ON BOARD DIAGNOSTICS II INFO

System D

*1 Applicable Compo./Sys. # Monitored component	13
misfire	
fuel system	
front oxygen sensor	
rear oxygen sensor	
evaporative emission control sys.	
thermostat	
crankshaft position sensor	x
engine coolant temperature sensor	x
manifold absolute pressure sensor	x
intake air temperature sensor	
atmospheric pressure sensor	
vehicle speed sensor	
starter switch	
idle air control	x
fuel tank pressure sensor	
fuel temperature sensor	
fuel level sensor	
EVAP canister purge valve	
fuel tank pressure control valve	
EVAP canister vent valve	
fan control relay	
CAN system	
Mass air flow sensor	x*2
TAC(throttle actuator control valve)	x
active valve control system	x
engine oil temperature sensor	
direct variable valve lift	
Pressure control valve	

*1:   number is corresponded to component/system on the summary sheet

*2:   except applicable system within each component

SYSTEM E

*1 Applicable Compo./Sys. # / Monitored component	1	2	3	4	5	6	7	8	11	12	13	14	14'	18	19	23	40	49	49'	50	51	52 52'	53	60	62	72	80	82	83	84	95	96	99
misfire			x	x	x	x	x					x				x										x							
fuel system		×	×	×														x	x														
front oxygen sensor	x	x	x	x *2	x *2	x	x	x								x		x		×													
rear oxygen sensor	x			x			x *2	x *2																									
evaporative emission control sys.		x	x	x	x															×			×										
thermostat																																	
crankshaft position sensor		x							x *2	x	x															x							
camshaft position sensor		x								x *2	x															x							
engine coolant temperature sensor	x	x	x	x	x		x					x	x *2	x		x		x			x				x	x							
manifold absolute pressure sensor	x	x	x	x	x		x					x				x		x			x	x			x *2	x	x						
intake air temperature sensor	x	x	x	x	x		x											x			x		x		x	x							
atmospheric pressure sensor	×	×	×													×		×		×					× *2								
vehicle speed sensor	x			x	x							x			x	x	x	x			x			x		x							
neutral switch		x														x																	
starter switch		×							x					x																			
idle air control valve												x				x *2																	
fuel tank pressure sensor																		x			x *2		x										
fuel temperature sensor																		x			x	x *2											
fuel level sensor	x	x	x	x	x											x		x			x	x	x *2			x							
mass air flow sensor	x	x	x	x	x		x				x										x					x							
exhaust temperature sensor																																	
EVAP canister purge valve		x	x	x	x													x	x	x													
fuel tank pressure control valve																		x	x														
EVAP canister vent valve																		x	x				x										
fan control relay		x															x																
solenoid valve for tank pressure sensor																																	
VVT cam position sensor																																	
oil control valve		x																											x				
control area network (CAN)														x							x									x			

*1:   number is corresponded to component/system on the summary sheet

*2:   except applicable system within each component

Map 2 Enable condition for catalyst monitoring

FORESTER 2.5L Turbo & IMPREZA 2.5L Turbo

(AT)

Intake-manifold pressure (KPa)	0.0	33.3	40.0	53.3	66.7	80.0	93.3	106.7	133.3	160.0	186.7	213.3
PM2SMP (deg C)	0	200	150	80	50	50	50	30	-200	-400	-600	-800

(MT)

Intake-manifold pressure (KPa)	0.0	26.7	40.0	53.3	66.7	80.0	93.3	106.7	133.3	160.0	186.7	213.3
PM2SMP (deg C)	0	200	150	80	50	50	50	30	-200	-400	-600	-800

LEGACY & OUTBACK 2.5L Turbo

(AT)

Intake-manifold pressure (KPa)	0.0	26.7	40.0	53.3	66.7	80.0	93.3	106.7	133.3	160.0	186.7	213.3
PM2SMP (deg C)	0	200	150	100	50	50	50	0	-200	-400	-600	-800

(MT)

Intake-manifold pressure (KPa)	0.0	26.7	33.3	53.3	66.7	80.0	93.3	106.7	133.3	160.0	186.7	213.3
PM2SMP (deg C)	0	50	220	150	80	60	50	0	-200	-400	-600	-800

Estimated temperature in the catalyst ($catt_n$) is defined as below

Calculations : every 512ms

$catt_n = ((pmsm + PM2SMP) - catt_{n-1}) * CATNAMASI + catt_{n-1}$ [deg C]

pmsm : Intake-manifold pressure(mmHg)

PM2SMP is shown in the tables above.

CATNAMASI : 0.04(AT)   0.015(MT)   (FORESTER 2.5L Turbo & IMPREZA 2.5L Turbo)

CATNAMASI : 0.04(AT)   0.02(MT)   (LEGACY & OUTBACK 2.5L Turbo)

Map 3-1 Enable condition for misfire monitoring

FORESTER 2.5L Turbo & IMPREZA 2.5L Turbo

rpm	700	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	6700
AT	26.264	24.665	23.598	26.664	27.331	26.131	29.531	31.331	32.731	34.13	38.197	43.996	49.529	53.329
MT(V. Speed>= 40 mph)	25.065	24.798	25.598	38.263	39.33	38.93	38.53	37.597	39.73	44.263	44.263	44.263	46.996	51.062
MT (V. Speed< 40 mph)	25.065	24.798	23.331	24.665	23.998	25.598	28.798	29.997	31.597	32.531	37.064	41.863	46.929	51.062

(KPa)

LEGACY & OUTBACK 2.5L Turbo

rpm	700	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	6700
AT	29.33	26.66	26.66	26.66	27.33	28.00	29.53	31.33	32.73	34.13	38.20	44.00	49.53	53.33
MT(V. Speed>= 40 mph)	25.06	24.80	25.60	40.00	40.80	42.13	44.00	44.53	47.33	54.66	54.66	54.66	46.93	51.06
MT (V. Speed< 40 mph)	27.33	23.33	23.60	23.33	24.00	24.40	28.80	30.00	31.60	32.53	37.06	41.86	54.66	54.66

(KPa)

Map 5-1 Enable condition for intake air

FORESTER 2.5L Turbo & IMPREZA 2.5L Turbo & LEGACY & OUTBACK 2.5L Turbo

Engine speed (rpm)	idle	800	1200	1600	2000	2400	2800	3200	3600	4000	4400
MAP Value (g/rev)	Na	0.228	0.22	0.22	0.22	0.228	0.23	0.234	0.242	0.25	0.25

Map 10   Secondary parameter for change of fuel level

FORESTER 2.5L Turbo & IMPREZA 2.5L Turbo

Fuel level (%)	0.0	16.7	33.3	50.0	66.7	83.3	100.0
change of fuel level (%)	7.0	7.0	6.8	6.7	6.5	6.3	6.3

LEGACY & OUTBACK 2.5L Turbo

Fuel level (%)	0.0	15.6	31.3	46.9	62.5	78.1	93.8
change of fuel level (%)	7.8	7.8	7.8	7.8	7.8	7.8	7.8

System H

*1 Applicable Compo./Sys. #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14'	18	19	23	40	46	49	49'	50	51	52	52'	53	60	61	62	72	92	94	95
Monitored component																																		
misfire			x	x	x		x							x				x														x		
fuel system		x		x																			x											
front oxygen sensor	x	x	x	x *2	x *2		x	x										x					x	x										x
rear oxygen sensor	x			x			x *2	x *2																										
EGR system		x	x																															
evaporative emission control sys.		x	x	x	x																		x											
thermostat																																		
crankshaft position sensor		x								x	x *2	x	x																		x		x	
camshaft position sensor		x								x		x *2	x																		x			
engine coolant temperature sensor	x	x	x	x	x		x			x			x	x *2	x			x	x		x				x			x	x		x	x	x	x
manifold absolute pressure sensor	x	x	x	x	x		x			x			x					x						x	x			x *2		x	x			x
intake air temperature sensor	x	x	x	x	x		x											x						x	x				x	x *2	x	x	x	
atmospheric pressure sensor	x	x	x							x								x			x								x *2					x
vehicle speed sensor	x			x	x					x				x			x	x	x	x	x		x		x	x		x	x	x				x
neutral switch		x								x								x																x
starter switch		x									x					x				x														
idle air control valve										x			x																					x
fuel tank pressure sensor																					x		x *2				x							
fuel temperature sensor																					x			x	x *2							x		
fuel level sensor	x	x	x	x	x													x			x			x	x	x *2	x							
EVAP canister purge valve		x	x	x	x																x			x										
fuel tank pressure control valve																					x													
EVAP canister vent valve																					x				x *2									
fan control relay		x								x									x *2															
Mass air flow sensor	x	x	x	x	x		x						x *2										x									x		x
TAC(throttle actuator control valve)	x	x	x	x	x	x	x	x		x	x	x	x	x		x	x	x	x		x		x	x	x	x	x	x	x	x	x			
CAN system																		x	x					x										
Engine oil temperature sensor																																x	x	
Oil Switching Valve																																x	x	
Direct Variable Valve Lift																																		x

*1:   number is corresponded to component/system on the summary sheet
*2:   except applicable system within each component
*3:   components listed on table 20

System H

*1 Applicable Compo./Sys. #	8	53	
Monitored component			
misfire			
fuel system			
front oxygen sensor	x		
rear oxygen sensor	x *2		
EGR system			
evaporative emission control sys.			
thermostat			
crankshaft position sensor			
camshaft position sensor			
engine coolant temperature sensor			
manifold absolute pressure sensor			
intake air temperature sensor			
atmospheric pressure sensor			
vehicle speed sensor			
neutral switch			
starter switch			
idle air control valve			
fuel tank pressure sensor		x	
fuel temperature sensor			
fuel level sensor			
EVAP canister purge valve			
fuel tank pressure control valve			
EVAP canister vent valve		x *2	
fan control relay			
Mass air flow sensor			
TAC(throttle actuator control valve)	x	x	
CAN system			
Engine oil temperature sensor			
Oil Switching Valve			
Direct Variable Valve Lift			

*1:   number is corresponded to compo

*2:   except applicable system within ea

*3:   components listed on table 20

System H

Forester   LEV2

Forester   PZEV

Impreza

Legacy and Outback LEV2

Legacy and Outback PZEV

Map 2-1   Enable condition for catalyst monitoring

Forester PZEV   Legacy and Outback PZEV

Catalyst warm-up counter

amount of intake air (g/s)	0	3.2	6.4	9.6	12.8	16	19.2	22.4	25.6	28.8	32.0	35.2
Additional warm-up value	-5	-5	15	31	46	62	77	92	108	123	127	127

Map 2-2   Enable condition for catalyst monitoring

Forester LEV2   Impreza   Legacy and Outback LEV2

(AT)

Intake-manifold pressure (KPa)	0.0	33.3	40.0	53.3	66.7	80.0	93.3	106.7
PM2SMP (deg C)	300	250	250	250	220	200	150	50

(MT)

Intake-manifold pressure (KPa)	0.0	33.3	40.0	53.3	66.7	80.0	93.3	106.7
PM2SMP (deg C)	0	350	450	300	250	180	150	100

Estimated temperature in the catalyst ($catt_n$) is defined as below .

Calculations : every 512ms

$catt_n = ((pmsm + PM2SMP) - catt_{n-1}) \times CATNAMASI + catt_{n-1}$ [deg C]

   pmsm : Intake-manifold pressure(mmHg)

   PM2SMP : additional temperature as shown in the above tables.

   CATNAMASI : 0.04(AT)   0.015(MT)

3 - cont.

System H

Forester   LEV2
Forester   PZEV
Impreza
Legacy and Outback LEV2
Legacy and Outback PZEV

Map 3-1   Enable condition for misfire monitoring
Forester LEV2   Impreza   Legacy and Outback LEV2

intake manifold pressure [KPa]   (MT / AT)

rpm	650 / 700	1000	1500	2000	2500	3000	3500
MT (V. Speed< 40 mph)	25.6	23.1	20.0	20.0	20.0	21.6	26.4
(V. Speed>= 40 mph)	31.6	31.6	31.6	31.1	31.3	33.1	33.9
AT	25.6	24.4	22.0	22.4	22.8	23.9	29.9

rpm	4000	4500	5000	5500	6000	6400
MT (V. Speed< 40 mph)	28.0	29.5	32.4	36.4	39.9	43.2
(V. Speed>= 40 mph)	28.8	30.1	33.3	36.9	40.1	43.2
AT	31.3	32.5	35.6	39.3	43.3	44.5

Map 3-2   Enable condition for misfire monitoring
Legacy and Outback PZEV

intake manifold pressure [KPa]   (MT / AT)

rpm	650 / 700	1000	1500	2000	2500	3000	3500
MT (V. Speed< 40 mph)	25.6	22.5	20.0	20.0	20.0	21.6	26.4
(V. Speed>= 40 mph)	31.6	31.6	31.6	31.1	31.3	33.1	33.9
AT	26.0	23.9	22.4	22.3	22.5	23.1	29.9

rpm	4000	4500	5000	5500	6000	6400
MT (V. Speed< 40 mph)	25.6	22.5	20.0	20.0	20.0	21.6
(V. Speed>= 40 mph)	28.8	30.1	33.3	36.9	40.1	43.2
AT	31.3	32.5	35.6	39.3	43.3	45.9

Forester   LEV2
Forester   PZEV
Impreza
Legacy and Outback LEV2
Legacy and Outback PZEV

Map 5 Enable condition for intake air

Engine speed (rpm)	idle	650	1000	1500	2000	2500	3000	3500	4000	4500
MAP Value (g/rev)	na	0.203	0.183	0.155	0.149	0.157	0.162	0.18	0.193	0.205

3. -   cont.

<div style="text-align:right">

Forester   LEV2
Forester   PZEV
Impreza
Legacy and Outback LEV2
Legacy and Outback PZEV

</div>

Map 6   Secondary parameter for engine coolant temperature

Vehicle speed   (MPH)

Temp. (deg.C)	0.0	5.0	9.9	14.9	19.9	24.9	29.8	34.8
−20	0 ms	32.076 ms	39.977 ms	47.879 ms	82.544 ms	117.209 ms	154.214 ms	185.260 ms
−10	0 ms	25.704ms	33.606 ms	41.508 ms	68.520 ms	95.532 ms	125.667 ms	155.802 ms
0	0 ms	17.646 ms	25.548 ms	33.450 ms	53.652 ms	73.855 ms	97.120 ms	120.386 ms
10	0 ms	7.901 ms	15.802 ms	23.704 ms	37.941 ms	52.177 ms	68.573 ms	82.538 ms

(A)   Fault Criteria

   $Tt \leq -20$ degree C

   Where, Tt is an engine coolant temperature at t seconds on timer for diagnosis.

$t = 573669 - 33924 \times Ti$ ($t \geq 176762$)

Ti is a lowest coolant temperature after starting the engine.

(B)   Timer for diagnosis

   a)   Timer stop at fuel cut mode.

   b)   During the driving conditions except a) above, timer count up by

64ms + TWCNT ms at every 64ms.

Where, TWCNT is determined as follows,

TWCNT = 0 at idle switch on,

TWCNT show on the following table at idle switch off.

3. - cont.

System H
Forester LEV2
Forester PZEV
Impreza
Legacy and Outback LEV2
Legacy and Outback PZEV

Map 9 Secondary parameter for engine oil temperature

Vehicle speed (MPH)

Temp. (deg.C)	0	5	10	15	20	25	30	35
-30	64 ms	73.2 ms	83.9 ms	96.3 ms	113.2 ms	133.9 ms	160.2 ms	194.6 ms
-20	64 ms	73.3 ms	84 ms	96.6 ms	113.7 ms	135 ms	162 ms	197.4 ms
-10	64 ms	73.4 ms	84.2 ms	96.9 ms	114.5 ms	136.4 ms	164.4 ms	201.5 ms
0	64 ms	73.5 ms	84.5 ms	97.4 ms	115.6 ms	138.5 ms	168 ms	207.6 ms
10	102.2 ms	114.8 ms	129.4 ms	146.7 ms	171.7 ms	203.4 ms	245.1 ms	302.1 ms

(A) Fault Criteria

Tt ≤ - 15 degree C

Where, Tt is an engine oil temperature at t seconds on timer for diagnosis.

t = 1882940 − 43302 × Ti   (t >=1882940)

Ti is a lowest oil temperature after starting the engine.

(B) Timer for diagnosis

a) Timer stop at fuel cut mode.

b) During the driving conditions except a) above, timer count up by

64ms + TOILCNT ms at every 64ms.

Where, TOILCNT is determined as follows,

TOILCNT = 0 at idle switch on,

TOILCNT show on the following table at idle switch off.

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System	Certification Standard	Enhanced Evap.	ORVR
System E	LEV-II	yes	yes

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria		Secondary Parameters		Enable Conditions			Time Required		MIL Illum.
							FORESTER	Impreza WRX	Legacy & Outback			
(1) Catalyst	P0420	oxygen storage	accumulated variation of output voltage of rear oxygen sensor per 32 msec. divided by accumulated variation of lambda of front lambda sensor per 32 msecs.		engine coolant temperature	>=	70	<--	<--	deg C	30-55 secs.	two driving cycles
					atmospheric pressure	>	75.06029	<--	<--	KPa		
					battery voltage	>	10.9	<--	<--	V		
					components listed on #1 of page 03-E-1		no failure	<--	<--			
					closed loop control with oxygen sensors		operating	<--	<--			
			$\Sigma \mid (ro2sad_n - ro2sad_{n-1}) \mid$		Estimated temperature in the catalyst on Map2 of page 03-E-3 AT	>=	480	<--	520	deg C		
			----------------------------------		MT	>=	500	<--	535			
			$\Sigma \mid (sglmd_n - sglmd_{n-1}) \mid$		difference between actual and target lambda < 0.10	>=	1000	<--	<--	msec		
					vehicle speed	>	43.498	<--	46.605	mph		
					amount of intake air	>=	12	<--	<--	g/s		
							and	<--	<--			
						<	40	<--	<--	g/s		
					intake air change every half engine revs.	<	0.02	<--	<--	g/rev		
					secondary oxygen sensor output change, Lean to Rich		experienced after	<--	<--			
					evaporative system monitoring		not in operation	<--	<--			
					misfire detection during 200 engine revs.	<	5	<--	<--	time		
					accumulative time of canister purge after engine start	>=	19.9	<--	5	sec		
					learning value of EVAP conc. during purge	<	0.2	<--	<--			
					after engine starting	>=	235	<--	230	sec		
(2) Misfire	P0301 (#1 cyl)	crankshaft speed fluctuation	FTP emission threshold		fuel parameter determination		not extremely low	<--	<--		1000 engine revs.	two driving cycles
					in-manifold pressure change during 1/2 engine rev.	<	13.33	<--	26.66	KPa		
						<	13.33	<--	<--	KPa		
	P0302 (#2 cyl)				throttle position change during 16 msecs.	<	14	<--	<--	deg		
						<	14	<--	<--	deg		
					fuel shut-off function		not operating	<--	<--			
	P0303 (#3 cyl)				VDC or auto. trans. torque control		NA	<--	<--			
					evaporative system monitoring		not in operation	<--	<--			
					battery voltage	>=	8	<--	<--	V		
	P0304 (#4 cyl)				components listed on #2 of page 03-E-1		no failure	<--	<--			
					atmospheric pressure	>=	75.06029	<--	<--	KPa		
					engine speed	>=	500	<--	600	rpm		
							and	<--	<--			
			catalyst damage			<	6500	<--	<--	rpm	200 engine revs.	immediately
					fuel level	>=	15.0	<--	<--	%		
					intake manifold pressure	>	value from Map 3 on page 03-E-3	<--	<--			
					all secondary parameters to be in enable conditions	>=	1024.0	<--	<--	msec		

