# 07_GRP06_All Engines.doc

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| THREE WAY CATALYTIC CONVERTER (TWC) | P0420 (BANK 1)<br><br>P0430 (BANK 2) | B | SECONDARY HO2S SIGNAL VARIANCE METHOD | CTAGE67 (BANK 1) 2)<br><br>CTAGE68 (BANK 2) 2) | >15000(hex)<br><br>>0B000(hex) | ECT 1<br><br>IAT2<br><br>VEHICLE SPEED<br><br>MAP<br><br>ENGINE SPEED<br><br>SHORT TERM FUEL TRIM STATUS<br><br><br><br>CATALYST TEMPERATURE (ESTIMATED VALUE BY PCM)<br><br>MAP DIFFERENCE<br><br>FUEL SYSTEM STATUS<br><br><br>SV DIFFERENCE 3)<br><br><br>MONITOR PRECONDITION<br><br><br><br><br>MONITORING PRIORITY ORDER | >69deg.C<br><br>>-21.5deg.C<br><br>>3mph<br><br>250<MAP<550mmHg<br><br>1150<RPM<2000rpm<br><br>WITHIN SHORT TERM FUEL TRIM LIMITS<br><br>ΔKACT<0.05 4)<br><br><br>>500deg.C<br><br><br><32.2mmHg 5)<br><br>SECONDARY HO2S FEED BACK IS ACTIVATED<br><br>DISABLE CONDITION:<br><0.488 DURING 3sec.<br><br>SECONDARY HO2S MONITOR PASS OR SENSOR SIGNAL PASSES ACROSS VOLTAGE ZONE FROM 0.742V TO 0.293V<br><br>LEVEL B: P0455 6) | JUDGMENT PASS OR FAULT: 100sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |

Note: 1): Refer to section for logic flowchart.
2): CTAGE67/CTAGE68: Calculated value derived from averaging the variance of secondary HO2S signal.
3): SV: Predicted exhaust gas volume introduced into catalyst. The value of less than 0.488 is equivalent to vehicle cruise condition.
4): ΔKACT: Difference in coefficient factor calculated based on A/F sensor signal per a specific time.
5): MAP difference: {MAP(n)-MAP(n-1)}+{MAP(n-2)-MAP(n-3)}+{MAP(n-4)-MAP(n-5)} < 32.23mmHg (n=50msec.)
6): LEVEL B: P0420 and P0430 are interrupted by P0455 and disabled while it runs.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| HEATED AIR FUEL RATIO (A/F) SENSOR | P2297 (BANK 1)<br><br>P2298 (BANK 2) | B | RATIONALITY CHECK A/F SENSOR OUTPUT CURRENT MONITORING METHOD | A/F SENSOR SIGNAL(ANALOG) | >4.50V<br>OR<br><2.90V | FUEL SYSTEM STATUS<br><br>ECT 1<br><br>ENGINE SPEED<br><br>IAT2<br><br>VEHICLE SPEED<br><br>CUMULATIVE TIME AFTER HEATER ON<br><br>HEATER OPERATING STATUS<br><br>A/F SENSOR ELEMENT RESISTANCE<br><br>A/F SENSOR VOLTAGE | FUEL CUT CONDITION<br><br>>69deg.C<br><br><2200rpm<br><br>>-21.5deg.C<br><br>>30mph<br><br>>5sec.<br><br>ACTIVATING<br><br><110ohm<br><br>>2.0V | JUDGMENT FAULT OR PASS:<br>(MIN): 4.25sec. 2)<br>(MAX): 3)<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |

Note: 1): Refer to section for logic flowchart.
2): Under A/F sensor stable output condition (A/F sensor output voltage difference <0.05V per 0.15sec.)
3): Maximum time to judgment fault or pass is not specified, because A/F sensor stable output condition is needed for monitoring.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| HEATED AIR FUEL RATIO (A/F)SENSOR | P0133 (BANK 1)<br><br>P0153 (BANK 2) | B | RESPONSE RATE CHECK | AMPLITUDE OF FILTERED SENSOR SIGNAL | 1C hex | ENGINE SPEED<br><br>MAP<br><br><br><br><br>ECT 1<br><br>IAT<br><br>VEHICLE SPEED<br><br>MAX FLUCTUATION OF FILTERED MAP SENSOR FILTERED OUTPUT<br><br>SHORT TERM FUEL TRIM STATUS<br><br>FUEL SYSTEM STATUS<br><br><br>A/F SENSOR ELEMENT RESISTANCE<br><br>CATALYST CONDITION<br><br><br>MONITORING PRIORITY ORDER | 1050rpm<RPM<2000rpm<br><br>RPM MAP(mmHg)<br>1050 350-570<br>1200 250-570<br>1500 210-570<br>1800 200-570<br><br>>68deg.C<br><br>>-21deg.C<br><br>>29mph<br><br><6.0mmHg 2)<br><br>WITHIN SHORT TERM FUEL TRIM LIMITS<br><br>STOICHIOMETRIC A/F CONDITION<br><br><110ohm/110ohm<br><br>EXCEPT DURING DEOXIDIZATION MODE 3)<br><br>LEVEL B: P0455 5)<br>LEVEL C: P0139 | JUDGMENT PASS OR FAULT:<br>(MAX): 7.8sec. 4)<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |

Note: 1): Refer to section for logic flowchart.
2): If the conditon is off, the monitor waits 2.0sec. for stabilization.
3): Till amount of excess oxygen in catalyst become low after fuel cut during deceleration.
4): If the conditon is off before detect malfunction, the cumulative result is reset.
5): LEVEL B: P0133 and P0153 are interrupted by P0455 and disabled while it runs.
LEVEL C: P0133 and P0153 are not interrupted but wait if P0139 runs in advance.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| HEATED AIR FUEL RATIO (A/F) SENSOR | P2252 (BANK 1) P2255 (BANK 2) | F | A/F SENSOR SENSOR CELL CIRCUIT CHECK (SHORT) | VOLTAGE IN SENSOR CELL CIRCUIT | <0.3V | CUMULATIVE TIME AFTER ENGINE START<br><br>VRPVS 2)<br><br>SENSOR HEATER OPERATING STATUS<br><br>ENGINE STATUS | >85sec.<br><br>>4.6V<br><br>ACTIVATING<br><br>RUNNING | JUDGEMENT FAULT : 5.5sec<br><br>MONITORING RUNS CONTINUOUSLY | 1 D/C |
| | P2245 (BANK 1) P2249 (BANK 2) | | A/F SENSOR REFERENCE VOLTAGE CIRCUIT CHECK (SHORT) | VOLTAGE IN SENSOR CELL CIRCUIT | <1.5V | | | | |
| | P2238 (BANK 1) P2241 (BANK 2) | | A/F SENSOR PUMP CELL CIRCUIT CHECK (SHORT) | VOLTAGE IN PUMP CELL CIRCUIT | <1.0V | CUMULATIVE TIME AFTER ENGINE START<br><br>SENSOR HEATER OPERATING STATUS<br><br>ENGINE STATUS | >85sec.<br><br>ACTIVATING<br><br>RUNNING | JUDGEMENT FAULT : 5.0sec<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P2253 (BANK 1) P2256 (BANK 2) | | A/F SENSOR SENSOR CELL CIRCUIT CHECK (OPEN) | VOLTAGE IN SENSOR CELL CIRCUIT | >6.0V | LOWEST VRPVS SINCE ENGINE START<br><br>VRPVS 2)<br><br>SENSOR HEATER OPERATING STATUS<br><br>ENGINE STATUS | <3.2V<br><br>>4.6V<br><br>ACTIVATING<br><br>RUNNING | JUDGMENT FAULT :5sec<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P2243 (BANK 1) P2247 (BANK 2) | | A/F SENSOR REFERENCE VOLTAGE CIRCUIT CHECK (OPEN) | VOLTAGE IN SENSOR CELL CIRCUIT | <3.4V DETECTED 50 TIMES AND >4.8V DETECTED 50 TIMES 3) | SENSOR HEATER OPERATING STATUS<br><br>ENGINE STATUS | ACTIVATING<br><br>RUNNING | JUDGMENT FAULT : (MAX)7sec<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P2239 (BANK 1) P2242 (BANK 2) | | A/F SENSOR PUMP CELL CIRCUIT CHECK (OPEN) | VOLTAGE IN PUMP CELL CIRCUIT | <2.0V OR >5.6V | VOLTAGE IN SENSOR CELL CIRCUIT<br><br>VRPVS 2)<br><br>SENSOR HEATER OPERATING STATUS<br><br>ENGINE STATUS | 3.4 < VOLTAGE <4.7V<br><br><4.6V<br><br>ACTIVATING<br><br>RUNNING | JUDGMENT FAULT :15sec<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P2627 (BANK 1) P2630 (BANK 2) | | A/F SENSOR LABEL RESISTOR SIGNAL (HIGH) | A/F SENSOR VLBL SIGNAL (ANALOG) | >4.7V | SENSOR HEATER OPERATING STATUS | ACTIVATING | JUDGMENT FAULT :5sec<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P2628 (BANK 1) P2631 (BANK 2) | | A/F SENSOR LABEL RESISTOR SIGNAL (LOW) | A/F SENSOR VLBL SIGNAL (ANALOG) | >0.29V | | | | |

