

01-03B SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [FS]

A3U010318881W01

Engine Control System

Component	Idle air control (IAC)	Fuel injection control	Pressure regulator control (PRC)	Electronic spark advance (ESA) control	Fuel pump control	HO2S heater (front) control	HO2S heater (rear) control	Electric fan control	Purge control	EGR control	VTCS	A/C cut-out control	Generator control
Input													
Brake switch		x		x									
Refrigerant pressure switch, A/C switch, blower fan switch and A/C amplifier	x	x		x				x				x	
PSP switch	x	x		x								x	
DLC in engine compartment (TEN)	x	x	x	x				x					
Neutral switch (MTX)	x	x	x	x									
Clutch switch (MTX)	x	x	x	x									
TR switch (ATX)	x	x	x	x									
CKP sensor	x	x	x	x	x	x	x	x	x	x	x	x	x
CMP sensor	x	x		x									
VSS	x	x		x						x			x
MAF sensor	x	x		x		x	x		x	x			
ECT sensor	x	x	x	x		x	x	x	x	x		x	x
IAT sensor	x	x	x	x		x			x	x			x
TP sensor	x	x	x	x		x		x	x	x		x	x
EGR boost sensor	x	x							x			x	
Battery positive voltage		x		x		x			x				x
Generator	x			x									x
HO2S (front)		x							x				
HO2S (rear)													
Output													
IAC valve	x												
A/C relay												x	
Cooling fan relay								x					
Condencer fan relay								x					
Fuel pump relay					x								
PRC solenoid valve			x										
Purge solenoid valve									x				
VTCS solenoid valve											x		
EGR valve										x			
HO2S heater						x	x						
Ignition coils				x									
Fuel injectors		x											
Generator (field coil)													x
Generator warning light													x

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

Monitoring System

x :Applied

Component	Catalyst monitor	Misfire monitor	Evaporative system monitor	Fuel system monitor	Oxygen sensor monitor	Oxygen sensor heater monitor	EGR system monitor
Input							
Brake switch							
Refrigerant pressure switch, A/C switch, blower fan and A/C amplifier		x		x			x
PSP switch		x		x			x
CKP sensor	x	x	x	x	x	x	x
CMP sensor	x	x	x	x	x	x	x
VSS	x	x	x	x	x		x
MAF sensor	x	x	x	x	x	x	x
ECT sensor	x	x	x	x	x	x	x
IAT sensor	x	x	x	x	x		x
TP sensor	x	x	x	x	x		x
EGR boost sensor							x
Fuel level sensor			x				
Fuel gauge sender unit			x				
Rear HO2S	x				x	x	
Front HO2S	x			x	x	x	
Output							
DLC-2 in passenger compartment (Terminal KLN)	x	x	x	x	x	x	x
MIL	x	x	x	x	x	x	x
Purge solenoid valve			x	x	x		
EGR valve							x
EGR boost sensor solenoid valve							x
Canister drain cut valve			x				
Fuel injectors				x			

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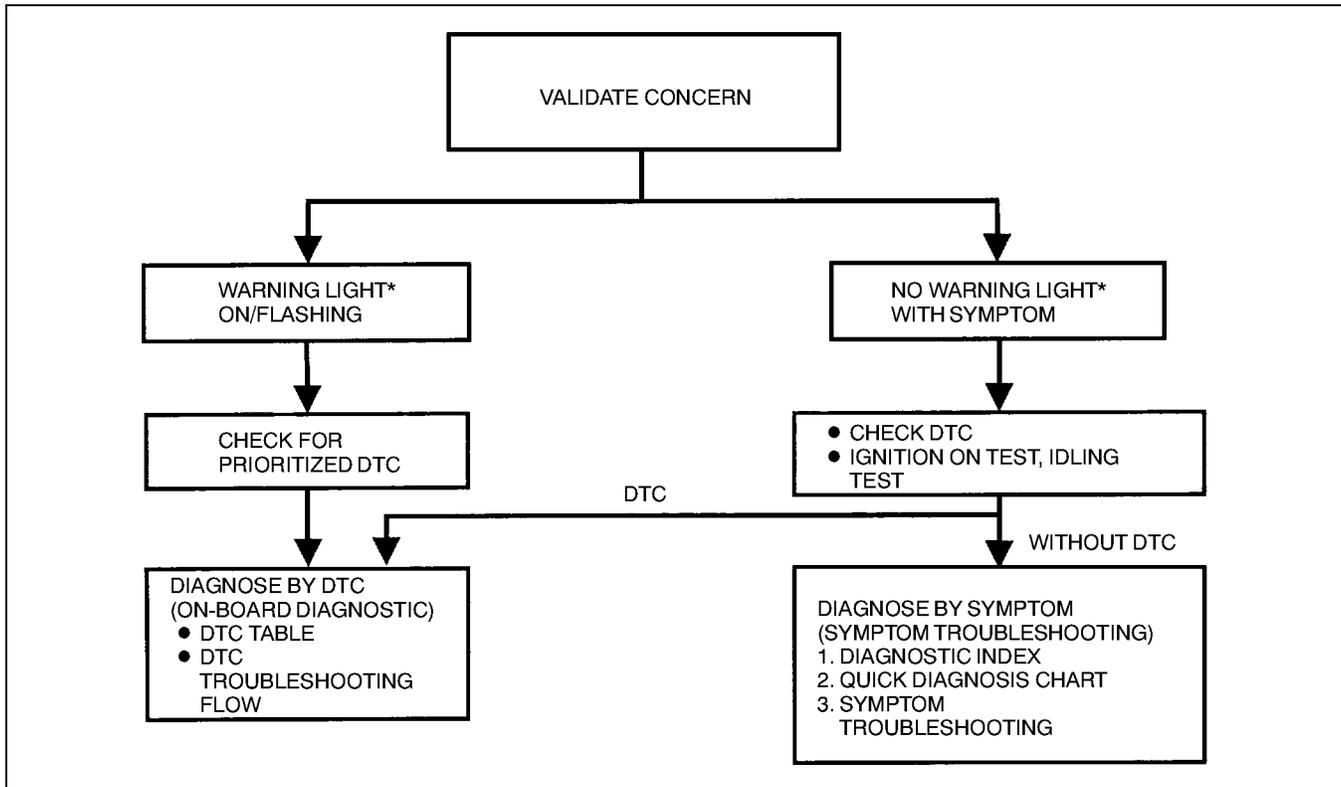
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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

FOREWORD [FS]

A3U010318881W02

- When the customer reports a vehicle malfunction, check the malfunction indicator light (MIL) and diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
 - If the DTC exists, diagnose the applicable DTC inspection. (See 01–02B–15 DTC TABLE [FS].)
 - If the DTC does not exist and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01–03B–7 SYMPTOM DIAGNOSTIC INDEX [FS].)



YMU102WBX

* : Malfunction Indicator Light (MIL), Generator Warning Light, Security Light

INTERMITTENT CONCERN TROUBLESHOOTING [FS]

A3U010318881W03

Vibration Method

- If malfunction occurs or becomes worse while driving on a rough road or when engine is vibrating, perform the steps below.

Note

- There are several reasons vehicle or engine vibration could cause an electrical malfunction. Some of the things to check for are:
 - Connectors not fully seated.
 - Wire harnesses not having full play.
 - Wires laying across brackets or moving parts.
 - Wires routed too close to hot parts.
- An improperly routed, improperly clamped, or loose harness can cause wiring to become pinched between parts.
- The connector joints, points of vibration, and places where wire harnesses pass through the fire wall, body panels, etc. are the major areas to be checked.

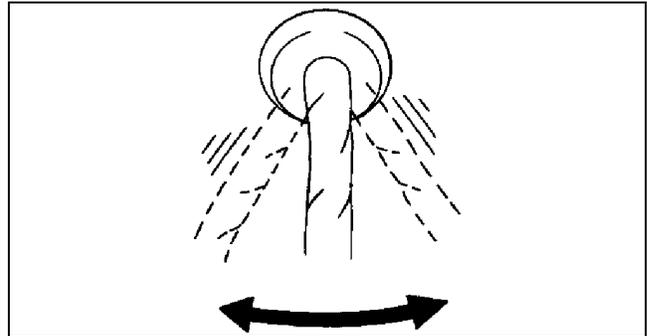
SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

Inspection Method for Switch Connectors or Wires

1. Connect WDS or equivalent to DLC-2.
2. Turn ignition key to ON (Engine OFF).

Note

- If engine starts and runs, perform the following steps at idle.
3. Access PIDs for the switch you are inspecting.
 4. Turn switch on manually.
 5. Shake each connector or wire harness a bit vertically and horizontally while monitoring the PID.
 - If PID value is unstable, check for poor connection.



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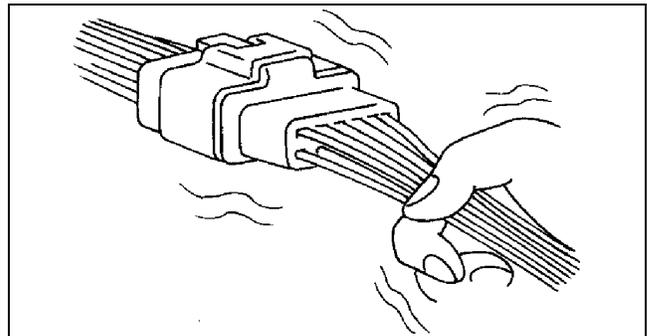
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Inspection Method for Sensor Connectors or Wires

1. Connect WDS or equivalent to DLC-2.
2. Turn ignition key to ON (Engine OFF).

Note

- If engine starts and runs, perform the following steps at idle.
3. Access PIDs for the switch you are inspecting.
 4. Shake each connector or wire harness a bit vertically and horizontally while monitoring the PID.
 - If PID value is unstable, check for poor connection.



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Inspection Method for Sensors

1. Connect WDS or equivalent to DLC-2.
2. Turn ignition key to ON (Engine OFF).

Note

- If engine starts and runs, perform the following steps at idle.
3. Access PIDs for the switch you are inspecting.
 4. Vibrate the sensor slightly with your finger.
 - If PID value is unstable or malfunction occurs, check for poor connection and/or poorly mounted sensor.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

Inspection Method for Actuators or Relays

1. Connect WDS or equivalent to DLC-2.
2. Turn ignition key to ON (Engine OFF).

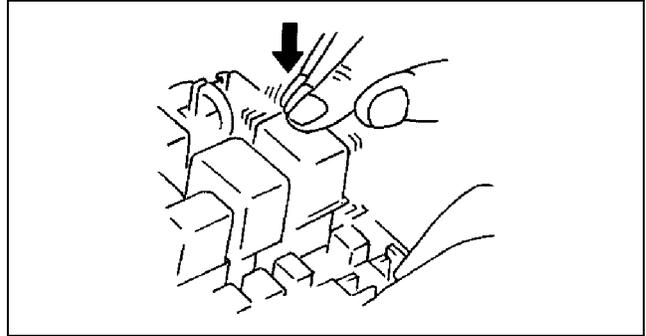
Note

- If engine starts and runs, perform the following steps at idle.

