°C	<93.8° C				
		side check)	minus calculated coolant temperature model					engine speed	>	520	rpm	>520rpm			or 4 sec	with: 0.4 sec
			•					integrated air mass	>	3000	~	× 2000a			cumulative	continuous
								integrated air mass no error engine speed	>	3000	g	> 3000g			cumulative	or 4 sec
								no error air mass flow meter								cumulative
Engine coolant	P050C	difference from intake	filtered difference					key up IAT - previous min	<	1.5	°C	<1.5° C	160 sec	0.2 sec	immediate	two driving
temperature sensor		air temperature after soaking	(ECT at key on - IAT at key on )	>	15	°C	>15° C	IAT key up IAT - previous min IAT	>	-24.75	°C	>-24.75° C	for block	continuous	additional	cycles each
		Soaking	key on j					previous accumulated air mass	>	2000	g	>2000g	heating		after block	with: 0.4 sec
								previous accumulated air mass	>	4000	g	>4000g			heater	cumulative
			or					previous engine run time or	>	500	Sec	>500sec			check	
			filtered difference ( ECT at key on - IAT at	<	-10	°C	<-10° C	ECT at shut down Controller Shut Down at	> last cycle	84.75 -	° C -	>84.75° C last cycle				
			key on )					end of Strong Wind / Open Hood	not detected	-	-	not detected				
								based on IAT rise at shut down	not dotootod			not dotottod				
								Block Heater	not detected	-	-	not detected				
Engine Coolant	P0128	Coolant Temperature	(calculated reference	>	5.3	°C	>5.3° C	debouncing time	>	15	sec	>15sec	approx.	0.1 sec	0.4 sec	two driving
Thermostat Monitoring	10120	Below Thermostat Regulating	model coolant temp		0.0			error: engine coolant temp	not set	-	-	not set	900 sec	continuous	continuous	cycles each
		Temperature	temperature)					error: vehicle speed sensor	not set	-	-	not set			or 4 sec	with: 0.4 sec
		(plausibility check)	reference model		74,3 75,8	°C	74,3 75.8° C	est. ambient temperature	>	-39.8	°C	> -39.8°C			cumulative	continuous
			calculation limit					est. ambient temperature	<	140	°C	<140°C				or 4 sec
			( development vehicles indicated					vehicle speed	>=	3.125	mph	>=3.125mph				cumulative
			steady thermostat regulating					engine speed	>	640	rpm	>640rpm				
			temperatures of 89°C,					coolant temperature at start	<	69.8	°C	< 69.8°C				
			as measured by the engine coolant					integrated air mass flow	>	1000	g	> 1000g				
			temp. sensor. 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.)													
Intake air temperature	P0111	response check	max intake air temperature -					drive period - count	>=	5	count	>=5count	2 sec	0.1 sec	0.4 sec	two driving
sensor			min intake air temperature	>	2.3	°C	>2.3° C	each with						continuous	continuous	cycles each
								vehicle speed	>=	56.25	mph	>=56.25mph			or 4 sec	with: 0.4 sec
								mass flow mass flow	< >	250 25.6	g/sec g/sec	<250g / sec > 25.6g/sec			cumulative	continuous or 4 sec
								coolant temperature at start		120	°C	<=120° C				cumulative
								no fuel shut-off idle period - count	>=	4	count	>=4count				
								each with			Count					
				-				vehicle speed	<=	1.5625	mph	<=1.5625mph		-		
								coolant temperature at start		120	°C	<=120° C				
								coolant temperature ECT decrease since prior	>	64.5 0	°C °C	>64.5° C >0° C				
		1						shutdown	,	5	U	20 0				

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
	P0112 P0113	range check low range check high	intake air temperature intake air temperature	>	125.3 -35.3	° C ° C	>125.3° C <-35.3° C	time after start		15		> 15sec				
	P0113	range check nigh	Intake air temperature	<	-35.3	- 0	<-35.3* C	then time in idle	>	3	sec sec	> 15Sec >3sec				
								and intake air temperature	<	-35.3	°C	<-35.3° C				
								then   IAT change   (abs value)	<=	2.3	°C	<=2.3° C				
								while								
								integrated air mass increases	>=	0	g	>=0g				
Mass air flow sensor	P0101	range check low	mass air flow	<	1.83 78.9	g/sec		battery voltage	>	10.5	V	>10.5V	0.40 sec	0.01 sec	0.4 sec	two driving
		or	and		KFMLDMN		g/sec KFMLDMN	time after start	>	0.4	sec	>0.4sec		continuous	continuous	cycles each
		fuel trim limits exceded	delta lambda correction	>	0,16	factor	>0.16factor	crankshaft revolution	>	150	rev	>150rev			or 4 sec	with: 0.4 sec
		range - multiplicative						counter error: throttle position	not set	-	-	not set			cumulative	continuous
								sensor	noroot						Gamaiaaro	
		and correction factor	correction factor air mass	<	0.83	factor	<0.83factor			0	0	00				or 4 sec
		(modeled air	correction factor all mass	<	0.65	Tactor	<0.05180101			0	g/s	0g/s				cumulative
		mass at throttle / air mass						ratio: MAP to Baro	<	1	-	<1 -				
		measured by air mass flow meter)						air mass flow	>	8.3	g/sec					
		now meter)						time after start	>	1	sec					
		range check high	mass air flow	>	26.9	g/sec	> 26.9	errors:	not set							
		or	and		312.5 KFMLDMX		312.5 g/sec KFMLDMX	throttle body								
		fuel trim limits exceded	delta lambda correction	<	-0.175	factor	<-0.175factor	Leak upstream throttle		-	-					
		range - multiplicative														
		and correction factor	correction factor air mass	>	1.1699	factor	>1.1699factor									
		(modeled air														
		mass at throttle / air mass														
		measured by air mass flow meter)														
	P0102	circuit check low	mass air flow	<	-10.3	g/sec	>10.3g/sec	battery voltage	>	7.5	V	>7.5V	0.2 sec			
	P0103	circuit check high	mass air flow	>	333.3	g/sec	>33.3g/sec									
pressure sensor	[				[		1			1	1		1			
upstream throttle /alve	P0238	cirtcuit continuity - high or open	measured sensor voltage	>	4.65	V	> 4.65 V						0.5 sec	continuous	0.2 sec	2 dcy
Valve	P0237		measured sensor voltage	<	0.45	V	< 0.45 V									
	P0238	range check - high	measured pressure	>	300	kPa	> 300 kPa	enabled by diagnostic					2 sec			
	P0237	range check - low	measured pressure	<	50	kPa	< 50 kPa	scheduler	true			true				
	P0236	rationality -	measured fuel pressure lies below													
		comparison between	expected minimum	true			true									
		measured pressure and	pressure													
		expected														
		(calculated) pressure														
	P0236	rationality -														
	1 0230		('measured') compression ratio exceeds													
		comparison between		true			true									
		('measured')	compression ratio													
		compression ratio and expected	נ													
		(calculated)														
		compression ratio														

MAF based pressure ratio       over the throttle valve         and       throttle body based         pressure ratio       over the throttle valve         over the throttle body based       (detection of leakage)         (detection of leakage)       (         over the throttle valve       (         over t	D. Malf	There all all t	<b>T</b> 1	71	There is a large		E	<b>E</b>	E	There is a local state	<b>T</b> .	F	0.11.11	
boost pressure control P2281 comparison between MAF based pressure ratio over the throttle valve and throttle body based pressure ratio over the throttle valve (detection of leakage) ( (detection of leakage) ( (detection of leakage) ( )	Primary Malfunction Signal and Criteria	Logic	Value	Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
P2281 comparison between ratio MAF based pressure ratio over the throttle valve and throttle body based pressure ratio over the throttle valve (detection of leakage) ( (detection of leakage) (	Signal and Cinteria	Logic	Value	Onits	conditions	T arameters	Logic	Value	Units	Conditions	Required	of checks	loi code	indiri.