Note: 1): Refer to section for logic flowchart.
2): VRPVS: Voltage corresponding to internal resistance of sensor cell in normal condition. Output is 5V when A/F sensor controller detedts particular malfunctions.
3): If voltage in sensor cell circuit (VS) oscillates, reference voltage circuit is judged open.
VS is monitored every 0.01sec, and VS is judged oscillating when both VS more than 4.8V and VS less than 3.4V are detected 50 times or more.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| HEATED AIR FUEL RATIO (A/F) SENSOR | P2414 (BANK 1)<br><br>P2415 (BANK 2) | G | MONITOR OF LEAN A/F SENSOR OUTPUT | A/F SENSOR SIGNAL (ANALOG) | >3.48V | A/F SENSOR ELEMENT RESISTANCE<br><br>FUEL SYSTEM STATUS<br><br>CUMULATIVE TIME AFTER FUEL CUT<br><br>CUMULATIVE TIME AFTER SENSOR ACTIVATED | <=200ohm<br><br>NOT FUEL CUT<br><br>>5.0sec.<br><br>>20sec. | JUDGMENT FAULT: 12sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 1 D/C |
| | P0132 (BANK 1)<br><br>P0152 (BANK 2) | F | OUT OF RANGE | VOLTAGE IN CIRCUIT | >4.70V | HEATER OPERATING STATUS<br><br>A/F SENSOR ELEMENT RESISTANCE | ACTIVATING<br><br><=200ohm | JUDGMENT FAULT 7sec.<br><br>MONITORING RUNS CONTINUOUSLY | 1 D/C |
| HEATED AIR FUEL RATIO (A/F) SENSOR OR HEATED AIR FUEL RATIO (A/F) SENSOR HEATER | P0135 (BANK 1)<br><br>P0155 (BANK 2) | K | MONITOR OF A/F SENSOR ACTIVITY-BEFORE SENSOR ACTIVATION | SENSOR ELEMENT RESISTANCE (ANALOG) OR VOLTAGE IN SENSOR CELL CIRCUIT (ANALOG) | >1.1ohm<br><br>>4.35 OR <3.85 | ENGINE OPERATING STATUS<br><br>BATTERY VOLTAGE<br><br>FUEL SYSTEM STATUS<br><br>CUMULATIVE TIME AFTER FUEL CUT | RUNNING<br><br>>=10.5V<br><br>NOT FUEL CUT<br><br>>15sec. | JUDGMENT FAULT: (MAX) 55sec.<br><br>MONITORING RUNS CONTINUOUSLY | 2 D/C |
| | | | MONITOR OF A/F SENSOR ACTIVITY-AFTER SENSOR ACTIVATION<br><br>JUDGMENT A | SENSOR ELEMENT RESISTANCE (ANALOG) OR VOLTAGE IN SENSOR CELL CIRCUIT (ANALOG) | >110ohm<br><br>>=4.35 OR <=3.85 | | | JUDGMENT FAULT: (MAX) 30sec. 2)<br><br>MONITORING RUNS CONTINUOUSLY | |
| | | | MONITOR OF A/F SENSOR ACTIVITY-AFTER SENSOR ACTIVATION<br><br>JUDGMENT B | SENSOR ELEMENT RESISTANCE (ANALOG) | >200ohm | | | JUDGMENT FAULT: 1sec. 3)<br><br>MONITORING RUNS CONTINUOUSLY | |
| HEATED AIR FUEL RATIO (A/F) SENSOR HEATER | P0030 (BANK 1)<br><br>P0050 (BANK 2) | | CIRCUIT CHECK (OPEN/SHORT) | VOLTAGE IN HEATER CIRCUIT (ANALOG) | =0V<br><br>=12V | A/F SENSOR HEATER OPERATING STATUS | OFF<br><br>ON | JUDGMENT FAULT: 1sec.<br><br>MONITORING RUNS CONTINUOUSLY | 1D/C |

Note: 1): Refer to section for logic flowchart.
2): When sensor element resistance stays between 110ohm to 200ohm during 15sec., PCM judges as malfunction.
3): Feedback control is continued during judgment time of 1.0sec., even if sensor element resistance exceeds 200ohm.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO2S) | P0137 (BANK 1)<br>P0157 (BANK 2) | F | CIRCUIT CHECK SHORT | SECONDARY HO2S SIGNAL | <0.293V | ECT1<br>IAT<br>FUEL SYSTEM STATUS | >68.8deg.C<br>>-21.5deg.C<br>STOICHIOMETRIC A/F CONDITION | JUDGMENT TIME:<br>CIRCUIT CHECK SHORT : 40sec.<br>CIRCUIT CHECK OPEN : 5sec. | 1 D/C |
| | P0138 (BANK 1)<br>P0158 (BANK 2) | | CIRCUIT CHECK OPEN | | >1.27V | SV 2)<br>SHORT TERM FUEL TRIM STATUS | >3E80 hex<br>WITHIN SHORT TERM FUEL TRIM LIMITS | MONITORING RUNS CONTINUOUSLY | |
| SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO2S) HEATER | P0141 (BANK 1)<br>P0161 (BANK 2) | F | CURRENT CHECK | HEATER CURRENT (ANALOG) | <0.38A OR >3.33A | ECT1<br>BATTERY VOLTAGE 3)<br>HEATER OPERATING STATUS | >5deg.C<br>>10.50V<br>ACTIVATED CONDITION | JUDGMENT TIME:<br>5.0sec.<br>MONITORING RUNS CONTINUOUSLY | 1 D/C |
| | P0036 (BANK 1)<br>P0056 (BANK 2) | | CIRCUIT CHECK (OPEN/SHORT) | VOLTAGE IN HEATER CIRCUIT (ANALOG) | =0V | HO2S HEATER OPERATING STATUS | OFF | JUDGMENT TIME:<br>1sec. | |
| | | | | | =12V | | ON | MONITORING RUNS CONTINUOUSLY | |