3. Prepare the SIMULATION TEST for actuators or relays that you are inspecting.
4. Vibrate the actuator or relay with your finger for 3 seconds after SIMULATION TEST is activated.
 - If variable click sound is heard, check for poor connection and/or poorly mounted actuator or relay.

Note

- Vibrating relays too strongly may result in open relays.



Y3U103WN5

Water Sprinkling Method

If malfunction occurs only during high humidity or rainy/snowy weather, perform the following steps.

Caution

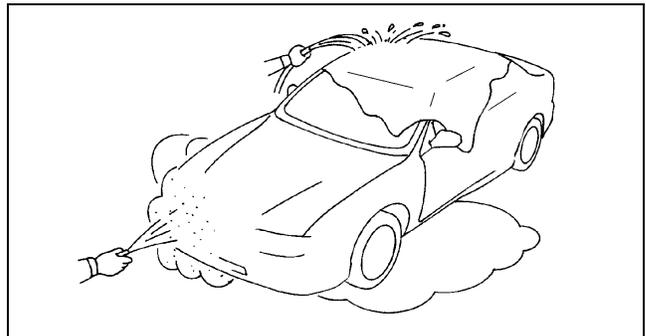
- Indirectly change the temperature and humidity by spraying water onto the front of the radiator.
- If a vehicle is subject to water leakage, the leakage may damage the control module. When testing a vehicle with a water leakage problem, special caution must be used.

1. Connect WDS or equivalent to DLC-2 if you are inspecting sensors or switches.
2. Turn ignition key to ON (Engine OFF).

Note

- If engine starts and runs, perform the following steps at idle.

3. Access PIDs for sensor or switch if you are inspecting sensors or switches.
4. If you are inspecting the switch, turn it on manually.
5. Spray water onto the vehicle or run it through a car wash.
 - If PID value is unstable or malfunction occurs, repair or replace part as necessary.



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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

SYMPTOM DIAGNOSTIC INDEX [FS]

A3U010318881W04

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Melting of main or other fuses		—	(See 01-03B-13 NO.1 MELTING OF MAIN OR OTHER FUSES [FS])
2	MIL illuminates		MIL is illuminated incorrectly.	(See 01-03B-14 NO.2 MIL ILLUMINATES [FS])
3	Will not crank		Starter does not work.	(See 01-03B-14 NO.3 WILL NOT CRANK [FS])
4	Hard start/long crank/erratic start/erratic crank		Starter cranks engine at normal speed but engine requires excessive cranking time before starting. Battery is in normal condition.	(See 01-03B-15 NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [FS])
5	Engine stalls	After start/at idle	Engine stops unexpectedly at idle and/or after start.	(See 01-03B-17 NO.5 ENGINE STALLS-AFTER START/AT IDLE [FS])
6	Crank normally but will not start		Starter cranks engine at normal speed but engine will not run.	(See 01-03B-20 NO.6 CRANKS NORMALLY BUT WILL NOT START [FS])
7	Slow return to idle		Engine takes more time than normal to return to idle speed.	(See 01-03B-22 NO.7 SLOW RETURN TO IDLE [FS])
8	Engine runs rough/rolling idle		Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively.	(See 01-03B-23 NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [FS])
9	Fast idle/runs on		Engine speed continues at fast idle after warm-up. Engine runs after ignition key is turned to OFF.	(See 01-03B-26 NO.9 FAST IDLE/RUNS ON [FS])
10	Low idle/stalls during deceleration		Engine stops unexpectedly at beginning of deceleration or recovery from deceleration.	(See 01-03B-26 NO.10 LOW IDLE/STALLS DURING DECELERATION [FS])
11	Engine stalls/quits	Acceleration/cruise	Engine stops unexpectedly at beginning of acceleration or during acceleration. Engine stops unexpectedly while cruising.	(See 01-03B-28 NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [FS])
	Engine runs rough	Acceleration/cruise	Engine speed fluctuates during acceleration or cruising.	
	Misses	Acceleration/cruise	Engine misses during acceleration or cruising.	
	Buck/jerk	Acceleration/cruise/deceleration	Vehicle bucks/jerks during acceleration, cruising, or deceleration.	
	Hesitation/stumble	Acceleration	Momentary pause at beginning of acceleration, or during acceleration	
	Surges	Acceleration/cruise	Momentary minor irregularity in engine output	
12	Lack/loss of power	Acceleration/cruise	Performance is poor under load (e.g. power down when climbing hills).	(See 01-03B-31 NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [FS])
13	Knocking/pinging	Acceleration/cruise	Sound is produced when air/fuel mixture is ignited by something other than spark plug (e.g. hot spot in combustion chamber).	(See 01-03B-33 NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [FS])
14	Poor fuel economy		Fuel economy is unsatisfactory.	(See 01-03B-34 NO.14 POOR FUEL ECONOMY [FS])
15	Emission compliance		Fails emissions test	(See 01-03B-36 NO.15 EMISSION COMPLIANCE [FS])
16	High oil consumption/leakage		Oil consumption is excessive.	(See 01-03B-37 NO.16 HIGH OIL CONSUMPTION/LEAKAGE [FS])

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
17	Cooling system concerns	Overheating	Engine runs at higher than normal temperature/overheats.	(See 01-03B-38 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [FS])
18	Cooling system concerns	Runs cold	Engine does not reach normal operating temperature.	(See 01-03B-40 NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [FS])
19	Exhaust smoke		Blue, black, or white smoke from exhaust system	(See 01-03B-41 NO.19 EXHAUST SMOKE [FS])
20	Fuel odor (in engine compartment)		Gasoline fuel smell or visible leakage	(See 01-03B-42 NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [FS])
21	Engine noise		Engine noise from under hood	(See 01-03B-43 NO.21 ENGINE NOISE [FS])
22	Vibration concerns (engine)		Vibration from under hood or driveline	(See 01-03B-44 NO.22 VIBRATION CONCERNS (ENGINE) [FS])
23	A/C does not work sufficiently.		A/C compressor magnetic clutch does not engage when A/C is turned on.	(See 01-03B-44 NO.23 A/C DOES NOT WORK SUFFICIENTLY [FS])
24	A/C is always ON or A/C compressor runs continuously.		A/C compressor magnetic clutch does not disengage.	(See 01-03B-45 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS])
25	A/C does not cut off under wide open throttle conditions		A/C compressor magnetic clutch does not disengage under wide open throttle.	(See 01-03B-46 NO.25 A/C IS NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS [FS])
26	Exhaust sulphur smell		Rotten egg smell (sulphur) from exhaust	(See 01-03B-46 NO.26 EXHAUST SULPHUR SMELL [FS])
27	Fuel refill concerns		Fuel tank does not fill smoothly.	(See 01-03B-47 NO.27 FUEL REFILL CONCERNS [FS])
28	Fuel filling shut off issues		Fuel does not shut off properly.	(See 01-03B-48 NO.28 FUEL FILLING SHUT OFF ISSUES [FS])
29	Intermittent concerns		Symptom occurs randomly and is difficult to diagnose.	(See 01-03B-48 NO.29 INTERMITTENT CONCERNS [FS])
30	Reference voltage		Incorrect reference voltage	(See 01-03B-49 NO.30 REFERENCE VOLTAGE [FS])
31	Spark plug condition		Incorrect spark plug condition	(See 01-03B-51 NO.31 SPARK PLUG CONDITION [FS])
32	ATX concerns	Upshift/downshift/engagement	ATX concerns not related to engine performance	(See 05-03-7 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING ITEM TABLE)

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

SYMPTOM QUICK DIAGNOSIS CHART [FS]

A3U010318881W05

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01-03B

Troubleshooting item		Possible factor																					
		Starter motor malfunction(Mechanical or electrical)	Starter circuit including ignition key open	Improper engine oil level	Low or dead battery	Charging system malfunction	Improper engine compression	Improper valve timing	Hydrolocked engine	Improper engine oil viscosity	Improper dipstick	Base engine malfunction	Drive plate or flywheel is seized.	Improper tension or damages drive belts	Improper engine coolant level	Water and anti-freeze mixture is improper.	Cooling system malfunction (Radiator,hoses,overflow system,thermostat,etc.)	Cooling fan system malfunction	Engine or transaxle mounts are improperly installed.	Cooling fan or condenser fan seat is improper.	Accelerator cable free play misadjustment	Fuel quality	
1	Melting of main or other fuses																						
2	MIL illuminates.																						
3	Will not crank	×	×		×	×				×				×									
4	Hard start/long crank/erratic start/erratic crank																						×
5	Engine stalls. After start/at idle																						×
6	Cranks normally but will not start																						×
7	Slow return to idle																						
8	Engine runs rough/rolling idle																						×
9	Fast idle/runs on																					×	
10	Low idle/stalls during deceleration																						
11	Engine stalls/quits. Acceleration/cruise																						×
	Engine runs rough. Acceleration/cruise																						×
	Misses Acceleration/cruise																						×
	Buck/jerk Acceleration/cruise/deceleration																						×
	Hesitation/stumble Acceleration																						×
	Surges Acceleration/cruise																						×
12	Lack/loss of power Acceleration/cruise																						×
13	Knocking/pinging Acceleration/cruise																						
14	Poor fuel economy																						
15	Emissions compliance																						
16	High oil consumption/leakage																						
17	Cooling system concerns Overheating																						
18	Cooling system concerns Runs cold																						
19	Exhaust smoke																						
20	Fuel odor (in engine compartment)																						
21	Engine noise																						
22	Vibration concerns (engine)																						
23	A/C does not work sufficiently.																						
24	A/C is always on or A/C compressor runs continuously.																						
25	A/C does not cut off under wide open throttle conditions.																						
26	Exhaust sulphur smell																						
27	Fuel refill concerns																						
28	Fuel filling shut off issues																						
29	Intermittent concerns																						
30	Constant voltage																						
31	Spark plug condition																						
32	Automatic transaxle concerns Upshift/downshift/engagement																						