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions				Time Required	MIL Illum.
					FORESTER	Impreza WRX	Legacy & Outback			
(3) Fuel system	P0171	fuel trim limits exceeded (based on a primary oxygen sensor) /Method 3 on page 02-5	fsobd = (sglmd - tglmda) + faf + flaf where, sglmd = measured lambda tglmda = target lambda faf = feed-back lambda coefficient every 64 msecs. flaf = learning lambda	fuel learning system	in operation	<--	<--		10 sec x 5 time	two driving cycles
				engine coolant temperature	>= 70	<--	<--	deg C		
				intake air	>= see Map 5 of page 03-E-3					
				intake air change during 0.5 engine rev.	<= 0.02	<--	<--	g/rev		
				components listed on #3 of page 03-E-1	no failure	<--	<--			
	P0172			fuel learning system	in operation	<--	<--		10 sec x 5 time	
				engine coolant temperature	>= 70	<--	<--	deg C		
				intake air	>= see Map 5 of page 03-E-3					
				intake air change during 0.5 engine rev.	<= 0.02	<--	<--	g/rev		
				learning value of EVAP conc. during purge	<= 0.1	<--	<--			
				accumulative time of canister purge after engine start	>= 20	<--	<--	sec		
				continuous period after canister purge starting	>= 29884	<--	<--	msec		
				components listed on #3 of page 03-H-1	no failure	<--	<--			
	P2096 P2097	fuel trim limits exceeded (based on a secondary oxygen sensor)	Secondary learning lambda (LTFT of secondary O2 sensor)	Sub feed back learning condition	in enable condition	<--	<--		5 sec × 1 time	two driving cycles
				all secondary parameters to be in enable conditions	>= 1	<--	<--	sec		
(4) Front lambda sensor -Output voltage	P1152	output range check /Method 4 on page 02-7	output lambda when rear oxygen sensor feedback value being at low limit	engine coolant temperature	>= 70	<--	<--	deg C	10000 msec	two driving cycles
				atmospheric pressure	> 75.06029	<--	<--	KPa		
				battery voltage	> 10.9	<--	<--	V		
				components listed on #4 of page 03-E-1	no failure	<--	<--			
	P1153		output lambda when rear oxygen sensor feedback value being at high limit	closed loop control with oxygen sensors	operating	<--	<--			
				rear oxygen sensor output voltage - feed-back target	>= -0.2	<--	<--	V		
					and	<--	<--			
					< 0.1	<--	<--	V		
				or rear oxygen sensor feed - back adjust	on minimum limit	<--	<--			
				or rear oxygen sensor feed - back adjust	on maximum limit	<--	<--			
				intake air change during 0.5 engine rev.	< 0.02	<--	<--	g/rev		
				impedance of front lambda sensor	>= 0	<--	<--	ohm		
					and	<--	<--			
					< 50	<--	<--	ohm		
				after engine starting	>= 60000	<--	<--	msec		
				vehicle speed	>= 12.428	<--	<--	mph		
				amount of intake air	>= 6	<--	<--	g/s		
				accumulative time of canister purge after engine start	>= 19.9	<--	<--	sec		
				learning value of EVAP conc. during purge	< 0.2	<--	<--			
				all secondary parameters to be in enable conditions	>= 4096	<--	<--	msec		
				Target lambda load correction coefficient	>= NA	<--	<--			
					and	<--	<--			
					< NA	<--	<--			

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (3)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		Enable Conditions FORESTER	Impreza WRX	Legacy & Outback		Time Required	MIL Illum.
(4) Front lambda sensor -Output voltage	P0131	circuit continuity	input voltage or input current	battery voltage components listed on #4 of page 03-E-1	>=	10.9 no failure	<-- <--	<-- <--	V	1000 msec	immediately
	P0132		input voltage or input current							1000 msec	
	P0134		impedance of front lambda sensor	battery voltage components listed on #4 of page 03-E-1	>=	10.9 no failure	<-- <--	<-- <--	V	5000 msec	
				accumulated variation of front lambda sensor heater control duty per 128ms.	>= >=	36000 70	<-- <--	<-- <--	msec %		
(5) Front lambda sensor -Response rate	P0133	comparison measured and feed-back signal	parafca = td2faf/td2lmd where, td2faf(N) = td2faf(n-1) + |d2faf(n)| td2lmd(N) = td2lmd(n-1) + |d2lmd(n)| add up for a total of 300 secs. d2faf(n) = (faf(n)-faf(n-1)) - (faf(n-1)-faf(n-2)) d2lmd(n) = (lmd(n)-lmd(n-1)) - (lmd(n-1)-lmd(n-2)) faf = feed-back lambda coefficient every 64 msecs. lmd = output lambda every 64 msecs.	components listed on #4 of page 03-E-1 after engine starting engine speed and vehicle speed and amount of intake air and atmospheric pressure battery voltage closed loop control with oxygen sensors impedance of front lambda sensor and engine coolant temperature intake air change during 0.5 engine rev. learning value of EVAP conc. during purge total time of operating canister purge all secondary parameters to be in enable conditions	>= >= < >= < >= < >= >= >= < >= <= <= >= >=	no failure 120000 1000 3200 6.214 74.568 10 31 75.06029 10.9 operating 0 50 70 0.02 0.2 19.9 1024	<-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <--	<-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <-- <--	msec rpm 4 rpm mph mph g/s g/s KPa V ohm ohm deg C g/rev sec msec	210 sec 32 ms × 1640 time	two driving cycles
(6) Front lambda sensor -Heater	P0031	circuit continuity	the level of output voltage	battery voltage components listed on #6 of page 03-E-1 front lambda sensor heater control duty	>= <	10.9 no failure 87.5	<-- <-- <--	<-- <-- <--	V %	1 secs. 4 ms × 250 time	immediately
	P0032		the level of output voltage	battery voltage components listed on #6 of page 03-E-1 front lambda sensor heater control duty	>= >=	10.9 no failure 12.5	<-- <-- <--	<-- <-- <--	V %	2 secs. 4 ms × 500 time	
	P0030	rationality check	impedance of front lambda sensor	battery voltage components listed on #6 of page 03-E-1 the condition as below front lambda sensor heater duty all secondary parameters to be in enable conditions after fuel shut-off	> >= >= >=	10.9 no failure experienced 35 42000 20000	<-- <-- <-- <-- <-- <--	<-- <-- <-- <-- <-- <--	V % msec msec	10000 msec	two driving cycles

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (4)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		Enable Conditions					Time Required		MIL Illum.
						FORESTER	Impreza WRX	Legacy & Outback					
(7) Secondary oxygen sensor -Output voltage	P0140	output range check /Method 7 on page 02-13	maximum output voltage	components listed on #7 of page 03-E-1		no failure	<--	<--			200000	msec	two driving cycles
				coolant temperature	>=	70	<--	<--	deg C				
			minimum output voltage	target output voltage of rear oxygen sensor	>=	0.6	<--	<--	V				
				amount of intake air	>=	10	<--	<--	g/s				
				battery voltage	>	10.9	<--	<--	V				
				closed loop control with oxygen sensors		in operation	<--	<--					
				the driving condition as below		experienced	<--	<--					
				the time of fuel shut of in decel	>=	5000	<--	<--	msec				
				from engine speed	>=	1700	<--	1600	rpm				
				misfire detection during 200 engine revs.	<	5	<--	<--	time				
				compensation factor for front lambda sensor		not in limit value	<--	<--					
(7')Secondary oxygen sensor '- A lack of circuit continuity	P0138	output range check	maximum output voltage caused by a lack of circuit continuity	secondary air system		not in operation	<--	<--			2500	msec	two driving cycles
				closed loop control with oxygen sensors		in operation	<--	<--					
				misfire detection during 200 engine revs.	<	5	<--	<--	times				
		/Method 7 on page 02-13		compensation factor for front lambda sensor		not in limit value	<--	<--					
				battery voltage	>	10.9	<--	<--	V				
	P0137		minimum output voltage caused by a lack of circuit continuity	secondary air system		not in operation	<--	<--			20000	msec	
				closed loop control with oxygen sensors		in operation	<--	<--			20000	msec	
				misfire detection during 200 engine revs.	<	5	<--	<--	times				
				compensation factor for front lambda sensor		not in limit value	<--	<--					
				battery voltage	>	10.9	<--	<--	V				
				amount of intake air	>=	10	<--	<--	g/s				
				secondary air system		not in operation	<--	<--		Forester,Impreza	40000	msec	
				closed loop control with oxygen sensors		in operation	<--	<--		Legacy&Outback	150000	msec	
				misfire detection during 200 engine revs.	<	5	<--	<--	times				
				compensation factor for front lambda sensor		not in limit value	<--	<--					
				battery voltage	>	10.9	<--	<--	V				
				amount of intake air	<	10	<--	<--	g/s				
				continuous time of rear O2 sensor heating	>=	25000	<--	<--	msec				
				fuel shut-off		no experienced	<--	<--					
				secondary air system		not in operation	<--	<--			* see table		
				closed loop control with oxygen sensors		in operation	<--	<--					
				misfire detection during 200 engine revs.	<	5	<--	<--	times				
				compensation factor for front lambda sensor		not in limit value	<--	<--					
				battery voltage	>	10.9	<--	<--	V				
				amount of intake air	<	10	<--	<--	g/s				
				continuous time of rear O2 sensor heating	>=	25000	<--	<--	msec				
				fuel shut-off		experienced	<--	<--					

fuel shut-off time (ms)	RO2KVNG F1	RO2KVNG F1
0	40000	150000
2000	40000	150000
10000	60000	150000

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (5)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		FORESTER	Impreza WRX	Legacy & Outback		Time Required	MIL Illum.
(8) Secondary oxygen sensor -Response rate	P0139	changing speed	shortest time change from rich(500 mV O2 output) to lean(200 mV) if voltage reduces from 550 mV to 150mV or the time of oxygen sensor output voltage >=kFSLDH1	components listed on #8 of page 03-E-1		no failure	<--	<--		1 time	two driving cycles
				battery voltage	>	10.9	<--	<--	V		
				closed loop control with secondary oxygen sensor		in operation	<--	<--			
				5 sec. or more fuel shut-off in decel.		experienced	<--	<--			
				after fuel shut-off	>=	2000	<--	<--	msec		
				accumulative time of rear O2 sensor heater operation	>=	60000	<--	<--	msec		
				continuous time of rear O2 sensor heater operation	>=	30000	<--	<--	msec		
				Estimated temperature in the catalyst	>=	400	<--	<--	deg C		
				number of the fuel shut-off in decel	>=	1	<--	<--	time		
			shortest time change from lean(300 mV O2 output) to rich(500 mV) if voltage reduces from 250 mV to 550 mV. or the time of oxygen sensor output voltage <kFSLDL1	components listed on #8 of page 03-H-1		no failure	<--	<--		1 time	two driving cycles
				battery voltage	>	10.9	<--	<--	V		
				closed loop control with secondary oxygen sensor		in operation	<--	<--			
				5 sec. or more fuel shut-off in decel.		experienced	<--	<--			
				after fuel shut-off	>=	2000	<--	<--	msec		
				accumulative time of rear O2 sensor heater operation	>=	60000	<--	<--	msec		
				continuous time of rear O2 sensor heater operation	>=	30000	<--	<--	msec		
				Estimated temperature in the catalyst	>=	0	<--	<--	deg C		
				number of the fuel shut-off in decel	>=	1	<--	<--	time		
(9) Secondary oxygen sensor -Heater	P0037	circuit continuity	the level of output voltage	battery voltage	>=	10.9	<--	<--	V	2.56 secs.	two driving cycles
				components listed on #9 of page 03-E-1		no failure	<--	<--		8 ms	
				after engine starting	>=	1	<--	<--	secs.	×	
				rear oxygen sensor heater control duty	<	75	<--	<--	%	320 time	
	P0038		the level of output voltage	battery voltage	>=	10.9	<--	<--	V	320 time	
				components listed on #9 of page 03-E-1		no failure	<--	<--			
				after engine starting	>=	1	<--	<--	secs.		
				rear oxygen sensor heater control duty	>=	25	<--	<--	%		
(11) Crankshaft position sensor	P0335	circuit continuity	crankshaft position sensor signal	components listed on #11 of page 03-E-1		no failure	<--	<--		3000 msec	immediately
				battery voltage	>=	8	<--	<--	V		
				starter switch		on	<--	<--			
	P0336	rationality check	amount of crank sensor signal during 1 rev.	components listed on #11 of page 03-E-1		no failure	<--	<--		10 eng. revs.	two driving cycles
				engine speed	<	3000	<--	<--	rpm	10 time	
				battery voltage	>=	8	<--	<--	V		
				cylinder number distinction		completed	<--	<--			
(13) Mass air flow sensor	P0102 P0103	range check	output voltage							500 msec 500 msec	immediately
	P0101	rationality check	output voltage	engine speed	>=	600	<--	<--	rpm	10000 msec	two driving cycles
						and	<--	<--			
					<	900	<--	<--	rpm		
					throttle angle	<	4.1	<--	<--	deg		
				coolant temperature	>=	70	<--	<--	deg C		
				intake manifold pressure	<	52.66219	<--	<--	KPa		
				component listed on #13 of page 03-E-1		no failure	<--	<--			
				engine speed	>=	2500	<--	<--	rpm	3000 msec	
				throttle angle	>=	15	<--	<--	deg		
				coolant temperature	>=	70	<--	<--	deg C		
				intake manifold pressure	>=	53.3288	<--	<--	KPa		
				component listed on #13 of page 03-E-1		no failure	<--	<--			
(14) Engine coolant temperature sensor	P0117 P0118	range check	output voltage							0.5 sec	immediately
	P0125	rationality check	engine coolant temperature	battery voltage	>=	10.9	<--	<--	V	not determined	two driving cycles
				engine speed	>=	500	<--	<--	rpm		
				components listed on #14 of page 03-E-1		no failure	<--	<--			
				timer count up by temp./vehicle speed		see map 6 on page 03-E-4					

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (6)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		FORESTER	Impreza WRX	Legacy & Outback		Time Required	MIL Illum.
(14') Engine coolant temperature sensor (stuck)	P0126		twoff-twmin	component listed on #14' of page 03-E-1		no failure	<--	<--		2500 msec	two driving cycles
				battery voltage	>=	10.9	<--	<--	V		
			where;	fuel level	>=	25	<--	23.4375	%		
			twoff : Engine coolant temperature at the end of the last driving cycle	after engine starting	>=	5	<--	<--	sec		
			twmin : Engine coolant temperature(min) after engine starting	vehicle speed	=	0	0	0	km/h		
				Fuel level of the current driving cycle - Fuel level at the end of the last driving cycle	<	5	<--	4.6875	%		
				Engine coolant temperature at the end of the last driving cycle	>=	70	<--	<--	deg C		
					<	95	<--	<--	deg C		
				fuel temperature	<	35	<--	<--	deg C		
				Fuel temperature at the end of the last driving cycle -fuel temperature	>	5	<--	<--	deg C		
				| intake air temperature - fuel temperature |	<	2.5	<--	<--	deg C		
(17) Knock sensor	P0327 P0328	range check	output voltage	ignition switch		on	<--	<--		1000 msec 1000 msec	immediately
(18) Vehicle speed sensor	P0500	range check	vehicle speed(from ABS)	battery voltage	>=	NA	NA	10.9	V	512 msec	immediately
				after engine starting	>=	NA	<--	2000	msec		
				components listed on #18 of page 03-E-1		NA	<--	no failure			
	P0502	functional check	number of signal in 1377 msec.	fuel shut-off in decel.		operating	<--	NA		4000 msec	immediately
				battery voltage	>=	10.9	<--	NA	V		
	P0503			engine speed	<	4000	<--	NA	rpm		
				components listed on #18 of page 03-E-1		no failure	<--	NA			
(19) Starter switch	P0512	functional check	starter 'off' signal	engine speed	>=	500	<--	<--	rpm	180000 msec	two driving cycles
				battery voltage	>=	8	<--	<--	V		
				components listed on #19 of page 03-E-1		no failure	<--	<--			
	P1518		starter 'on' signal	engine speed after continuous 0.8 sec. or more of < 500 rpm engine speed	>=	500	500	<--	rpm	800 msec	
				vehicle speed	<	0.6214	<--	<--	mph		
				components listed on #19 of page 03-E-1		no failure	<--	<--			
(23) Idle speed control (ISC)	P0506	functional check	actual - target eng. speed	components listed on #23 of page 03-E-1		no failure	<--	<--		10 sec x 3	two driving cycles
				closed control in ISC		in operation	<--	<--			
				feedback value for ISC		limits reached	<--	<--			
				vehicle speed	=	0	<--	<--	km/h		
				engine coolant temperature	>=	70	<--	<--	deg C		
				atmospheric pressure	>=	75.06029	<--	<--	KPa		
				fuel level	>=	15	<--	<--	%		
	P0507		actual - target eng. speed	after engine starting	>=	10.49	<--	<--	sec		
				measured lambda	>=	0.9	<--	<--			
						and	<--	<--			
					<	1.1	<--	<--			
				after air condition switching on-off, off-on	>=	5.1	<--	<--	sec		
				battery voltage	>=	10.9	<--	<--	V		
				after in-manifold pressure change more than 30 mmHg	>	5.1	<--	<--	sec		
				after neutral switch on - off event	>	5.1	<--	<--	sec		
	P0519	functional check	actual - target eng. speed	battery voltage	>=	10.9	<--	<--	V	2000 msec	immediately
				after engine starting	>=	1000	<--	<--	msec		
				closed control in ISC		in operation	<--	<--			
				components listed on #23 of page 03-E-1		no failure	<--	<--			
				vehicle speed	<	2.4856	<--	<--	mph		
					<	7.4568	<--	2.4856	mph		
				feedback value for ISC	<=	0	0	<--	%		
				engine speed change every 180 degree engine rev.	>=	-5	-5	<--	rpm		
(24) Solenoid valve for purge control	P0458	circuit continuity	drain voltage of FET	battery voltage	>=	10.9	<--	<--	V	2500 msec	two driving cycles
				after engine starting	>=	1	<--	<--	secs.		
				ignition switch		on	<--	<--			
				duty ratio of 'on'	<	75	<--	<--	%		
	P0459		drain voltage of FET	battery voltage	>=	10.9	10.9	<--	V	2500 msec	
				after engine starting	>=	1	1	<--	secs.		
				ignition switch		on	on	<--			
				duty ratio of 'on'	>=	25	25	<--	%		

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (7)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions FORESTER		Impreza WRX	Legacy & Outback		Time Required		MIL Illum.
(40) Radiator fan	P0691	circuit continuity	drain voltage of FET	engine speed	>=	500	<--	<--	rpm	2500	msec	two driving cycles
			& signal from ECM for relays	battery voltage	>=	10.9	<--	<--	V			
	P0692		drain voltage of FET	after engine starting	>=	1	<--	<--	secs.	2500	msec	
			& signal from ECM for relays	ignition switch		on	<--	<--				
	P0483	functional check	coolant temperature	components listed on #40 of page 03-E-1		no failure	<--	<--		300000	msec	two driving cycles
				engine speed	>=	550	<--	<--	rpm			
						and	<--	<--				
					<	950	<--	<--	rpm			
				idle switch		on	<--	<--				
				vehicle speed	=	0	0	<--	km/h			
				radiator fan signal change		"off" to "on"	<--	<--				
				coolant temperature	>=	95	<--	<--	degC			
				battery voltage	>=	10.9	<--	<--	V			
(46) Neutral switch	P0851	circuit continuity for AT	switch signal when park/	components listed on #46 of page 03-E-1		no failure	<--	<--		6.5	secs.	two driving cycles
			neutral="on" & any other	ignition switch		on	<--	<--		64	ms	
			switches="off" on AT	after engine starting	>=	2	<--	<--	secs.	×		
	P0852		switch signal when park/	starter switch		turn off	<--	<--		100	time	
			neutral="off" & any other	battery voltage	>=	10.9	<--	<--	V			
			switches="on" on AT	range switch on AT TCM		no failure	<--	<--				
	P0851	circuit continuity for MT	switch signal for MT	components listed on #46 of page 03-E-1		no failure	<--	<--		3	time	two driving cycles
				ignition switch		on	<--	<--				
				after engine starting	>=	2	<--	<--	secs.			
	P0852			starter switch		turn off	<--	<--				
				battery voltage	>=	10.9	<--	<--	V			
				driving condition change		a) to b)	<--	<--				
				a) vehicle speed	<=	0	<--	<--	mph			
				&								
				engine speed	>=	600	<--	<--	rpm			
					<=	and	<--	<--				
						900	<--	<--	rpm			
				b) vehicle speed	>=	39.7696	<--	<--	mph			
				&								
				engine speed	>=	1600	<--	<--	rpm			
						and	<--	<--				
					<=	2550	<--	<--	rpm			