Note: 1): Refer to section for logic flowchart
2): Predicted exhaust gas volume introduced into catalyst.
3): Read value by PCM.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO2S) | P0139 (BANK 1)<br><br>P0159 (BANK 2) | B | RESPONSE RATE CHECK | MOVING TIME OF A/F SENSOR SIGNAL | FAIL THRESHOLD<br>T1 4) (SEC) T2 5) (SEC)<br>0.00 >0.60<br>0.92 >0.60<br>1.08 >0.86<br>3.45 >1.26<br>15.0 >3.21<br><br>PASS THRESHOLD<br>T1 4) (SEC) T2 5) (SEC)<br>0.92 <0.49<br>0.93 <0.60<br>1.08 <0.86<br>3.45 <1.26<br>15.0 <3.21 | ECT1<br><br>IAT<br><br>MAP<br><br>ENGINE SPEED<br><br>VEHICLE SPEED<br><br>SECONDARY HO2S SIGNAL AT MONITORING START<br><br>DELTA MAP<br><br>DELTA KCMD DURING RICH AND LEAN CONTROL 5)<br><br>CUMULATIVE TIME AFTER ENGINE START<br><br>FEED BACK CONTROL SYSTEM STATUS<br><br>FUEL SYSTEM STATUS<br><br>DELAY TIME AFTER FUEL CUT<br><br><br><br><br><br><br>DELAY TIME AFTER PURGE CUT<br><br>MONITORING PRIORITY ORDER | >68.8deg.C<br><br>>=-21.5deg.C<br><br>160mmHg<MAP<520mmHg<br><br>1100rpm<RPM<1850rpm<br><br>>30mph<br><br>>0.293V<br><br><br><20mmHg/2engine revs<br><br><0.047<br><br><br>>150sec. 6)<br><br><br>CLOSED LOOP CONDITION<br><br><br>STOICHIOMETRIC A/F CONDITION<br><br>MONITOR IS DISABLED AFTER FUEL CUT<br>FUEL CUT TIME (sec) / DISABLE TIME (sec)<br>0.0 / 0.0<br>30.0 / 2.8<br>60.0 / 60.0<br>180.0 / 90.0<br>300.0 / 150.0<br><br>MONITOR IS DISABLED DURING 2.5sec AFTER PURGE CUT<br><br>LEVEL B: P0455 7)<br>LEVEL C: P0171, P0172, P0133, P0135 8) | JUDGMENT FAULT OR PASS:<br>(MAX): 15.5sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |

Note: 1): Refer to section for logic flowchart
2): T1: No reaction time of A/F sensor, duration after the PCM changes A/F command rich-to-lean intrusively until secondary HO2S output reaches 0.4V.
3): T2: Duration after secondary HO2S output passes 0.4V until it reaches 0.15V.
4): If secondary HO2S output can not reach 0.15V during 3.3sec. after secondary HO2S output passes 0.4V, the ECM judges as malfunction.
5): KCMD: Command value of fuel injection coefficient. When actual A/F before catalyst change, KCMD value changes to control actual A/F to stoiciometric condition.
6): If fuel cut condition is met during 150sec. after engine start, this disable time becomes long according to fuel cut time.
7) LEVEL B: P0133 and P0153 are interrupted by P0455 and disabled while it runs.
8) LEVEL C: P0133 and P0153 are not interrupted but wait if P0139 runs in advance.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| SECONDARY HEATED OXYGEN SENSOR (SECONDARY HO2S) | P2271 (BANK 1)<br><br>P2273 (BANK 2) | B | SECONARY HO2S SIGNAL STUCK CHECK (RICH) | SECONDARY HO2S SIGNAL | >0.293V | SAME AS SECONDARY PARAMETERS OF P0139, P0159 EXCEPT FOR THE PARAMETER BELOW<br><br>DURING LEAN CONTROL | SAME AS ENABLE CONDITIONS OF P0139, P0159 EXCEPT FOR THE CONDITION BELOW<br><br>KCMD=0.957 2) | JUDGMENT FAULT: 17sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |
| | P2270 (BANK 1)<br><br>P2272 (BANK 2) | | SECONARY HO2S SIGNAL STUCK CHECK (LEAN) | SECONDARY HO2S SIGNAL | <0.65V | SAME AS SECONDARY PARAMETERS OF P0139, P0159 EXCEPT FOR THE PARAMETER BELOW<br><br>DURING RICH CONTROL | SAME AS ENABLE CONDITIONS OF P0139, P0159 EXCEPT FOR THE CONDITION BELOW<br><br>KCMD=1.027 2) | JUDGMENT FAULT: 31sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | |

Note: 1): Refer to section for logic flowchart
2): KCMD: Command value of fuel injection coefficient. When actual A/F before catalyst change, KCMD value changes to control actual A/F to stoiciometric condition.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| MISFIRE | P0301 (#1CYL)<br>P0302 (#2CYL)<br>P0303 (#3CYL)<br>P0304 (#4CYL)<br>P0305 (#5CYL)<br>P0306 (#6CYL)<br>P0300 (MULT.) | REFER TO SECTION FOR MONITORING DESCRIPTION | CRANKSHAFT SPEED FLUCTUATION METHOD | MISFIRE RATIO (CATALYST DAMAGE) | REFER TO SUPPORT DATA 1) | MISFIRE COUNTER STATUS | RUNNING (MISFIRE COUNTER STARTS AFTER 1sec. FROM ENCOUNTERING THE ENABLE CONDITIONS) | JUDGMENT FAULT OR PASS:<br>200 ENGINE REVS<br>MONITORING RUNS CONTINUOUSLY | REFER TO SECTION FOR MONITORING DESCRIPTION |
| | | | | | | ECT1 | >-10deg.C<br>(ECT1 AT ENGINE START>-10deg.C)<br>>20deg.C<br>(ECT1 AT ENGINE START<-10deg.C) | | |
| | | | | | | IAT2 | >-10deg.C | | |
| | | | | MISFIRE RATIO (FTP EMISSION) | 1.47% | ENGINE SPEED | 500<RPM<6300rpm | JUDGMENT FAULT OR PASS:<br>1000 ENGINE REVS<br>MONITORING RUNS CONTINUOUSLY | |
| | | | | | | MAP | POSITIVE TORQUE CONDITIONS WHICH ENGINE LOAD IS ABOVE THE ONES IN THE TABLES BELOW 3) | | |
| | | | | | | CUMULATIVE TIME FROM ENGINE START | 2) | | |
| | | | | | | THROTTLE ANGLE DIFFERENCE | >5deg./10msec<br>*MISFIRE COUNTER IS HELD<br>*DISABLE CONDITION | | |
| | | | | | | VEHICLE OPERATING CONDITION | ROUGH LOAD<br>*MISFIRE COUNTER IS RESET<br>*DISABLE CONDITION | | |

Note: 1): Refer to support data for misfire.
2): Before picking-up pulsar pitch error or when engine speed is more than 2000rpm, misfire counters are compensated for 10 engine revs after reaching the engine speed of 500 rpm when ignition is turned on. In another case, misfire counters are compensated for 2 engine revs after reaching the engine speed of 500 rpm when ignition is turned on.
3): Positive torque conditions are shown below:

-After compensating for pick-up pulsar pitch errors-

| NO LOAD CONDITION (VEHICLE SPEED=0) | | ROAD LOAD CONDITION (VEHICLE SPEED>0) | | | |
|---|---|---|---|---|---|
| | | 1ST OR 2ND GEAR POSITION | | 3RD OR HIGHER GEAR POSITION | |
| ENGINE SPEED (RPM) | MAP (mmHg) | ENGINE SPEED (RPM) | MAP (mmHg) | MAP (mmHg) | MAP (mmHg) |
| 500 | 185 | 500 | 245 | 500 | 245 |
| 1000 | 158 | 1440 | 180 | 1080 | 205 |
| 2100 | 135 | 2090 | 180 | 1900 | 205 |
| 2500 | 148 | 2350 | 198 | 3500 | 335 |
| 3000 | 148 | 3950 | 198 | 5200 | 335 |
| 6500 | 330 | 6500 | 330 | 6500 | 450 |

-Before compensating for pick-up pulsar pitch errors-

| NO LOAD CONDITION (VEHICLE SPEED=0) | | ROAD LOAD CONDITION (VEHICLE SPEED>0) | | | |
|---|---|---|---|---|---|
| | | 1ST OR 2ND GEAR POSITION | | 3RD OR HIGHER GEAR POSITION | |
| ENGINE SPEED (RPM) | MAP (mmHg) | ENGINE SPEED (RPM) | MAP (mmHg) | MAP (mmHg) | MAP (mmHg) |
| 900 | 185 | 1000 | 760 | 1000 | 760 |
| 920 | 500 | 1600 | 180 | 1600 | 205 |
| 2000 | 500 | 2090 | 180 | 1900 | 205 |
| 2500 | 148 | 2350 | 198 | 3500 | 335 |
| 3000 | 148 | 3950 | 198 | 5200 | 335 |
| 6500 | 330 | 6500 | 330 | 6500 | 450 |

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| FUEL INJECTOR | P0201 (#1CYL)<br><br>P0202 (#2CYL)<br><br>P0203 (#3CYL)<br><br>P0204 (#4CYL)<br><br>P0205 (#5CYL)<br><br>P0206 (#6CYL) | F | CIRCUIT CHECK (OPEN/SHORT) | VOLTAGE IN INJECTOR CONTROL CIRCUIT (ANALOG) | =0V | INJECTOR OPERATING STATUS | OFF (NO FUEL INJECTING) | JUDGMENT FAULT: 1sec.<br><br>MONITORING RUNS CONTNUOUSLY | 1 D/C |
| | | | | | =12V | | ON (FUEL INJECTING) | | |

Note: 1): Refer to section for logic flowchart.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| EXHAUST GAS RECIRCULATION (EGR) SYSTEM | P0404 | E | LIFT FEEDBACK CONTROL METHOD WHICH COMPARES THE ACTUAL VALVE LIFT(LACT) TO THE LOGICAL VALVE LIFT(LCMD) | EGR VALVE LIFT SENSOR SIGNAL (ANALOG) | \|LCMD- LACT\| >1.02mm | LCMD<br><br>ENGINE SPEED<br><br>BATTERY VOLTAGE 2) | >0.3mm<br><br><4000rpm<br><br>>10.50V | JUDGEMENT FAULT OR PASS: 5sec.<br><br>MONITORING RUNS CONTINUOUSLY | 2 D/C |
| | P2413 | G | LIFT FEEDBACK CONTROL METHOD WHICH COMPARES THE ACTUAL VALVE LIFT(LACT) TO THE LOGICAL VALVE LIFT(LCMD) | EGR VALVE LIFT SENSOR SIGNAL (ANALOG) | LACT<0.15mm | LCMD<br><br>ENGINE SPEED<br><br>BATTERY VOLTAGE 2) | >0.30mm<br><br><4000rpm<br><br>>10.50V | JUDGEMENT FAULT OR PASS: 5sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |
| | P0403 | F | EGR CONTROL SOLENOID CIRCUIT RETURN SIGNAL CHECK | RETURN SIGNAL CHECK(ANALOG) | NO SIGNAL CHANGE | BATTERY VOLTAGE 2) | >10.50V | JUDGEMENT FAULT: 2sec.<br><br>MONITORING RUNS CONTNUOUSLY | 1 D/C |
| | P0406 | | RANGE CHECK | EGR VALVE LIFT SENSOR SIGNAL (ANALOG) | >4.88V | KEY POSITION | IG ON | JUDGMENT FAULT: 2sec.<br><br>MONITORING RUNS CONTINUOUSLY | |

Note: LCMD: EGR valve lift command signal
LACT: Actual EGR valve lift signal
1): Refer to section for logic flowchart.
2): Read value by PCM.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| EXHAUST GAS RECIRCULATION (EGR) SYSTEM | P0401 | B | INTAKE AIR PRESSURE METHOD WHICH MEASURES THE VARIATION OF THE PRESSURE BETWEEN EGR VALVE CLOSE AND OPEN | REGRF 2) | <15% | FUEL SYSTEM STATUS<br><br>ENGINE SPEED<br><br>ECT1<br><br>MAP<br><br>VEHICLE SPEED<br><br>BATTERY VOLTAGE 2)<br><br>ENGINE SPEED FLUCTUATION AFTER MONITORING START<br><br>MONITORING PRIORITY ORDER | FUEL CUT CONDITION<br><br>1100<RPM<2200rpm<br><br>>69deg.C<br><br>>100mmHg<br><br>>30mph<br><br>>10.50V<br><br>-800<ΔRPM<200rpm<br><br>LEVEL A: P0404, P2413 3) | JUDGEMENT FAULT OR PASS: 3.0sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |

Note: 1): Refer to section for logic flowchart.

2): REGRF: The ratio indicates the extent of EGR valve clogging. REGRF = DPBBF / DPBST

DPBBF: Actual difference of intake air pressure between EGR valve close and open.

DPBST: Predicted difference of intake air pressure between EGR valve close and open when EGR has no clogging. DPBST values are shown below.

| BARO = 460mmHg | |
|---|---|
| ENGINE SPEED (rpm) | DPBST (mmHg) |
| 1100 | 67.9 |
| 1400 | 53.8 |
| 1700 | 40.2 |
| 2000 | 35.0 |
| 2200 | 34.6 |

| BARO = 760mmHg | |
|---|---|
| ENGINE SPEED (rpm) | DPBST (mmHg) |
| 1100 | 109.6 |
| 1400 | 89.3 |
| 1700 | 73.9 |
| 2000 | 61.7 |
| 2200 | 53.1 |

3): LEVEL A: P0401 is disabled until P0404 and P2413 pass or complete.

| COMPONENT / SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| FUEL SYSTEM | P0172 (BANK 1)<br><br>P0175 (BANK 2) | C | LONG TERM FUEL TRIM METHOD - RICH | LONG TERM FUEL TRIM VALUE CALCULATED BY A/F SENSOR AND SECONDARY HO2S (DIGITAL) | <0.844 (NORMAL)<br><br><0.852 (PURGE CUT) | ECT1<br><br>IAT2<br><br>MAP<br><br>ENGINE SPEED<br><br>LONG TERM FUEL TRIM VALUE (P0172 ONLY) | >69deg.C<br><br>>0deg.C<br><br>160mmHg<br><br>640<RPM<4000rpm<br><br>IF THE INFLUENCE OF EVAP PURGE IS FOUND BY PAUSING PURGE, MONITORING IS DISABLED UNTIL EVAP VAPOR IS PURGED TO PREDETERIMINED LEVEL 2)<br><br>CLOSED LOOP CONDITION<br><br>LEVEL B: P0133, P0455 3)<br>LEVEL C: P0139 4) | JUDGMENT FAULT: 7sec.INTERVAL<br><br>MONITORING RUNS CONTINUOUSLY | 2 D/C |
| | P0171 (BANK 1)<br><br>P0174 (BANK 2) | | LONG TERM FUEL TRIM METHOD - LEAN | | >1.164 | | | | |