See 05-03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING

Y3U103WN7

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

Troubleshooting item		Possible factor																			
		Engine overheating	Air cleaner element clogging or restriction	Air leakage from intake-air system (Loose, tubes, cracks breakage)	IAC valve improper operation	Throttle body malfunction	VICS malfunction	Tumble swirl control system malfunction	Vacuum leakage (Vacuum hose damage, misrouting)	Ignition coil malfunction (e.g. open, short or cracks)	Initial ignition timing misadjustment (CKP & crankshaft pulley misadjustment)	Spark plug malfunction	High-tension leads malfunction (Cracks, open, low resistance)	CKP sensor is damaged (e.g. open or short circuits).	Crankshaft pulley is damaged.	Improper gap between CKP sensor and crankshaft pulley	Fuel pump malfunction (Mechanical or electrical)	Pressure regulator malfunction	Fuel hoses restriction or clogging		
1	Melting of main or other fuses																				
2	MIL illuminates.																				
3	Will not crank																				
4	Hard start/long crank/erratic start/erratic crank		x	x				x			x	x	x	x	x	x	x	x	x		
5	Engine stalls. After start/at idle	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x		
6	Cranks normally but will not start	x		x	x			x	x	x	x	x	x	x	x	x	x	x	x		
7	Slow return to idle						x														
8	Engine runs rough/rolling idle	x		x	x	x		x		x	x	x	x	x	x	x	x	x	x		
9	Fast idle/runs on																				
10	Low idle/stalls during deceleration			x	x																
11	Engine stalls/quits. Acceleration/cruise	x	x	x		x		x			x		x	x	x	x	x	x	x		
	Engine runs rough. Acceleration/cruise	x	x	x		x		x			x		x	x	x	x	x	x	x		
	Misses Acceleration/cruise	x	x	x		x		x			x		x	x	x	x	x	x	x		
	Buck/jerk Acceleration/cruise/deceleration	x	x	x		x		x			x		x	x	x	x	x	x	x		
	Hesitation/stumble Acceleration	x	x	x		x		x			x		x	x	x	x	x	x	x		
	Surges Acceleration/cruise	x	x	x		x		x			x		x	x	x	x	x	x	x		
12	Lack/loss of power Acceleration/cruise	x	x	x		x	x	x			x		x	x	x	x	x	x	x		
13	Knocking/pinging Acceleration/cruise	x																x	x		
14	Poor fuel economy		x					x	x			x	x					x	x	x	
15	Emissions compliance		x	x		x						x	x					x	x	x	
16	High oil consumption/leakage																				
17	Cooling system concerns Overheating																				
18	Cooling system concerns Runs cold																				
19	Exhaust smoke		x										x	x					x	x	x
20	Fuel odor (in engine compartment)																			x	
21	Engine noise			x						x											
22	Vibration concerns (engine)																				
23	A/C does not work sufficiently.																				
24	A/C is always on or A/C compressor runs continuously.																				
25	A/C does not cut off under wide open throttle conditions.																				
26	Exhaust sulphur smell																				
27	Fuel refill concerns																				
28	Fuel filling shut off issues																				
29	Intermittent concerns					x		x	x	x		x	x	x				x	x		
30	Constant voltage																				
31	Spark plug condition		x										x						x	x	x
32	Automatic transaxle concerns Upshift/downshift/engagement																				

See 05-03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

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01-03B

Troubleshooting Item		Possible factor																	
		Injectors malfunction (Leakage or clogging, inoperative)	Fuel leakage from fuel system (Including Insulator, injector O-ring)	Fuel filters restriction or clogging	PRC solenoid valve improper operation	CMP sensor is damaged (e.g. open or short circuit).	Camsshaft is damaged.	Improper air/fuel mixture ratio control	Exhaust system restriction or clogging	Catalytic converter malfunction	EGR system malfunction	Evaporative emission control system malfunction	PCV valve malfunction	V-reference supply circuit malfunction	Main relay malfunction (Mechanical or electrical)	ECT sensor malfunction	TR switch misadjustment (ATX)	P/N position switch in TR switch is open, (ATX)	Brake switch and related circuit malfunction
1	Melting main or other fuses																		
2	MIL illuminates.																		
3	Will not crank																x		
4	Hard start/long crank/erratic start/erratic crank			x	x			x	x		x	x	x						
5	Engine stalls.																		
	After start/at idle	x	x					x	x		x	x	x		x				
6	Cranks normally but will not start	x	x					x	x		x	x	x	x					
7	Slow return to idle															x			
8	Engine runs rough/rolling idle	x		x		x	x	x	x		x	x	x						
9	Fast idle/runs on															x			
10	Low idle/stalls during deceleration								x			x						x	
11	Engine stalls/quits.	x		x		x	x	x	x		x	x	x	x					
	Acceleration/cruise																		
	Engine runs rough.	x		x		x	x	x	x		x	x	x	x					
	Acceleration/cruise																		
	Misses	x		x		x	x	x	x		x	x	x	x					
	Acceleration/cruise																		
Buck/jerk	x		x		x	x	x	x		x	x	x	x						
Acceleration/cruise/deceleration																			
Hesitation/stumble	x		x		x	x	x	x		x	x	x	x						
Acceleration																			
Surges	x		x		x	x	x	x		x	x	x	x						
Acceleration/cruise																			
12	Lack/loss of power	x				x	x		x		x	x	x						
Acceleration/cruise																			
13	Knocking/pinging																		
Acceleration/cruise																			
14	Poor fuel economy				x	x	x	x		x									
15	Emissions compliance				x		x	x	x		x	x	x						
16	High oil consumption/leakage												x						
17	Cooling system concerns																		
Overheating																			
18	Cooling system concerns																		
Runs cold																			
19	Exhaust smoke	x			x								x						
20	Fuel odor (in engine compartment)		x											x					
21	Engine noise																		
22	Vibration concerns (engine)																		
23	A/C does not work sufficiently.																		
24	A/C is always on or A/C compressor runs continuously.																		
25	A/C does not cut off under wide open throttle conditions.																		
26	Exhaust sulphur smell																		x
27	Fuel refill concerns																		x
28	Fuel filling shut off issues																		x
29	Intermittent concerns	x			x					x	x	x			x	x	x	x	x
30	Constant voltage																		
31	Spark plug condition	x	x						x							x			
32	Automatic transaxle concerns																		
Upshift/downshift/engagement		<i>See 05-03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING</i>																	

Y3U103WN9

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

× : Applied

Troubleshooting item		Possible factor																		
		Neutral or clutch switch and related circuit malfunction (MTX)	MAF sensor and related circuit malfunction	TP sensor and related circuit malfunction	TP sensor misadjustment (Including looseness)	Power steering pressure switch and related circuit malfunction	Improper refrigerant charging amount	A/C relay (A/C control signal) circuit malfunction	Condenser fan system malfunction	Improper load signal input	Clutch slippage	Automatic transaxle related parts malfunction	VSS and related circuit malfunction	Improper ATF level	Brake dragging	Loose parts	Wheels and tires improper balance	Driveline malfunction	Suspension malfunction	
1	Melting main or other fuses																			
2	MIL illuminates.																			
3	Will not crank																			
4	Hard start/long crank/erratic start/erratic crank		×																	
5	Engine stalls. After start/at idle						×	×	×											
6	Cranks normally but will not start																			
7	Slow return to idle										×									
8	Engine runs rough/rolling idle					×	×	×	×	×										
9	Fast idle/runs on									×										
10	Low idle/stalls during deceleration	×	×	×	×			×												
11	Engine stalls/quits. Acceleration/cruise		×	×	×			×	×	×		×	×	×						
	Engine runs rough. Acceleration/cruise		×	×	×			×	×	×		×	×	×						
	Misses Acceleration/cruise		×	×	×			×	×	×		×	×	×						
	Buck/jerk Acceleration/cruise/deceleration		×	×	×			×	×	×		×	×	×						
	Hesitation/stumble Acceleration		×	×	×			×	×	×		×	×	×						
	Surges Acceleration/cruise		×	×	×			×	×	×		×	×	×						
12	Lack/loss of power Acceleration/cruise							×	×	×		×	×	×		×				
13	Knocking/pinging Acceleration/cruise		×																	
14	Poor fuel economy									×					×	×				
15	Emissions compliance																			
16	High oil consumption/leakage																			
17	Cooling system concerns Overheating							×	×	×										
18	Cooling system concerns Runs cold									×										
19	Exhaust smoke																			
20	Fuel odor (in engine compartment)																			
21	Engine noise																×			
22	Vibration concerns (engine)																	×	×	×
23	A/C does not work sufficiently.							×	×	×										
24	A/C is always on or A/C compressor runs continuously.								×	×										
25	A/C does not cut off under wide open throttle conditions.			×	×															
26	Exhaust sulphur smell																			
27	Fuel refill concerns																			
28	Fuel filling shut off issues																			
29	Intermittent concerns	×	×	×		×		×				×								
30	Constant voltage																			
31	Spark plug condition		×																	
32	Automatic transaxle concerns Upshift/downshift/engagement																			

See 05-03 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESHOOTING

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

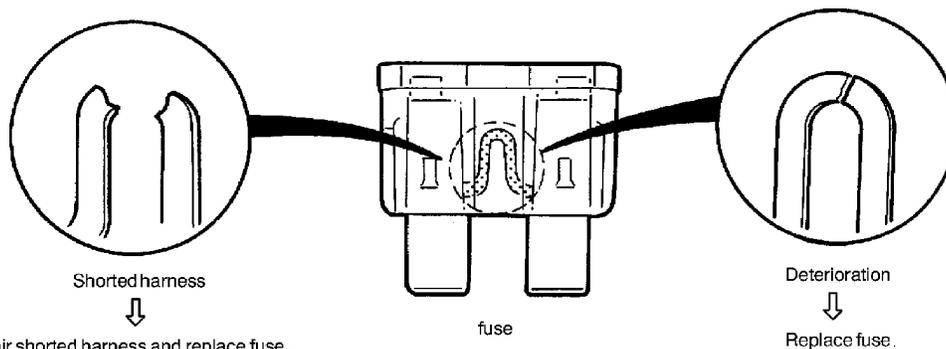
NO.1 MELTING OF MAIN OR OTHER FUSES [FS]

A3U010318881W06

1 Melting of main or other fuses

[TROUBLESHOOTING HINTS]

Inspection condition of fuse.