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (8)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		Enable Conditions				Time Required	MIL Illum.
						FORESTER	Impreza WRX	Legacy & Outback			
(49) Evaporative emission control sys.	P0442 (0.04-leak)	functional check	P2 - K x P1	components listed on #49 of page 03-E-1		no failure	<--	<--		30 - 100 secs.	two driving cycles
			P2=tank pressure increase	closed air fuel ratio control		in operation	<--	<--			
			when Evap. system sealed	fuel temperature	>=	-10	<--	<--	deg C		
			after a vacuum applied during 16 secs.			and	<--	<--			
			P1=tank pressure increase		<	45	<--	<--	deg C		
			when Evap. system sealed during 16 secs.	fuel tank pressure	<	1426.545	<--	<--	Pa		
			note;	intake air temperature	>=	-10	<--	<--	deg C		
			K :P1>=0 : K=1.5	intake manifold vacuum (relative pressure)	<	-13332.2	<--	<--	Pa		
			P1< 0 : K=0	vehicle speed	>=	19.8848	<--	<--	mph		
				fuel level	>=	15	<--	<--	%		
	P0457 (big leak)		min. pressure after 10secs.			and	<--	<--			
			from vacuum starting		<	85	<--	<--	%		
				after engine starting	>=	335	<--	<--	sec		
				barometric pressure	>=	75.06029	<--	<--	KPa		
				battery voltage	>=	10.9	<--	<--	V		
				total time of canister purge operation	>=	120000	<--	<--	msec		
				learning value of EVAP conc. during purge	<=	0.08	<--	<--			
				change of fuel level per 128ms		4.166667	<--	3.125	%		
				pressure change per sec. compare to previous sec.	<	226.6474	<--	<--	Pa		
					<	226.6474	<--	<--	Pa		
				min-pressure change per sec.- max-pressure change							
				per sec. during monitoring	<	226.6474	<--	<--	Pa		
					<	226.6474	<--	<--	Pa		
				air fuel ratio	>=	0.76	<--	<--			
						and	<--	<--			
					<	1.25	<--	<--			
				engine speed	>=	1050	<--	<--	rpm		
						and	<--	<--			
					<	6500	<--	<--	rpm		

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; System E   2007 MY   Summary Sheet for OBD Strategy (9)

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		FORESTER	Impreza WRX	Legacy & Outback		Time Required	MIL Illum.
(49')Evaporative emission control system for 0.02 inches leak	P0456 (0.02-leak)	functional check	P1 P1:tank pressure increase above -5mmHg during the period that is decided time for changing pressure from -15mmHg to -5 mmHg when Evap. system sealed	components listed on #49' of page 03-H-1		no failure	<--	<--		65 - 516 sec	two driving cycles
				closed air fuel ratio control (at starting a diagnosis)		in operation	<--	<--			
				fuel temperature	>=	-10	<--	<--	deg C		
				and			<--	<--			
					<	55	<--	<--	deg C		
				or							
				after engine start with coolant temperature of 40 deg C or below	<	2400	<--	<--	sec		
				after engine starting	>=	120	<--	<--	sec		
				fuel level	>=	15	<--	<--	%		
				and			<--	<--			
					<	85	<--	<--	%		
				fuel tank pressure	>=	-666.61	<--	-426.6304	Pa		
				and			<--	<--			
					<	1426.545	<--	<--	Pa		
				intake manifold vacuum (relative pressure)	<	-13.3322	<--	<--	KPa		
							<--	<--			
				Continuous two minutes of vehicle speed (at starting a diagnosis)	>=	31.07			mph		
				vehicle speed	>=	18.642	<--	<--	mph		
				atmospheric pressure	>=	75.06029	<--	<--	KPa		
				battery voltage	>=	10.9	<--	<--	V		
				total time of canister purge operation	>=	120000	<--	<--	msec		
				since last incomplete diagnosis event of 0.02 inches leak	>=	120000	<--	<--	msec		
					>=	600000	<--	<--	msec		
				engine speed	>=	1050	<--	<--	rpm		
				and			<--	<--			
					<	6000	<--	<--	rpm		
				(during diagnosis) pressure change per sec. compare to previous sec.	<	58.66168	<--	<--	KPa		
				min-pressure change per sec. - max-pressure change per sec. during monitoring	<	67.99422	<--	<--	Pa		
				| tank pressure change per sec. |	<=	99.9915	<--	<--	Pa		
							<--	<--			
				change of fuel level	<=	see Map 10 on page 03-E-8			liters/ms		
				change of atmospheric pressure(modeD)	>	-0.4799592	<--	<--	KPa		
				and			<--	<--			
					<=	0.3199728	<--	<--	KPa		
				change of atmospheric pressure(modeE)	>	-0.3199728	<--	<--	KPa		
				and			<--	<--			
					<=	0.3199728	<--	<--	KPa		
(50) Tank pressure sensor	P0453	range check	fuel tank pressure	vehicle speed	>=	1.2428	<--	<--	mph	15000 msec	immediately
				battery voltage	>=	10.9	<--	<--	V		
				components listed on #50 of page 03-E-1		no failure	<--	<--			
				all conditions for EVAP canister purge		to be in enable	<--	<--			
				learning value of EVAP conc. during purge	<=	0.08	<--	<--			
				feed-back lambda coefficient	>=	0.9	<--	<--			
				fuel temperature	<	35	<--	<--	deg C		
				atmospheric pressure	>	75.06029	<--	<--	KPa		
	P0452			battery voltage	>=	10.9	<--	<--	V		
				components listed on #50 of page 03-E-1		no failure	<--	<--			
	P0451	rationality check	max. - min. tank pressure	change of fuel temperature	>=	7	<--	<--	deg C	1 sec	two driving cycles
				count of detecting fuel level change above 5liters during 1min		16	<--	<--	time		
				fuel level	>=	15	<--	<--	%		
				fuel temperature	<	35	<--	<--	deg C		
				atmospheric pressure	>	75.06029	<--	<--	KPa		
				after engine starting	>=	60	<--	<--	sec		
				battery voltage	>=	10.9	<--	<--	V		
				on/off change of EVAP canister purge		experienced	<--	<--			
				fuel temp. & level sensor		no failure	<--	<--			
(51) Fuel temperature sensor	P0182	range check	output voltage	battery voltage	>	10.9	<--	<--	V	2500 msec	immediately
	P0183									2500 msec	
	P0181	rationality check	fuel temperature - coolant temperature	components listed on #51 of page 03-E-1		no failure	<--	<--		120 sec	two driving cycles
				fuel level	>=	15	<--	<--	%		
				battery voltage	>	10.9	<--	<--	V		
				coolant temp. - coolant temp. at engine start	>	10	<--	<--	deg C		
				after engine starting	>=	20	<--	<--	sec		
			fuel temperature difference between max. and min.	accumulated amount of intake air	>	550	<--	<--	kg		
				after engine starting	>=	20000	<--	<--	msec		
				components listed on #51 of page 03-E-1		no failure	<--	<--			
				battery voltage	>	10.9	<--	<--	V		
(52) Fuel level sensor	P0462 P0463	range check	output voltage	battery voltage	>=	10.9	<--	<--	V	2500 msec 1000 msec	two driving cycles
				ignition switch		on	<--	<--			
				after engine starting	>=	3000	<--	<--	msec		
	P0461	rationality check	max.- min. fuel level output	accumulated amount of intake air	>	330957	<--	<--	g	not determined	
				battery voltage	>=	10.9	10.9	<--	V		
				after engine starting	>=	5000	<--	<--	msec		
				components listed on #52 of page 03-E-1		no failure	<--	<--			

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (10)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		FORESTER	Impreza WRX	Legacy & Outback		Time Required	MIL Illum.
(52') Fuel level sensor - slosh	P0464	rationality check	integrated times of the condition reaching follows, DVFLMAX >= Threshold or SUMVFL >= Threshold	engine speed	>=	500	<--	<--	rpm	12288 msec	two driving cycles
				battery voltage	>	10.9	<--	<--	V	x	
				after engine starting	>=	1	<--	<--	secs.	4 time	
				ignition switch		on	<--	<--			
				idle switch		on	<--	<--			
			where, - DVFLMAX is max. deviation of	fuel level	>=	15	<--	<--	%		
						and	<--	<--			
			sensor output during 12.2 secs.		<	85	<--	<--	%		
			- SUMVFL is integrated value of	vehicle speed = 0 km/h	>=	10000	<--	<--	msec		
			sensor output deviation during 12.2 secs.	components listed on #52' of page 03-E-1		no failure	<--	<--			
				Max - Min of tank pressure during 12.2 secs.	<	49.99575	<--	<--	Pa		
				Max - Min of battery voltage during 12.2 secs.	<	0.465	<--	0.27	V		
(53) Solenoid valve for canister vent control	P0447	circuit continuity	drain voltage of FET and signal from ECM	battery voltage	>=	10.9	<--	<--		2500 msec	immediately
				after engine starting	>=	1	<--	<--	secs.		
	P0448		drain voltage of FET and signal from ECM	ignition switch		on	<--	<--		2500 msec	
	P1443	functional check	fuel tank pressure	components listed on #53 of page 03-H-1		no failure	<--	<--		3000 msec	
				battery voltage	>=	10.9	<-	<-	V		
				barometric pressure	>=	75.06029	<--	<--	KPa		
				solenoid valve for canister vent control		open	<--	<--			
				fuel tank pressure at engine start	>=	-666.61	<--	-426.6304	Pa		
						and	<--	<--			
					<	1426.545	<--	<--	Pa		
(54) Pressure control valve	P1400	circuit continuity	drain voltage of FET and signal from ECM	battery voltage	>=	10.9	<--	<--	V	2500 msec	two driving cycles
				after engine starting	>=	1	<--	<--	secs.		
	P1420		drain voltage of FET and signal from ECM	ignition switch		on	<--	<--		2500 msec	
(60) Manifold absolute pressure (MAP) sensor	P0107 P0108	range check	output voltage	components listed on #60 of page 03-E-1		no failure	<--	<--		500 msec 500 msec	immediately
	P0068	rationality check	output voltage	engine coolant temperature	>=	70	<--	<--	deg C	3000 msec	two driving cycles
				engine speed	<=	2500	<--	<--	rpm		
				intake air every half engine revs.	>	1.356	<--	<--	g/rev		
				throttle position	>=	10	<--	<--	deg		
				components listed on #60 of page 03-E-1		no failure	<--				
			output voltage	engine coolant temperature	>=	70	<--	<--	deg C	3000 msec	
				engine speed	>=	600	<--	<--	rpm		
						and	<--	<--			
					<	900	<--	<--	rpm		
				intake air every half engine revs.	<=	0.4	<--	<--	g/rev		
				throttle position	<=	2.75	<--	<--	deg		
				components listed on #60 of page 03-E-1		no failure	<--	<--			
(61) Intake air temperature sensor	P0111	rationality check	output voltage difference between max. and min.	coolant temp. before engine start	<	30	<--	<--	deg C	1 sec	two driving cycles
				coolant temperature	>	95	<--	<--	deg C		
				battery voltage	>=	10.9	<--	<--	V		
				driving blow 50 km/h	>=	600	<--	<--	sec		
				coolant temperature sensor		no failure	<--	<--			
	P0112 P0113	range check	output voltage	ignition switch		on	<--	<--		500 msec 500 msec	immediately
(64)Back-up power supply for memory of ECM	P1560	functional check	voltage of back-up power	engine speed	>=	500	<--	<--	rpm	2500 msec	immediately
				battery voltage	>=	10.9	<--	<--	V		

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (11)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		FORESTER	Impreza WRX	Legacy & Outback		Time Required		MIL Illum.
(72) Thermostat	P0128	functional check	(estimated - measured) coolant temperature	engine coolant temperature	<	70	<--	<--	deg C	not determined		two driving cycles
				engine coolant temperature at engine starting	<	55	<--	<--	deg C			
				battery voltage	>=	10.9	<--	<--	V			
				vehicle speed	>=	18.642	<--	<--	mph			
				components listed on #72 of page 03-E-1		no failure	<--	<--				
				estimated coolant temperature	>=	70	<--	<--	deg C			
				estimated ambient air temperature	>=	-7	<--	<--	deg C			
(74) Fuel pump control module	P0230	Functional/ check	fuel controller output diagnostic signal	battery voltage	>=	8	8	<--	V	2500	msec	two driving cycles
				fuel level	>=	16.66667	<--	15.625	%			
				after engine starting	>=	180000	<--	<--	msec			
				fuel pump control		on	<--	<--				
(76) Tumble generator valve (TGV)	P2008(RH) P2011(LH)	circuit continuity (for open circuit)	diagnostic input - open diagnostic input - short	battery voltage	>=	10.9	10.9	<--	V	2	sec	immediately
				output signal from ECM		at before change "on" to "off"				20	time	
										x		
										98	ms	
	P2009(RH) P2012(LH)	circuit continuity (for short circuit)	diagnostic input - open diagnostic input - short							1	sec	
										10	time	
										x		
										98	ms	
	P2004(RH) P2005(LH)	functional check (for open stuck)	TGV angle	the time of TGV "close" signal output	>=	2200	<--	3200	msec	3000	msec	
				coolant temperature	>=	0	<--	-30	deg C			
				ambient temperature	>=	0	<--	-30	deg C			
				battery voltage	>=	10.9	<--	<--	V			
				components listed on #76 of page 03-E-1		no failure	<--	<--				
	P2006(RH) P2007(LH)	functional check (for closed stuck)		the time of TGV "open" signal output	>=	1432	<--	4600	msec			
				coolant temperature	>=	0	<--	-30	deg C			
				ambient temperature	>=	0	<--	-30	deg C			
				battery voltage	>=	10.9	<--	<--	V			
				components listed on #76 of page 03-E-1		no failure	<--	<--				
(77) TGV position sensor	P2016(RH) P2021(LH)	range check	output voltage							500	msec	immediately
	P2017(RH) P2022(LH)									500	msec	
(78) Turbocharger pressure control solenoid	P0245	circuit continuity	ECM output signal	battery voltage	>	10.9	<--	<--	V	640	ms	immediately
				after engine starting	>=	1	<--	<--	secs.	4	ms	
				duty ratio for turbocharged pressure control	<	75	<--	<--	%	x		
										160	time	
	P0246			battery voltage	>	10.9	<--	<--	V	640	ms	
				after engine starting	>=	1	<--	<--	secs.	4	ms	
				duty ratio for turbocharged pressure control	>	25			%	x		
										160	time	
	P0244	functional check	intake manifold pressure							1	sec	immediately

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**　　　　　　　　　**2007 MY　Summary Sheet for OBD Strategy (12)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions				Time Required	MIL Illum.
					FORESTER	Impreza WRX	Legacy & Outback			
(81) Positive crankcase ventilation system	P1491	circuit continuity	Positive crankcase ventilation diagnostic. signal	battery voltage	> 10.9	<--	<--	V	2500 msec	immediately
				engine speed	>= 500	<--	<--	rpm		
(82)Active Valve Control System (AVCS)	P0340 (RH) P0345 (LH)	circuit continuity for cam position sensor	amount of cam sensor signal　　　　　　　　during 2 rev.	battery voltage	>= 8	<--	<--	V	100 revs 50	immediately
				components listed on #82 of page 03-E-1	no failure	<--	<--			
			cam sensor signal	starter switch	on	<--	<--		3000 msec	
	P2088 (RH) P2092 (LH)	circuit continuity for Oil control valve (OCV)	OCV control actual current	battery voltage	>= 10.9	<--	<--	V	2000 msec	immediately
				components listed on #82 of page 03-E-1	no failure	<--	<--			
				OCV control duty	>= 99.61	<--	<--	%		
	P2089 (RH) P2093 (LH)		OCV control actual current	battery voltage	>= 10.9	<--	<--	V	2000 msec	
				components listed on #82 of page 03-E-1	no failure	<--	<--			
				OCV control duty	< 0.39	<--	<--	%		
	P0011 (RH) P0021 (LH)	functional check for AVCS system								
			vtd > 0 　Σ | vtd$_n$ |　　　　　　　　R bank vtd < 0 　Σ | vtd$_n$ |　　　　　　　　R bank 　　　　　　　　　　　L bank 　where, 　　vtd= target position- actual position	battery voltage	>= 10.9	<--	<-	V	30000 msec	two driving cycles
				components listed on #82 of page 03-E-1	no failure	<--	<--			
				engine speed	>= 1300	<--	<--	rpm		
			L bank coolant temperature		> 60	<--	<--	deg C		
				AVCS	operating	<--	<--			
				target position change during 64msec.	< 1.07	<--	<--	°CA		
				AVCS target position	> 0	<--	<--	°CA		
				all secondary parameters to be in enable conditions	3000	<--	<--	msec		
	P0016 (Bank1) P0018 (Bank2)		Camshaft position	battery voltage	>= 10.9	<--	<--	V	20000 msec	two driving cycles
				components listed on #82 of page 03-E-1	no failure	<--	<--			
				engine speed	>= 500	<--	<--	rpm		
				coolant temperature	>= 60	<--	<--	deg C		
				AVCS	not operating	<--				
(83) CAN system	P0600	functional check	bus off flag or error warning flag or 　communication ID from TCU or ECU or VDC/ABS ECU not received 　　　　　　(LEGACY) 　　　communication ID from TCM not received 　　　　　(FORESTER,IMPREZA) or 　　　the data from ECU does not be updated 　　　　　(LEGACY) 　　　the data from AT does not be updated 　　　　　(FORESTER,IMPREZA)	battery voltage	>= 10.9	<--	<--	V	1 sec	immediately
				components listed on #83 of page 03-E-1	no failure	<--	<--			
				starter switch	off	<--	<--			
				engine	run	<--	<--			
(84) Transmission control system	P0700	functional check /Method 11 on page 02-20	MIL request flag from TCM	battery voltage	>= 10.9	<--	<--	V	2500 msec	immediately
				components listed on #84 of page 03-E-1	no failure	<--	<--			
(95)Cold start emission reduction strategy	P1602	amount of intake air	Estimated exhaust gas temperature after 14 seconds at cold start	atmospheric pressure	> 75.06029	<--	<--	KPa	14 sec	two driving cycles
				battery voltage	> 10.9	<-	<-	V		
			Duration to satisfy	components listed on #95 of page 03-E-1	no failure	<-	<-			
			"nefbgd – ne"	engine	run	<-	<-			
			Duration to satisfy	vehicle speed	<= 1.2428	<--	<--	mph		
			"Ignition timing retard"	Misfire detection during 200 engine rev. 　　(Because of catalyst damages)	< 5	<--	<--			
				Time after engine starting	= 14	14	<--	sec		