P2281       comparison between ratio       ratio         Over the throttle valve       and         image: strate in the image in														
P2281 comparison between ratio MAF based pressure ratio over the throttle valve and throttle body based pressure ratio pressure ratio (detection of leakage) ( (detection of leakage) ( (detectio														
MAF based pressure ratio       n         over the throttle valve       and         throttle body based pressure ratio       p         over the throttle valve       over the throttle valve         (detection of leakage)       (         and       n          and       n														
ratio ratio ratio over the throttle valve and throttle body based pressure ratio over the throttle valve (detection of leakage) (detectio	ratio between	>	0.098		> 0.098	engine speed	>	1520	rpm	> 1520 rpm	1 sec	continuous	0.2 sec	2 dcy
over the throttle valve       and       throttle body based       pressure ratio       over the throttle valve       (detection of leakage)       (detection of lea			to		to	time after engine start	>	10	sec	> 10 sec				
and       throttle body based       pressure ratio       over the throttle valve       (detection of leakage)       (detection of leak	ratio		1.25		1.25	no fault of								
throttle body based pressure ratio     p       over the throttle valve     (detection of leakage)       (detection of leakage)     (        -	over the throttle valve		1.25		1.25	no lault of								
pressure ratio       pressure ratio         over the throttle valve         (detection of leakage)         <	and					- pressure sensor								
Over the throttle valve       (detection of leakage)       (detection of leakage)    <	throttle body based					upstream throttle valve	true			true				
Image: Constraint of the stage     (detection of teakage)     (       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Image: Constraint of teakage       Image: Constraint of teakage     Image: Constraint of teakage     Im	pressure ratio													
P0299 comparison between compari	over the throttle valve					- throttle position sensors	true			true				
P0299 comparison between compari						- MAF sensor	true			true				
P0299 comparison between compari	(fine leakage)					boost pressure control								
P0299 comparison between compari						is active	true			true				
P0299 comparison between compari														
P0299 comparison between compari	ratio between	>	0.101		> 0.101						1 sec			
P0299 comparison between desired boost pressure and current boost pressure and current boost pressure () () () () () () () () () () () () ()	MAF based pressure ratio		to		to									
P0299 comparison between compari	over the throttle valve		1.297		1.297									
P0299 comparison between compari	and													
P0299 comparison between of bost pressure and current bost pressure and current bost pressure (()) () () () () () () () () () () () (	throttle body based													
P0299 comparison between d P0299 comparison between d current boost pressure and current boost pressure () () () () () () () () () ()	pressure ratio													
P0299 comparison between of bost pressure and current boost pressure () () () () () () () () () () () () ()	over the throttle valve													
P0299 comparison between of boost pressure and current boost pressure () () () () () () () () () () () () ()	(coarse leakage)													
P0299 comparison between compari														
P0299 comparison between d desired boost pressure and current boost pressure desired boost pressure and current boost pressure desired boost pressure and current boost pressure desired boost pressure and current boost pressure and	ratio between	>	0.109		> 0.109	engine speed	>	1520	rpm	> 1520 rpm	1.8 sec			
P0299 comparison between of the comparison b	MAF based pressure		to		to	time after engine start	>	10	sec	> 10 sec				
P0299 comparison between d desired boost pressure and current boost pressure desired boost pressure and current boost pressure desired boost pressure current boost pressure desired boost pressure current boost pressure desired boost pressure and current boost pressure and	ratio		1 209		1.398	no fault of								
P0299 comparison between d desired boost pressure and current boost pressure (( ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) )	over the throttle valve and		1.398		1.390	- pressure sensor								
P0299 comparison between of bost pressure and current boost pressure (()	throttle body based					upstream throttle valve	true			true				
P0299 comparison between d desired boost pressure and current boost pressure () () () () () () () () () () () () ()	pressure ratio													
P0299 comparison between d desired boost pressure and current boost pressure (() () () () () () () () () () () () ()	over the throttle valve					- throttle position sensors	true			true				
P0299 comparison between d desired boost pressure and current boost pressure () () () () () () () () () () () () ()							4.0.1.0			4				
P0299 comparison between d desired boost pressure and current boost pressure (() () () () () () () () () () () () ()	(coarse leakage)					- MAF sensor - canister purge system	true true			true true				
desired boost       pressure       and       current boost       pressure       pressure       (0)       P0234       comparison between       desired boost       pressure       and	(oourse rearrage)					boost pressure control	uuo			liuo				
desired boost       pressure       and       current boost       pressure       pressure       0<						is not active	true			true				
desired boost       pressure       and       current boost       pressure       pressure       (0)       P0234       comparison between       desired boost       pressure       and						for time	>			>				
desired boost       pressure       and       current boost       pressure       pressure       0<						cruise control not active	true	0.00		true				
desired boost       pressure       and       current boost       pressure       pressure       0<						setpoint canister purge rate	<	0.03		< 0.03				
desired boost       pressure       and       current boost       pressure       pressure       (0)       P0234       comparison between       desired boost       pressure       and						no dynamic engine	true							
desired boost       pressure       and       current boost       pressure       pressure       (0)       P0234       comparison between       desired boost       pressure       and						condition								
desired boost       pressure       and       current boost       pressure       pressure       (0)       P0234       comparison between       desired boost       pressure       and														
P0234 comparison between of boost pressure	difference (positive)	>	12	kPa	> 12 kPa	boost pressure control					6 sec			
Pressure and and current boost pressure  P0234 Comparison between current boost comparison between current boost comparison between current boost current bo	between					is active	true			true				
and       current boost       pressure       (I)       (I) <t< td=""><td>set-point boost pressure</td><td></td><td></td><td></td><td></td><td>13 duive</td><td>uue</td><td></td><td></td><td>uue</td><td></td><td></td><td>   </td><td></td></t<>	set-point boost pressure					13 duive	uue			uue				
P0234 comparison between of boost pressure	and					engine speed	>	2000	rpm	> 2000 rpm				
P0234 comparison between d desired boost pressure and	current boost pressure							or		or				
P0234 comparison between of boost pressure and								00000		0000				
P0234 comparison between of boost pressure and	(boost pressure to low)					atmospheric pressure		2800 66	rpm kPa	2800 rpm > 66 kPa				
desired boost pressure and	(DODSI PRESSURE ID IDW)					setpoint boost pressure	>	base	۳ď	> 66 KPa > base				
desired boost pressure and						point booot probotio	-	boost		boost				
desired boost pressure and								pressure		pressure				
desired boost pressure and								+		+				
desired boost pressure and								5	kPa	5 kPa				
desired boost pressure and	difference (negative)	>	32	kPa	> 32 kPa	pressure upstream throttle					0.8 sec			
desired boost pressure and	between	,	52	n'a	- 52 KF d	prosoure uponeant unolle					0.0 500			
pressure and			to		to	valve is valid	true			true				
	set-point boost pressure													
	and		127.5	kPa	127.5 kPa									
	current boost pressure													
pressure														
	(boost pressure to high)													

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria		Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable	Enable Value	Enable Units	Threshold Conditions	Time	Frequency of Checks	Criteria for Code	MIL Illum.