Damaged Fuse	Related Wiring Harness
MAIN (100A)	MAIN fuse <ul style="list-style-type: none"> • Generator
IG KEY (60A)	IG KEY fuse <ul style="list-style-type: none"> • Ignition key
A/C (15A)	A/C fuse <ul style="list-style-type: none"> • A/C relay • Condenser fan relay
A/C (10A)	A/C relay <ul style="list-style-type: none"> • Magnetic clutch
AD FAN (30A)	Condenser fan relay <ul style="list-style-type: none"> • Condenser fan motor
INJ (30A)	INJ fuse <ul style="list-style-type: none"> • PCM Main relay <ul style="list-style-type: none"> • PCM • Fuel pump relay • Fuel injectors • Purge solenoid valve • PRC solenoid valve • VICS solenoid valve • VTCS solenoid valve Fuel pump relay <ul style="list-style-type: none"> • Fuel pump <ul style="list-style-type: none"> • Mass air flow sensor • Vehicle speedometer sensor • EGR valve • EGR check solenoid valve • CDCV
ENGINE (10A)	ENGINE fuse <ul style="list-style-type: none"> • Ignition coil • Condenser • Heated oxygen sensor • Main relay • Cooling fan relay • Malfunction indicator lamp
METER (10A)	METER fuse <ul style="list-style-type: none"> • Transaxle range switch (ATX) • O/D OFF indicator light (ATX)
COOLING FAN (30A)	Cooling fan relay <ul style="list-style-type: none"> • Cooling fan motor

- If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis.
 - If vehicle is repaired, troubleshooting completed.
 - If vehicle is not repaired or additional diagnostic information is not available, repair PCM.

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.2 MIL ILLUMINATES [FS]

A3U010318881W07

2	MIL illuminates
DESCRIPTION	MIL is illuminated incorrectly.
POSSIBLE CAUSE	<ul style="list-style-type: none"> • PCM illuminates for emission-related concern (DTC is stored in PCM) • Short to ground circuit between MIL (located on instrument cluster) and PCM <p>Note</p> <ul style="list-style-type: none"> • If MIL blinks at steady rate, misfire condition could possibly exist.

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Retrieve any DTC. • Turn ignition key to ON. • Is "DTC" displayed? 	Yes	No DTC is displayed: <ul style="list-style-type: none"> • Inspect for short to ground circuit between MIL (located on instrument cluster) and PCM terminal 2.
		No	DTC is displayed: <ul style="list-style-type: none"> • Go to appropriate DTC test.
2	<ul style="list-style-type: none"> • Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, inspect related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

NO.3 WILL NOT CRANK [FS]

A3U010318881W08

3	Will not crank
DESCRIPTION	<ul style="list-style-type: none"> • Starter does not work.
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Open starter circuit between ignition key and starter • Transaxle range switch malfunction (ATX) • Transaxle range switch misadjustment (ATX) • Starter interlock switch malfunction (MTX) • Starter malfunction • Seized/hydrolocked engine, flywheel (MTX) or drive plate (ATX)

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Battery connection — Battery condition — Transaxle is in Park or Neutral. (ATX) — Clutch is fully depressed. (MTX) — Fuses • Are all items okay? 	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	<ul style="list-style-type: none"> • Is clicking sound heard from starter when ignition key is turned to START? 	Yes	Go to next step.
		No	Go to Step 4.
3	<ul style="list-style-type: none"> • Inspect starting system. (See 01-19-2 STARTER INSPECTION.) • Is starting system okay? 	Yes	Inspect for seized/hydrolocked engine, flywheel (MTX) or drive plate (ATX).
		No	Repair or replace components as required.
4	<ul style="list-style-type: none"> • Do any other electrical accessories work? 	Yes	Go to next step.
		No	Inspect charging system. (See 01-17-1 BATTERY INSPECTION.) (See 01-17-3 GENERATOR INSPECTION.)
5	<p>Note</p> <ul style="list-style-type: none"> • Following test should be performed on ATX only. For MTX, go to next step. • Inspect adjustment of transaxle range switch. • Is transaxle range switch adjusted properly? 	Yes	Go to next step.
		No	Inspect for open circuit between transaxle range switch and PCM terminal 64 or starter.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
6	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed? 	Yes	No DTC displayed: <ul style="list-style-type: none"> • Inspect following: <ul style="list-style-type: none"> — START circuit in ignition key — Open circuit between ignition key and starter — Starter interlock switch (MTX)
		No	DTC displayed: <ul style="list-style-type: none"> • Go to appropriate DTC test. Communication error message displayed: <ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Open circuit between main relay and PCM terminal 71 or 97 — Open main relay GND circuit — Main relay is stuck open. — Open or poor GND circuit (PCM terminal 24, 51, 76, 77, or 103) — Poor connection of vehicle body GND
7	<ul style="list-style-type: none"> • Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

01-03B

NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [FS]

A3U010318881W09

4	Hard to start/long crank/erratic start/erratic crank
DESCRIPTION	<ul style="list-style-type: none"> • Starter cranks engine at normal speed but engine requires excessive cranking time before starting. • Battery is in normal condition.
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Spark leakage from high-tension leads • Vacuum leakage • Poor fuel quality • Starting system malfunction • Spark plug malfunction • Air leakage from intake-air system • Erratic signal from CKP sensor • Erratic signal from CMP sensor • Air cleaner restriction • IAC valve malfunction • PCV valve malfunction • Inadequate fuel pressure • Purge solenoid valve malfunction • MAF sensor contamination • Restriction in exhaust system • EGR valve malfunction • Pressure regulator control (PRC) system malfunction <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. <p>(See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)</p>

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Vacuum leakage — Fuel quality (e.g. proper octane, contamination, winter/summer blend) — Loose bands on intake-air system — Cracks on intake-air system parts — Air cleaner restriction • Are all items okay? 	Yes	Go to next step.
		No	Service as necessary.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is "DTC" displayed? 	Yes	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.
		No	No DTC displayed: <ul style="list-style-type: none"> Go to next step.
3	<ul style="list-style-type: none"> Is engine overheating? 	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS - OVERHEATING [FS]."
		No	Go to next step.
4	<ul style="list-style-type: none"> Inspect for cracks on high-tension leads. Are there any cracks on high-tension leads? 	Yes	Repair suspected high-tension leads.
		No	Go to next step.
5	<ul style="list-style-type: none"> Inspect condition of spark plugs. Is spark plug wet, covered with carbon or grayish white? 	Yes	Spark plug is wet or covered with carbon: <ul style="list-style-type: none"> Inspect for fuel leakage from fuel injector. Spark plug is grayish white: <ul style="list-style-type: none"> Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
6	<ul style="list-style-type: none"> Visually inspect CKP sensor and teeth of crankshaft pulley. Are CKP sensor and teeth of crankshaft pulley okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
7	<ul style="list-style-type: none"> Measure gap between CKP sensor and teeth of crankshaft pulley. Specification 0.5—1.5 mm {0.020—0.59 in} <ul style="list-style-type: none"> Is gap within specification? 	Yes	Go to next step.
		No	Adjust CKP sensor.
8	<ul style="list-style-type: none"> Remove and inspect PCV valve. Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
9	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Connect jumper wire between F/P terminal at DLC in engine compartment and GND. (See 01-14-5 AFTER REPAIR PROCEDURE.) Turn ignition key to ON. Is fuel line pressure correct? Fuel line pressure 270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect for open fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. Inspect PRC solenoid valve and related vacuum hose and harness. High <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
10	<ul style="list-style-type: none"> Is fuel line pressure held after ignition key is turned to LOCK? (See 01-14-28 Operation Inspection.) 	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. If condition is okay, inspect fuel injector. If condition is not okay, replace pressure regulator.
11	<ul style="list-style-type: none"> Disconnect vacuum hose from pressure regulator and plug the hose. Start engine. Does fuel line pressure remain within ± 20 kPa {0.21 kgf/cm², 3 psi} while driving vehicle? 	Yes	Go to next step.
		No	Inspect for clogged fuel filter.
12	<ul style="list-style-type: none"> Connect vacuum hose to pressure regulator. Install vacuum gauge to intake manifold. Start engine. Does fuel pressure gauge reading increase as vacuum gauge reading decreases and/or fuel pressure gauge reading decrease as vacuum gauge reading increases? 	Yes	Go to next step.
		No	Connect vacuum pump to pressure regulator. Start engine. Verify that fuel pressure gauge reading changes as vacuum changes. If changes, inspect vacuum line. If does not change, replace pressure regulator.
13	<ul style="list-style-type: none"> Disconnect vacuum hose from purge solenoid valve and plug opening end of vacuum hose. Attempt to start engine. Is starting condition improved? 	Yes	Inspect if purge solenoid valve is stuck open.
		No	Go to next step.
14	<ul style="list-style-type: none"> Inspect MAF sensor for contamination. Is there any contamination? 	Yes	Replace MAF sensor.
		No	Go to next step.
15	<ul style="list-style-type: none"> Is there a restriction in exhaust system? 	Yes	Inspect exhaust system.
		No	Go to next step.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
16	<ul style="list-style-type: none"> Inspect engine condition while tapping EGR valve housing. Does engine condition improve? 	Yes	Replace EGR valve.
		No	Go to next step.
17	<ul style="list-style-type: none"> Inspect starting system. (See 01-19-2 STARTER INSPECTION.) Is starting system normal? 	Yes	Inspect for loose connectors or poor terminal contact. If okay, remove EGR valve and visually inspect for mechanically stuck EGR valve.
		No	Repair or replace components as required.
18	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

01-03B

NO.5 ENGINE STALLS-AFTER START/AT IDLE [FS]