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System **; System E**   **2007 MY   Summary Sheet for OBD Strategy (13)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions FORESTER	Impreza WRX	Legacy & Outback		Time Required	MIL Illum.
(201) Throttle actuator control	P0638	functional check	motor control Duty	ignition switch	on	<--	<--		5000 msec	immediately
				motor supply voltage	>= 6.2	<--	<--	V		
				motor relay	on	<--	<--			
				CPU communication	no failure	<--	<--			
				previous diagnosis result	no failure	<--	<--			
				engine speed	< 500	<--	<--	rpm		
				ignition switch	on	<--	<--		2 sec	
				motor supply voltage	>= 6.2	<--	<--	V		
				motor relay	on	<--	<--			
				CPU communication	no failure	<--	<--			
				previous diagnosis result	no failure	<--	<--			
				engine speed	>= 500	<--	<--	rpm		
			| target throttle position -	ignition switch	on	<--	<--		see table 21-2 table 21-2	
				motor relay	on	<--	<--			
				previous diagnosis result	no failure	<--	<--			
				engine speed	>= 500	<--	<--	rpm		
				battery voltage	>= 6.2	<--	<--	V		
				throttle position sensor 1	>= target throttle position	<--	<--	deg		
				motor supply voltage	>= 6.2	<--	<--	V		
				throttle position sensor 1 circuit diagnosis	complete	<--	<--			
				throttle position sensor 2 circuit diagnosis	complete	<--	<--			
				throttle position sensor rationality diagnosis	complete	<--	<--			
				ignition switch	on	<--	<--		1000 msec	
				motor relay	on	<--	<--			
				previous diagnosis result	no failure	<--	<--			
				motor supply voltage	>= 6.2	<--	<--	V		
				engine speed	>= 500	<--	<--	rpm		
				battery voltage	>= 6.2	<--	<--	V		
				throttle position sensor 1	< target throttle position	<--	<--	deg		
				throttle position sensor 1 circuit diagnosis	complete	<--	<--			
				throttle position sensor 2 circuit diagnosis	complete	<--	<--			
				throttle position sensor rationality diagnosis	complete	<--	<--			
				ignition switch	on	<--	<--		5000 msec	
				motor relay	on	<--	<--			
				previous diagnosis result	no failure	<--	<--			
				motor supply voltage	>= 6.2	<--	<--	V		
				engine speed	< 500	300	<--	rpm		
				battery voltage	>= 6.2	<--	<--	V		
				throttle position sensor 1 circuit diagnosis	complete	<--	<--			
				throttle position sensor 2 circuit diagnosis	complete	<--	<--			
				throttle position sensor rationality diagnosis	complete	<--	<--			
(202) Throttle actuator control motor	P2101	circuit continuity	malfunction flag from motor operation IC	ignition switch	on	<--	<--		500 msec	immediately
				motor relay	on	<--	<--			
				CPU communication	no failure	<--	<--			
				previous diagnosis result	no failure	<--	<--			
				battery voltage	>= 6.2	<--	<--	V		
				motor supply voltage	>= 6.2	<--	<--	V		
	P2102		motor supply voltage	motor relay	on	<--	<--		400 msec	
				battery voltage	>= 11	<--	<--	V		
				CPU communication	no failure	<--	<--			
				previous diagnosis result	no failure	<--	<--			
	P2103		motor supply voltage	motor relay	off	<--	<--		600 msec	
				battery voltage	>= 6	<--	<--	V		
				CPU communication	no failure	<--	<--			
(203) Throttle return spring	P1160	functional check	throttle position sensor 1 at diagnosis start - throttle position sensor 1	ignition switch	off	<--	<--		600 msec	immediately
				the time after ignition switch off	= 992	<--	<--	msecs.		
				CPU communication	no failure	<--	<--			
				throttle position sensor 1 circuit diagnosis	complete	<--	<--			
				throttle position sensor 2 circuit diagnosis	complete	<--	<--			
				throttle position sensor rationality diagnosis	complete	<--	<--			
				motor supply voltage	>= 6	<--	<--	V		
				battery voltage	>= 6	<--	<--	V		
				| target throttle position at diagnosis start - throttle position sensor 1 at diagnosis start |	< 2	<--	<--	deg		
(204) Throttle position sensor minimum stop	P2109	rationality check	minimum stop position	battery voltage	>= 6	<--	<--	V	8 msec	immediately
				previous diagnosis result	no failure	<--	<--			
			| throttle position at ignition switch off to on - throttle minimum stop position |	battery voltage	>= 6	<--	<--	V	80 msec	
				previous diagnosis result	no failure	<--	<--			

Table 21-2

throttle position sensor1 (deg)	time msecs.
5.5	1000
9.0	400
13.0	300
22.0	250

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (14)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		Enable Conditions			Time Required	MIL Illum.
					FORESTER	Impreza WRX	Legacy & Outback			
(205) Throttle position sensor	P0122 (sensor1) P0222 (sensor2)	circuit continuity	output voltage (sensor2)	ignition switch	on	<--	<--		24 msec	immediately
				motor supply voltage	>= 6	<--	<--	V	24 msec	
				previous diagnosis result	no failure	<--	<--			
	P0123 (sensor1) P0223 (sensor2)		(sensor1) (sensor2)						24 msec 24 msec	
	P2135	rationality check	| throttle position sensor 1(deg) - throttle position sensor 2(deg)	ignition switch	on	<--	<--		212 msec	
				motor supply voltage	>= 6	<--	<--	V		
				previous diagnosis result	no failure	<--	<--			
				throttle position sensor 1 circuit diagnosis	complete	<--	<--			
				throttle position sensor 2 circuit diagnosis	complete	<--	<--			
(206) Pedal position sensor	P2122 (sensor1) P2127 (sensor2)	circuit continuity	output voltage (sensor1) (sensor2)	ignition switch	on	<--	<--		100 msec	immediately
				motor relay	on	<--	<--		100 msec	
				previous diagnosis result	no failure	<--	<--			
				battery voltage	>= 6	<--	<--	V		
	P2123 (sensor1) P2128 (sensor2)		(sensor1) (sensor2)						32 msec 100 msec	
	P2138	rationality check	| pedal position sensor 1 (deg) - pedal position sensor 2 (deg)	ignition switch	on	<--	<--		116 msec	
				previous diagnosis result	no failure	<--	<--			
				battery voltage	>= 6	<--	<--	V		
				pedal position sensor 1 circuit diagnosis	complete	<--	<--			
				pedal position sensor 2 circuit diagnosis	complete	<--	<--			

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (15)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		FORESTER	Enable Conditions Impreza WRX	Legacy & Outback		Time Required		MIL Illum.
(207) ECM performance	P0607	circuit continuity (inside ECM)	input voltage of throttle position sensor 1 | main CPU - sub CPU |	ignition switch previous diagnosis result battery voltage CPU communication starter switch the time after sub CPU reset	>= >=	on no failure 6 no failure off 200	<-- <-- <-- <-- <-- <--	<-- <-- <-- <-- <-- <--	V msec	600 msec 400 msec 350 msec 300 msec 250 msec		immediately
		circuit continuity (inside ECM)	input voltage of pedal position sensor 1 | main CPU - sub CPU |	ignition switch previous diagnosis result CPU communication battery voltage starter switch	>=	on no failure no failure 6 off	<-- <-- <-- <-- <--	<-- <-- <-- <-- <--	V	Forester,Impreza 750 msec 830 Forester,Impreza 550 msec 720 Forester,Impreza 400 msec 610 Forester,Impreza 300 msec 415 250 msec		immediately
		functional check (Sub CPU)	Watch dog signal from Sub CPU	ignition switch previous diagnosis result starter sw battery voltage the time after sub CPU reset	>= >=	on no failure off 6 200	<-- <-- <-- <-- <--	<-- <-- <-- <-- <--	V msec	200 msec		immediately
		functional check (CPU communication)	(Main CPU) sum check error, key word error, data writing error or communication error from sub CPU data	ignition switch previous diagnosis result starter switch battery voltage the time after sub CPU reset	>= >=	on no failure OFF 6 200	<-- <-- <-- <-- <--	<-- <-- <-- <-- <--	V msec	200 msec		immediately
			(Sub CPU) sum check error, key word error, or communication error from main CPU data	ignition switch previous diagnosis result battery voltage	>=	on no failure 6	<-- <-- <--	<-- <-- <--	V	200 msec		
		functional check (AMP circuit in ECM)	| throttle position sensor 1 - (amplified throttle position sensor 1) / 4 |	ignition switch previous diagnosis result battery voltage throttle position sensor 1	>= <	on no failure 6 see Map24	<-- <-- <-- <--	<-- <-- <-- <--	V deg	24 msec		immediately
			(amplified throttle position sensor 1) / 4	ignition switch previous diagnosis result battery voltage throttle position sensor 1	>= >=	on no failure 6 see Map24	<-- <-- <-- <--	<-- <-- <-- <--	V deg			
		functional check (cruise control)	cruise control	brake switch ignition switch motor relay battery voltage Sub CPU ETC activation previous diagnosis result CPU communication	>=	on on on 6.2 available no failure no failure	<-- <-- <-- <-- <-- <-- <--	<-- <-- <-- <-- <-- <-- <--	V	250 msec		immediately
		rationality check (brake switch circuit)	brake switch of main CPU brake switch of sub CPU	ignition switch battery voltage previous diagnosis result	>=	on 10.9 no failure	<-- <-- <--	<-- <-- <--	V	200 msec		immediately
			brake switch of main CPU brake switch of sub CPU	CPU communication		no failure	<--	<--				

Map24

battery voltage (V)	TAAD (deg.)
7.5	27.5
8.0	31

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (16)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		FORESTER	Impreza WRX	Legacy & Outback		Time Required		MIL Illum.
							Enable Conditions					
(207) ECM performance	P0607	functional check (instruction check)	(Main CPU) instruction error	ignition switch		off to on CPU reset	<-- <--	<-- <--		2 time		immediately
			calculated data through CPU and FPU compare with expectation	ignition switch throttle position sensor 1 circuit diagnosis		on complete	<-- <--	<-- <--		512 msec		
			(Sub CPU) calculated data from Main CPU compare with expectation	CPU communication the time after sub CPU reset	>=	no failure 200	<-- <--	<-- <--	msec	240 msec 40 msec * 6 time		
		functional check (software flow check)	(Main CPU) software flow error	ignition switch		on	<--	<--		504 msec		
			(Sub CPU) calculated data from Main CPU compare with expectation	CPU communication the time after sub CPU reset	>=	no failure 200	<-- <--	<-- <--	msec	240 msec 40 msec * 6 time		
		functional check (software monitor check)	software monitor error	CPU communication the time after sub CPU reset	>=	no failure 200	<-- <--	<-- <--	msec	248 msec		
(208)RAM in ECM	P0604	functional check	(Main CPU) Setting value can be written in all RAM area, and the values can be read correctly	ignition switch		off to on (CPU reset)	<--	<--		not determined		immediately
			(Sub CPU) check sum data on RAM , calculated sum data compare	CPU communication ignition switch the time after sub CPU reset	>=	no failure off to on 200	<-- <-- <--	<-- <-- <--	msec			
(209)ROM in ECM	P0605	functional check	check sum data on ROM , calculated sum data compare	(Main CPU) ignition switch		off to on (CPU reset)	<--	<--		not determined		immediately
				(Sub CPU) ignition switch motor supply voltage previous diagnosis result CPU communication the time after sub CPU reset	>= >=	on 6 no failure no failure 200	<-- <-- <-- <-- <--	<-- <-- <-- <-- <--	V msec			

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E (Forester AT)**　　　　　　**2007 MY　Summary Sheet for OBD Strategy (17)**

Component/ System	Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
(301) Range switch	P0705	functional check	"D" signal continuously	shifted vehicle speed	"N" to "3" >= 60 km/h	3.0 secs.	two driving cycles
			simultaneous signals	engine speed engine speed signal	> 3000 rpm not failure	3.0 secs.	
(302) Brake switch for AT	P0719	functional check	"on" signal	vehicle speed change	30 to 0 km/h	10 times	two driving cycles
	P0724	functional check	"off" signal	vehicle speed change	0 to 30 km/h	10 times	two driving cycles
(303) ATF temperature sensor	P0712	range check	output voltage	vehicle speed	>= 10 km/h	60.0 secs.	immediately
	P0713	range check	output voltage	vehicle speed	>= 10 km/h	60.0 secs.	immediately
(304) Turbine shaft speed sensor	P0715	range check	turbine shaft speed	engine speed output shaft speed range switch	>= 3000 rpm >= 1600 rpm "D","3","2"or "1"	3.0 secs.	immediately
(305) Vehicle speed sensor	P0720	range check	output shaft speed	determined output shaft speed determined output shaft speed	>= 800 rpm not failure	3.0 secs.	immediately
(306) Engine speed signal for AT	P0725	range check	engine speed	turbine shaft speed turbine shaft speed sensor vehicle speed vehicle speed sensor	>= 1000 rpm not failure >= 10 km/h not failure	3.0 secs.	immediately
(307) Automatic transmission gear ratio	P0731 P0732 P0733 P0734	functional check	GR/(1st gear ratio) GR/(2nd gear ratio) GR/(3rd gear ratio) GR/(4th gear ratio) where, GR = (turbine shaft speed) / (output shaft speed)	upshift or downshift events output shaft speed turbine shaft speed range switch throttle angle (at 1st gear) throttle angle (at not 1st gear) range switch turbine shaft speed sensor vehicle speed sensor	not in operation >= 300 rpm >= 300 rpm "D","3","2"or "1" >= 30 deg >= 6 deg not failure not failure not failure	3.0 secs.	immediately
(308) Lock-up clutch	P0741	functional check	engine speed - turbine shaft speed >= 　　　40 + vehicle speed /2	duty ratio for duty solenoid valve engine speed signal turbine shaft speed sensor	>= 90 % not failure not failure	10.0 secs.	two driving cycles
(309) Lock-up clutch duty solenoid	P0743	functional check	drain level of FET for solenoid valve is not change in one duty cycle	on duty ratio for duty solenoid valve	>= 5 %	200 msecs.	immediately
			drain level of FET for solenoid valve	on duty ratio for duty solenoid valve	= 0 %	200 msecs.	
(310) AT line pressure linear solenoid	P0748	functional check	cur_mon	cur_tgt	>= 100 mA	0.10 secs.	immediately
			cur_mon 　　　or 　　　　　cur_tgt - cur_mon where, cur_mon=monitor current for solenoid cur_tgt=target current for solenoid	cur_tgt	>= 100 mA	0.06secs.	
(311) Low clutch duty solenoid	P0753	functional check	drain level of FET for solenoid valve is not change in one duty cycle	on duty ratio for duty solenoid valve	>= 5 %	200 msecs.	immediately
			drain level of FET for solenoid valve	on duty ratio for duty solenoid valve	= 0 %	200 msecs.	
(312) 2-4th brake duty solenoid	P0758	functional check	drain level of FET for solenoid valve is not change in one duty cycle	on duty ratio for duty solenoid valve	>= 5 %	200 msecs.	immediately
			drain level of FET for solenoid valve	on duty ratio for duty solenoid valve	= 0 %	200 msecs.	
(313) High clutch duty solenoid	P0763	functional check	drain level of FET for solenoid valve is not change in one duty cycle	on duty ratio for duty solenoid valve	>= 5 %	200 msecs.	immediately
			drain level of FET for solenoid valve	on duty ratio for duty solenoid valve	= 0 %	200 msecs.	
(314) Low&Reverse brake duty solenoid	P0768	functional check	drain level of FET for solenoid valve is not change in one duty cycle	on duty ratio for duty solenoid valve	>= 5 %	200 msecs.	immediately
			drain level of FET for solenoid valve	on duty ratio for duty solenoid valve	= 0 %	200 msecs.	
(317) CAN communication	P1718	functional check	CAN bus condition	turbine shaft speed range switch	> 0 rpm "D","3","2"or "1"	500 msecs.	immediately
			fail counter from ECM is not change				

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; System E   2007 MY   Summary Sheet for OBD Strategy (22)

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions FORESTER		Impreza WRX	Legacy & Outback		Time Required		MIL Illum.
(96)-1 Secondary Air System (at operating)				=lowest temperature among *,*,and* at engine starting battery voltage battery voltage atmospheric pressure engine operated	>= >= >= >=	4.4 10.9 7 75.06029 operating	<-- <-- <-- <--	<-- <-- <-- <--	deg C V V KPa	10	sec	
	P0410	secondary air flow is not detected (based on pressure sensor in piping)	**<Monitoring for pressure of pump supplying>** secondary air pressure in the pipe (after corrected by atmospheric pressure)	amount of intake air (ga) pump of secondary air comb. valve	>=	2 operating One comb. valve is opening (except both comb. valves are closing)	<-- <-- <--	<-- <-- <--	g/s			
	P2443	Control valve closed stick (Bank2)	**<Monitoring for pulsation when one comb. valve closing>** accumulated pulsation value when RH comb.valve is closing	area where monitoring is able to be executed see MAP 23 on page 03-E-10	>=	1	<--	---				
	P2441	Control valve closed stick (Bank1)	accumulated pulsation value when RH comb.valve is closing	after fuel shut-off	>=	0	<--	---	msec			
	P2440	Control valve opened stick (Bank1)	**<Monitoring for pulsation when both comb. valves closing>** accumulated pulsation value when RH and LH comb. valve are closing. flow when RH comb. valve is closing (dsaicflopr)	engine load (gn) after fuel shut-off	>= >=	0.2 500	<-- <--	<-- 1000	g/rev msec			
	P2442	Control valve opened stick (Bank2)	accumulated pulsation value when RH and LH comb. valve are closing. flow when LH comb. valve is closing (dsaicflopl)									
	P2443	Control valve closed stick (Bank2)	**<Monitoring for pressure when comb. valves switching>** pressure change when LH comb. valve switches	amount of intake air (ga)	>	2 and	<-- <--	<-- <--	g/s			
	P2441	Control valve closed stick (Bank1)	pressure change when RH comb. valve switches	 engine speed (ne) after fuel shut-off	< < >=	20 4000 500	<-- <-- <--	25 <-- 1000	g/s rpm msec			
	P0411	secondary air flow increase unusual	**<Monitoring for excessive flow>** flow when RH comb. valve is closing (dsaicflestafvr) or flow when LH comb. valve is closing (dsaicflestafvl) dsaicflp0rlvb – dsaicflp0rvb dsaicflp0rlvb – dsaicflp0lvb									

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA, FORESTER, LEGACY, OUTBACK with Turbo Charged Engine System

Applicable System ; **System E**   **2007 MY   Summary Sheet for OBD Strategy (23)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		FORESTER	Impreza WRX	Legacy & Outback		Time Required	MIL Illum.