Note: 1): Refer to section for logic flowchart.
2): Monitoring disable time depends on EVAP vapor amount, but the monitoring forces to restart after 5 minutes disablement even if the influence of EVAP vapor still remains.
3): LEVEL B: P0172, P0171, P0175 and P0174 are interrupted by P0133 and P0455 and disabled while they run.
4): LEVEL C: P0172, P0171, P0175 and P0174 are not interrupted but wait if P0139 runs in advance.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| ENGINE COOLANT TEMPERATURE (ECT1) SENSOR | P0125 | B | ACHIEVING TIME METHOD WHICH MEASURES THE TIME INTERVAL UNTIL ECT1 ACHIEVES ABOVE CLOSED LOOP ENABLE TEMPERATURE AFTER ENGINE START | CUMULATIVE ENGINE RUNNING TIME UNTIL ECT1 REACHES -12deg.C | TEMP deg.C) / TIME (sec.)<br>-31.4 / >=300<br>-20.3 / >=120<br>-12.0 / >=60 | ECT1 AT ENGINE START<br><br>FUEL SYSTEM STATUS | -48.7deg.C<ECT1<-12deg.C<br><br>EXCEPT FUEL CUT CONDITIONS | JUDGMENT FAULT OR PASS : ACCORDING TO THRESHOLD<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |
| | | | | CUMULATIVE HIGH ENGINE LOAD TIME UNTIL ECT1 REACHES -12deg.C | >1200sec. | ECT1 AT ENGINE START<br><br>ENGINE LOAD | <-48.7deg.C<br><br>RPM / MAP(mmHg)<br>500 / >600<br>1000 / >360<br>2000 / >250<br>3000 / >160 | | |
| | P0116 | | MONITOR OF ECT1 SENSOR DEVIATION AT COLD START 2) | DIFFERENCE OF ECT1 SENSOR OUTPUT | <10deg.C | SOAK TIME BEFORE RUNNING<br><br>FUEL CONSUMPTION AFTER ENGINE START<br><br>IG OFF TIME AFTER RUNNING | >6hours<br><br>>0.65L<br><br>>10sec. | JUDGMENT FAULT OR PASS: 10sec. 3) | 2 D/C |
| | | | MONITOR OF ECT1 SENSOR DEVIATION AT HOT START 2) | | | FUEL CONSUMPTION AFTER ENGINE START<br><br>IG OFF TIME AFTER RUNNING | >0.65L<br><br>>150min. | JUDGMENT FAULT OR PASS: 10sec. 3) | |
| | P0117 | F | RANGE CHECK-LOW | ECT1 SENSOR SIGNAL(ANALOG) | <0.08V | KEY POSITION | IG ON | JUDGMENT FAULT: 2sec. MONITORING RUNS CONTINUOUSLY | 1 D/C |
| | P0118 | | RANGE CHECK-HIGH | | >4.92V | | | | |

Note: 1): Refer to section for logic flowchart.
2): Hot start: Soak time befor engine start is less than 6hours.
Cold start: Soak time befor engine start is more than 6hours.
3): The malfunction is detected after 10seconds from engine start in next driving cycle

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| INTAKE AIR TEMPERATURE (IAT) SENSOR AND ENGINE COOLANT TEMPERATURE 1 (ECT1) SENSOR AND ECT2 SENSOR | P0096<br>P1126<br>P2183 | B | COMPARISON CHECK OF ECT1, ECT2 AND IAT SENSOR | DIFFERENCE OF EACH SENSOR OUTPUT AT ENGINE START | \|IAT-ECT1\|>28deg.C<br>\|IAT-ECT2\|>23deg.C<br>\|ECT2-ECT1\|>24deg.C<br>2) | ENGINE OPERATING STATUS<br><br>SOAK TIME BEFORE ENGINE START | RUNNING<br><br>>6hours | JUDGMENT FAULT OR PASS:<br>10sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |

Note: 1): Refer to section for logic flowchart.
2): Relation between result of comparison check and stored malfunction is shown below. However, in case of ECT1 at engine start > 35deg.C, ECT1 sensor is not judged pass even if check between ECT1 and IAT sensors judges pass.

| Result of comparison check | | | Stored malfunction | | |
|---|---|---|---|---|---|
| \|ECT-IAT\| | \|ECT2-IAT\| | \|ECT-ECT2\| | IAT | ECT | ECT2 |
| ○ | ○ | ○ | Pass | Pass | Pass |
| ○ | ○ | × | Pass | Fail | Fail |
| ○ | × | ○ | Fail | Pass | Fail |
| ○ | × | × | Pass | Pass | Fail |
| × | ○ | ○ | Fail | Fail | Pass |
| × | ○ | × | Pass | Fail | Pass |
| × | × | ○ | Fail | Pass | Pass |
| × | × | × | Fail | Fail | Fail |

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| ENGINE COOLANT TEMPERATURE 2 (ECT2) SENSOR | P2184 | F | RANGE CHECK-LOW | ECT2 SENSOR SIGNAL (ANALOG) | <0.08V | KEY POSITION | IG ON | JUDGMENT FAULT: 2.0sec.<br><br>MONITORING RUNS CONTINUOUSLY | 1 D/C |
| | P2185 | | RANGE CHECK-HIGH | | >4.92V | | | | |

Note: 1): Refer to section for logic flowchart.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| THROTTLE POSITION (TP) SENSOR 1 (TPS1) | P0122 | F | RANGE CHECK-LOW | TP SENSOR SIGNAL (ANALOG) | <0.28V | | | JUDGMENT FAULT: 0.1sec.<br><br>MONITORING RUNS CONTINUOUSLY | 1 D/C |
| | P0123 | | RANGE CHECK-HIGH | | >4.747V | | | | |
| THROTTLE POSITION (TP) SENSOR 2 (TPS2) | P0222 | | RANGE CHECK-LOW | | <0.182V | | | | |
| | P0223 | | RANGE CHECK-HIGH | | >4.843V | | | | |
| THROTTLE POSITION (TP) SENSORS | P2135 | | COMPARISON CHECK | DIFFERENCE OF SIGNALS BETWEEN TPS1 AND TPS2 | \|TPS1-TPS2\| > 5deg. | | | | |
| | | | SHORT CIRCUIT BETWEEN TPS1 AND TPS2 CHECK | DIFFERENCE OF SIGNALS BETWEEN TPS1 AND TPS2 | \|TPS1-TPS2\| < 0.05V | CIRCUIT VOLTAGE OF TPS2 | = 0V 2) | JUDGMENT FAULT: 10sec.<br><br>MONITORING RUNS CONTINUOUSLY | |
| ACCELERATOR POSITION (AP) SENSOR 1 (APS1) | P2122 | | RANGE CHECK-LOW | AP SENSOR SIGNAL (ANALOG) | <0.2V | | | JUDGMENT FAULT: 0.2sec.<br><br>MONITORING RUNS CONTINUOUSLY | 1 D/C |
| | P2123 | | RANGE CHECK-HIGH | | >4.85V | | | | |
| ACCELERATOR POSITION (AP) SENSOR 2 (APS2) | P2127 | | RANGE CHECK-LOW | | <0.2V | | | | |
| | P2128 | | RANGE CHECK-HIGH | | >4.85V | | | | |
| ACCELERATOR POSITION (AP) SENSORS | P2138 | | COMPARISON CHECK | DIFFERENCE OF SIGNALS BETWEEN APS1 AND APS2 | APS1/2-0.12V>APS2 OR APS1/2+0.12V<APS2 | | | JUDGMENT FAULT: 0.3sec.<br><br>MONITORING RUNS CONTINUOUSLY | |
| SERIAL DATA LINK | U0107 | | SIGNAL EXISTANCE CHECK | SERIAL DATA LINK SIGNAL (DIGITAL) | NO SIGNAL | BATTERY VOLTAGE<br>CPU INITIAL DELAY | >8.0V 3)<br>>1sec | JUDGMENT FAULT: 0.25sec.<br><br>MONITORING RUNS CONTINUOUSLY | 1 D/C |