System	Code	Description	Signal and Criteria	Logic	Value	Units	Conditions	Farameters	Logic	Value	Units	Conditions	Required	of Checks	for Code	mum.
			(Remark: for comparison													
			the negative													
			value is converted to an													
			absolute value)													
ump valve	P2261	counting of increased	normalized difference					engine coolant temperature	>	50.3	°C	> 50.3 °C	0.48 sec	continuous	0.2 sec	2 dcy
	1 2201	pulsation	between					engine coolant temperature	-	00.0	Ŭ	2 00.0 0	0.40 000	continuous	0.2 300	2 doy
		in the intake manifold						intake air temperature	>	-10.5	°C	> -10.5 °C				
			value and modeled value	>	0,352		> 0,352	pressure in front of								
		(increased pulsation	modeled value		0,002		> 0,332	throttle valve	>	60	kPa	> 60 kPa				
		may occure	-													
		when dump valve is jammed	for					supervision phase is active	true			true				
		in closed position)														
			number of times	>	4	counts	> 4 counts	conditions for an active								
								supervision phase are								
								- negative load gradient detected	true			true				
								- ratio of pressure in front	>	1.05		> 1.05				
								of throttle value to		to		**				
								throttle valve to minimum		to		to				
								pressure after air filter		3.12		3.12				
								- dump valve is active	true			true				
arometric Pressure Sensor	P2227	rationality	difference between barometric pressure										3 sec	0.1 sec	0.4 sec	two driving
ambient air pressure		signal discontinuity	signal pressure and	>	15	kPa	>15kPa	plausible pressure signal	TRUE			TRUE			continuous	cycles each
ensor)			pressure in front of throttle					pressure sensor								-
								in front of throttle							or 4 sec	with: 0.4 sec
								and		-					cumulative	continuous
								throttle angle and	<	5	%	<5%				or 4 sec cumulative
								engine speed	<	1000	rpm	<1000rpm				cumulative
			or					enabled by scheduler for	>	3	sec	>3sec				
								time								
			barometric pressure													
			signal pressure													
			jump from previous key	>	10	kPa	>10kPa	Baro from previous drive	valid	-	-	valid				
			off					difference: Baro substitute	>	15	kPa	>15kPa				
								amoronoon Baro caboutato	-			P TONE U				
			and					model versus sensor								
			difference between	>	10	kPa	>10kPa	engine speed lower and	<	621	rpm	< 621 rpm				
			barometric pressure			iu u	y rola a	and								
			signal pressure and pressure in front of					throttle angle	<	5	%	< 5%				
			throttle													
								both for time	>	3	sec	>3sec				
	P2228	range check low	sensor signal	<	45	kPa	<45kPa	enabled by scheduler for	>	1	sec	>1sec	2 sec			
								time								
	1 2220					V	< 0,45V						0.5 sec		1	
	1 2220		sensor voltage	<	0.45	v	< 0,40V									
	1 2220		sensor voltage	<	0.45	v	< 0,40 V									
	P2229	range check high	sensor voltage sensor signal	>	0.45	kPa	>115kPa	enabled by scheduler for	>	1	sec	>1sec	2 sec			
		range check high						enabled by scheduler for time	>	1	sec	>1sec	2 sec 0.5 sec			
		range check high	sensor signal	>	115	kPa	>115kPa		>	1	sec	>1sec				
lle Sneed System		range check high	sensor signal	>	115	kPa	>115kPa		>	1	Sec	>1sec				
le Speed System lisabled during cold		range check high	sensor signal	>	115	kPa	>115kPa		>	1	Sec	>1sec		0.1 sec	0.4 sec	two driving

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
	P0507		desired rpm - actual rpm	<	-200	rpm	<-200rpm	intake air temp	>	-10.5	°C	>-10.5° C			or 4 sec	with: 0.4 sec
			or					vehicle	at idle			at idle			cumulative	continuous
			fuel cut off due to overspeed	>	3	count	>3count	altitude factor ( sea level = 1.0 )	>	0.703	factor	>0.703factor				or 4 sec
			during this idle					time after engine start	> FALSE	0	sec	>0sec				cumulative
								cold start idle speed control				FALSE				
								intrusive evap test	not active			not active				
Idle Speed System																
(enabled during cold start)	P0506	functional check	desired rpm - actual rpm	^	100	rpm	>100rpm	load (for underspeed only)	<	39.75	%	<39.75%	5 sec	0.1 sec	0.4 sec	two driving
			during catalyst heating on					Engine coolant start temp.	>	-10 +40	°C	> -10 +40° C		continuous	continuous	cycles each
	P0507		desired rpm - actual rpm	~	-200	rpm	<-200rpm	intake air temp	>	40	°C	>40° C			or 4 sec	with: 0.4 sec
			during catalyst heating on					vehicle	at idle			at idle			cumulative	continuous
			during outaryst neuting on					altitude factor ( sea level = 1.0 )	>	0.703	factor	>0.703factor				or 4 sec
								time after engine start	>	0	sec	>0sec				cumulative
								idle speed control catalyst	TRUE			TRUE				
								heating intrusive evap test	not active			not active				
			·		l 	I			not douve	· · · · ·		not doive	I			I 
Vehicle speed sensor																
	P0500	rationality (high range check)	vehicle speed	>	171.875	mph	>171.875mph	-	-	-	-		2 sec	0.1 sec continuous	0.4 sec continuous	two driving with: 0.4 sec
		rationality	vehicle speed minus	=	0	mph	=0mph	vehicle speed	>	0	mph	>0mph		continuous	or 4 sec	continuous
		(stuck check)	previous vehicle speed				•	vehicle speed	<	319.375	mph	<319.375mph			cumulative	or 4 sec
		CAN wheel speed	CAN wheel speed	=	corrupt		=corrupt	time	>	10	Sec	>10sec				cumulative
		message check	message corrupt				-									
			or missing	=	missing		=missing									
Crankshaft Position Sensor	P0335	circuit continuity	no engine signal	=	0	rpm	=0rpm	camshaft revolutions detected	>	12	counts	>12counts	approx.	0.01 sec	0.4 sec	two driving
			but phase signals available										5 sec	continuous	continuous	cycles each
		rationality check	reference gap missing	>	6	gaps	>6gaps								or 4 sec	with: 0.4 sec
			( sensor signal but no reference )												cumulative	continuous
	P0336	rationality check	unexpected re-	>	6	count	>6count									or 4 sec
			synchronization													oursulative.