(96)-2 Secondary Air System (at disable)	P1410	Control valve open stick	difference between maximum value and minimum value
			   of pressure in piping
			and
			accumulation change of pressure in piping
			   every 4ms.
			and
			Change of atmosphere
				engine speed
				after engine starting
				after secondary air system disable
				amount of intake air
				
				battery voltage
					>=
					>=
					>=
					>=
					
					<
					>=
						500
						9000
						9000
						2
						and
						400
						10.9
							<--
							<--
							<--
							<--
							<--
							<--
							<--
								<--
								<--
								<--
								<--
								<--
								<--
								<--
									rpm
									msec
									msec
									g/s
									
									g/s
									V
										2000 msec
										x
										20 time
											immediately

	P2444	Pump "ON" stick	secondary air pressure in the pipe
			   - secondary air pressure in the pipe
			      (before the secondary air system operating)
				battery voltage
				engine running
				ignition switch
				secondary air pressure in the pipe calculation completion
				(before the secondary air system operating)
				progress time after the control secondary air systems end
				
				Pump "ON" stick no failure
					
					>=
					<=
						
						3000
						8000
							
							<--
							<--
								
								<--
								<--
									
									msec
									msec
										8 sec	

(97) Secondary Air Control valve relay	P0413 (bank1) P0416 (bank2) P0414 (bank1) P0417 (bank2)	Circuit Continuity	drain voltage of FET & signal from ECM for relays drain voltage of FET & signal from ECM for relays	ignition switch battery voltage	 >=	on 10.9	<-- <--	<-- <--	 V	2500 msec 2500 msec	immediately
(98) Secondary Air Pump relay	P0418 P1418	Circuit Continuity	drain voltage of FET & signal from ECM for relays drain voltage of FET & signal from ECM for relays	ignition switch battery voltage Secondary Air Pump relay "low" no failure	 >=	on 10.9	<-- <--	<-- <--	 V	2500 msec 2500 msec	immediately
(99) Secondary Air Pressure Sensor	P2131	rationality check	|pressure in piping - MAP|	engine speed at engine starting vehicle speed |in-mani press. at eng. start - MAP| after secondary air system disable components listed on #62 of page 03-E-1	< < < >=	300 0.6214 1.331887 2976 no failure	<-- <-- <-- <-- <--	<-- <-- <-- <-- <--	rpm mph KPa msec	328 msec	two driving cycles
	P2432 P2433	range check	output voltage	ignition switch		on	<--	<--		500 msec	immediately
(100) Solenoid valve for purge control 2	P2419	circuit continuity	drain voltage of FET and signal from ECM	battery voltage after engine starting	>= >=	10.9 1	<-- <--	<-- <--	 secs.	2500 msec	two driving cycles
	P2420		drain voltage of FET and signal from ECM	ignition switch		on	<--	<--		2500 msec	
	P0441	rationality check	fuel tank pressure difference between at the end of EVAP sys. diagnosis & 3.5 secs. later	EVAP emission control sys. amount of intake air fuel tank pressure at the end of EVAP system diagnosis	 < <	no failure 45 -1.29989	<-- <-- <--	<-- <-- <--	 g/s KPa	3500 msec	two driving cycles

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA 2.5L NA (LEV2), FORESTER 2.5L NA (LEV2), LEGACY 2.5L NA (LEV2), OUTBACK 2.5L NA (LEV2), FORESTER 2.5L NA (PZEV), LEGACY 2.5L NA (PZEV) & OUTBACK 2.5L NA (PZEV)

Applicable System ; **System H**   2007 MY Summary Sheet for OBD Strategy (1)

Applicable System	Certification Standard	Enhanced Evap.	ORVR		
System H	PZEV	yes	yes		

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters		FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA		Time Required	MIL Illum.
(1) Catalyst	P0420	Oxygen storage		engine coolant temperature	>=	70	<--	<--	<--	<--	deg C	30-55 secs.	two driving cycles
			$\Sigma \mid (ro2sad_n - ro2sad_{n-1}) \mid$	atmospheric pressure	>	75.06029	<--	<--	<--	<--	KPa		
			-----------------------------------	battery voltage	>	10.9	<--	<--	<--	<--	V		
			$\Sigma \mid (sglmd_n - sglmd_{n-1}) \mid$	components listed on #1 of page 03-H-1		no failure	<--	<--	<--	<--			
				closed loop control with O2 sensors		operating	<--	<--	<--	<--			
				amount of intake air	>=	10	<--	<--	<--	<--	g/s		
						and	<--	<--	<--	<--			
					<	40	<--	<--	<--	<--	g/s		
				after fuel shut off (SystemH P-ZEV only condition)	>=	-	value from Map 23 on page 03-H-11	-	value from Map 23 on page 03-H-11	-	msec		
				catalyst warm-up counter on Map 2-1 of page 03-H-3.1 (Only System H PZEV)	>=	-	9000	-	9000	-	time		
				Estimated temperature in the catalyst on Map 2-2 of page 03-H-3.1 (the other vehicles in System H except PZEV)	>=	650	-	650	-	650	deg C		
				difference between actual and target lambda < 0.10	>=	1000	<--	<--	<--	<--	msec		
				vehicle speed	>	43.498	<--	<--	<--	<--	mph		
				intake air change every half engine revs.	<	0.02	<--	<--	<--	<--	g/rev		
				secondary oxygen sensor output change, Lean to Rich		experienced after fuel shut-off	<--	<--	<--	<--			
				evaporative system monitoring		not in operation	<--	<--	<--	<--			
				misfire detection during 200 engine revs.	<	5	<--	<--	<--	<--	time		
				accumulative time of canister purge after engine start	>=	5	<--	<--	<--	<--	sec		
				learning value of EVAP conc. during purge	<=	0.2	<--	<--	<--	<--			
				after engine starting	>=	205	<--	<--	<--	<--	sec		
(2) Misfire	P0301 (#1 cyl) P0302 (#2 cyl) P0303 (#3 cyl) P0304 (#4 cyl)	crankshaft speed fluctuation	FTP emission threshold	fuel parameter determination		not extremely low volatility	<--	<--	<--	<--		1000 engine revs.	two driving cycles
				in-manifold pressure change during 1/2 engine rev.	<	13.3322	<--	<--	<--	<--	KPa		
						13.3322	<--	<--	<--	<--	KPa		
				throttle position change during 16 msecs.	<	21	<--	<--	<--	<--	deg		
						21	<--	<--	<--	<--	deg		
				fuel shut-off function		not operating	<--	<--	<--	<--			
				VDC or auto. trans. torque control		not operating	<--	<--	<--	<--			
				evaporative system monitoring		not in operation	<--	<--	<--	<--			
				battery voltage	>=	8	<--	<--	<--	<--	V		
				components listed on #2 of page 03-H-1		no failure	<--	<--	<--	<--			
				atmospheric pressure	>=	75.06029	<--	<--	<--	<--	KPa		
				engine speed	>=	460	<--	<--	<--	<--	rpm		
						and	<--						
					<	6400	<--	<--	<--	<--	rpm		
				fuel level	>=	15	<--	<--	<--	<--	%		
				intake manifold pressure	>	value from Map 3 on page 03-H-3.2	<--	<--	<--	<--			
				all secondary parameters to be in enable conditions	>=	1024	<--	<--	<--	<--	msec		
			catalyst damage										200 eng.revs.	immediately

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA 2.5L NA (LEV2), FORESTER 2.5L NA (LEV2), LEGACY 2.5L NA (LEV2), OUTBACK 2.5L NA (LEV2), FORESTER 2.5L NA (PZEV), LEGACY 2.5L NA (PZEV) & OUTBACK 2.5L NA (PZEV)

Applicable System ; System H   **2007 MY   Summary Sheet for OBD Strategy (2)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA		Time Required	MIL Illum.
(3) Fuel system	P0171 (Bank 1)	Fuel trim limits exceeded	$fsobd = (sglmd - tglmda) + faf + flaf$ where, sglmd = measured lambda tglmda = target lambda faf = feed-back lambda coefficient every 64 msecs. flaf=learning lambda	fuel learning system	in operation	<--	<--	<--	<--		10 sec x 5 time	two driving cycles
				engine coolant temperature	>= 75	<--	<--	<--	<--	deg C		
				intake air	>= see Map 5 of page 03-H-3.3	<--	<--	<--	<--			
				intake air change during 0.5 engine rev.	<= 0.02	<--	<--	<--	<--	g/rev		
				components listed on #3 of page 03-H-1	no failure	<--	<--	<--	<--			
	P0172 (Bank 1)	Fuel trim limits exceeded	$fsobd = (sglmd - tglmda) + faf + flaf$	fuel learning system	in operation	<--	<--	<--	<--		10 sec x 5 time	
				engine coolant temperature	>= 75	<--	<--	<--	<--	deg C		
				intake air	>= see Map 5 of page 03-H-3.3	<--	<--	<--	<--			
				intake air change during 0.5 engine rev.	<= 0.02		<--	<--	<--	g/rev		
				learning value of EVAP conc. during purge	<= 0.1	0.15	<--	<--	0.1			
				accumulative time of canister purge after engine start	>= 20	<--	<--	<--	<--	sec		
				continuous period after canister purge starting	>= 29884	<--	<--	<--	<--	msec		
				components listed on #3 of page 03-H-1	no failure	<--	<--	<--	<--			
	P2096 (Bank 1) P2097 (Bank 1)	fuel trim limits exceeded (based on a secondary oxygen sensor)	secondary learning lambda	Sub feed back learning condition	in enable condition	<--	<--	<--	<--		5 sec × 1 time	two driving cycles
				all secondary parameters to be in enable conditions	>= 1	<--	<--	<--	<--	sec		
(4) Front lambda sensor -Output voltage	P1152 (Bank 1)	output range check	output lambda when rear O2 sensor feedback value being at low limit	engine coolant temperature	>= 75	<--	<--	<--	<--	deg C	10000 msec	two driving cycles
				atmospheric pressure	> 75.06029	<--	<--	<--	<--	KPa		
				battery voltage	> 10.9	<--	<--	<--	<--	V		
				components listed on #4 of page 03-H-1	no failure	<--	<--	<--	<--			
				closed loop with O2 sensors	operating	<--	<--	<--	<--			
				rear O2 sensor output voltage-feed-back target	>= -0.2 and	<-- <--	<--	<--	<--	V		
					< 0.1	<--	<--	<--	<--	V		
	P1153 (Bank 1)		output lambda when rear O2 sensor feedback value being at high limit	or rear O2 sensor feed - back adjust	on minimum limit	<--	<--	<--	<--			
				or rear O2 sensor feed - back adjust	on maximum limit	<--	<--	<--	<--			
				intake air change during 0.5 engine rev.	< 0.02	<--	<--	<--	<--	g/rev		
				impedance of front O2 sensor	>= 0 and	<-- <--	<--	<--	<--	ohm		
					< 50	<--	<--	<--	<--	ohm		
				after engine starting	>= 60000	<--	<--	<--	<--	msec		
				vehicle speed	>= 12.428	<--	<--	<--	<--	mph		
				amount of intake air	>= 6	<--	<--	<--	<--	g/s		
				accumulative time of canister purge after engine start	>= 19.9	<--	<--	<--	<--	sec		
				learning value of EVAP conc. during purge	< 0.2	<--	<--	<--	<--			
				all secondary parameters to be in enable conditions	>= 4096	<--	<--	<--	<--	msec		
				Target lambda load correction coefficient	>= -0.03 and	<-- <--	<--	<--	<--			
					< 0	<--	<--	<--	<--			
	P0131 (Bank 1)	circuit continuity	input voltage or input current	battery voltage	>= 10.9	<--	<--	<--	<--	V	1000 msec	immediately
				components listed on #4 of page 03-H-1	no failure	<--	<--	<--	<--			
	P0132 (Bank 1)		input voltage or input current								1000 msec	
	P0134 (Bank 1)		impedance of front lambda sensor	battery voltage	>= 10.9	<--	<--	<--	<--	V	5000 msec	
				components listed on #4 of page 03-H-1	no failure	<--	<--	<--	<--			
				accumulated variation of	>= 36000	<--	<--	<--	<--	msec		
				front lambda sensor heater control duty per 128ms.	>= 70	<--	<--	<--	<--	%		
(5) Front lambda sensor -Response rate	P0133 (Bank 1)	comparison measured and feed-back signal	$parafca = td2faf/td2lmd$ where, $td2faf(N) = td2faf(n-1) + |d2faf(n)|$ $td2lmd(N) = td2lmd(n-1) + |d2lmd(n)|$ add up for a total of 210 secs. $d2faf(n) = (faf(n)-faf(n-1)) - (faf(n-1)-faf(n-2))$ $d2lmd(n) = (lmd(n)-lmd(n-1)) - (lmd(n-1)-lmd(n-2))$ faf = feed-back lambda coefficient every 128 msecs. lmd = output lambda every 128 msecs.	components listed on #5 of page 03-H-1	no failure	<--	<--	<--	<--		210 sec 32 ms × 4 × 1640 time	two driving cycles
				after engine starting	>= 120000	<--	<--	<--	<--	msec		
				engine speed	>= 1000 and	<-- <--	<--	<--	<--	rpm		
					< 3200	<--	<--	<--	<--	rpm		
				vehicle speed	>= 6.214 and	<-- <--	<--	<--	<--	mph		
					< 74.568	<--	<--	<--	<--	mph		
				amount of intake air	>= 10 and	<-- <--	<--	<--	<--	g/s		
					< 40	<--	<--	<--	<--	g/s		
				atmospheric pressure	> 75.06029	<--	<--	<--	<--	KPa		
				battery voltage	> 10.9	<--	<--	<--	<--	V		
				closed loop control with lambda sensors	operating	<--	<--	<--	<--			
				impedance of front lambda sensor	>= 0 and	<-- <--	<--	<--	<--	ohm		
					< 50	<--	<--	<--	<--	ohm		
				engine coolant temperature	>= 75	<--	<--	<--	<--	deg C		
				intake air change during 0.5 engine rev.	<= 0.02	<--	<--	<--	<--	g/rev		
				learning value of EVAP conc. during purge	< 0.2	<--	<--	<--	<--			
				accumulative time of canister purge after engine start	>= 19.9	<--	<--	<--	<--	sec		
				all secondary parameters to be in enable conditions	>= 1024	<--	<--	<--	<--	msec		

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA 2.5L NA (LEV2), FORESTER 2.5L NA (LEV2), LEGACY 2.5L NA (LEV2), OUTBACK 2.5L NA (LEV2), FORESTER 2.5L NA (PZEV), LEGACY 2.5L NA (PZEV) & OUTBACK 2.5L NA (PZEV)

Applicable System ; System H   2007 MY   Summary Sheet for OBD Strategy (3)

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA		Time Required	MIL Illum.
(6) Front lambda sensor -Heater	P0031(Bank1)	circuit continuity	the level of output voltage	battery voltage	>= 10.9	<--	<--	<--	<--	V	1 secs.	immediately
				front lambda sensor heater control duty	< 87.5	<--	<--	<--	<--	%	4 ms	
											× 250 time	
	P0032(Bank1)		the level of output voltage	battery voltage	>= 10.9	<--	<--	<--	<--	V	2 secs.	
				front lambda sensor heater control duty	> 12.5	<--	<--	<--	<--	%	4 ms	
											× 500 time	
	P0030(Bank1)	rationality check	impedance of a oxygen sensor	battery voltage	> 10.9	<--	<--	<--	<--	V	10000 msec	two driving cycles
				components listed on #6 of page 03-H-1	no failure	<--	<--	<--	<--			
				heater continuity	in operation	<--	<--	<--	<--			
				the condition as below	experienced	<--	<--	<--	<--			
				front lambda sensor heater duty	>= 35	<--	<--	<--	<--	%		
				all secondary parameters to be in enable conditions	>= 42000	<--	<--	<--	<--	msec		
				after fuel shut-off	>= 20000	<--	<--	<--	<--	msec		
(7) Secondary oxygen sensor -Output voltage	P0140(Bank1)	output range check	maximum output voltage	components listed on #7 of page 03-H-1	no failure	<--	<--	<--	<--		200000 msec	two driving cycles
				coolant temperature	>= 75	<--	<--	<--	<--	deg C		
				target output voltage of secondary O2 sensor	>= 0.6	<--	<--	<--	<--	V		
			minimum output voltage									
				amount of intake air	>= 10	<--	<--	<--	<--	g/s		
				battery voltage	> 10.9	<--	<--	<--	<--	V		
				closed loop control with O2 sensors	in operation	<--	<--	<--	<--			
				the driving condition as below	experienced	<--	<--	<--	<--			
				the time of fuel shut of in decel	>= 6000	<--	<--	<--	<--	msec		
				from engine speed	>= 1700	<--	<--	<--	<--	rpm		
				misfire detection during 200 engine revs.	<= 5	<--	<--	<--	<--	time		
				compensation factor for front lambda sensor	not in limit value	<--	<--	<--	<--			
(7')Secondary oxygen sensor '- A lack of circuit continuity	P0138(Bank1)	output range check	maximum output voltage caused by a lack of circuit continuity	secondary air system	not in operation	<--	<--	<--	<--		2500 msec	two driving cycles
				closed loop control with oxygen sensors	in operation	<--	<--	<--	<--			
				misfire detection during 200 engine revs.	< 5	<--	<--	<--	<--	times		
				compensation factor for front lambda sensor	not in limit value	<--	<--	<--	<--			
				battery voltage	> 10.9	<--	<--	<--	<--	V		
	P0137(Bank1)		minimum output voltage caused by a lack of circuit continuity	secondary air system	not in operation	<--	<--	<--	<--		20000 msec	
				closed loop control with oxygen sensors	in operation	<--	<--	<--	<--		20000 msec	
				misfire detection during 200 engine revs.	< 5	<--	<--	<--	<--	times		
				compensation factor for front lambda sensor	not in limit value	<--	<--	<--	<--			
				battery voltage	> 10.9	10.9	<--	<--	<--	V		
				amount of intake air	>= 10	<--	<--	<--	<--	g/s		
				secondary air system	not in operation	<--	<--	<--	<--		40000 msec	
				closed loop control with oxygen sensors	in operation	<--	<--	<--	<--			
				misfire detection during 200 engine revs.	< 5	<--	<--	<--	<--	times		
				compensation factor for front lambda sensor	not in limit value	<--	<--	<--	<--			
				battery voltage	> 10.9	10.9	<--	<--	<--	V		
				amount of intake air	< 10	<--	<--	<--	<--	g/s		
				continuous time of rear O2 sensor heating	>= 30000	<--	<--	<--	<--	msec		
				fuel shut-off	no experienced	<--	<--	<--	<--			
				secondary air system	not in operation	<--	<--	<--	<--		* see table	
				closed loop control with oxygen sensors	in operation	<--	<--	<--	<--			
				misfire detection during 200 engine revs.	< 5	<--	<--	<--	<--	times		
				compensation factor for front lambda sensor	not in limit value	<--	<--	<--	<--			
				battery voltage	> 10.9	<--	<--	<--	<--	V		
				amount of intake air	< 10	<--	<--	<--	<--	g/s		
				continuous time of rear O2 sensor heating	>= 30000	<--	<--	<--	<--	msec		
				fuel shut-off	experienced	<--	<--	<--	<--			
(8) Secondary oxygen sensor -Response rate	P0139(Bank1)	changing speed	shortest time change from rich(500 mV O2 output) to lean(200 mV) if voltage reduces from 550 mV to 150mV or the time of oxygen sensor output voltage	components listed on #8 of page 03-H-1	no failure	<--	<--	<--	<--		1 time	two driving cycles
				battery voltage	> 10.9	<--	<--	<--	<--	V		
				closed loop control with rear O2 sensor	in operation	<--	<--	<--	<--			
				6 sec. or more fuel shut-off in decel.	experienced	<--	<--	<--	<--			
				after fuel shut-off	2000	<--	<--	<--	<--	msec		
				accumulative time of rear O2 sensor heater operation	>= 60000	<--	<--	<--	<--	msec		
				continuous time of rear O2 sensor heater operation	>= 30000	<--	<--	<--	<--	msec		
				Estimated temperature in the catalyst (the other vehicles in System H except PZEV)	>= 400	-	400	-	400	deg C		
				catalyst warm-up counter (Only System H PZEV)	>=	9000	<--	9000	<--			
				number of the fuel shut-off in decel	>= 1	<--	<--	<--	<--	time		
			shortest time change from lean(300 mV O2 output) to rich(500 mV) if voltage reduces from 250 mV to 550 mV. or the time of oxygen sensor output voltage	components listed on #8 of page 03-H-1	no failure	<--	<--	<--	<--		1 time	
				battery voltage	> 10.9	<--	<--	<--	<--	V		
				closed loop control with rear O2 sensor	in operation	<--	<--	<--	<--			
				6 sec. or more fuel shut-off in decel.	experienced	<--	<--	<--	<--			
				after fuel shut-off	>= 2000	<--	<--	<--	<--	msec		
				accumulative time of rear O2 sensor heater operation	>= 0	60000	0	60000	0	msec		
				continuous time of rear O2 sensor heater operation	>= 0	30000	0	30000	0	msec		
				Estimated temperature in the catalyst	>= 0	-	0	-	0	deg C		
				number of the fuel shut-off in decel	>= 1	<--	<--	<--	<--	time		

fuel shut-off time (ms)
0
2000
10000

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA 2.5L NA (LEV2), FORESTER 2.5L NA (LEV2), LEGACY 2.5L NA (LEV2), OUTBACK 2.5L NA (LEV2), FORESTER 2.5L NA (PZEV), LEGACY 2.5L NA (PZEV) & OUTBACK 2.5L NA (PZEV)

Applicable System ; System H   2007 MY   Summary Sheet for OBD Strategy (4)