A3U010318881W10

5	Engine stalls—After start/at idle
DESCRIPTION	<ul style="list-style-type: none"> Engine stops unexpectedly at idle and/or after start.
POSSIBLE CAUSE	<ul style="list-style-type: none"> A/C system improper operation Air leakage from intake-air system parts Purge solenoid valve malfunction Improper operation of IAC valve EGR valve malfunction No signal from CKP sensor due to sensor, related wire or wrong installation Vacuum leakage Low engine compression Spark leakage from high-tension leads Poor fuel quality PCV valve malfunction Air cleaner restriction Restriction in exhaust system Electrical connector disconnection Open or short circuit in fuel pump and related harness No battery power supply to PCM or poor GND Inadequate fuel pressure Fuel pump mechanical malfunction Fuel leakage from fuel injector Fuel injector clogging Immobilizer system and/or circuit malfunction Pressure regulator control (PRC) system malfunction <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual. (See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Vacuum connection — Air cleaner element — No air leakage from intake-air system — No restriction of intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Ignition wiring — Fuel quality: proper octane, contamination, winter/summer blend — Electrical connections — Smooth operation of throttle • Are all items okay? 	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	<ul style="list-style-type: none"> • Turn ignition key to ON. • Disconnect TP sensor connector. • Measure voltage at TP sensor connector VREF terminal with ignition key on. Voltage 4.5—5.5 V <ul style="list-style-type: none"> • Is voltage okay? 	Yes	Go to next step.
		No	Go to symptom troubleshooting “NO.30 REFERENCE VOLTAGE [FS].”
3	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Retrieve any DTC. • Turn ignition key to ON. • Is “DTC” displayed? 	Yes	DTC is displayed: <ul style="list-style-type: none"> • Go to appropriate DTC test. Communication error message is displayed: <ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Open circuit between main relay and PCM terminal 71 or 97 — Open main relay GND circuit — Main relay is stuck open. — Open or poor GND circuit (PCM terminal 24, 51, 76, 77 or 103) — Poor connection of vehicle body GND
		No	No DTC is displayed: <ul style="list-style-type: none"> • Go to next step.
4	<ul style="list-style-type: none"> • Attempt to start engine at part throttle. • Does engine run smoothly at part throttle? 	Yes	Inspect IAC valve and wiring harness.
		No	Go to next step.
5	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Access RPM PID. • Is RPM PID indicating engine speed during cranking of engine? 	Yes	Go to next step.
		No	Inspect for following: <ul style="list-style-type: none"> • Open or short circuit in CKP sensor • Open or short circuit between CKP sensor and PCM terminal 21 or 22 • Open or short circuit in CKP sensor harnesses If CKP sensor and harness are okay, go to next step.
6	<ul style="list-style-type: none"> • Visually inspect CKP sensor and teeth of crankshaft pulley. • Are CKP sensor and teeth of crankshaft pulley okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
7	<ul style="list-style-type: none"> • Measure gap between CKP sensor and teeth of crankshaft pulley. Gap 0.5—1.5 mm {0.020—0.059 in} <ul style="list-style-type: none"> • Is gap within specification? 	Yes	Go to next step.
		No	Adjust CKP sensor.
8	<ul style="list-style-type: none"> • Inspect for cracks on high-tension leads. • Are there any cracks on high-tension leads? 	Yes	Repair suspected high-tension leads.
		No	Go to next step.
9	<ul style="list-style-type: none"> • Is strong blue spark visible at each disconnected high-tension lead during engine cranking? 	Yes	Go to next step. If symptom occurs with A/C on, go to Step 15.
		No	Inspect for following: <ul style="list-style-type: none"> • Open or short circuit in ignition coil • Open circuit in high-tension leads • Open circuit between ignition coil connector GND terminal and body GND • Open circuit between ignition key and ignition coil • Open circuit between ignition coil and PCM terminal 26 or 52

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
10	<ul style="list-style-type: none"> Inspect condition of spark plugs. Is spark plug wet, covered with carbon or grayish white? 	Yes	Spark plug is wet or covered with carbon: <ul style="list-style-type: none"> Inspect for fuel leakage from injector. Spark plug is grayish white: <ul style="list-style-type: none"> Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
11	<ul style="list-style-type: none"> Remove and shake PCV valve. Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
12	<ul style="list-style-type: none"> Inspect for a restriction in exhaust system. Is there any restriction? 	Yes	Inspect exhaust system.
		No	Go to next step.
13	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Connect jumper wire between F/P terminal at DLC in engine compartment and GND. Turn ignition key to ON. Is fuel line pressure correct with ignition key on? Fuel line pressure 270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect for open fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. Inspect PRC solenoid valve and related vacuum hose and harness. High <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
14	<ul style="list-style-type: none"> Visually inspect for fuel leakage at fuel injector O-ring and fuel line. Service as necessary. Does fuel line pressure hold after ignition key is turned to LOCK? (See 01-14-28 PRESSURE REGULATOR INSPECTION.) 	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. If condition is okay, inspect fuel injector. If condition is not okay, replace pressure regulator.
15	Note <ul style="list-style-type: none"> The following test is for stall concerns with A/C on. If other symptoms exist, go to next step. Connect pressure gauges to A/C low and high pressure side lines. Turn A/C on and measure low side and high side pressures. Are pressures within specifications? (See 07-10-3 REFRIGERANT PRESSURE CHECK.) 	Yes	Go to next step.
		No	If A/C is always on, go to symptom troubleshooting "NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS]." For other symptoms, inspect following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation
16	<ul style="list-style-type: none"> Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid side. Plug opening end of vacuum hose. Start engine. Is engine stall now eliminated? 	Yes	Inspect if purge solenoid valve is stuck open. Inspect evaporative emission control system.
		No	Go to next step.
17	<ul style="list-style-type: none"> Is air leakage felt or heard at intake-air system components while racing engine to higher speed? 	Yes	Repair or replace faulty part.
		No	Go to next step.
18	<ul style="list-style-type: none"> Inspect engine condition while tapping EGR valve housing Does engine condition improve? 	Yes	Replace EGR valve.
		No	Go to next step.
19	<ul style="list-style-type: none"> Is engine compression correct? 	Yes	Inspect valve timing.
		No	Inspect for cause.
20	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.6 CRANKS NORMALLY BUT WILL NOT START [FS]

A3U010318881W11

6	Crank normally but will not start
DESCRIPTION	<ul style="list-style-type: none"> Starter cranks engine at normal speed but engine will not run. Refer to "ENGINE STALLS" if this symptom appears after engine stall. Fuel is in tank. Battery is in normal condition.
POSSIBLE CAUSE	<ul style="list-style-type: none"> No battery power supply to PCM Air leakage from intake-air system Open PCM GND or vehicle body GND Improper operation of IAC valve EGR valve malfunction No signal from CKP sensor due to sensor, related wire or incorrect installation No signal from CMP sensor due to sensor, related wire or incorrect installation Low engine compression Vacuum leakage Spark leakage from high-tension leads Poor fuel quality PCV valve malfunction Air cleaner restriction Restriction in exhaust system Disconnected electrical connector Open or short circuit in fuel pump and related harness Inadequate fuel pressure Fuel pump mechanical malfunction Fuel leakage from injector Fuel injector clogging Purge solenoid valve malfunction Pressure regulator solenoid (PRC) system malfunction <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. (See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Verify following: <ul style="list-style-type: none"> — Vacuum connection — External fuel shut off or accessory (kill switch, alarm etc.) — Fuel quality: proper octane, contamination, winter/summer blend — No air leakage from intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Ignition wiring — Electrical connections — Fuses — Smooth operation of throttle Are all items okay? 	Yes No	Go to next step. Service as necessary. Repeat Step 1.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is "DTC" displayed? 	Yes	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test. Communication error message displayed: <ul style="list-style-type: none"> Inspect for following: <ul style="list-style-type: none"> Open circuit between main relay and PCM terminal 71 or 97 Open main relay GND circuit Main relay is stuck open. Open or poor GND circuit (PCM terminal 24, 51, 76, 77, or 103) Poor connection of vehicle body GND
		No	No DTC displayed: <ul style="list-style-type: none"> Go to next step.
3	<ul style="list-style-type: none"> Turn ignition key to LOCK. Disconnect TP sensor connector. Measure voltage at TP sensor connector VREF terminal with ignition key on. Voltage 4.5—5.5 V <ul style="list-style-type: none"> Is voltage okay? 	Yes	Go to next step.
		No	Go to symptom troubleshooting "NO.30 REFERENCE VOLTAGE [FS]."
4	<ul style="list-style-type: none"> Does engine start with throttle closed? 	Yes	Go to Step 20.
		No	Go to next step.
5	<ul style="list-style-type: none"> Will engine start and run smoothly at part throttle? 	Yes	Inspect IAC valve and wiring harness.
		No	Go to next step.
6	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Access RPM PID. Is RPM PID indicating engine speed when cranking engine? 	Yes	Go to next step.
		No	Inspect for following: <ul style="list-style-type: none"> Open or short circuit in CKP sensor Open or short circuit between CKP sensor and PCM terminal 21 or 22 Open or short circuit in CKP sensor harnesses If CKP sensor and harness are okay, go to next step.
7	<ul style="list-style-type: none"> Visually inspect CKP sensor and teeth of crankshaft pulley. Are CKP sensor and teeth of crankshaft pulley okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
8	<ul style="list-style-type: none"> Measure gap between CKP sensor and teeth of crankshaft pulley. Gap 0.5—1.5 mm {0.020—0.059 in} <ul style="list-style-type: none"> Is gap within specification? 	Yes	Go to next step.
		No	Adjust CKP sensor.
9	<ul style="list-style-type: none"> Inspect for cracks on high-tension leads. Are there any cracks, on high-tension leads? 	Yes	Repair suspected high-tension leads.
		No	Go to next step.
10	<ul style="list-style-type: none"> Is strong blue spark visible at each disconnected high-tension lead during engine cranking? 	Yes	Go to next step.
		No	Inspect for following: <ul style="list-style-type: none"> Open or short circuit in ignition coil Open circuit in high-tension leads Open circuit between ignition coil connector GND terminal and GND Open circuit between ignition key and ignition coil Open circuit between ignition coil and PCM terminal 26 or 52
11	<ul style="list-style-type: none"> Inspect condition of spark plugs. Is spark plug wet, covered with carbon or grayish white? 	Yes	Spark plug is wet or covered with carbon: <ul style="list-style-type: none"> Inspect for fuel leakage from injector. Spark plug is grayish white: <ul style="list-style-type: none"> Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
12	<ul style="list-style-type: none"> Remove and shake PCV valve. Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
13	<ul style="list-style-type: none"> Is there any restriction in exhaust system? 	Yes	Inspect exhaust system.
		No	Go to next step.