			(loss of reference mark)													cumulative
		rationality check	intermittent loss of engine	^	14	count	>14count									
	P0338	rationality check	speed signal difference in counted	>	8	teeth	>8teeth						approx.	1 per rev		
			teeth between reference gap position										2 sec	continuous		
			events										2 300	continuous		
Camshaft Position																
Sensor																
Bank 1 Intake	P0341	plausibility check	no cam position sensor signal	>	5	count	>5count	engine in synchronized mode	TRUE	-	-	TRUE	10	1 per rev	0.4 sec	two driving
	P0342	circuit low		>			>						revolutions	continuous	continuous	cycles each
	P0343	circuit continuity or high	1	>			>								or 4 sec	with: 0.4 sec
															cumulative	continuous
Bank 2 Intake	P0345	plausibility check	no cam position concer		5	count	>5count								cumulative	or 4 sec
Darik z Iritake	FU345	раизіліну спеск	no cam position sensor signal	>	э	count	>ocount									UI 4 SEC
	P0347	circuit low	С С	>	5	count	>5count									cumulative
	P0348	circuit continuity or high		>	5	count	>5count									
										1			1			

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
uel tank pressure								barometric pressure	>=			>= 68 kPa	14 sec	continous	0.4 sec	2 dcy
ensor	P0453	circuit continuity - high	fuel tank pressure	>	3781	Pa	> 3781 Pa	vehicle speed	=	68 0	kPa mph	= 0 mph				
		or open						fuel level	>	6,2	%	> 6,2 %				
						_	1000 5	fuel level	<	87	%	< 87 %				
	P0452	circuit continuity - low	fuel tank pressure	<	-4000	Pa	< -4000 Pa	engine start finished enabled by diagnostic scheduler	true			true true				
	P0451	rationality -	fuel tank pressure difference	>=	813	Ра	>= 813 Pa						25.5 sec	continous	0.4 sec	2 dcy
		within time	within	=	1	Sec	= 1 sec	canister vent valve open	true			true				
	-	(oscillation check)	for integrated time	>=	25.5	sec	>= 25.5 sec	for time vehicle speed	>	3 18.64	Sec	> 3 sec <= 18.64 mph				
								enabled by diagnostic scheduler	<= true	18.64	mph	<= 18.64 mpn true				
	P0451	rationality - sensor signal stuck (incremental check)	max-min difference of canister purge valve duty cycle	>=	39.84	%	>= 39.84 %	vehicle speed	>=	6.22	mph	>= 6.22 mph	25 sec	continous	0.4 sec	2 dcy
			and					canister purge is active	true			true				
			max-min difference of fue tank pressure signal	<	80	Pa	< 80 Pa	ratio of intake manifold pressure to atmospheric pressure	<=	0.477	-	<= 0.477 -				
			for number of checks	>=	2	counts	>= 2 counts	atmospheric pressure	>=	68	kPa	>= 68 kPa				
								incremental check without result yet	true			true				
								fuel level	>	6,2	%	> 6,2 %				
								fuel level enabled by diagnostic scheduler	< true	87	%	< 87 % true				
	P0327	Monitoring via knock- sensor- and	Cylinder individual signal value	<	0.7422 6.8164	V	< 0.7422 6.8164 V	- Knock control is active.	true			true	0,3 sec	continuous	2.6 sec	no MIL
		cylinder-based basic reference noise	(depends on engine speed)					- engine coolant tempetature	>	45	°C	> 45 °C				
	P0328	signal (voltage).	Cylinder individual signal value	>	57.8908  72.7541	V	> 57.8908 72.7541 V	- load	>	30	%	> 30 %				
			(depends on engine speed)					- Engine speed for strong signals.	>	2520	rpm	> 2520 rpm				
								<ul> <li>Engine speed for weak signals.</li> <li>No phase sensor faults</li> </ul>	> true	2520	rpm	> 2520 rpm true				
								during engine start.	litte			litte				
								- Engine speed dynamics for	false			false				
								knock detection exist. - Load dynamics for knock	false			false				
								detection exist. - No ECM knock-control ciruit	true			true				
								error. - Engine stpeed limp home	false			false				
								function is active.								
	P0332	Monitoring via knock- sensor- and	Cylinder individual signal value	<	0.7422 6.8164	v	< 0.7422 6.8164 V	- Knock control is active.	true			true	0,3 sec	continuous	2.6 sec	no MIL
		cylinder-based basic reference noise	(depends on engine speed)					- engine coolant tempetature	>	45	°C	> 45 °C				
	P0333	signal (voltage).	Cylinder individual signal value	>	57.8908  72.7541	V	> 57.8908 72.7541 V	- load	>	30	%	> 30 %				
			(depends on engine speed)					- Engine speed for strong signals.	>	2520	rpm	> 2520 rpm				
								- Engine speed for weak signals	>	2520	rpm	> 2520 rpm				
								<ul> <li>No phase sensor faults during</li> </ul>	true			true				

Component/	Fault	Monitor Strategy	Primary Malfunction	Threshold	Threshold	Threshold	Threshold	Secondary	Enable	Enable	Enable	Threshold	Time	Frequency	Criteria	MIL
System	Code	Description	Signal and Criteria	Logic	Value	Units	Conditions	Parameters	Logic	Value	Units	Conditions	Required	of Checks	for Code	Illum.
								- Engine speed dynamics	false			false				
								for knock detection exist.								