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions							Time Required	MIL Illum.
					FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA				
(9) Secondary oxygen sensor -Heater	P0037(Bank1)	circuit continuity	the level of output voltage	battery voltage	>= 10.9	<--	<--	<--	<--	V	2.56	sec	two driving
				after engine starting	>= 1	<--	<--	<--	<--	sec	8	ms	
				components listed on #9 of page 03-H-1	no failure	<--	<--	<--	<--	×			cycles
				rear oxygen sensor heater control duty	< 75	<--	<--	<--	<--	%	320	time	
	P0038(Bank1)		the level of output voltage	battery voltage	>= 10.9	<--	<--	<--	<--	V	320	time	
				after engine starting	>= 1	<--	<--	<--	<--	sec			
				components listed on #9 of page 03-H-1	no failure	<--	<--	<--	<--				
				rear oxygen sensor heater control duty	>= 20	<--	<--	<--	<--	%			
(10) Electronically controlled EGR	P01493(A+) P01495(A-) P01497(B+) P01499(B-)	circuit continuity	drain voltage of FEET and signal from ECM	battery voltage	> 10.9	<--	<--	<--	<--	V	2.5	sec	immediately
				target EGR valve positing	> 0	<--	<--	<--	<--	step	4	ms	
											×		
	P01492(A+) P01494(A-) P01496(B+) P01498(B-)		drain voltage of FEET and signal from ECM								625	time	
	P0400	functional check	PM2on - (PM2of1 + PM2of2)/2 where,	after engine starting	>= 40	<--	<--	<--	<--	sec C	1	time	two driving
				engine coolant temperature	>= 75	<--	<--	<--	<--	deg C			cycles
			when the EGR valve position	engine speed	>= 1200	<--	<--	<--	<--	rpm			
			change from off - on -off,	and		<--	<--	<--	<--				
			in-manifold pressure are determined		<= 2950	<--	<--	<--	<--	rpm			
			as PM2of1, PM2on1, PM2of2	intake manifold pressure	< 43.99626	<--	<--	<--	<--	KPa			
			respectively	estimated ambient temperature	>= 5	<--	<--	<--	<--	deg C			
				throttle position	< 0.25	<--	<--	<--	<--	deg			
				battery voltage	> 10.9	<--	<--	<--	<--	V			
				atmospheric pressure	>= 75.06029	<--	<--	<--	<--	KPa			
				components listed on #10 of page 03-H-1	no failure	<--	<--	<--	<--				
				vehicle speed	>= 32.9342	<--	<--	<--	<--	mph			
				fuel shut-off function	operating	<--	<--	<--	<--				
				neutral switch	off	<--	<--	<--	<--				
					and	<--	<--	<--	<--				
				continuous time of changing from "on" to "off"	>= 1000	<--	1000	<--	1000	msec			
				after load input switch operation (air conditioner, power steering, lights, rear defroster, heater fun and radiator fan)	>= 5000	<--	<--	<--	<--	msec			
(11) Crankshaft position sensor	P0335	circuit continuity	crankshaft position sensor signal	components listed on #11 of page 03-H-1	no failure	<--	<--	<--	<--		3000	msec	immediately
				battery voltage	>= 8	<--	<--	<--	<--	V			
				starter switch	on	<--	<--	<--	<--				
	P0336	rationality check	amount of crank sensor signal during 1 rev.	components listed on #11 of page 03-H-1	no failure	<--	<--	<--	<--		10	eng. rev	two driving
				engine speed	< 4000	<--	<--	<--	<--	rpm	10	time	cycles
				battery voltage	>= 8	<--	<--	<--	<--	V			
				cylinder number distinction	complete	<--	<--	<--	<--				
(12) Camshaft position sensor	P0340	circuit continuity	amount of cam sensor signal during 2 rev.	battery voltage	>= 8	<--	<--	<--	<--	V	8	revs.	immediately
											4	time	
											×		
											2		
	P0341	rationality check	cam sensor output signal timing compare to #1 or #3 cyl. crankshaft position	components listed on #12 of page 03-H-1	no failure	<--	<--	<--	<--		10	revs.	two driving
				engine speed	>= 550	<--	<--	<--	<--	rpm	10	time	cycles
					and	<--	<--	<--	<--				
					< 1000	<--	<--	<--	<--	rpm			
				engine operation	in idle	<--	<--	<--	<--				
				misfire	not detect	<--	<--	<--	<--				
				battery voltage	>= 8	<--	<--	<--	<--	V			
				cylinder number distinction	complete	<--	<--	<--	<--				
(13) Mass air flow sensor	P0102	circuit continuity	output voltage								500	msec	immediately
	P0103										500	msec	
	P0101	rationality check	output voltage	engine speed	>= 600	<--	<--	<--	<--	rpm	10000	msec	two driving
					and	<--	<--	<--	<--				cycles
					< 900	<--	<--	<--	<--	rpm			
				throttle angle	< 2.44	<--	<--	<--	<--	deg			
				coolant temperature	>= 75	<--	<--	<--	<--	deg C			
				intake manifold pressure	< 39.9966	<--	<--	<--	<--	KPa			
				component listed on #13 of page 03-H-1	no failure	<--	<--	<--	<--				
				engine speed	>= 2000	<--	<--	<--	<--	rpm	3000	msec	
				throttle angle	>= 13	<--	<--	<--	<--	deg			
				coolant temperature	>= 75	<--	<--	<--	<--	deg C			
				intake manifold pressure	>= 53.3288	<--	<--	<--	<--	KPa			
				component listed on #13 of page 03-H-1	no failure	<--	<--	<--	<--				

Applicable System ; **System H**   **2007 MY   Summary Sheet for OBD Strategy (5)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA		Time Required	MIL Illum.
(14) Engine coolant temperature sensor	P0117	range check	output voltage								500 msec	immediately
	P0118										500 msec	
	P0125	rationality check	engine coolant temperature	battery voltage	> 10.9	<--	<--	<--	<--	V	not determined	two driving cycles
				engine speed	>= 500	<--	<--	<--	<--	rpm		
				components listed on #14 of page 03-H-1	no failure	<--	<--	<--	<--			
				timer count up by temp./vehicle speed	see Map6 on page	<--	<--	<--	<--			
(14') Engine coolant temperature sensor (stuck)	P0126		twoff-twmin	component listed on #13 of page 03-D-1	no failure	<--	<--	<--	<--		2500 msec	two driving cycles
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
			where;	fuel level	>= 25	<--	23.4375	<--	25	%		
			twoff : Engine coolant temperature	after engine starting	>= 5	<--	<--	<--	<--	sec		
			twmin : Engine coolant temperatur	vehicle speed	= 0	0	<--	<--	<--	MPH		
				Fuel level of the current driving cycle - Fuel level at the end of the last driving cycle	< 3.333333	<--	3.125	<--	3.333333	%		
				Engine coolant temperature at the end of the last driving cycle	>= 75	<--	<--	<--	<--	deg C		
					< 100	<--	<--	<--	<--	deg C		
				fuel temperature	< 35	<--	<--	<--	<--	deg C		
				Fuel temperature at the end of the last driving cycle - fuel temperature	> 5	<--	<--	<--	<--	deg C		
				| intake air temperature - fuel temperature |	< 2.5	<--	<--	<--	<--	deg C		
(17) Knock sensor	P0327	range check	output voltage	ignition switch	on	<--	<--	<--	<--		1000 msec	immediately
	P0328										1000 msec	
(18) Vehicle speed sensor	P0502 (RESTER,IMPREZA)	functional check	number of signal in 472 msec.	fuel shut-off in decel.	operating	<--	-	-	operating	V	4000 msec	immediately
	P0503 (FORESTER,IMPREZA)			battery voltage	>= 10.9	<--	-	-	10.9	V		
				engine speed	< 4000	<--	-	-	4000	rpm		
				components listed on #18 of page 03-H-1	no failure	<--	-	-	no failure			
	P0500 (LEGACY)		vehicle speed(front right) or vehicle speed(front left)	ignition switch	-	-	on	<--	-		2500 msec	immediately
				battery voltage	>=	-	10.9	<--	-	V		
				components listed on #18 of page 03-H-1	-	-	no failure	<--	-			
				after engine starting	>=	-	2000	<--	-	msec		
				the data from ABS ECU	-	-	vehicle speed sens	<--	-			
(19) Starter switch	P0512	functional check	starter 'off' signal	engine speed	> 500	<--	<--	<--	<--	rpm	180000 msec	two driving cycles
				battery voltage	> 8	<--	<--	<--	<--	V		
				components listed on #19 of page 03-H-1	no failure	<--	<--	<--	<--			
	P1518		starter 'on' signal	engine speed after continuous 0.8 sec. or more of < 500 rpm engine speed	>= 500	<--	<--	<--	<--	rpm	800 msec	
				vehicle speed	< 0.6214	<--	<--	<--	<--	mph		
				components listed on #19 of page 03-H-1	no failure	<--	<--	<--	<--			
(23) Idle speed control (ISC)	P0506	functional check	actual - target eng. speed	components listed on #23 of page 03-H-1	no failure	<--	<--	<--	<--		10 sec	two driving cycles
	P0507		actual - target eng. speed	closed control in ISC	in operation	<--	<--	<--	<--		x 3	
				feedback value for ISC	reach in limits	<--	<--	<--	<--			
				vehicle speed	= 0	<--	<--	<--	<--	MPH		
				engine coolant temperature	>= 75	<--	<--	<--	<--	deg C		
				atmospheric pressure	> 75.06029	<--	<--	<--	<--	KPa		
				fuel level	>= 15.0	<--	<--	<--	<--	%		
				after engine starting	>= 10.49	<--	<--	<--	<--	sec		
				measured lambda	>= 0.81	<--	<--	<--	<--			
				and	< 1.1	<--	<--	<--	<--			
				after air condition switching on-off, off-on	> 5.1	<--	<--	<--	<--	sec		
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
				after in-manifold pressure change more than 30 KPa	> 5.1	<--	<--	<--	<--	sec		
				after neutral switch on - off event	> 5.1	<--	<--	<--	<--	sec		
	P0519	functional check	actual - target eng. speed	battery voltage	>= 10.9	<--	<--	<--	<--	V	2000 msec	immediately
				after engine starting	>= 1000	<--	<--	<--	<--	msec		
				closed control in ISC	in operation	<--	<--	<--	<--			
				components listed on #23 of page 03-H-1	no failure	<--	<--	<--	<--			
				vehicle speed	< 2.4856	<--	<--	<--	<--	mph		
					< 2.4856	<--	<--	<--	<--	mph		
				feedback value for ISC	<= 0	<--	<--	<--	<--			
				engine speed change every 180 degree engine rev.	>= -5	<--	<--	<--	<--	rpm		
(24) Solenoid valve for purge control	P0458	functional check	drain voltage of FET	battery voltage	>= 10.9	<--	<--	<--	<--	V	2500 msec	two driving cycles
				after engine starting	>= 1	<--	<--	<--	<--	sec		
				ignition switch	on	<--	<--	<--	<--			cycles
				duty ratio of 'on'	< 75	<--	<--	<--	<--	%		
	P0459		drain voltage of FET	battery voltage	>= 10.9	<--	<--	<--	<--	V	2500 msec	
				after engine starting	>= 1	<--	<--	<--	<--	sec		
				ignition switch	on	<--	<--	<--	<--			
				duty ratio of 'on'	>= 25	<--	<--	<--	<--	%		

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA 2.5L NA (LEV2), FORESTER 2.5L NA (LEV2), LEGACY 2.5L NA (LEV2), OUTBACK 2.5L NA (LEV2), FORESTER 2.5L NA (PZEV), LEGACY 2.5L NA (PZEV) & OUTBACK 2.5L NA (PZEV)

Applicable System ; **System H**   **2007 MY   Summary Sheet for OBD Strategy (6)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA		Time Required	MIL Illum.
(40) Radiator fan	P0691	functional check	drain voltage of FET	engine speed	>= 500	<--	<--	<--	<--	rpm	2500 msec	two driving cycles
			& signal from ECM for relays	battery voltage	>= 10.9	<--	<--	<--	<--	V		
	P0692		drain voltage of FET	after engine starting	>= 1	<--	<--	<--	<--	sec.	2500 msec	
			& signal from ECM for relays	ignition switch	on	<--	<--	<--	<--			
	P0483		coolant temperature	components listed on #40 of page 03-H-1	no failure	<--	<--	<--	<--		300024 msec	
				engine speed	>= 560	<--	<--	<--	<--	rpm		
				and		<--	<--	<--	<--			
					< 900	<--	<--	<--	<--	rpm		
				idle switch	on	<--	<--	<--	<--			
				vehicle speed	< 1.2	<--	<--	<--	<--	MPH		
				radiator fan signal change	"off" to "on"	<--	<--	<--	<--			
				coolant temperature	>= 100	<--	<--	<--	<--	deg C		
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
(46) Neutral switch	P0851	circuit continuity	switch signal when park/	components listed on #46 of page 03-H-1	no failure	<--	<--	<--	<--		6.4 sec	two driving cycles
			neutral="off" & any other	ignition switch	on	<--	<--	<--	<--		64 ms	
			switches="on" on AT	after engine starting	>= 2	<--	<--	<--	<--	secs.	×	
	P0852		switch signal when park/	starter switch	turn off	<--	<--	<--	<--		100 time	
			neutral="on" & any other	battery voltage	>= 10.9	<--	<--	<--	<--	V		
			switches="off" on AT	range switch on AT TCM	no failure	<--	<--	<--	<--			
	P0851	circuit continuity	switch signal for MT	components listed on #46 of page 03-H-1	no failure	<--	<--	<--	<--		3 time	two driving cycles
				ignition switch	on	<--	<--	<--	<--			
				after engine starting	>= 2	<--	<--	<--	<--	sec.		
	P0852			starter switch	turn off	<--	<--	<--	<--			
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
				driving condition change	a) to b)	<--	<--	<--	<--			
				a) vehicle speed	<= 0	<--	<--	<--	<--	mph		
				&								
				engine speed	>= 600	<--	<--	<--	<--	rpm		
					<= and	<--	<--	<--	<--			
					900	<--	<--	<--	<--	rpm		
				b) vehicle speed	>= 39.7696	<--	<--	<--	<--	mph		
				&								
				engine speed	>= 1600	<--	<--	<--	<--	rpm		
					and	<--	<--	<--	<--			
					<= 2550	<--	<--	<--	<--	rpm		

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA 2.5L NA (LEV2), FORESTER 2.5L NA (LEV2), LEGACY 2.5L NA (LEV2), OUTBACK 2.5L NA (LEV2), FORESTER 2.5L NA (PZEV), LEGACY 2.5L NA (PZEV) & OUTBACK 2.5L NA (PZEV)

Applicable System ; **System H**   **2007 MY   Summary Sheet for OBD Strategy (7)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions						Time Required	MIL Illum.
					FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA			
(49) Evaporative emission control sys.	P0442 (0.04-leak)	functional check	P2 - K x P1 P2=tank pressure increase when Evap. system sealed after a vacuum applied during 10 secs. P1=tank pressure increase when Evap. system sealed during 10 secs. note; K :P1>=0 : K=1.5 P1< 0 : K=0	components listed on #49 of page 03-H-1	no failure	<--	<--	<--	<--		30 - 100 secs.	two driving cycles
				closed air fuel ratio control	in operation	<--	<--	<--	<--			
				fuel temperature	>= -10	<--	<--	<--	<--	deg C		
					and	<--	<--	<--	<--			
					< 45	<--	<--	<--	<--	deg C		
				fuel tank pressure	>= -3999.66	<--	<--	<--	<--	Pa		
				intake air temperature	>= -10					deg C		
				intake manifold vacuum (relative pressure)	< 26.6644	<--	<--	<--	<--	Pa		
				vehicle speed	>= 19.8848	<--	<--	<--	<--	mph		
				fuel level	>= 15	<--	<--	<--	<--	%		
					and	<--	<--	<--	<--			
					< 85	<--	<--	<--	<--	%		
				after engine starting	>= 856	<--	<--	<--	<--	sec		
				atmospheric pressure	>= 75.06029	<--	<--	<--	<--	KPa		
	P0457 (big leak)		min. pressure after 10secs. from vacuum starting	battery voltage	>= 10.9	<--	<--	<--	<--	V		
				total time of canister purge operation	>= 120000	<--	<--	<--	<--	msec		
				learning value of EVAP conc. during purge	<= 0.08	<--	<--	<--	<--			
				change of fuel level	< 4.166667	<--	3.125	<--	4.166667	%		
				pressure change per sec. compare to previous sec.	< 226.6474	<--	<--	<--	<--	Pa		
					< 226.6474	<--	<--	<--	<--	Pa		
				min-pressure change per sec.- max-pressure change per sec. during monitoring	< 226.6474	<--	<--	<--	<--	Pa		
					< 226.6474	<--	<--	<--	<--	Pa		
				air fuel ratio	>= 0.76	<--	<--	<--	<--			
					and	<--	<--	<--	<--			
					< 1.25	<--	<--	<--	<--			
				engine speed	>= 1050	<--	<--	<--	<--	rpm		
					and	<--	<--	<--	<--			
					< 6000	<--	<--	<--	<--	rpm		
(49')Evaporative emission control system for 0.02 inches leak	P0456 (0.02-leak)	functional check	P1	components listed on #49 of page 03-H-1	no failure	<--	<--	<--	<--		65 - 514 secs.	two driving cycles
				closed air fuel ratio control	in operation	<--	<--	<--	<--			
				(at starting a diagnosis)								
				fuel temperature	>= -10	<--	<--	<--	<--	deg C		
					and	<--	<--	<--	<--			
					< 55	<--	<--	<--	<--	deg C		
				or after engine start with coolant temperature of 40 deg C or below	< 2400	<--	<--	<--	<--	sec		
				after engine starting	>= 120	<--	<--	<--	<--	sec		
				fuel level	>= 15	<--	<--	<--	<--	%		
					and	<--	<--	<--	<--			
					< 85	<--	<--	<--	<--	%		
				fuel tank pressure	>= -666.61	<--	-426.6304	<--	-666.61	Pa		
					to	<--	<--	<--	<--			
					< 1426.545	<--	<--	<--	<--	Pa		
				intake manifold vacuum (relative pressure)	< 7.99932	<--	<--	<--	<--	KPa		
				Continuous two minutes of vehicle speed (at starting a diagnosis)	>= 31.07	<--	<--	<--	<--	mph		
				vehicle speed	>= 18.642	<--	<--	<--	<--	mph		
				atmospheric pressure	>= 75.06029	<--	<--	<--	<--	KPa		
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
				total time of canister purge operation	>= 120000	<--	<--	<--	<--	msec		
				since last incomplete diagnosis event of 0.02 inches leak	>= 120000	<--	<--	<--	<--	msec		
					>= 600000	<--	<--	<--	<--	msec		
				engine speed	>= 1050	<--	<--	<--	<--	rpm		
					and	<--	<--	<--	<--			
					< 6000	<--	<--	<--	<--	rpm		
				(during diagnosis) pressure change per sec. compare to previous sec.	< 58.66168	<--	<--	<--	<--	Pa		
				min-pressure change per sec. - max-pressure change per sec. during monitoring	< 67.99422	<--	<--	<--	<--	Pa		
				| tank pressure change per sec. |	<= 99.9915	<--	<--	<--	<--	Pa		
				change of fuel level	<= see Map 10 on page 03-H-8	<--	<--	<--	<--	%		
				change of atmospheric pressure(modeD)	> -0.4799592	<--	<--	<--	<--	KPa		
					and	<--	<--	<--	<--			
					<= 0.3199728	<--	<--	<--	<--	KPa		
				change of atmospheric pressure(modeE)	> -0.32	<--	<--	<--	<--	KPa		
					and	<--	<--	<--	<--			
					<= 0.3199728	<--	<--	<--	<--	KPa		