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
14	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Connect jumper wire between F/P terminal at DLC in engine compartment and GND. Turn ignition key to ON. Is fuel line pressure correct when ignition key is cycled on/off five times? Fuel line pressure 270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect for open fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. Inspect PRC solenoid valve and related vacuum hose and harness. High: <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
15	<ul style="list-style-type: none"> Visually inspect for fuel leakage at fuel injector O-ring and fuel line. Service as necessary. Is fuel line pressure held after ignition key is turned to LOCK? (See 01-14-28 Operation Inspection.)	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. If condition is okay, inspect fuel injector. If condition is not okay, replace pressure regulator.
16	<ul style="list-style-type: none"> Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. Plug opening end of vacuum hose. Attempt to start engine. Is starting condition improved? 	Yes	Inspect if purge solenoid valve sticks open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
17	<ul style="list-style-type: none"> Is air leakage felt or heard at intake-air system components while racing engine to higher speed? 	Yes	Repair or replace.
		No	Go to next step.
18	<ul style="list-style-type: none"> Inspect engine condition while tapping EGR valve housing. Does engine condition improve? 	Yes	Replace EGR valve.
		No	Go to next step.
19	<ul style="list-style-type: none"> Is engine compression correct? 	Yes	Inspect valve timing.
		No	Inspect for causes.
20	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

NO.7 SLOW RETURN TO IDLE [FS]

A3U010318881W12

7	Slow return to idle
DESCRIPTION	<ul style="list-style-type: none"> Engine takes more time than normal to return to idle speed.
POSSIBLE CAUSE	<ul style="list-style-type: none"> ECT sensor malfunction Thermostat is stuck open. Throttle body malfunction Air leakage from intake-air system

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is "DTC" displayed? 	Yes	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.
		No	No DTC displayed: <ul style="list-style-type: none"> Go to next step.
2	<ul style="list-style-type: none"> Remove thermostat and inspect operation. (See 01-12-5 THERMOSTAT REMOVAL/INSTALLATION.) (See 01-12-7 THERMOSTAT INSPECTION.) Is thermostat okay? 	Yes	ECT sensor and thermostat are okay. Go to next step.
		No	Access ECT PID on WDS or equivalent. Inspect for both ECT and temperature gauge on instrument cluster readings. <ul style="list-style-type: none"> If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor. If temperature gauge on instrument cluster indicates cold range but ECT is normal, inspect temperature gauge and heat gauge unit.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
3	<ul style="list-style-type: none"> Is throttle body free of contaminations? 	Yes	Inspect for air leakage from intake-air system components while racing engine to higher speed.
		No	Clean or replace throttle body.
4	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

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NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [FS]

A3U010318881W13

8	Engine runs rough/rolling idle
DESCRIPTION	<ul style="list-style-type: none"> Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively. Idle speed is too slow and engine shakes excessively.
POSSIBLE CAUSE	<ul style="list-style-type: none"> Air leakage from intake-air system parts A/C system improper operation Spark leakage from high-tension leads Purge solenoid valve malfunction IAC valve improper operation EGR valve malfunction Erratic or no signal from CMP sensor Low engine compression Erratic signal from CKP sensor Poor fuel quality PCV valve malfunction Air cleaner restriction Restriction in exhaust system Disconnected electrical connectors Inadequate fuel pressure Fuel pump mechanical malfunction Fuel leakage from fuel injector Fuel injector clogging Engine overheating Vacuum leakage Pressure regulator control (PRC) system malfunction <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. (See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Inspect for following: <ul style="list-style-type: none"> External fuel shut off or accessory (kill switch, alarm etc.) Fuel quality: proper octane, contamination, winter/summer blend No air leakage from intake-air system Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve Ignition wiring Electrical connections Fuses Smooth operation of throttle Are all items okay? 	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is "DTC" displayed? 	Yes	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.
		No	No DTC displayed: <ul style="list-style-type: none"> Go to next step.
3	<ul style="list-style-type: none"> Is engine overheating? 	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS - OVERHEATING [FS]."
		No	Go to next step.
4	<p>Note</p> <ul style="list-style-type: none"> Following test is for engine running rough idle with A/C on concerns. If other symptoms exist, go to next step. Connect pressure gauge to A/C low and high pressure side lines. Start engine and run it at idle. Turn A/C switch on. Measure low side and high side pressures. Are reading pressures within specifications? (See 07-10-3 REFRIGERANT PRESSURE CHECK.) 	Yes	Go to next step.
		No	If A/C is always on, go to symptom troubleshooting "NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS]." For other symptoms, inspect following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation
5	<ul style="list-style-type: none"> Start engine and run it at idle. Turn steering wheel right to left. Does engine running rough exist while turning steering wheel right to left? 	Yes	Inspect P/S pressure switch operation and wiring harness between P/S pressure switch connector and PCM connector terminal 31.
		No	Go to next step.
6	<ul style="list-style-type: none"> Visually inspect CKP sensor and teeth of crankshaft pulley. Are CKP sensor and teeth of crankshaft pulley okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
7	<ul style="list-style-type: none"> Measure gap between CKP sensor and teeth of crankshaft pulley. <p>Specification 0.5—1.5 mm {0.020—0.059 in}</p> <ul style="list-style-type: none"> Is gap within specification? 	Yes	Go to next step.
		No	Adjust CKP sensor.
8	<ul style="list-style-type: none"> Inspect for cracks on high-tension leads. Are there any cracks on high-tension leads? 	Yes	Repair suspected high-tension leads.
		No	Go to next step.
9	<ul style="list-style-type: none"> Inspect condition of spark plugs. Is spark plug wet, covered with carbon or grayish white? 	Yes	Spark plug is wet or covered with carbon: <ul style="list-style-type: none"> Inspect for fuel leakage from injector. Spark plug is grayish white: <ul style="list-style-type: none"> Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
10	<ul style="list-style-type: none"> Start engine and disconnect IAC valve connector. Does rpm drop or engine stall? 	Yes	Go to next step.
		No	Inspect IAC valve and wiring harness.
11	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Start engine and run it at idle. Measure fuel line pressure at idle. Is fuel line pressure correct at idle? <p>Fuel line pressure 210—250 kPa {2.1—2.6 kgf/cm², 30—36 psi}</p>	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect for open fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. Inspect PRC solenoid valve and related vacuum hose and harness. High: <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
12	<ul style="list-style-type: none"> Visually inspect for fuel leakage at fuel injector, O-ring, and fuel line. Service as necessary. Does fuel line pressure hold after ignition key is turned to LOCK? (See 01-14-28 Operation Inspection.) 	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. <ul style="list-style-type: none"> If condition is okay, inspect fuel injector. If condition is not okay, replace pressure regulator.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
13	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Start engine and run it at idle. • Access LONG FT1 PID. • Measure LONG FT1 PID at idle. • Is PID value between -15% and +15%? 	Yes	Go to next step.
		No	LONG FT1 PID is out of specification. Less than specification (too rich): <ul style="list-style-type: none"> • Inspect evaporative emission control system. • If system is okay, go to Step 15. Greater than specification (too lean): <ul style="list-style-type: none"> • Inspect for air leakage at intake-air system components. • If system okay, go to next step.
14	<ul style="list-style-type: none"> • Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. • Plug opening end of vacuum hose. • Start engine. • Does engine condition improve? 	Yes	Inspect if purge solenoid valve is stuck open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
15	<ul style="list-style-type: none"> • Remove and shake PCV valve. • Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
16	<ul style="list-style-type: none"> • Is there any restriction in exhaust system? 	Yes	Inspect exhaust system.
		No	Go to next step.
17	<ul style="list-style-type: none"> • Visually inspect CMP sensor and projections of camshaft pulley. • Are CMP sensor and projections of camshaft pulley okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
18	<ul style="list-style-type: none"> • Inspect engine condition while tapping EGR valve housing. • Does engine condition improve? 	Yes	Replace EGR valve.
		No	Go to next step.
19	<ul style="list-style-type: none"> • Is engine compression correct? 	Yes	Inspect valve timing.
		No	Inspect for causes.
20	<ul style="list-style-type: none"> • Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.9 FAST IDLE/RUNS ON [FS]

A3U010318881W14

9	Fast idle/runs on
DESCRIPTION	<ul style="list-style-type: none"> Engine speed continues at fast idle after warm-up. Engine runs after ignition key is turned to OFF.
POSSIBLE CAUSE	<ul style="list-style-type: none"> ECT sensor malfunction Air leakage from intake-air system Throttle body malfunction Accelerator cable free play misadjustment Cruise actuator cable misadjustment

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Access ECT PID. Start and warm-up engine to normal operating temperature. Is ECT PID reading between 82—112°C {180—234°F}? 	Yes	Go to next step.
		No	ECT PID is higher than 112°C {234°F}: <ul style="list-style-type: none"> Go to symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS — OVERHEATING [FS].” ECT PID is less than 82°C {180°F}: <ul style="list-style-type: none"> Go to symptom troubleshooting “NO.18 COOLING SYSTEM CONCERNS - RUNS COLD [FS].”
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is “DTC” displayed? 	Yes	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.
		No	No DTC displayed: <ul style="list-style-type: none"> Go to next step.
3	<ul style="list-style-type: none"> Is there air leakage felt or heard at intake-air system components while racing engine to higher speed? 	Yes	Repair or replace parts as necessary.
		No	Inspect accelerator cable free play. (See 01-13B-17 ACCELERATOR CABLE INSPECTION [FS].)
4	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

NO.10 LOW IDLE/STALLS DURING DECELERATION [FS]

A3U010318881W15

10	Low idle/stalls during deceleration
DESCRIPTION	<ul style="list-style-type: none"> Engine stops unexpectedly at beginning of deceleration or recovery from deceleration.
POSSIBLE CAUSE	<ul style="list-style-type: none"> Vacuum leakage IAC valve malfunction Air leakage from intake-air system TP sensor or related circuit malfunction MAF sensor or related circuit malfunction Brake switch or related circuit malfunction Neutral/clutch switch or related circuit malfunction (MTX)

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Does engine idle rough? 	Yes	Go to symptom troubleshooting “NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [FS].”
		No	Go to next step.
2	<ul style="list-style-type: none"> Inspect for following: <ul style="list-style-type: none"> — Proper routing and no damage of vacuum lines — IAC valve is connected properly. — No air leakage from intake-air system Are all items okay? 	Yes	Go to next step.
		No	Service as necessary. Repeat Step 2.
3	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is “DTC” displayed? 	Yes	No DTC displayed: <ul style="list-style-type: none"> Go to next step.
		No	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
4	<ul style="list-style-type: none"> • Does idle speed drop or stall when disconnecting IAC valve? 	Yes	Go to next step.
		No	Inspect following: <ul style="list-style-type: none"> • Circuit from IAC valve to PCM connector terminal 54 or 83 for open and short • IAC valve for sticking If okay, go to next step.
5	<ul style="list-style-type: none"> • Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. • Plug opening end of vacuum hose. • Drive vehicle. • Does engine condition improve? 	Yes	Inspect evaporative emission control system.
		No	Go to next step.
6	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Access TP, MAF, VSS PIDs. • Monitor each PID while driving vehicle. • Are PIDs okay? 	Yes	Go to symptom troubleshooting "NO.29 INTERMITTENT CONCERNS [FS]."
		No	TP PID: Inspect TP sensor. MAF PID: Inspect MAF sensor. VSS PID: Inspect VSS.
7	<ul style="list-style-type: none"> • Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [FS]