								- Load dynamics for knock	false			false				
								detection evict								
								detection exist. - No ECM knock-control	true			true				
								ciruit								
								error. - Engine speed limp home	false			false				
								- Engine speed imp nome	laise			laise				
								function is active.								
Knock control sensor's										1			250	Zero and	2.6 s	2 dcy
evaluation IC													working	2010 and	2.0 5	2 009
		Response to Zero											cylces	Test pulse		
	P0324	Pulse monitor IC's integrator	integrator's value -	>	0.215	V	> 0.215 V	knock control active	true	-	-	true		alternate every		
		offset	715mV													
								no dynamic condition on engine speed	true	-	-	true		250 working		
								no dynamic condition on	true	-	-	true		cycles.		
								engine load								
								no fault assumption from knock control								
								test pulse.	true	-	-	true				
								the engine speed is within a								
								calibrated range	true	-	-	true				
	P0324	monitor IC's integrator	integrator gradient	>	measuring	V/s		same as for IC integrator's	100			liuc				
		gradient			window			offset monitoring								
					length dependent											
					dopendent											
		Response to Test														
	P0324	Pulse integrator value check	integrator value of test	<	3.691	V	< 3.691 V	the engine coolant	true			true				
	1 0324	integrator value check	pulse		5.051	v	< 5.031 V	temperature > calibration	lide			lide				
								no dynamic condition on	true			true				
								engine speed no dynamic condition on	true			true				
								engine load	lide			lide				
								no fault assumption from								
								the knock control zero test.	true			true				
								control zero test.	lide			lide				
Transmission Control	P0700	OBD emission fault	signal input	=	TCM MIL	FAULT	=TCM	-	-	-	-		0.01 sec	0.01 sec	immediate	immediate
Module MIL Illumination		detected by the TCM					MILFAULT							continuous		
Request														continuodo		
	(Specific															
	TCM DTC shown in															
	freeze															
	frame)										l					
fuel injector				1												
cylinder #1	P0201	circuit continuity - open	Voltage	IC internal			IC internal	engine speed	>	80	rpm	> 80 rpm	immediatel	continuous	0.2 sec	2 dcy
	P0261	circuit continuity -						batten/ voltage		9,99	v	> 9,99 V	у			
	F 0201	ground						battery voltage	>	3,99	v	> 5,99 V				
	P0262	circuit continuity -						battery voltage	<	17,99	V	< 17,99 V				
cylinder #2	P0202	voltage						output activated and					-			
cymluel #2	FUZUZ	circuit continuity - open						ouipui activateu anu								
	P0264	circuit continuity -						deactivated for complete								
	P0265	ground circuit continuity -						checking	true			true	-			
	1 0200	voltage						oncoking	ude			uue				
cylinder #3	P0203	circuit continuity - open														
	P0267	circuit continuity -														

													_		
Component/ System	Fault Code	Monitor Strategy Primary Malfuncti Description Signal and Criter		Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
oyatem			la Logio	Value	Units	Conditions	T drumeters	Logio	Value	Units	Contaitions	nequireu	of officials		intain.
	P0268	circuit continuity - voltage													
ylinder #4	P0204	circuit continuity - open													
-															
	P0270	circuit continuity - ground													
	P0271	circuit continuity -													
ylinder #5	P0205	voltage circuit continuity - open													
yinder #5	F 0203	circuit continuity - open													
	P0273	circuit continuity -													
	P0274	ground circuit continuity -													
		voltage													
/linder #6	P0206	circuit continuity - open													
	P0276	circuit continuity -													
		ground													
	P0277	circuit continuity - voltage													
		Tonago													
	l														
nister ventilation	P0449	circuit continuity - open Voltage	IC internal			IC internal	engine speed	>	80	rpm	> 80 rpm	immediatel	continuous	0.2 sec	2 dcy
alve												у		<b>_</b>	
	P0498	circuit continuity - ground					battery voltage	>	9,99	V	> 9,99 V				
	P0499	circuit continuity -					battery voltage	<	17,99	V	< 17,99 V				
		voltage					output activated and							<u> </u>	
							output activated and deactivated for complete								
							checking	true			true				
anister purge valve	P0443	circuit continuity - open Voltage	IC internal			IC internal	engine speed	>	80	rpm	> 80 rpm	immediatel	continuous	0.2 sec	2 dcy
	P0458	circuit continuity -					battery voltage	>	9,99	V	> 9,99 V	У			
		ground													
	P0459	circuit continuity - voltage					battery voltage	<	17,99	V	< 17,99 V				
		voltage					output activated and							+	
							deactivated for complete								
							checking	true			true				
unatroom ou gon				1										4	1
ownstream oxygen ensor heater															
ank #1	P0036	circuit continuity - open Voltage	IC internal			IC internal	engine speed	>	80	rpm	> 80 rpm	immediatel	continuous	0.2 sec	2 dcy
	P0037	circuit continuity -					battery voltage	>	9,99	V	> 9,99 V	У		<u> </u>	
		ground						-							
	P0038	circuit continuity -			T		battery voltage	<	17,99	V	< 17,99 V				
		voltage					output activated and					1		<u> </u>	
							deactivated for complete							<b>_</b>	
							checking	true	 		true				
andany air sums	D0449		IC internal			IC internal	ongino spood		80	-	> 90	immediatel	continuous	0.2 sec	0 day
econdary air pump	P0418	circuit continuity - open Voltage	IC internal			ic internal	engine speed	>	80	rpm	> 80 rpm	y	continuous	U.Z Sec	2 dcy
	P2445	circuit continuity -					battery voltage	>	9,99	V	> 9,99 V	Ĺ			
	P2444	ground circuit continuity -					battery voltage	<	17,99	v	< 17,99 V			<u> </u>	
	. 2444	voltage					Sallery Vollage		11,00	*	< 11,00 V				
						-	output activated and		-			-		+	-
		+ +					deactivated for complete checking	true			true	-		<u> </u>	
		1	1	1			199		1	1		1			-

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
		Decemption	eighar and erhena	Logio	Fulue	<b>U</b>	Conditione	i ulullotoro	209.0	, and a	Unite	Conductio	Itoquilou	er enteente		indini
ntake camshaft control																
ntake Bank #1	P0010	circuit continuity - open	Voltage	IC internal			IC internal	engine speed	>	80	rpm	> 80 rpm	immediatel	continuous	0.2 sec	2 dcy