Applicable System ; **System H**   **2007 MY   Summary Sheet for OBD Strategy (8)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA		Time Required	MIL Illum.
(50) Tank pressure sensor	P0453	range check	fuel tank pressure	vehicle speed	>= 1.2428	<--	<--	<--	<--	mph	15000 msec	immediately
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
				components listed on #50 of page 03-H-1	no failure	<--	<--	<--	<--			
				all conditions for EVAP canister purge	to be in enable	<--	<--	<--	<--			
				learning value of EVAP conc. during purge	<= 0.08	<--	<--	<--	<--			
				feed-back lambda coefficient	>= 0.9	<--	<--	<--	<--			
				fuel temperature	< 35	<--	<--	<--	<--	deg C		
				atmospheric pressure	> 75.06029	<--	<--	<--	<--	KPa		
	P0452			battery voltage	>= 10.9	<--	<--	<--	<--	V		
				components listed on #50 of page 03-H-1	no failure	<--	<--	<--	<--			
	P0451	rationality check	max. - min. tank pressure	change of fuel temperature	>= 7	<--	<--	<--	<--	deg C	1 secs.	two driving cycles
				count of detecting fuel level change above 3.3% during 1min	16	<--	<--	<--	<--	time		
				fuel level	>= 15	<--	<--	<--	<--	%		
				fuel temperature	< 35	<--	<--	<--	<--	deg C		
				atmospheric pressure	> 75.06029	<--	<--	<--	<--	KPa		
				after engine starting	>= 60	<--	<--	<--	<--	sec		
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
				fuel temp. & level sensor	no failure	<--	<--	<--	<--			
(51) Fuel temperature sensor	P0182	range check	output voltage	battery voltage	> 10.9	<--	<--	<--	<--	V	2500 msec	immediately
	P0183										2500 msec	
	P0181	rationality check	fuel temperature - coolant temperature	components listed on #51 of page 03-H-1	no failure	<--	<--	<--	<--		120 sec	two driving cycles
				fuel level	>= 15	<--	<--	<--	<--	%		
				battery voltage	> 10.9	<--	<--	<--	<--	V		
				after engine starting	>= 20	<--	<--	<--	<--	sec		
				coolant temp. diff. from engine start	> 10	<--	<--	<--	<--	deg C		
			fuel temperature difference between max. and min.	accumulated amount of intake air	> 551043	<--	<--	<--	<--	g		
				after engine starting	>= 20000	<--	<--	<--	<--	msec		
				components listed on #51 of page 03-H-1	no failure	<--	<--	<--	<--			
				battery voltage	> 10.9	<--	<--	<--	<--	V		
(52) Fuel level sensor	P0462	range check	output voltage	battery voltage	>= 10.9	<--	<--	<--	<--	V	2500 msec	two driving cycles
	P0463			ignition switch	on	<--	<--	<--	<--		1000 msec	
				after engine starting	>= 3000	<--	<--	<--	<--	msec		
	P0461	rationality check	max.- min. fuel level output	accumulated amount of intake air	>= 330957	<--	<--	<--	<--	g	not determined	
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
				after engine starting	>= 5000	<--	<--	<--	<--	msec		
				components listed on #52 of page 03-H-1	no failure	<--	<--	<--	<--			
(52') Fuel level sensor - slosh	P0464	rationality check	integrated times of the condition reaching follows, DVFLMAX >= Threshold or SUMVFL >= Threshold	engine speed	>= 500	<--	<--	<--	<--	rpm	12288 msec	two driving cycles
				battery voltage	>= 10.9	<--	<--	<--	<--	V	x	
				after engine starting	>= 1	<--	<--	<--	<--	sec	4 time	
				ignition switch	on	<--	<--	<--	<--			
				idle switch	on	<--	<--	<--	<--			
			where, - DVFLMAX is max. deviation of sensor output during 12.2 secs.	fuel level	>= 15	<--	<--	<--	<--	%		
				and		<--	<--	<--	<--			
					< 85	<--	<--	<--	<--	%		
			- SUMVFL is integrated value of sensor output deviation during 12.2 secs.	vehicle speed = 0 MPH	>= 10000	<--	<--	<--	<--	msec		
				components listed on #52' of page 03-H-1	no failure	<--	<--	<--	<--			
				Max - Min of tank pressure during 12.2 secs.	< 49.99575	<--	<--	<--	<--	Pa		
				Max - Min of battery voltage during 12.2 secs.	< 1.65	<--	0.609	<--	1.65	V		
(53) Solenoid valve for canister vent control	P0447	circuit continuity	drain voltage of FET and signal from ECM	battery voltage	>= 10.9	<--	<--	<--	<--	V	2500 msec	immediately
				after engine starting	>= 1	<--	<--	<--	<--	sec.		
	P0448		drain voltage of FET and signal from ECM	ignition switch	on	<--	<--	<--	<--		2500 msec	
	P1443	functional check	fuel tank pressure	components listed on #53' of page 03-H-1	no failure	<--	<--	<--	<--		3000 sec	
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
				barometric pressure	>= 75.06029	<--	<--	<--	<--	KPa		
				solenoid valve for canister vent control	open	<--	<--	<--	<--			
				fuel tank pressure at engine start	>= -666.61	<--	-426.6304	<--	-666.61	Pa		
				and		<--	<--	<--	<--			
					< 1426.545	<--	<--	<--	<--	Pa		
(54) Pressure control valve	P1400	functional check	drain voltage of FET and signal from ECM	battery voltage	>= 10.9	<--	<--	<--	<--	V	2500 msec	two driving cycles
				after engine starting	>= 1	<--	<--	<--	<--	sec.		
	P1420		drain voltage of FET and signal from ECM	ignition switch	on	<--	<--	<--	<--		2500 msec	

Applicable System ; **System H**   2007 MY   Summary Sheet for OBD Strategy (9)

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA		Time Required	MIL Illum.
(60) Manifold absolute pressure (MAP)sensor	P0107 P0108	range check	output voltage	components listed on #60 of page 03-H-1	no failure	<--	<--	<--	<--		500 msec 500 msec	immediately
	P0068	rationality check	output voltage	engine coolant temperature	>= 75	<--	<--	<--	<--	deg C	3000 msec	two driving cycles
				engine speed	< 2500	<--	<--	<--	<--	rpm		
				intake air every half engine revs.	> 0.55	<--	<--	<--	<--	g/rev		
				throttle position	>= 12	<--	<--	<--	<--	deg		
				components listed on #60 of page 03-H-1	no failure	<--	<--	<--	<--			
			output voltage	engine coolant temperature	>= 75	<--	<--	<--	<--	deg C	7000 msec	
				engine speed	>= 600	<--	<--	<--	<--	rpm		
					and	<--	<--	<--	<--			
					< 900	<--	<--	<--	<--	rpm		
				intake air every half engine revs.	< 0.4	<--	<--	<--	<--	g/rev		
				throttle position	<= 2.44	<--	<--	<--	<--	deg		
				components listed on #60 of page 03-H-1	no failure	<--	<--	<--	<--			
(61) Intake air temperature sensor	P0111	rationality check	output voltage difference between max. and min.	coolant temp. before engine start	< 30	<--	<--	<--	<--	deg C	1 secs.	two driving cycles
				coolant temperature	> 100	<--	<--	<--	<--	deg C		
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
				driving below 37 MPH	>= 600	<--	<--	<--	<--	sec		
				coolant temperature sensor	no failure	<--	<--	<--	<--			
	P0112 P0113	range check	output voltage	ignition switch	on	<--	<--	<--	<--		500 msec 500 msec	immediately
(62) Atmospheric pressure sensor	P2227	rationality check	| atmospheric - MAP |	engine speed at engine starting	< 300	<--	<--	<--	<--	rpm	328 msec	two driving cycles
				vehicle speed	< 0.6214	<--	<--	<--	<--	mph		
				|in-mani press. at eng. start - MAP|	< 1.331887	<--	<--	<--	<--	KPa		
				components listed on #62 of page 03-H-1	no failure	<--	<--	<--	<--			
	P2228 P2229	range check	output voltage	ignition switch	on	<--	<--	<--	<--		500 msec	immediately
(64)Back-up power supply for memory of ECM	P1560	functional check	voltage of back-up power	engine speed	>= 500	<--	<--	<--	<--	rpm	2500 msec	immediately
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
(72) Thermostat	P0128	functional check	(estimated - measured) coolant temperature	engine coolant temperature	< 75	<--	<--	<--	<--	deg C	not determined	two driving cycles
				engine coolant temperature at engine starting	< 55	<--	<--	<--	<--	deg C		
				battery voltage	>= 10.9	<--	<--	<--	<--	V		
				vehicle speed	>= 18.642	<--	<--	<--	<--	mph		
				components listed on #72 of page 03-H-1	no failure	<--	<--	<--	<--			
				estimated coolant temperature	>= 75	<--	<--	<--	<--	deg C		
				estimated ambient air temperature	>= -7	<--	<--	<--	<--	deg C		

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA 2.5L NA (LEV2), FORESTER 2.5L NA (LEV2), LEGACY 2.5L NA (LEV2), OUTBACK 2.5L NA (LEV2), FORESTER 2.5L NA (PZEV), LEGACY 2.5L NA (PZEV) & OUTBACK 2.5L NA (PZEV)

Applicable System ; System H   2007 MY   Summary Sheet for OBD Strategy (10)

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions							Time Required	MIL Illum.
						FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA			
(81) Positive crankcase ventilation system	P1491	circuit continuity	Positive crankcase ventilation diagnostic. signal	battery voltage	>	10.9	<--	<--	<--	<--	V	2500 msec	immediately
				engine speed	>=	500	<--	<--	<--	<--	rpm		
(83) CAN system	P0600	functional check	bus off flag or error warning flag	battery voltage	>=	10.9	<--	<--	<--	<--	V	1 sec	immediately
			communication ID from TCU or ECU or VDC/ABS ECU not received (LEGACY)	components listed on #83 of page 03-H-1		no failure	<--	<--	<--	<--			
			communication ID from TCM not received (FORESTER,IMPREZA)	starter switch		off	<--	<--	<--				
				engine		run	<--	<--	<--				
			the data from ECU does not be updated (LEGACY)										
			the data from TCU does not be updated (FORESTER,IMPREZA)										
(84) Transmission control system (MIL request)	P0700	functional check	MIL request flag from TCM	battery voltage	>=	10.9	<--	<--	<--	<--	V	2500 msec	immediately
				components listed on #84 of page 03-E-1		no failure	<--	<--	<--	<--			
(92) Engine oil temperature sensor	P0197	range check	output voltage									0.5 secs.	immediately
	P0198											0.5 secs.	
	P0196	rationality check	engine oil temperature	battery voltage	>=	10.9	<--	<--	<--	<--	V	not determined	two driving cycles
				engine speed	>=	500	<--	<--	<--	<--	rpm		
				components listed on #92 of page 03-H-1		no failure	<--	<--	<--	<--			
				timer count up by temp./vehicle speed		see Map 9 on page 03-H-7	<--	<--	<--	<--			
(93) Oil Switching Valve	P0076(RH) P0082(LH)	range check (for open circuit)	control current	battery voltage	>=	10.9	<--	<--	<--	<--	V	2000 msec	immediately
				duty ratio of 'on'	>=	30	<--	<--	<--	<--	%		
	P0077(RH) P0083(LH)	range check (for short circuit)	control current	battery voltage	>=	10.9	<--	<--	<--	<--	V		
				duty ratio of 'on'	<	7	<--	<--	<--	<--	%		
(94) Direct Variable Valve Lift (DVVL)	P0026(RH) P0028(LH)	functional check	oil pressure switch and control duty	battery voltage	>=	10.9	<--	<--	<--	<--	V	784 msec	immediately
				after engine starting	>=	6000	<--	<--	<--	<--	msec		
				engine oil temperature	>=	15	<--	<--	<--	<--	deg C		
			oil pressure switch and control duty	DVVL		operating	<--	<--	<--	<--		3000 msec	
				components listed on #94 of page 03-H-1		no failure	<--	<--	<--	<--			
(95) Cold start emission reduction strategy	P1602	amount of intake air		atmospheric pressure	>	-	-	-	563	-	KPa	6 sec	two driving cycles
				battery voltage	>	-	-	-	10.9	-	V		
			Average amount of intake air when controlling ignition timing retard for warming up catalyst (gaobdav)	components listed on #95 of page 03-H-1		-	-	-	no failure	-			
			average value of retard ignition timing under all condition (acldobdav).	engine		-	-	-	run	-			
			Transmission:MT and neutral switch:ON	vehicle speed	<=	-	-	-	1.8642	-	mph		
			Transmission:AT and neutral switch:ON	After closed control in ISC	>=	-	-	-	1500	-	msec		
		gaobdav = sgmgaobd / cdcldsttm sgmgaobd= accumulated amount of intake air when controlling ignition timing retard for warming up catalyst cdcldsttm=counter when controlling ignition timing retard for warming up catalyst	Transmission:AT and neutral switch:OFF	Counter of minimum engine speed.	<	-	-	-	2000	-	count		
				after neutral switch on - off event	>	-	-	-	3000	-	msec		
				Continuous period of cold start emission reduction strategy 1		-	-	-	in operation	-			
				Execute Warming up catalyst		-	-	-	in operation	-			
				After load input switch operation(air conditioner, power steering, lights, rear defroster, heater fun and radiator fan)	>=	-	-	-	3500	-	msec		
				Misfire detection during 200 engine rev. (Because of catalyst damages)	<	-	-	-	5	-			
				Execute Cold start strategy when both conditions as below are satisfied		-	-	-		-			
					ECT - intake air temperature		<=	-	-	-	5	-	deg C		
					ECT – fuel temperature		<=	-	-	-	2	-	deg C		
				Time after changing warming up mode	>=	-	-	-	6000	-	msec		
			target engine speed - actual engine speed	atmospheric pressure	>	-	-	-	563	-	mmHg	6 sec	two driving cycles
				battery voltage	>	-	-	-	10.9	-	V		
				components listed on #95 of page 03-H-1		-	-	-	no failure	-			
				engine		-	-	-	run	-			
				vehicle speed	<=	-	-	-	3	-	km/h		
				After closed control in ISC	>=	-	-	-	1500	-	msec		
				Counter of minimum engine speed.	<	-	-	-	2000	-	count		
				after neutral switch on - off event	>	-	-	-	3000	-	msec		
				Continuous period of cold start emission reduction strategy 1	>=	-	-	-	experienced	-			
				Execute Warming up catalyst		-	-	-	in operation	-			
				After load input switch operation(air conditioner, power steering, lights, rear defroster, heater fun and radiator fan)	>=	-	-	-	3500	-	msec		
				Misfire detection during 200 engine rev. (Because of catalyst damages)	<	-	-	-	5	-	time		
				Execute Cold start strategy when both conditions as below are satisfied		-	-	-		-			
					ECT - intake air temperature		<=	-	-	-	5	-	deg C		
					ECT – fuel temperature		<=	-	-	-	2	-	deg C		
				Time after changing warming up mode	>=	-	-	-	6000	-	msec		
	P1602	amount of intake air	Estimated exhaust gas temperatureafter 14 seconds at cold start	atmospheric pressure	>	75	<--	<--	-	75	KPa	14 sec	two driving cycles
				battery voltage	>	10.9	<--	<--	-	10.9	V		
				components listed on #95 of page 03-H-1		no failure	<--	<--	-	no failure			
				engine		run	<--	<--	-	run			
				vehicle speed	<=	1.2428	<--	<--	-	1.2428	mph		
			Duration to satisfy	Misfire detection during 200 engine rev. (Because of catalyst damages)	<	5	<--	<--	-	5			
			"nefbgd – ne"	Time after engine starting	=	14	<--	<--	-	14	sec		

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA 2.5L NA (LEV2), FORESTER 2.5L NA (LEV2), LEGACY 2.5L NA (LEV2), OUTBACK 2.5L NA (LEV2), FORESTER 2.5L NA (PZEV), LEGACY 2.5L NA (PZEV) & OUTBACK 2.5L NA (PZEV)

Applicable System ; **System H**   2007 MY   Summary Sheet for OBD Strategy (11)

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA		Time Required	MIL Illum.
(201) Throttle actuator control	P0638	functional check	motor control Duty	ignition switch	on	<--	<--	<--	<--		5000 msec	immediately
				motor supply voltage	>= 6.2	<--	<--	<--	<--	V		
				motor relay	on	<--	<--	<--	<--			
				CPU communication	no failure	<--	<--	<--	<--			
				previous diagnosis result	no failure	<--	<--	<--	<--			
				engine speed	< 500	<--	<--	<--	<--	rpm		
				ignition switch	on	<--	<--	<--	<--		2 sec	
				motor supply voltage	>= 6.2	<--	<--	<--	<--	V		
				motor relay	on	<--	<--	<--	<--			
				CPU communication	no failure	<--	<--	<--	<--			
				previous diagnosis result	no failure	<--	<--	<--	<--			
				engine speed	>= 500	<--	<--	<--	<--	rpm		
			| target throttle position -	ignition switch	on	<--	<--	<--	<--		see table 21-2	
				motor relay	on	<--	<--	<--	<--			
				previous diagnosis result	no failure	<--	<--	<--	<--			
				engine speed	>= 500	<--	<--	<--	<--	rpm		
				battery voltage	>= 6.2	<--	<--	<--	<--	V		
				throttle position sensor 1	>= target throttle position	<--	<--	<--	<--	deg		
				motor supply voltage	>= 6.2	<--	<--	<--	<--	V		
				throttle position sensor 1 circuit diagnosis	complete	<--	<--	<--	<--			
				throttle position sensor 2 circuit diagnosis	complete	<--	<--	<--	<--			
				throttle position sensor rationality diagnosis	complete	<--	<--	<--	<--			
				ignition switch	on	<--	<--	<--	<--		1000 msec	
				motor relay	on	<--	<--	<--	<--			
				previous diagnosis result	no failure	<--	<--	<--	<--			
				motor supply voltage	>= 6.2	<--	<--	<--	<--	V		
				engine speed	>= 500	<--	<--	<--	<--	rpm		
				battery voltage	>= 6.2	<--	<--	<--	<--	V		
				throttle position sensor 1	< target throttle position	<--	<--	<--	<--	deg		
				throttle position sensor 1 circuit diagnosis	complete	<--	<--	<--	<--			
				throttle position sensor 2 circuit diagnosis	complete	<--	<--	<--	<--			
				throttle position sensor rationality diagnosis	complete	<--	<--	<--	<--			
				ignition switch	on	<--	<--	<--	<--		5000 msec	
				motor relay	on	<--	<--	<--	<--			
				previous diagnosis result	no failure	<--	<--	<--	<--			
				motor supply voltage	>= 6.2	<--	<--	<--	<--	V		
				engine speed	< 500	<--	300	<--	500	rpm		
				battery voltage	>= 6.2	<--	<--	<--	<--	V		
				throttle position sensor 1 circuit diagnosis	complete	<--	<--	<--	<--			
				throttle position sensor 2 circuit diagnosis	complete	<--	<--	<--	<--			
				throttle position sensor rationality diagnosis	complete	<--	<--	<--	<--			
(202) Throttle actuator control motor	P2101	circuit continuity	malfunction flag from motor operation IC	ignition switch	on	<--	<--	<--	<--		500 msec	immediately
				motor relay	on	<--	<--	<--	<--			
				CPU communication	no failure	<--	<--	<--	<--			
				previous diagnosis result	no failure	<--	<--	<--	<--			
				battery voltage	>= 6.2	<--	<--	<--	<--	V		
				motor supply voltage	>= 6.2	<--	<--	<--	<--	V		
	P2102		motor supply voltage	motor relay	on	<--	<--	<--	<--		400 msec	
				battery voltage	>= 11	<--	<--	<--	<--	V		
				CPU communication	no failure	<--	<--	<--	<--			
				previous diagnosis result	no failure	<--	<--	<--	<--			
	P2103		motor supply voltage	motor relay	off	<--	<--	<--	<--		600 msec	
				battery voltage	>= 6	<--	<--	<--	<--	V		
				CPU communication	no failure	<--	<--	<--	<--			
(203) Throttle return spring	P1160	functional check	throttle position sensor 1 at diagnosis start - throttle position sensor 1	ignition switch	off	<--	<--	<--	<--		1880 msec	immediately
				the time after ignition switch off	= 992	<--	<--	<--	<--	msecs.		
				CPU communication	no failure	<--	<--	<--	<--			
				throttle position sensor 1 circuit diagnosis	complete	<--	<--	<--	<--			
				throttle position sensor 2 circuit diagnosis	complete	<--	<--	<--	<--			
				throttle position sensor rationality diagnosis	complete	<--	<--	<--	<--			
				motor supply voltage	>= 6	<--	<--	<--	<--	V		
				battery voltage	>= 6	<--	<--	<--	<--	V		
				| target throttle position at diagnosis start - throttle position sensor 1 at diagnosis start	< 2	<--	<--	<--	<--	deg		
(204) Throttle position sensor minimum stop	P2109	rationality check	minimum stop position	battery voltage	>= 6	<--	<--	<--	<--	V	8 msec	immediately
				previous diagnosis result	no failure	<--	<--	<--	<--			
			| throttle position at ignition switch off to or - throttle minimum stop position	battery voltage	>= 6	<--	<--	<--	<--	V	80 msec	
				previous diagnosis result	no failure	<--	<--	<--	<--			

table 21-2

throttle position sensor1 (deg)	time msecs.
5.5	1000
9.0	400
13.0	300
22.0	250

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA 2.5L NA (LEV2), FORESTER 2.5L NA (LEV2), LEGACY 2.5L NA (LEV2), OUTBACK 2.5L NA (LEV2), FORESTER 2.5L NA (PZEV), LEGACY 2.5L NA (PZEV) & OUTBACK 2.5L NA (PZEV)