Note: 1): Refer to section for logic flowchart.
2): Power supply in TPS2 is compulsorily cut for 0.0045 seconds every 1 second in order to monitor short circuit between TPS1 and TPS2.
3): Read value by PCM.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| THROTTLE VALVE CONTROL | P2100 | F | CURRENT CHECK | MOTOR CURRENT (ANALOG) | >8A | | | JUDGMENT FAULT: 0.5sec. MONITORING RUNS CONTINUOUSLY | 1 D/C |
| | P2101 | | FUNCTION CHECK | DIFFERENCE OF VALUE BETWEEN ESTIMATED (THHT) THROTTLE ANGLE AND ACTUAL TROTTLE (TH) ANGLE<br><br>DTHE=\|THHT-TH\| | DTHE > 5deg. | | | JUDGMENT FAULT: 0.3sec.<br><br>MONITORING RUNS CONTINUOUSLY | |
| | | | | | DTHE > 5deg. | \|TTH(n) – TTH(n-1)\| | > 5deg. | JUDGMENT FAULT: 0.2sec.<br><br>MONITORING RUNS CONTINUOUSLY | |
| | | | | | DTHE > 2deg. | \|TTH(n) – TTH(n-1)\| | > 2deg. | JUDGMENT FAULT: 0.5sec.<br><br>MONITORING RUNS CONTINUOUSLY | |
| | | | | | DTHE > 2deg. 2) | \|TTH(n) – TTH(n-1)\| | < 0.25deg. | JUDGMENT FAULT: (MIN) 0.2sec. 2) (MAX) 2)<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P2176 | G | RANGE CHECK (FULL CLOSE POINT) | THROTTLE POSITION SENSOR 1 (TPS1) SIGNAL | >ITPS1 + 0.151V OR <ITPS1 – 0.108V | BATTERY VOLTAGE<br><br>KEY POSITION | >7.0V 3)<br><br>THE INSTANCE OF IGINITION ON | JUDGMENT FAULT: 0.5sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | |
| | | | | | \|TPS1 – LFCTPS1\| > 0.5deg. | | | | |
| | | | | THROTTLE POSITION SENSOR 2 (TPS2) SIGNAL | >ITPS2 + 0.151V OR <ITPS2 – 0.108V | | | | |
| | | | | | \|TPS2 – LFCTPS2\| > 0.5deg. | | | | |

Note: THHT : Estimated throttle value calculated from target throttle value.
TTH(n) : Target throttle value.
TTH(n-1) : Target throttle value of 0.01seconds ago.
ITPS1/2 : Full close point value set at the throttle body assembling.
LFCTPS1/2 : Full close point value set at last D/C.
1): Refer to section for logic flowchart.
2): This monitoring checks oscillation of actual throttle angle. The monitoring carries out every 0.0015seconds. The counter is increased by 2 when the criteria is exceeded, and the counter is decreased when the criteria is not exceeded. When the counter exceeds 267, the throttle valve control is regarded to oscillate fail. Judgment time is according to oscillating condition.
3): Read value by PCM.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| THROTTLE VALVE CONTROL (contd.) | P2108 | F | COMPARISON CHECK (CPU) 2) | MARK BIT(INCLUDE SERIAL LINK DATA) | NOT EQUAL | | | JUDGMENT FAULT: 0.2sec.<br><br>MONITORING RUNS CONTINUOUSLY | 1 D/C |
| | P2553 | G | FUNCTION CHECK (RELAY) 3) | SERIAL DATA LINK SIGNAL (DIGITAL) | NORMAL SIGNAL | BATTERY VOLTAGE<br><br>KEY POSITION | >7.0V 4)<br><br>IG OFF | JUDGMENT FAULT: 0.25sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE 5) | |
| | P2554 | F | RANGE CHECK (LOW) | THROTTLE INHIBIT CIRCUIT (ANALOG) | <0.498V | PCM STATUS | PROCESSING | JUDGMENT FAULT: 0.2sec.<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P2555 | | RANGE CHECK (HIGH) | | >10V (IG ON)<br><br>>4.5V (IG OFF) | | | | |
| | P2112 | G | FUNCTION CHECK (DEFAULT POSITION SPRING) 4) | THROTTLE POSITION SENSOR SIGNAL (ANALOG) | <3.7deg. | KEY POSITION<br><br>ECT1 | IG OFF<br><br>>=69.5deg.C | JUDGMENT FAULT: 4sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE 5) | |
| | P2111 | | FUNCTION CHECK (RETURN SPRING) 4) | THROTTLE POSITION SENSOR SIGNAL (ANALOG) | >9.1deg. | | | | |

Note: 1): Refer to section for logic flowchart.
2): Two units(FI,ETCS) check each other including RAM and ROM SUM checks.
3): If relay is normal, no serial data.
4): Read value by PCM.
5): The monitor carries out after ignition OFF timing. (MIL is illuminated at the next driving cycle.)

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| THROTTLE VALVE CONTROL (contd.) | P0507 (HIGH)<br><br>P0506 (LOW) | E | FUNCTIONAL CHECK | CKP SENSOR SIGNAL (PULSE) | RPM>TARGET+200rpm OR RPM<TARGET-100rpm | ECT1<br><br>IAT2<br><br>BATTERY VOLTAGE 2)<br><br>THROTTLE ANGLE<br><br>SHORT TERM FUEL TRIM STATUS<br><br>FUEL SYSTEM STATUS<br><br>CUMULATIVE TIME AFTER ENGINE START | >69deg.C<br><br>>0deg.C<br><br>>10.50V<br><br><0.3deg.<br><br>WITHIN SHORT TERM FUEL TRIM LIMITS<br><br>CLOSED LOOP CONDITION<br><br>>15sec. | JUDGMENT FAULT OR PASS: 20sec.<br><br>MONITORING RUNS CONTINUOUSLY 3) | 2 D/C |

Note: 1): Refer to section for logic flowchart.
2): Read value by PCM.
3): This monitor runs whenever enable conditions are met until fail is detected. If fail is detected, temporary fault code is stored and the monitoring is disabled for the reminder of the D/C. If fail is detected at initial monitoring event of 2nd D/C, fault code is stored and MIL is illuminated. Otherwise, temporary fault code is erased unless fail is detected again for the reminder of the 2nd D/C.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR | P0107 | F | RANGE CHECK-LOW | MAP SENSOR SIGNAL (ANALOG) | <0.23V | KEY POSITION | IG ON | JUDGMENT FAULT: 2sec. | 1 D/C |
| | P0108 | | RANGE CHECK-HIGH | | >4.49V | | | MONITORING RUNS CONTINUOUSLY | |
| | P1128 | B | RATIONALITY-LOW | | BARO (mmHg) VOLT.(V)<br>776 <1.61<br>460 <1.14 | ENGINE SPEED<br>VEHICLE SPEED<br>ECT1<br>THROTTLE ANGLE | 1100<RPM<6300rpm<br>>15mph<br>>69deg.C<br>RPM TH-ANGLE(deg.)<br>1000 >11.8<br>2000 >19.0<br>3000 >25.0<br>4000 >31.5<br>5500 >40.5 | JUDGMENT FAULT OR PASS: 2sec.<br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |
| | P1129 | | RATIONALITY-HIGH | | >1.14V | ENGINE SPEED<br>VEHICLE SPEED<br>ECT1<br>FUEL SYSTEM STATUS<br>MONITORING PRIORITY ORDER | 1100<RPM<6300rpm<br>>15mph<br>>69deg.C<br>FUEL CUT CONDITION<br>LEVEL B: P0401 2) | | |