	50000		-										у			
	P2088	circuit continuity - ground						battery voltage	>	9,99	V	> 9,99 V				
	P2089	circuit continuity -						battery voltage	<	17,99	V	< 17,99 V				
Intake Bank #2	P0020	voltage circuit continuity - open						output activated and								
								•								
	P2092	circuit continuity - ground						deactivated for complete								
	P2093	circuit continuity -						checking	true			true				
		voltage														
	50000	1 10 11 10		10.1.1.1		1								.1		
Dump valve turbo	P0033	circuit continuity - open	Voltage	IC internal			IC internal	engine speed	>	80	rpm	> 80 rpm	immediatel v	continuous	0.2 sec	no MIL
	P0034	circuit continuity -						battery voltage	>	9,99	V	> 9,99 V				
	P0035	ground circuit continuity -						battery voltage	<	17,99	v	< 17,99 V				
	1 0000	voltage						ballery vollage	-	17,55	v	< 17,33 V				
								output activated and deactivated for complete								
								checking	true			true				
Boost control valve	P0244	circuit continuity - open	Voltage	IC internal			IC internal	engine speed	>	80	rpm	> 80 rpm	immediatel	continuous	0.2 sec	no MIL
	P0245	circuit continuity -						battery voltage	>	9,99	V	> 9,99 V	У			
		ground														
	P0246	circuit continuity - voltage						battery voltage	<	17,99	V	< 17,99 V				
		Voltage						output activated and								
								deactivated for complete checking	true			true				
								CHECKING	liue			true				
Ignition Coil																
circuit continuity Cylinder #1	P0351	circuit continuity - open			20	revs	>20revs	engine speed	>	600	rpm	>600rpm	approx.	engine	0.4 sec	two driving
		or signal not plausible												-		-
			Voltage > during or minimum two fault	>	3			engine speed	<	5000	rpm	<5000rpm	1 sec	cycle	continuous	cycles each
			counters													
	P2300	circuit continuity - ground	Voltage > during		20	revs	>20revs	battery voltage	>	10	V	>10V		frequency	or 4 sec	with: 0.4 sec
	P2301	circuit continuity -	Voltage > during		20	revs	>20revs	battery voltage	<	18	V	<18V			cumulative	continuous
Cylinder #2	P0352	voltage circuit continuity - open	Voltage > during		20	revs	>20revs							continuous		or 4 sec
	1 0352	or signal not plausible			20	1643	>2016V3							continuous		01 4 360
			Voltage > during		2											
			or minimum two fault counters	>	3											cumulative
	P2303	circuit continuity -			20	revs	>20revs									
	P2304	ground circuit continuity -	Voltage > during		20	revs	>20revs									
0 11 1 10		voltage	Voltage > during													
Cylinder #3	P0353	circuit continuity - open	Voltage > during		20	revs	>20revs									
			or minimum two fault	>	3											
	P2306	circuit continuity	counters		20	revs	>20revs									
		circuit continuity - ground	Voltage > during			1842	~201645									
	P2307	circuit continuity -			20	revs	>20revs									
Cylinder #4	P0354	voltage circuit continuity - open	Voltage > during		20	revs	>20revs									
-			Voltage > during													
			or minimum two fault counters	>	3											
	P2309	circuit continuity -			20	revs	>20revs									
		ground	Voltage > during					L								

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
oyatem			orginal and oriteria	Logic				T arameters	Logic	Value	Units	Conditions	Required	of checks		
	P2310	circuit continuity - voltage	Voltage > during		20	revs	>20revs									
Cylinder #5	P0355	circuit continuity - oper	N Voltage > during		20	revs	>20revs									
			or minimum two fault	>	3											
	P2312	circuit continuity -	counters		20	revs	>20revs									
		ground	Voltage > during													
	P2313	circuit continuity - voltage	Voltage > during		20	revs	>20revs									
Cylinder #6	P0356	circuit continuity - oper	1		20	revs	>20revs									
			Voltage > during or minimum two fault	>	3											
	D0045		counters				00									
	P2315	circuit continuity - ground	Voltage > during		20	revs	>20revs									
	P2316	circuit continuity -	Voltage > during		20	revs	>20revs									
		voltage	voltage > duning													
Electronic Throttle Control																
Jona Ol	P0638	motor control range	powerstage duty cycle	>	80	%	>80%	battery voltage	>	7	V	>7V	0.6 sec	0.01 sec	immediate	immediate
		check short term	( absolute value )	>	80	%	>80%						(recoverabl	continuous		
		Short term	(absolute value)	-	00	70	20078						e)	continuous		
		motor control range											5.0 sec			
		check														
		long term											(latched)			}
lectronic Throttle																
Control	P1551	limp-home throttle	throttle position	<	1.8006	%	<1.8006%	vehicle speed	<=	0	mph	<=0mph	5 sec	0.01 sec	immediate	immediate
		position	OR							40				at have an		
		out of range	throttle position	>	13.0785	%	>13.0785%	engine speed engine coolant temperature	< >=	40 5.25	° C	<40rpm >=5.25° C		at key on		
								ongine exclant temperature		84.75	°C	<=84.75° C				
								engine coolant temperature	<=	64.75	C					
								intake air temperature intake air temperature	>= <=	5.25 60	°C °C	>=5.25° C <=60° C				
								battery voltage	>	9.99	V	>9.99V				
								accelerator pedal position	<	14.9	%	<14.9%				<u> </u>
Electronic Throttle															/	
Control	P2100	powerstage circuit	output circuits not	=	deactivation	fault	=deactivationfa	-		-	-		0.1 sec	0.01 sec	immediate	immediate
		switch-off	deactivated				ult									
			as commanded											at key on		
	P2101		difference between set	>	4 50	%	>4 50%	electronic throttle	not active	-	-	not active	0.5 sec	0.01 sec	immediate	immediate
		and actual position of	and actual position of		dep. on rate		dep. on rate of	adaptation battery voltage	>	7	V	>7V		continuous		
		throttle blade	throttle blade		of change		change	·								
				1	1											
	P2107	amplifier adjustment of	amplification value	<	3.9961	V	<3.9961V	vehicle speed	<=	0	mph	<=0mph	< 6 sec	0.01 sec	immediate	immediate
		throttle position	or					engine speed	<	40	rpm	<40rpm		once per		
														throttleAdaption		1
			amplification value	>	4.3242	V	>4.3242V	engine coolant temperature	>=	5.25	°C	>=5.25° C				
			or					engine coolant temperature	<=	84.75	°C	<=84.75° C	+			
					0.4754											
			offset value	<	-0.1501	V	<-0.1501V	intake air temperature intake air temperature	>= <=	5.25 60	°C °C	>=5.25° C <=60° C	+			
							1							1		(