Applicable System ; **System H**   **2007 MY   Summary Sheet for OBD Strategy (12)**

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions						Time Required	MIL Illum.
					FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA			
(205) Throttle position sensor	P0122 (sensor1) P0222 (sensor2)	circuit continuity	output voltage (sensor2)	ignition switch motor supply voltage previous diagnosis result	on >=6 no failure	on <-- no failure	<-- <-- <--	<-- <-- <--	<-- <-- <--	V	24 msec 24 msec	immediately
	P0123 (sensor1) P0223 (sensor2)		(sensor1) (sensor2)								24 msec 24 msec	
	P2135	rationality check	| throttle position sensor 1(deg) - throttle position sensor 2(deg)	ignition switch motor supply voltage previous diagnosis result throttle position sensor 1 circuit diagnosis throttle position sensor 2 circuit diagnosis	on >=6 no failure complete complete	on <-- no failure complete complete	<-- <-- <-- <-- <--	<-- <-- <-- <-- <--	<-- <-- <-- <-- <--	V	212 msec	
(206) Pedal position sensor	P2122 (sensor1) P2127 (sensor2)	circuit continuity	output voltage (sensor1) (sensor2)	ignition switch motor relay previous diagnosis result battery voltage	on on no failure >=6	on on no failure <--	<-- <-- <-- <--	<-- <-- <-- <--	<-- <-- <-- <--	V	100 msec 100 msec	immediately
	P2123 (sensor1) P2128 (sensor2)		(sensor1) (sensor2)								100 msec 100 msec	
	P2138	rationality check	| pedal position sensor 1 (deg) - pedal position sensor 2 (deg)	ignition switch previous diagnosis result battery voltage pedal position sensor 1 circuit diagnosis pedal position sensor 2 circuit diagnosis	on no failure >=6 complete complete	on no failure <-- complete complete	<-- <-- <-- <-- <--	<-- <-- <-- <-- <--	<-- <-- <-- <-- <--	V	116 msec	

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA 2.5L NA (LEV2), FORESTER 2.5L NA (LEV2), LEGACY 2.5L NA (LEV2), OUTBACK 2.5L NA (LEV2), FORESTER 2.5L NA (PZEV), LEGACY 2.5L NA (PZEV) & OUTBACK 2.5L NA (PZEV)

Applicable System ; System H   2007 MY Summary Sheet for OBD Strategy (13)

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions							Time Required	MIL Illum.
					FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA				
(207) ECM performance	P0607	circuit continuity (inside ECM)	input voltage of throttle position sensor 1 | main CPU - sub CPU |	ignition switch	on	<--	<--	<--	<--			600 msec	immediately
				previous diagnosis result	no failure	<--	<--	<--	<--				
				battery voltage	>= 6	<--	<--	<--	<--	V			
				CPU communication	no failure	<--	<--	<--	<--				
				starter switch	off	<--	<--	<--	<--			400 msec	
				the time after sub CPU reset	>= 200	<--	<--	<--	<--	msec			
												350 msec	
												300 msec	
												250 msec	
		circuit continuity (inside ECM)	input voltage of pedal position sensor 1 | main CPU - sub CPU |	ignition switch	on	<--	<--	<--	<--		FORESTER,IMPREZA	750 msec	
				previous diagnosis result	no failure	<--	<--	<--	<--		LEGACY	830 msec	
				CPU communication	no failure	<--	<--	<--	<--				
				battery voltage	>= 6	<--	<--	<--	<--	V			
				starter switch	off	<--	<--	<--	<--		FORESTER,IMPREZA	550 msec	
											LEGACY	720 msec	
											FORESTER,IMPREZA	400 msec	
											LEGACY	610 msec	
											FORESTER,IMPREZA	300 msec	
											LEGACY	415 msec	
												250 msec	
		functional check (Sub CPU)	Watch dog signal from Sub CPU	ignition switch	on	<--	<--	<--	<--			200 msec	immediately
				previous diagnosis result	no failure	<--	<--	<--	<--				
				starter sw	off	<--	<--	<--	<--				
				battery voltage	>= 6	<--	<--	<--	<--	V			
				the time after sub CPU reset	>= 200	<--	<--	<--	<--	msec			
		functional check (CPU communication)	(Main CPU) sum check error, key word error, data writing error or communication error from sub CPU data	ignition switch	on	<--	<--	<--	<--			200 msec	immediately
				previous diagnosis result	no failure	<--	<--	<--	<--				
				starter switch	OFF	<--	<--	<--	<--				
				battery voltage	>= 6	<--	<--	<--	<--	V			
				the time after sub CPU reset	>= 200	<--	<--	<--	<--	msec			
			(Sub CPU) sum check error, key word error, or communication error from main CPU data	ignition switch	on	<--	<--	<--	<--			200 msec	
				previous diagnosis result	no failure	<--	<--	<--	<--				
				battery voltage	>= 6	<--	<--	<--	<--	V			
		functional check (AMP circuit in ECM)	| throttle position sensor 1 - (amplified throttle position sensor 1) / 4 |	ignition switch	on	<--	<--	<--	<--			24 msec	immediately
				previous diagnosis result	no failure	<--	<--	<--	<--				
				battery voltage	>= 6	<--	<--	<--	<--	V			
				throttle position sensor 1	< see Map24	<--	<--	<--	<--	deg	03-H-12		
						<--	<--	<--	<--				
			(amplified throttle position sensor 1) / 4	ignition switch	on	<--	<--	<--	<--				
				previous diagnosis result	no failure	<--	<--	<--	<--				
				battery voltage	>= 6	<--	<--	<--	<--	V			
				throttle position sensor 1	>= see Map24	<--	<--	<--	<--	deg	03-H-12		
			Map 24										
		functional check (cruise control)	cruise control	brake switch	on	<--	<--	<--	<--			250 msec	immediately
				ignition switch	on	<--	<--	<--	<--				
				motor relay	on	<--	<--	<--	<--				
				battery voltage	>= 6.2	<--	<--	<--	<--	V			
				Sub CPU ETC activation	available	<--	<--	<--	<--				
				previous diagnosis result	no failure	<--	<--	<--	<--				
				CPU communication	no failure	<--	<--	<--	<--				
		rationality check (brake switch circuit)	brake switch of main CPU brake switch of sub CPU	ignition switch	on	<--	<--	<--	<--			200 msec	immediately
				battery voltage	>= 10.9	<--	<--	<--	<--	V			
				previous diagnosis result	no failure	<--	<--	<--	<--				
			brake switch of main CPU brake switch of sub CPU	CPU communication	no failure	<--	<--	<--	<--				

Map 24

battery voltage (V)	TAAD (deg)
7.5	27.5
8.0	31

Applicable Model Year: 2007; Applicable Vehicle Line: IMPREZA 2.5L NA (LEV2), FORESTER 2.5L NA (LEV2), LEGACY 2.5L NA (LEV2), OUTBACK 2.5L NA (LEV2), FORESTER 2.5L NA (PZEV), LEGACY 2.5L NA (PZEV) & OUTBACK 2.5L NA (PZEV)

Applicable System ; **System H**   2007 MY   Summary Sheet for OBD Strategy (14)

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions						Time Required	MIL Illum.
					FORESTER LEV2	FORESTER P-ZEV	LEGACY LEV2	LEGACY P-ZEV	IMPREZA			
(207) ECM performance	P0607	functional check (instruction check)	(Main CPU) instruction error	ignition switch	off to on	<--	<--	<--	<--		2	immediately
					CPU reset	<--	<--	<--	<--			
			calculated data through CPU and FPU compare with expectation	ignition switch	on	<--	<--	<--	<--		512 msec	
				throttle position sensor 1 circuit diagnosis	complete	<--	<--	<--	<--			
			(Sub CPU) calculated data from Main CPU compare with expectation								240 msec 40 msec x	
				CPU communication	no failure	<--	<--	<--	<--			
				the time after sub CPU reset	>= 200	<--	<--	<--	<--	msec	6 time	
		functional check (software flow check)	(Main CPU) software flow error	ignition switch	on	<--	<--	<--	<--		504 msec	
			(Sub CPU) calculated data from Main CPU compare with expectation								240 msec 40 msec x	
				CPU communication	no failure	<--	<--	<--	<--			
				the time after sub CPU reset	>= 200	<--	<--	<--	<--	msec	6 time	
		functional check (software monitor check)	software monitor error	CPU communication	no failure	<--	<--	<--	<--		248 msec	
				the time after sub CPU reset	>= 200	<--	<--	<--	<--	msec		
(208) RAM in ECM	P0604	functional check	(Main CPU) Setting value can be written in all RAM area, and the values can be read correctly	ignition switch	off to on (CPU reset)	<--	<--	<--	<--		not determined	immediately
			(Sub CPU) check sum data on RAM , calculated sum data compare	CPU communication	no failure	<--	<--	<--	<--			
				ignition switch	off to on	<--	<--	<--	<--			
				the time after sub CPU reset	>= 200	<--	<--	<--	<--	msec		
(209) ROM in ECM	P0605	functional check	check sum data on ROM , calculated sum data compare	(Main CPU) ignition switch	off to on (CPU reset)	<--	<--	<--	<--		not determined	immediately
				(Sub CPU) ignition switch	on	<--	<--	<--	<--			
				motor supply voltage	>= 6	<--	<--	<--	<--	V		
				previous diagnosis result	no failure	<--	<--	<--	<--			
				CPU communication	no failure	<--	<--	<--	<--			
				the time after sub CPU reset	>= 200	<--	<--	<--	<--	msec		

Diagnosis for SystemH AT (FORESTER)

Applicable System ; **System H**   2007 MY   Summary Sheet for OBD Strategy (15)

Component/ System	Fault Code	Monitor Strategy Description/Method	Malfunction Criteria	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
(301) Range switch	P0705	functional check	"D" signal continuously	shifted	"N" to "3"	3.0 secs.	two driving cycles
				vehicle speed	>= 60 km/h		
			simultaneous signals	engine speed	> 3000 rpm	3.0 secs.	
				engine speed signal	not failure		
(302) Brake switch for AT	P0719	functional check	"on" signal	vehicle speed change	30 to 0 km/h	10 times	two driving cycles
	P0724	functional check	"off" signal	vehicle speed change	0 to 30 km/h	10 times	two driving cycles
(303) ATF temperature sensor	P0712	range check	output voltage	vehicle speed	>= 10 km/h	60.0 secs.	immediately
	P0713	range check	output voltage	vehicle speed	>= 10 km/h	60.0 secs.	immediately
(304) Turbine shaft speed sensor	P0715	range check	turbine shaft speed	engine speed	>= 3000 rpm	3.0 secs.	immediately
				output shaft speed	>= 1600 rpm		
				range switch	"D","3","2"or "1"		
(305) Vehicle speed sensor	P0720	range check	output shaft speed	determined output shaft speed	>= 800 rpm	3.0 secs.	immediately
				determined output shaft speed	not failure		
(306) Engine speed signal for AT	P0725	range check	engine speed	turbine shaft speed	>= 1000 rpm	3.0 secs.	immediately
				turbine shaft speed sensor	not failure		
				vehicle speed	>= 10 km/h		
				vehicle speed sensor	not failure		
(307) Automatic transmission gear ratio	P0731	functional check	GR/(1st gear ratio)	upshift or downshift events	not in operation	3.0 secs.	immediately
	P0732		GR/(2nd gear ratio)	output shaft speed	>= 300 rpm		
	P0733		GR/(3rd gear ratio)	turbine shaft speed	>= 300 rpm		
	P0734		GR/(4th gear ratio)	range switch	"D","3","2"or "1"		
			where,	throttle angle (at 1st gear)	>= 30 deg		
			GR = (turbine shaft speed) / (output shaft speed)	throttle angle (at not 1st gear)	>= 6 deg		
				range switch	not failure		
				turbine shaft speed sensor	not failure		
				vehicle speed sensor	not failure		
(308) Lock-up clutch	P0741	functional check	engine speed - turbine shaft speed >= 40 + vehicle speed /2	duty ratio for duty solenoid valve	>= 90 %	10.0 secs.	two driving cycles
				engine speed signal	not failure		
				turbine shaft speed sensor	not failure		
(309) Lock-up clutch duty solenoid	P0743	functional check	drain level of FET for solenoid valve is not change in one duty cycle	on duty ratio for duty solenoid valve	>= 5 %	200 msecs.	immediately
			drain level of FET for solenoid valve	on duty ratio for duty solenoid valve	= 0 %	200 msecs.	
(310) AT line pressure linear solenoid	P0748	functional check	cur_mon	cur_tgt	>= 100 mA	0.10 secs.	immediately
			cur_mon or cur_tgt - cur_mon	cur_tgt	>= 100 mA	0.06secs.	
			where, cur_mon=monitor current for solenoid cur_tgt=target current for solenoid				
(311) Low clutch duty solenoid	P0753	functional check	drain level of FET for solenoid valve is not change in one duty cycle	on duty ratio for duty solenoid valve	>= 5 %	200 msecs.	immediately
			drain level of FET for solenoid valve	on duty ratio for duty solenoid valve	= 0 %	200 msecs.	
(312) 2-4th brake duty solenoid	P0758	functional check	drain level of FET for solenoid valve is not change in one duty cycle	on duty ratio for duty solenoid valve	>= 5 %	200 msecs.	immediately
			drain level of FET for solenoid valve	on duty ratio for duty solenoid valve	= 0 %	200 msecs.	
(313) High clutch duty solenoid	P0763	functional check	drain level of FET for solenoid valve is not change in one duty cycle	on duty ratio for duty solenoid valve	>= 5 %	200 msecs.	immediately
			drain level of FET for solenoid valve	on duty ratio for duty solenoid valve	= 0 %	200 msecs.	
(314) Low&Reverse brake duty solenoid	P0768	functional check	drain level of FET for solenoid valve is not change in one duty cycle	on duty ratio for duty solenoid valve	>= 5 %	200 msecs.	immediately
			drain level of FET for solenoid valve	on duty ratio for duty solenoid valve	= 0 %	200 msecs.	
(317) CAN communication	P1718	functional check	CAN bus condition	turbine shaft speed	> 0 rpm	500 msecs.	immediately
				range switch	"D","3","2"or "1"		
			fail counter from ECM is not change				

Mode $06 definition of SUBARU 2.5L NA ENGINE

TEST ID	Type of Test Limit and Comp.ID	Description	Decimal range	HEX Range
O2 Sensor Circuit(B1S2)				
$41	$81	Maximum output voltage	0 - 1.275 V	00 - FF
$41	$02	Minimum output voltage	0 - 1.275 V	00 - FF
O2 sensor curcit(B1S1)				
$44	$01	output value		0000 - FFFF
$44	$82	output value		0000 - FFFF
Catalyst System Efficiency Below Threshold				
$81	$01	Ratio of lambda cumulative value	0 - 256	0000 - FFFF
EGR SYSTEM				
$82	$81	The intake manifold pressure value when nealy full open	0 - 273019 Pa	0000 - FFFF
$82	$02	The intake manifold pressure value when close	0 - 273019 Pa	0000 - FFFF
Evaporative Emission Control System Leak Detected (small leak)				
$83	$81	Tank pressure in mode-Z	0 - 2	0000 - FFFF
$83	$02	Tank pressure variation in the tank in mode-D	0 - 819 kPa	0000 - FFFF
$83	$03	Tank pressure in mode-C	-409.6 - 410 kPa	0000 - FFFF
$83	$04	Tank pressure in mode-B	-409.6 - 410 kPa	0000 - FFFF
$83	$05	Tank pressure in mode-C	-409.6 - 410 kPa	0000 - FFFF
$83	$06	Tank pressure variation in the tank in mode-D	0 - 819 kPa	0000 - FFFF
O2 Sensor Circuit Slow Response(B1S1)				
$84	$01	Time from lean to rich	0 - 65535 ms	0000 - FFFF
$84	$02	Time from rich to lean	0 - 65535 ms	0000 - FFFF
O2 Sensor Circuit Slow Response(B1S2)				
$85	$01	Response time	0 - 655 s	0000 - FFFF
$85	$02	Response time	0 - 655 s	0000 - FFFF
Heater control curcuit				
$89	$81	electoric power	0 - 51.5 W	0000 - FFFF
$89	$02	electoric power	0 - 51.5 W	0000 - FFFF

Mode $06 deffinition of SUBARU - 3.0L H6, 2.0L&2.5L TURBO, 2.5L PZEV&LEV2 ENGINE

TEST ID	Type of Test Limit and Comp.ID	Description	Decimal range	HEX Range
O2 Sensor Circuit(B1S2)				
$41	$81	Maximum output voltage	0 - 1.275 Volt	00 - FF
$41	$02	Minimum output voltage	0 - 1.275 Volt	00 - FF
O2 Sensor Circuit(B1S3)				
$42	$81	Maximum output voltage	0 - 1.275 Volt	00 - FF
$42	$02	Minimum output voltage	0 - 1.275 Volt	00 - FF
O2 Sensor Circuit(B2S2)				
$43	$81	Maximum output voltage	0 - 1.275 Volt	00 - FF
$43	$02	Minimum output voltage	0 - 1.275 Volt	00 - FF
Catalyst System Efficiency Below Threshold				
$81	$01	Ratio of lambda cumulative value	0 - 312	0000 - FFFF
Exhaust Gas Recirculation Flow Malfunction				
$82	$81	The intake manifold pressure value when nearly full open	-150 - 1250 mmHg	0000 - FFFF
$82	$02	The intake manifold pressure value when close	-150 - 1250 mmHg	0000 - FFFF
Evaporative Emission Control System Leak Detected (small leak)				
$83	$01	Tank pressure in mode Z	-62.5 - 125 mmHg	0000 - FFFF
$83	$02	Negative pressure in the intake manifold to tank	-62.5 - 125 mmHg	0000 - FFFF
$83	$03	Tank pressure when starting calculation	-62.5 - 125 mmHg	0000 - FFFF
$83	$04	amount of negative pressure change	-62.5 - 125 mmHg	0000 - FFFF
$83	$05	tank pressure in mode D	-62.5 - 125 mmHg	0000 - FFFF
$83	$86	The change of tank pressure in mode E	-62.5 - 125 mmHg	0000 - FFFF
O2 Sensor Circuit Slow Response(B1S1)				
$84	$01	Ratio of faf difference to lambda value difference	0 - 8	0000 - FFFF
O2 Sensor Circuit Slow Response(B1S2)				
$85	$01	Shortest time change from rich to lean	0 - 2097120 ms	0000 - FFFF
$85	$02	Time at over 0.55V	0 - 2097120 ms	0000 - FFFF
O2 Sensor Circuit Slow Response(B1S3)				
$86	$01	Response time	0 - 2097120 ms	0000 - FFFF
O2 Sensor Circuit Slow Response(B2S1)				
$87	$01	ratio of faf difference to lambda value difference	0 - 8	0000 - FFFF
O2 Sensor Circuit Slow Response(B2S2)				
$88	$01	Shortest time change from rich to lean	0 - 2097120 ms	0000 - FFFF
$88	$02	Time at over 0.55V	0 - 2097120 ms	0000 - FFFF
$89	$81	Secondary air supply pipe pressure	0 - 1250 mmHg	0000 - FFFF
$89	$82	Integrated value of pulse when the left combination valve is closed	0 - 50 Volt	0000 - FFFF
$89	$83	Supply piping pressure when the right combination valve is switched	0 - 5 Volt	0000 - FFFF
$89	$84	Integrated value of pulse when the right combination valve is closed	0 - 50 Volt	0000 - FFFF
$89	$85	Supply piping pressure when the left combination valve is switched	0 - 5 Volt	0000 - FFFF
$89	$06	Supply piping pressure when both left and right combination valves are closed	0 - 50 Volt	0000 - FFFF
$89	$07	Flow rate when the right bank is closed	0 - 20 L/sec	0000 - FFFF
$89	$08	Flow rate when the left bank is closed	0 - 20 L/sec	0000 - FFFF
Purge control solenoid valve 2 stuck close diagnosis				
$8A	$81	variation gap between tank pressure at the end of mode C and after mode C	-62.5 - 62.5 mmHg	0000 - FFFF