Note: 1): Refer to section for logic flowchart.
2): P1129 is interrupted by P0401 and disabled while it runs.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| BAROMETRIC PRESSURE (BARO) SENSOR | P2228 | F | CIRCUIT CHECK-LOW | BARO SENSOR SIGNAL(ANALOG) | <1.58V | KEY POSITION | IG ON | JUDGMENT FAULT: 2sec. MONITORING RUNS CONTINUOUSLY | 1 D/C |
| | P2229 | | CIRCUIT CHECK-HIGH | | >3.59V | | | | |
| | P2227 | H | RATIONALITY CHECK | JUDGMENT A: DIFFERENCE OF SIGNALS BETWEEN BARO SENSOR AND MAP SENSOR WHEN KEY IS ON BUT ENGINE IS NOT RUNNING (ANALOG) | \|BARO-MAP\| >150mmHg(0.55V) | ENGINE OPERATING CONDITION<br><br>FLUCTUATION OF MAP SENSOR OUTPUT<br><br>FLUCTUATION OF BARO SENSOR OUTPUT<br><br>IMMOBILIZER SYSTEM STATUS | STOP (WHILE KEY SWITCH IS TURNED FROM ON TO CRANKING POSITION)<br><br><26.8mmHg/210msec.<br><br><26.8mmHg/210msec.<br><br>OK | JUDGMENT FAULT OR PASS (MIN): 0.63sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C 2) |
| | | | | JUDGMENT B: 2) DEFFERENCE OF SIGNALS BETWEEN BARO SENSOR AND MAP SENSOR | \|BARO-MAP\| >190mmHg(0.69V) | THROTTLE ANGLE<br><br><br><br><br>FLUCTUATION OF MAP SENSOR OUTPUT AFTER ENGINE START<br><br>FLUCTUATION OF TP SENSOR OUTPUT AFTER ENGINE START | RPM TH-ANGLE(deg.)<br>1000 >13.31<br>2000 >20.70<br>3000 >26.86<br>4000 >33.53<br>5500 >42.77<br><br>>43mmHg<br><br>>2deg. | JUDGMENT FAULT OR PASS: 2.5sec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | |

Note: 1): Refer to section for logic flowchart.
2): Judgment B runs if judgment A does not completed.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| CAMSHAFT POSITION SENSOR (CMP) | P0340 (SHORT /OPEN) | F | COMPARISON CHECK (BETWEEN CMP1 SIGNAL AND CKP SIGNAL) | CMP SENSOR SIGNAL (PULSE) | NO SIGNAL | ENGINE STATUS | RUNNING | JUDGMENT FAULT: 17 ENGINE REVS 2)<br><br>MONITORING RUNS CONTINUOUSLY | 1 D/C |
| | P0341 (NOISE) | | | COUNTER OF IMPROPER CMP SIGNAL 3) | =30 | ENGINE SPEED | >400rpm | JUDGMENT FAULT: 2.2 sec. 4)<br><br>MONITORING RUNS CONTINUOUSLY | |
| CRANKSHAFT POSITION SENSOR A (CKP1) | P0335 (SHORT /OPEN) | | COMPARISON CHECK (BETWEEN CKP1 SIGNAL AND CKP2 SIGNAL) | CKP1 SENSOR SIGNAL (PULSE) | NO SIGNAL | ENGINE STATUS | RUNNING | JUDGMENT FAULT: 5 ENGINE REVS 5)<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P0336 (NOISE) | | | COUNTER OF IMPROPER CKP1 SIGNAL 6) | =30 | ENGINE SPEED | >400rpm | JUDGMENT FAULT: 2.2sec. 4)<br><br>MONITORING RUNS CONTINUOUSLY | |
| CRANKSHAFT POSITION SENSOR B (CKP2) | P0385 (SHORT /OPEN) | | COMPARISON CHECK (BETWEEN CKP2 SIGNAL AND CKP1 SIGNAL) | CKP2 SENSOR SIGNAL (PULSE) | NO SIGNAL | ENGINE STATUS | RUNNING | JUDGMENT FAULT: 17 ENGINE REVS 5)<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P0386 (NOISE) | | | COUNTER OF IMPROPER CKP2 SIGNAL 6) | =30 | ENGINE SPEED | >400rpm | JUDGMENT FAULT: 2.2sec. 4)<br><br>MONITORING RUNS CONTINUOUSLY | |

Note: 1): Refer to section for logic flowchart.
2): Engine rev is based on CKP1 signal. 22CKP1 signals are regarded as 1 engine rev.
3): Proper rate means 3CMP signals per 44CKP signals. Signal check is done every half a engine rev. When improper number of CMP signals is detected, the counter counts 1 up. The counter goes 1 back every 10sec.
4): Monitoring time at engine idling.
5): Engine rev is based on CMP signal. 3CMP signals are regarded as 2engine rev.
6): Proper rate means 44CKP signals per 3CMP signal. Signal check is done every half a engine rev. When improper number of CKP signals is detected, the counter counts 1 up. The counter goes 1 back every 10sec.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION 2) | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| THERMOSTAT | P0128 | B | COMPARISON CHECK BETWEEN ENGINE COOLANT TEMPERATURE SENSOR OF RADIATOR (ECT2) OUTPUT AND ECT2 SENSOR OUTPUT AT ENGINE START [TYPE B]<br>COMPARISON CHECK BETWEEN ACTUAL ECT1 SENSOR OUTPUT AND PREDICTED ECT1 [TYPE B] | DIFFERENCE OF SIGNAL BETWEEN ECT2 AND ECT2 AT ENGINE START WHEN PREDICTED ECT1 RISES 19DEG.C ECT1 SENSOR OUTPUT WHEN PREDICTED ECT1 REACHES 70.0deg.C | FAIL JUDGMENT: >9.0deg.C<br>PASS JUDGMENT: <5.0deg.C | ECT1 AT ENGINE START<br>THE LOWEST TEMPERATURE OF IAT, ECT1 AND ECT2 AT ENGINE START<br>SOAK TIME<br>DISABLE CONDITIONS:<br>(IAT AT ENGINE START )–(IAT)<br>ECT1 FLUCTUATION WHEN ENGINE SPEED IS MORE THAN 5000rpm<br>(ECT2 WHEN ENGINE SPEED IS MORE THAN 5000rpm) - (ECT2 AT 5000rpm)<br>MONITORING PRIORITY ORDER | <50.6deg.C<br>>-6.9deg.C<br>>6hours<br>>1.0deg.C (AT VS<=24.9mph) >2.0deg.C (AT VS>24.9mph)<br>>2.0deg.C<br>>2.0deg.C 3)<br>LEVEL A: P0096, P2183 4) | JUDGMENT FAULT OR PASS: ACCORDING TO DRIVING CONDITION<br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |
| | | | COMPARISON CHECK BETWEEN ACTUAL ECT1 SENSOR OUTPUT AND PREDICTED ECT1 [TYPE B] | ECT1 SENSOR OUTPUT WHEN PREDICTED ECT1 REACHES 70.0deg.C | <70.0deg.C | | | | |