			offset value	>	0.1501	V	>0.1501V	battery voltage	>	9.99	V	>9.99V			+	
	P2119	functionality of return	offset value throttle blade return	>	0.1501	V	>0.1501V >0.56sec	battery voltage accelerator pedal position vehicle speed	> < <=	9.99 14.9 0	V % mph	>9.99V <14.9% <=0mph	0.56 sec	0.01 sec	immediate	immediate

Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Threshold Logic	Threshold Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
								engine coolant temperature	>=	5.25	°C	>=5.25° C	once			
								engine coolant temperature	<=	84.75	°C	<=84.75° C	per			
								intake air temperature intake air temperature	>= <=	5.25 60	° C ° C	>=5.25° C <=60° C	ignition on			
								battery voltage	>	9.99	V	>9.99V	UII			
								accelerator pedal position	<	14.9	%	<14.9%				
Electronic Throttle Control																
	P2176	throttle exchange detection	range check poti1 value at lower stop					vehicle speed	<=	0	mph	<=0mph	1 sec	0.01 sec	immediate	immediate
		learn fail	throttle potentiometer 1 voltage	<	0.212	V	<0.212V	engine speed	<	40	rpm	<40rpm		at key on		
		or	or					engine coolant temperature	>=	5.25	°C	>=5.25° C	once			
		initial throttle learn failed	throttle potentiometer 1	>	0.865	V	>0.865V	engine coolant temperature	<=	84.75	°C	<=84.75° C	per			
		or	voltage					intake air temperature	>=	5.25	°C	>=5.25° C	ignition			
		to	range check poti2 value at lower stop			0	0	intake air temperature	<=	60	°C	<=60° C	on			
		secondary parameters not met	throttle potentiometer 2 voltage	<	4.14	V	<4.14V	battery voltage	>	9.99	V	>9.99V				
		or minimum throttle	or throttle potentiometer 2	>	4.84		>4.84	accelerator pedal position	<	14.9	%	<14.9%				
		position out of range	voltage													
		ouronnango														
	Datat					0/	201			-		71/			0.1	
Throttle Position	P0121	range check poti voltage	sensor difference	>	9	%	>9%	battery voltage	>	7	V	>7V	continuous	0.1 sec	0.4 sec	two driving
Sensor 1 (primary)	P0122	plausibility to other poti	sensor circuit low voltage	<	0.176	V	<0.176V							continuous	continuous	cycles each
	P0123		sensor circuit high voltage	>	4.629	V	>4.629V								or 4 sec	with: 0.4 sec
															cumulative	continuous
Sensor 2 (redundant)	P0221	range check poti voltage,	sensor difference	>	9	%	>9%	battery voltage	>	7	V	>7V	continuous	0.1 sec		or 4 sec
	P0222	plausibility to other poti	sensor circuit low voltage	<	0.156	V	<0.156V							continuous		cumulative
	P0223		sensor circuit high voltage	>	4.883	V	>4.883V									
			Voltage													
function monitoring of microcontroller (PCM level 2	P0606	torque comparison	irreversible error of torque comparison	true			true						5.5 sec	continuous	0.2 sec	2 dcy
command check)			(current and maximum													
			allowed engine													
			torque out of range)													
		engine load comparison	irreversible error of engine load													
			comparison	true			true									
			(calculated and measured engine load													
			out of range)													
		engine speed comparison	irreversible error of engine speed													
			comparison	true			true									
			(calculated and measured engine speed													
			out of range)													
		accelerator pedal signal comparison	irreversible error of accelerator pedal													

_																
Component/ System	Fault Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	I hreshold Logic	Value	Threshold Units	Threshold Conditions	Secondary Parameters	Enable Logic	Enable Value	Enable Units	Threshold Conditions	Time Required	Frequency of Checks	Criteria for Code	MIL Illum.
eyelelli	oouo	Decemption							20910	Tuluo	Unite		Itoquirou			
			signal comparison	true			true									
			(synchronism between	<u> </u>		++									<u> </u>	
			the two													
			pedal sensors out of													
			range)			++							+			
		monitoring of AD	irreversible error of AD-			<u>+</u>							-			
		converter queue	converter queue	ļ												
			monitoring	true		++	true								<sup> </sup>	
			(queue not running)										-			
			irreversible error of lower	1												
		mechanical throttle valve position	mechanical throttle valve position	true		++	true								<u> </u>	
			limit check													
				ļ												
			(position out of range)			++							+			
		check of variant coding	irreversible error of		<u> </u>	++		+ +					4			1
		5	variant coding	ļ	<u> </u>	<u> </u>		<u> </u>								<u> </u>
			check	true	<u> </u>	───	true	<u> </u>					+		<sup> </sup>	
			(coding is incorrect)		<u> </u>	++		++					+		<u> </u>	
			irreversible error of AD-													
		signal	converter signal check	true	+	┼───┼	true	+					+		<u> </u> !	+
			Chicola				liuc									
			(converted low voltage													
			test impuls out of range)			++									<sup> </sup>	
			out of range)			++							-			
		check of ignition timing											-			
			comparison of	<u> </u>												
			ignition timing value	true		++	true						+		<u> </u> !	
			(comparison of ignition	1												
			timing value	ļ	<u> </u>	L							_			
			with its one's complement is wrong)													
			complement is wrong)	1												
			irreversible error of										-			
		load value	engine load value verification	true	<u> </u>	++									'	
			veniication	true		++	true								<u> </u>	
			(engine load value and													
			verification	L												
			value are not identical)		+	+		++					+		<u> </u>	+
		function controller	monitoring module has		1			+ +					-			
		response check	detected a fault		<u> </u>	<u> </u>									<u> </u>	1
			of function controller	true	<u> </u>	───┼	true						<u> </u>		<u> </u>	
		watchdog output signal	WDA signal activated	true	<u> </u>	┼───┼	true	┼───┤					-		<u> </u>	
		check	<b>č</b>													
					<u> </u>	+										
		overvoltage detection	internal supply voltage	true	┢────	┼───┼	true	++		+			4		<u> </u> !	+
		startonago detection	exceeded	1.00												
ECM Monitoring																
	P0605	rationality check -	wrong ROM checksum	true	<u> </u>	++	true	PCM after-run time of the		-			30 sec	at key off	2.6 sec	immediataly
					<u> </u>			last								
		verification of ROM						driving cycle completly						once per		1
		checksum			+	┼───┼		finished	true			true	+	dcy	<u> </u> !	