A3U010318881W16

11	<p>Engine stalls/quits — Acceleration/cruise Engine runs rough — Acceleration/cruise Misses — Acceleration/cruise Buck/jerk — Acceleration/cruise/deceleration Hesitation/stumble — Acceleration Surges — Acceleration/cruise</p>
DESCRIPTION	<ul style="list-style-type: none"> • Engine stops unexpectedly at beginning of acceleration or during acceleration. • Engine stops unexpectedly while cruising. • Engine speed fluctuates during acceleration or cruising. • Engine misses during acceleration or cruising. • Vehicle bucks/jerks during acceleration, cruising or deceleration. • Momentary pause at beginning of acceleration or during acceleration • Momentary minor irregularity in engine output
POSSIBLE CAUSE	<ul style="list-style-type: none"> • A/C system improper operation • Erratic signal or no signal from CMP sensor • Air leakage from intake-air system parts • Purge solenoid valve malfunction • IAC valve improper operation • EGR valve malfunction • Erratic signal from CKP sensor • Low engine compression • Vacuum leakage • Poor fuel quality • Spark leakage from high-tension leads • Air cleaner restriction • PCV valve malfunction • Improper valve timing due to jumping out of timing belt • Restriction in exhaust system • Intermittent open or short in fuel pump circuit • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogging • Intermittent open or short of MAF sensor, throttle position sensor and VSS • ATX malfunction • Clutch slippage <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual. <p>(See 01–14–4 BEFORE REPAIR PROCEDURE.) (See 01–14–5 AFTER REPAIR PROCEDURE.)</p>

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Vacuum connection — Air cleaner element — No air leakage from intake-air system — No restriction of intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Ignition wiring — Fuel quality: proper octane, contamination, winter/summer blend — Electrical connections — Smooth operation of throttle • Are all items okay? 	<p style="text-align: center;">Yes</p> <hr/> <p style="text-align: center;">No</p>	<p style="text-align: center;">Go to next step.</p> <hr/> <p style="text-align: center;">Service as necessary. Repeat Step 1.</p>

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is "DTC" displayed? 	Yes	No DTC displayed: <ul style="list-style-type: none"> Go to next step.
		No	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.
3	<ul style="list-style-type: none"> Is engine overheating? 	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS - OVERHEATING [FS]."
		No	Go to next step.
4	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Access RPM PID, MAF PID, TP PID, and VSS PID. Drive vehicle with monitoring PIDs. Are PIDs within specification? 	Yes	Go to next step.
		No	RPM PID: <ul style="list-style-type: none"> Inspect CKP sensor and related wiring harness: vibration, intermittent open/short circuit. MAF PID: <ul style="list-style-type: none"> Inspect for open circuit of MAF sensor and related wiring harness intermittently. TP PID: <ul style="list-style-type: none"> Inspect if output signal from TP sensor changes smoothly. VSS PID: <ul style="list-style-type: none"> Inspect for open circuit of VSS and related wiring harness intermittently.
5	<ul style="list-style-type: none"> Visually inspect CKP sensor and teeth of crankshaft pulley. Are CKP sensor and teeth of crankshaft pulley okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
6	<ul style="list-style-type: none"> Measure gap between CKP sensor and teeth of crankshaft pulley. Gap 0.5—1.5 mm {0.020—0.059 in} <ul style="list-style-type: none"> Is gap within specification? 	Yes	Go to next step.
		No	Adjust CKP sensor.
7	<ul style="list-style-type: none"> Inspect condition of spark plugs. Is spark plug wet, covered with carbon or grayish white? 	Yes	Spark plug is wet or covered with carbon: <ul style="list-style-type: none"> Inspect for fuel leakage from fuel injector. Spark plug is grayish white: <ul style="list-style-type: none"> Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
8	<ul style="list-style-type: none"> Remove and shake PCV valve. Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
9	<ul style="list-style-type: none"> Verify that throttle lever is resting on throttle valve stop screw and/or throttle valve orifice plug. Is lever in correct position? 	Yes	Go to next step.
		No	Adjust as necessary.
10	<ul style="list-style-type: none"> Are there any restrictions in the exhaust system? 	Yes	Inspect exhaust system.
		No	Go to next step.
11	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Connect jumper wire between F/P terminal at DLC in engine compartment and GND. Turn ignition key to ON. Is fuel line pressure correct with ignition key at ON? Fuel line pressure 270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect for open fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. High: <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
12	<ul style="list-style-type: none"> Visually inspect for fuel leakage at fuel injector, O-ring, and fuel line. Service as necessary. Does fuel line pressure hold after ignition key is turned to LOCK? (See 01-14-28 Operation Inspection.) 	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. If condition is okay, inspect fuel injector. If condition is not okay, replace pressure regulator.

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
13	<p>Note</p> <ul style="list-style-type: none"> The following test is for engine stalling with A/C on. If other symptoms exist, go to next step. Connect pressure gauge to A/C low and high pressure side lines. Turn A/C on and measure low side and high side pressures. Are pressures within specifications? (See 07-10-3 REFRIGERANT PRESSURE CHECK.) 	Yes	Go to next step.
		No	If A/C is always on, go to symptom troubleshooting "NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS]." For other symptoms, inspect following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation
14	<p>Note</p> <ul style="list-style-type: none"> The following test is performed for symptom with cruise control on. If other symptoms exist, go to next step. Inspect cruise control system. Is cruise control system okay? 	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
15	<ul style="list-style-type: none"> Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. Plug opening end of vacuum hose. Drive vehicle. Does engine condition improve? 	Yes	Inspect if purge solenoid valve is stuck open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
16	<ul style="list-style-type: none"> Visually inspect CMP sensor and projections of camshaft pulley. Are CMP sensor and projections of camshaft pulley okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
17	<ul style="list-style-type: none"> Inspect EGR valve. Is EGR valve okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
18	<ul style="list-style-type: none"> Is engine compression correct? 	Yes	Inspect following: <ul style="list-style-type: none"> Valve timing Internal transaxle part (ATX) Clutch (MTX)
		No	Inspect for cause.
19	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [FS]

A3U010318881W17

12	Lack/loss of power — Acceleration/cruise
DESCRIPTION	<ul style="list-style-type: none"> • Performance is poor under load (e.g. power down when climbing hills).
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Improper A/C system operation • Erratic signal or no signal from CMP sensor • Air leakage from intake-air system parts • VICS malfunction • Tumble swirl control system malfunction • Purge control solenoid malfunction • EGR valve malfunction • Brake dragging • Erratic signal from CKP sensor • Low engine compression • Vacuum leakage • Poor fuel quality • Spark leakage from high-tension leads • Air cleaner restriction • PCV valve malfunction • Improper valve timing due to jumping out of timing belt • Restriction in exhaust system • Intermittent open or short in fuel pump circuit • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogging • Intermittent open or short of MAF sensor, TP sensor and VSS • ATX malfunction • Clutch slippage <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual. (See 01–14–4 BEFORE REPAIR PROCEDURE.) (See 01–14–5 AFTER REPAIR PROCEDURE.)

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Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Vacuum connection — Air cleaner element — No air leakage from intake-air system — No restriction of intake-air system — Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve — Fuel quality: proper octane, contamination, winter/summer blend • Are all items okay? 	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is “DTC” displayed? 	Yes	DTC displayed: <ul style="list-style-type: none"> • Go to appropriate DTC test.
		No	No DTC displayed: <ul style="list-style-type: none"> • Go to next step.
3	<ul style="list-style-type: none"> • Is engine overheating? 	Yes	Go to symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS - OVERHEATING [FS].”
		No	Go to next step.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
4	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Access RPM PID, MAF PID, TP PID, and VSS PID. Drive vehicle while monitoring PIDs. Are PIDs within specification? 	Yes	Go to next step.
		No	RPM PID: <ul style="list-style-type: none"> Inspect CKP sensor and related wiring harness for vibration and/or intermittent open/short circuit. MAF PID: <ul style="list-style-type: none"> Inspect for intermittent open circuit of MAF sensor and related wiring harness. TP PID: <ul style="list-style-type: none"> Inspect if TP sensor output increases smoothly. VSS PID: <ul style="list-style-type: none"> Inspect for intermittent open circuit of VSS and related wiring harness.
5	<ul style="list-style-type: none"> Visually inspect CKP sensor and teeth of crankshaft pulley. Are CKP sensor and teeth of crankshaft pulley okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
6	<ul style="list-style-type: none"> Measure gap between CKP sensor and teeth of crankshaft pulley. Gap 0.5—1.5 mm {0.020—0.059 in} <ul style="list-style-type: none"> Is the gap within specification? 	Yes	Go to next step.
		No	Adjust CKP sensor.
7	<ul style="list-style-type: none"> Inspect condition of spark plugs. Is spark plug wet, covered with carbon or grayish white? 	Yes	Spark plug is wet or covered with carbon: <ul style="list-style-type: none"> Inspect for fuel leakage from fuel injector. Spark plug is grayish white: <ul style="list-style-type: none"> Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to next step.
8	<ul style="list-style-type: none"> Remove and shake PCV valve. Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
9	<ul style="list-style-type: none"> Is there any restriction in exhaust system? 	Yes	Inspect exhaust system.
		No	Go to next step.
10	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Connect jumper wire between F/P terminal at DLC in engine compartment and GND. Turn ignition key to ON. Is fuel line pressure correct with ignition key on? Fuel line pressure 270—310 kPa {2.7—3.2 kgf/cm², 39—45 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect for open fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. High: <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
11	<ul style="list-style-type: none"> Inspect for VICS operation. (See 01—03B—57 VICS Operation Inspection.) Does VICS work properly? 	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
12	<ul style="list-style-type: none"> Inspect for tumble swirl control system operation. (See 01—03B—57 Variable Tumble Control System (VTCS) Inspection.) Does tumble swirl control system work properly? 	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
13	Note <ul style="list-style-type: none"> Following test is for engine stalling with A/C on concern. If other symptoms exist, go to next step. Connect pressure gauge to A/C low and high side pressure lines. Turn A/C on and measure low side and high side pressures. Are the pressures within specifications? (See 07—10—3 REFRIGERANT PRESSURE CHECK.) 	Yes	Go to next step.
		No	If A/C is always on, go to symptom troubleshooting "NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS]". For other symptoms, inspect following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
14	<ul style="list-style-type: none"> Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side. Plug opening end of vacuum hose. Drive vehicle. Does engine condition improve? 	Yes	Inspect if purge solenoid valve is stuck open mechanically. Inspect evaporative emission control system.
		No	Go to next step.
15	<ul style="list-style-type: none"> Visually inspect CMP sensor and projections of camshaft pulley. Are CMP sensor and projections of camshaft pulley okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
16	<ul style="list-style-type: none"> Inspect EGR valve. Is EGR valve okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
17	<ul style="list-style-type: none"> Is engine compression correct? 	Yes	Inspect following: <ul style="list-style-type: none"> Valve timing Internal transaxle components (ATX) Clutch (MTX) Brake system for dragging
		No	Inspect for cause.
18	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