Note: 1): Refer to section for logic flowchart.
2)
3): This condition is only applied to comparison check between ECT2 output and ECT2 output at engine start.
4): LEVEL A: P0128 is disabled until P0096 and P2183 pass or complete.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C & MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| INTAKE AIR TEMPERATURE 1 SENSOR (IAT1) | P0112 | F | RANGE CHECK-LOW | IAT1 SENSOR SIGNAL (ANALOG) | <0.078V | KEY POSITION | IG ON | JUDGMENT FAULT: 2.0sec. | 1 D/C |
| | P0113 | | RANGE CHECK-HIGH | | >4.922V | | | MONITORING RUNS CONTINUOUSLY | |
| INTAKE AIR TEMPERATURE 2 SENSOR (IAT2) | P0097 | | RANGE CHECK-LOW | IAT2 SENSOR SIGNAL (ANALOG) | <0.078V | | | JUDGMENT FAULT: 2.0sec. | |
| | P0098 | | RANGE CHECK-HIGH | | >4.922V | | | MONITORING RUNS CONTINUOUSLY | |
| IAT2 SENSOR OR IAT1 SENSOR | P2199 | B | CHECK OF TEMPERATURE DIFFERENCE BETWEEN IAT1 AND IAT2 AT COLD ENGINE START | IAT1 SENSOR OUTPUT SIGNAL(ANALOG) AND IAT2 SENSOR OUTPUT SIGNAL \|IAT2-IAT1\| | >25deg.C | SOAK TIME<br><br>CUMULATIVE TIME AFTER IG ON | >8hours<br><br>>5sec. | JUDGMENT FAULT: 200msec.<br><br>MONITORING RUNS ONCE PER DRIVING CYCLE | 2 D/C |
| KNOCK SENSOR (KS) | P0325 | F | EXISTENCE OF KS SIGNAL | KS SIGNAL (ANALOG) | NO SIGNAL | ECT1<br><br>ENGINE SPEED | >60deg.C<br><br>>2000rpm | JUDGMENT FAULT: 5sec.<br><br>MONITORING RUNS CONTINUOUSLY | 1 D/C |
| VARIABLE VALVE TIMING ELECTRIC CONTROL (VTEC) SYSTEM | P2647 | | RATIONALITY CHECK BETWEEN ROCKER ARM OIL PRESSURE SWITCH AND ROCKER ARM OIL CONTROL SOLENOID COMMAND SIGNAL | ROCKER ARM OIL PRESSURE SWITCH SIGNAL | ROCKER ARM OIL PRESSURE SWITCH OFF SIGNAL | ROCKER ARM OIL CONTROL SOLENOID COMMAND SIGNAL<br><br>BATTERY VOLTAGE 2) | OFF (LOW VALVE TIMING)<br><br>>10.50V | JUDGMENT FAULT: 5sec.<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P2646 | | | ROCKER ARM OIL PRESSURE SWITCH SIGNAL | ROCKER ARM OIL PRESSURE SWITCH ON SIGNAL | ROCKER ARM OIL CONTROL SOLENOID COMMAND SIGNAL<br><br>BATTERY VOLTAGE 2) | ON (HIGH VALVE TIMING)<br><br>>10.50V | JUDGMENT FAULT: 7sec.<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P2649 | | RETURN SIGNAL CHECK | RETURN SIGNAL VOLTAGE | =12V | ROCKER ARM OIL CONTROL SOLENOID COMMAND SIGNAL<br><br>BATTERY VOLTAGE 2) | OFF (LOW VALVE TIMING)<br><br>>10.00V | JUDGMENT FAULT: 2.0sec.<br><br>MONITORINTG RUNS CONTINUOUSLY | |
| | P2648 | | | RETURN SIGNAL VOLTAGE | =0V | ROCKER ARM OIL CONTROL SOLENOID COMMAND SIGNAL<br><br>BATTERY VOLTAGE 2) | ON (HIGH VALVE TIMING)<br><br>>10.00V | JUDGMENT FAULT: 2.0sec.<br><br>MONITORINTG RUNS CONTINUOUSLY | |

Note: 1): Refer to section for logic flowchart.
2): Read value by PCM.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C& MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| POSITIVE CRANKCASE VENTILATION (PCV) VALVE | P2282 | B | FUNCTIONAL CHECK BY ESTIMATING AIR LEAK FROM PCV DISCONNECTION | CALCULATED AIR QUANTITY | MAP-BARO (mmHg) / Qpcv 2) (liter/min.)<br>-570 / >200<br>-470 / >175<br>-400 / >160<br>-330 / >145<br>-260 / >135 | CUMULATIVE TIME AFTER ENGINE START<br>ECT1<br>IAT<br>BATTERY VOLTAGE<br>MAP-BARO<br>THROTTLE ANGLE<br>FEED BACK CONTROL SYSTEM STATUS<br>FUEL TRIM STATUS | >15.0sec.<br>>69deg.C<br>>0deg.C<br>>10.50V<br><-260mmHg<br><0.3deg.<br>CLOSED LOOP CONDITIONS<br>WITHIN SHORT TERM FUEL TRIM LIMITS | JUDGMENT FAULT OR PASS: 22.0sec.<br>ONCE PER DRIVING CYCLE | 2 D/C |

Note: 1): Refer to section for logic flowchart.
2): Qpcv means the amount of air quantity that return to the intake manifold from PCV valve.

| COMPONENT/ SYSTEM | FAULT CODE | FLOW CHART TYPE 1) | MONITOR STRATEGY DESCRIPTION | MALFUNCTION CRITERIA | THRESHOLD VALUE | SECONDARY PARAMETERS | ENABLE CONDITIONS | TIME REQUIRED | STORING F/C& MIL ILLUM. |
|---|---|---|---|---|---|---|---|---|---|
| POWERTRAIN CONTROL MODULE (PCM) | P062F | F | CHECK SUM-CHECK OF E2PROM | E2PROM DATA | CHECK SUM ERROR (5 TIMES) | | | JUDGMENT FAULT: 2)<br><br>MONITORING RUNS CONTINUOUSLY | 1 D/C |
| | NO CODE | N/A | CHECK SUM-CHECK OF ROM | ROM DATA | CHECK SUM ERROR (1 TIME) | | | | |
| | P2610 | F | INTERNAL ENGINE OFF TIMER PERFORMANCE | GAP BETWEEN EONV TIMER AND PCM TIMER 3) | <-500sec. OR >500sec. | EONV TIMER<br><br>KEY POSITION | <51 hours<br><br>IG ON | JUDGMENT FAULT: 360sec.<br><br>MONITORING RUNS CONTINUOUSLY | |
| | P0685 | | POWER SUPPLY CHECK | POWER SUPPLY | FAILURE | KEY POSITION<br><br>PCM STATUS<br><br>ENGINE SPEED AT THE MOMENT KEY POSITION CHANGED TO IG OFF AT THE LAST D/C | IG OFF<br><br>PROCESSING<br><br>>400rpm | JUDGMENT FAULT: 1sec.<br><br>MONITORING RUNS CONTINUOUSLY | |
| SENSOR REFERENCE VOLTAGE A | P0641 | F | CIRCUIT CHECK | REFERENCE VOLTAGE (ANALOG) | <0.96V OR >1.07V | | | JUDGMENT FAULT: 2.0sec.<br><br>MONITORING RUNS CONTINUOUSLY | |
| SENSOR REFERENCE VOLTAGE B | P0651 | | | | | | | | |

Note: 1): Refer to section for logic flowchart.
2): Approximately 30 to 60 seconds depending on operating condition.
3): EONV timer is reset and started when the key position becomes IG on or IG off. PCM timer is started when the key position becomes IG on and reset when the key position becomes IG off.