					1				100			1100	+	ucy		1
			t			+		+		1					1	1
	P0605	rationality check -	wrong cyclic ROM	true			true						5 sec	0.04 sec	2.6 sec	immediataly

Component/	Fault	Monitor Strategy	Primary Malfunction	Threshold	Threshold	Threshold	Threshold	Secondary	Enable	Enable	Enable	Threshold	Time	Frequency	Criteria	MIL
System	Code	Description	Signal and Criteria	Logic	Value	Units	Conditions	Parameters	Logic	Value	Units	Conditions	Required	of Checks	for Code	Illum.
		verification of ROM	critical regions											continous		
		checksum														
	P0604	writeability check of	RAM read and write test	true			true	PCM after-run time of the					30 sec	at key off	2.6 sec	immediataly
		RAM	failed					last driving cycle completly						once per		
								finished	true			true		dcy		
	P0604	writeability check of	cyclic RAM read and write										1 sec	0.04 sec	2.6 sec	immediataly
	1 0004	RAM	test of										1 360	0.04 360	2.0 360	inineciataly
			critical regions failed	true			true							continous		
	P0606	rationality check -	shut down of power stages not possible	true			true						0.05 sec	at key on	2.6 sec	immediataly
		programming	stages not possible											once per		
		incomplete														
														dcy		
	P0606	writeability check of	TPU parameter RAM	true			true						0.05 sec	at key on	2.6 sec	immediataly
		Time Processing Unit (TPU) parameter	read and write											once per		
		RAM	test failed													
														dcy		
	P0606	rationality check -	wrong TPU code RAM	true			true						0.3 sec	0.1 sec	2.6 sec	immediataly
		verification of Time	checksum											continous		
		Processing												Contailodo		
		Unit (TPU) code RAM checksum														
	P0606	rationality check -	difference between Time Processing Unit										0.3 sec	0.1 sec	2.6 sec	immediataly
		time difference check	time and PCM time	>	0.001	sec	> 0.001 sec							continous		
accelerator accelerator		Voltage accelerator position sensor														
position sensor		position sensor														
	P 2123	range check high	accelerator position	>	4.824	V	> 4.824 V	for time	>	0.2	sec	> 0.2 sec	immediatal	continuously	0.2 sec	0.4 sec
			sensor voltage 1					condition batterie voltage is					У			
								sufficient for 5V accelerator	true			true				
								sensor supply								
	P 2122	range check low	accelerator sensor voltage 1	<	0.898	V	< 0.898 V	for time	>	0.2	sec	> 0.2 sec				
			and		0.001		0.0000									
			accelerator sensor voltage 2	<	0.664	V	< 0.664 V									
			or									A -				
			accelerator sensor voltage 1	<	0.898	V	< 0.898 V	for time	>	0.2	Sec	> 0.2 sec				
			and													
			synchronization between													
			voltages 1 and 2													
			violated (see values of													
			absolute													
			difference in	true			true									
			accelerator sensor voltages depending on													
			ranges in													
			FP1P absolute difference check													
			below)													
L	I	1	and	l	1	l	l						1			I

Component/	Fault	Monitor Stratomy	Brimony Molfunction	Threshold	Threehold	Threshold	Threshold	Secondary	Enable	Enable	Enchio	Threshold	Time	Fraguenov	Criteria	MIL
Component/ System	Code	Monitor Strategy Description	Primary Malfunction Signal and Criteria	Logic	Value	Units	Conditions	Secondary Parameters	Logic	Value	Enable Units	Conditions	Time Required	Frequency of Checks	for Code	Illum.
			error reaction accelerator- travel sensor limphome	false			false									
			and													
			high contact resistance at	false			false									
			accelerator voltage 1					condition lower limit								
	P 2138	absolute difference check	absolute difference between both					voilated (see min fault path of FP1P)	false			false				
		fault time	accelerator sensor voltages in the range					condition lower limit voilated (see min fault path of FP2P)	false			false				
			below 1.25 V	>	0.215	V	> 0.215 V	error reaction accelerator- travel sensor limphome	false			false				
			or					condition batterie voltage is sufficient for 5V accelerator sensor supply	true			true				
			absolute difference between both													
			accelerator sensor													
			voltages in the range from 1.25 V to 3.496 V	>	0.273	V	> 0.273 V									
			or													
			absolute difference between both													
			accelerator sensor voltages in the range													
			above 3.496 V	>	1.035	V	> 1.035 V									
			and fullfilled for the time	>	0.24	sec	> 0.24 sec									
	P 2128	range check high	accelerator sensor voltage	>	4.824	V	> 4.824 V	for time	>	0.2	Sec	> 0.2 sec				
		fault time						condition batterie voltage is sufficient for 5V accelerator	true			true				
								sensor supply								
	P 2127	range check low	accelerator sensor voltage 1	<	0.898	V	< 0.898 V	for time	>	0.2	sec	> 0.2 sec				
			and accelerator sensor	<	0.684	V	< 0.684 V									
			voltage 2			-										
			or accelerator sensor	<	0.684	V	< 0.684 V	for time	>	0.2	sec	> 0.2 sec				
			voltage 2	-												
			and synchronization													
			between potentiometers 1 and 2 violated (see values of absolute difference in accelerator sensor	true			true									
			voltages depending on ranges in FP1P absolute difference check below)													
			and													
			error reaction accelerator- travel sensor limphome	false			false									
			and high contact resistance at accelerator voltage 2	false			false									
Diagnosis of CAN																
signal timeout – instrument panel	U0212	CAN signal missing	CAN message of Gateway ID 0x380/1 received	<	1.250	S	< 1.250 s	battery voltage	>	10	V	> 10 V		continuous	immediately	immediately

Component/	Fault	Monitor Strategy	Primary Malfunction	Threshold	Threshold	Threshold	Threshold	Secondary	Enable	Enable	Enable	Threshold	Time	Frequency	Criteria	MIL
System	Code	Description	Signal and Criteria	Logic	Value	Units	Conditions	Parameters	Logic	Value	Units	Conditions	Required	of Checks	for Code	Illum.
				J					5		1					
								battery voltage	<	18	V	< 18 V				
								condition ignition switch on	>	3	S	> 3 s	3 s			
								for time								
								CAN-Status Enable normal	true			true				
								message transmission								
OBD ISO-15765																
Communication Bus																
	U0001	ISO-15765 Bus Error	Invalid Message Received	=	invalid		=invalid	CAN Bus	initialized			initialized	0.5 sec	0.01 sec	immediately	immediately
			or Dual Port Ram	=	error		=error	consisting of:	and ready			and ready	0.01 sec	continuous		
			Hardware Error;													
			or No Communication / Bus Off	=	bus off		=bus off	ignition on for	>	3	Sec	>3sec	0.03			
								battery voltage	>	10	V	>10V				
								battery voltage	<	18	V	<18V				
								normal bus communication	running	-	-	running				
	U0101	Communication with TCM	TCM Message Timeout	=	message		=message	Automatic Transmission	equipped	-	-	equipped	2.5 sec	0.01 sec	immediately	immediately
	U0402		or Invalid Message	=	missing,		=missing,	CAN Bus	initialized	-	-	initialized		continuous		
			Content													
					delayed,		delayed,	consisting of:	and ready			and ready				
					or		or	ignition on for	>	3	sec	>3sec				
					invalid		invalid	battery voltage	>	10	V	>10V				
					content		content	battery voltage	<	18	V	<18V				
								normal bus communication	running	-	-	running				
		1		l.						L	1		1		1	
end		1	1	1						1	1					