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NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [FS]

A3U010318881W18

13	Knocking/pinging — Acceleration/cruise
DESCRIPTION	<ul style="list-style-type: none"> Sound is produced when air/fuel mixture is ignited by something other than spark plug (e.g. hot spot in combustion chamber).
POSSIBLE CAUSE	<ul style="list-style-type: none"> Engine overheating due to cooling system malfunction ECT sensor malfunction IAT sensor malfunction Inadequate engine compression Inadequate fuel pressure <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. (See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Access ECT PID. Verify ECT PID is less than 116°C {241°F} during driving. Is ECT PID less than specification? 	Yes	Go to next step.
		No	Inspect cooling system for cause of overheating.
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key on. Retrieve any DTC. Is "DTC" displayed? 	Yes	No DTC displayed: <ul style="list-style-type: none"> Go to next step.
		No	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.
3	<ul style="list-style-type: none"> Is engine compression correct? 	Yes	Go to next step.
		No	Inspect for cause.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
4	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Start engine and run it at idle. Measure fuel line pressure at idle. Is fuel line pressure correct at idle? Fuel line pressure 210—250 kPa {2.1—2.6 kgf/cm², 39—45 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect for open fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. High: <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
5	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

NO.14 POOR FUEL ECONOMY [FS]

A3U010318881W19

14	Poor fuel economy
DESCRIPTION	<ul style="list-style-type: none"> Fuel economy is unsatisfactory.
POSSIBLE CAUSE	<ul style="list-style-type: none"> Contaminated air cleaner element VICS malfunction Tumble swirl control system malfunction Engine cooling system malfunction Improper automatic transaxle fluid level (ATX) Weak spark Poor fuel quality Erratic or no signal from CMP sensor Improper coolant level Inadequate fuel pressure Spark plug malfunction PCV valve malfunction Brake dragging Improper valve timing due to jumping out of timing belt Contaminated MAF sensor Improper engine compression Exhaust system clogging <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. <p>(See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)</p>

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Inspect for following: <ul style="list-style-type: none"> Air cleaner element for contamination Automatic transaxle fluid level Fuel quality Coolant level Are all items okay? 	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is "DTC" displayed? 	Yes	No DTC displayed: <ul style="list-style-type: none"> Go to next step.
		No	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.
3	<ul style="list-style-type: none"> Access ECT PID. Drive vehicle while monitoring PID. Is PID within specification? 	Yes	Go to next step.
		No	Inspect for coolant leakage, cooling fan and condenser fan operations or thermostat operation.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
4	<ul style="list-style-type: none"> Is strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Inspect for following: <ul style="list-style-type: none"> Spark plugs malfunction CMP sensor is improperly installed. Trigger wheel damage on camshaft Open or short circuit on CMP sensor Open or short circuit between CMP sensor and PCM terminal 85 or 86 Repair or replace malfunctioning parts. If okay, go to next step.
		No	Inspect following: <ul style="list-style-type: none"> High-tension leads Ignition coil and connector
5	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Start engine and run it at idle. Measure fuel line pressure at idle. Is fuel line pressure correct at idle? Fuel line pressure 210—250 kPa {2.1—2.6 kgf/cm², 30—36 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect for open fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. High: <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
6	<ul style="list-style-type: none"> Inspect VICS operation. (See 01-03B-57 VICS Operation Inspection.) Does VICS work properly? 	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
7	<ul style="list-style-type: none"> Inspect tumble swirl control system operation. (See 01-03B-57 Variable Tumble Control System (VTCS) Inspection.) Does tumble swirl control system work properly? 	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
8	<ul style="list-style-type: none"> Remove and shake PCV valve. Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
9	<ul style="list-style-type: none"> Is there any restriction in exhaust system? 	Yes	Inspect exhaust system.
		No	Go to next step.
10	<ul style="list-style-type: none"> Is brake system functioning properly? 	Yes	Go to next step.
		No	Inspect for cause.
11	<ul style="list-style-type: none"> Inspect MAF sensor for contamination. Is there any contamination? 	Yes	Replace MAF sensor.
		No	Go to next step.
12	<ul style="list-style-type: none"> Is engine compression correct? 	Yes	Inspect valve timing.
		No	Inspect for cause.
13	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.15 EMISSION COMPLIANCE [FS]

A3U010318881W20

15	Emission compliance
DESCRIPTION	<ul style="list-style-type: none"> • Fails emissions test
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Vacuum lines leakage or blockage • Cooling system malfunction • Spark plug malfunction • Leakage from intake manifold • Erratic or no signal from CMP sensor • Inadequate fuel pressure • PCV valve malfunction or incorrect valve installation • EGR valve malfunction • Exhaust system clogging • Fuel tank ventilation system malfunction • Charcoal canister damage • Excessive carbon is built up in combustion chamber. • Improper engine compression • Improper valve timing <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. (See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Vacuum lines for leakage or blockage — Electrical connections — Proper maintenance schedule followed — Intake-air system and air cleaner element concerns: obstructions, leakage or dirtiness • Are all items okay? 	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed? 	Yes	No DTC displayed: <ul style="list-style-type: none"> • Go to next step.
		No	DTC displayed: <ul style="list-style-type: none"> • Go to appropriate DTC test.
3	<ul style="list-style-type: none"> • Is any other drivability concern present? 	Yes	Go to appropriate symptom troubleshooting.
		No	Go to next step.
4	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Access ECT PID. • Warm up engine and run it at idle. • Verify ECT PID is correct. • Is ECT PID correct? 	Yes	Go to next step.
		No	Inspect for coolant leakage, cooling fan and condenser fan operation or thermostat operation.
5	<ul style="list-style-type: none"> • Is strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Inspect for following: <ul style="list-style-type: none"> • Spark plugs malfunction • CMP sensor is improperly installed. • Damage of trigger wheel on camshaft • Open or short circuit on CMP sensor • Open or short circuit between CMP sensor and PCM terminal 85 or 86 Repair or replace malfunctioning parts. If okay, go to next step.
		No	Inspect following: <ul style="list-style-type: none"> • High-tension leads • Ignition coil and connector

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
6	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Start engine and run it at idle. Measure fuel line pressure at idle. Is fuel line pressure correct at idle? Fuel line pressure 210—250 kPa {2.1—2.6 kgf/cm ² , 30—36 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect for open fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. High: <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
7	<ul style="list-style-type: none"> Remove and shake PCV valve. Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
8	<ul style="list-style-type: none"> Inspect for fuel saturation inside charcoal canister. Is excess amount of liquid fuel present in canister? 	Yes	Replace charcoal canister.
		No	Inspect fuel tank vent system. Then, go to next step.
9	<ul style="list-style-type: none"> Is there any restriction in exhaust system? 	Yes	Inspect exhaust system.
		No	Inspect EGR valve.
10	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

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NO.16 HIGH OIL CONSUMPTION/LEAKAGE [FS]

A3U010318881W21

16	High oil consumption/leakage
DESCRIPTION	<ul style="list-style-type: none"> Oil consumption is excessive.
POSSIBLE CAUSE	<ul style="list-style-type: none"> PCV valve malfunction Improper dipstick Improper engine oil viscosity Engine internal parts malfunction

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Remove and shake PCV valve. Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
2	<ul style="list-style-type: none"> Inspect for following: <ul style="list-style-type: none"> External leakage Proper dipstick Proper engine oil viscosity Are all items okay? 	Yes	Inspect internal engine parts such as valves, valve guides, valve stem seals, cylinder head drain passage, and piston rings.
		No	Service as necessary. Repeat Step 2.
3	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [FS]

A3U010318881W22

17	Cooling system concerns — Overheating
DESCRIPTION	<ul style="list-style-type: none"> • Engine runs at higher than normal temperature/overheats.
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Improper coolant level • Blown fuses • Coolant leakage • Excessive A/C system pressure • Improper water/anti-freeze mixture • Fans reverse rotation • Poor radiator condition • Thermostat malfunction • Radiator hoses damage • Condenser fan is inoperative. • Improper or damaged radiator cap • Cooling fan is inoperative. • Coolant overflow system malfunction • Improper tension of drive belt • Drive belt damage

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Engine coolant level — Coolant leakage — Water and anti-freeze mixture — Radiator condition — Collapsed or restricted radiator hoses — Radiator pressure cap — Overflow system — Fan rotational direction — Fuses • Are all items okay? 	Yes	Go to next step.
		No	Service as necessary. Repeat Step 1.
2	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed? 	Yes	DTC displayed: <ul style="list-style-type: none"> • Go to appropriate DTC test.
		No	No DTC displayed: <ul style="list-style-type: none"> • Go to next step.
3	<ul style="list-style-type: none"> • Start engine and run it at idle speed. • Turn A/C switch on. • Does A/C compressor engage? 	Yes	Go to next step.
		No	Inspect for following and repair or replace as necessary: <ul style="list-style-type: none"> • Refrigerant charging amount • Open circuit between A/C relay and PCM terminal 96 • Seized A/C magnetic clutch • A/C magnetic clutch malfunction If all items are okay, inspect following: <ul style="list-style-type: none"> • Refrigerant pressure switch operation • Evaporator temperature sensor and A/C amplifier • A/C switch is stuck open. • Open or short circuit between refrigerant pressure switch and PCM terminal 41 • Open circuit of blower motor fan switch and resistor (if blower motor does not operate)

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
4	<ul style="list-style-type: none"> • Start engine and run it at idle speed. • Turn A/C switch on. • Do cooling fan and condenser fan operate? 	Yes	Go to next step.
		No	<p>Cooling fan motor does not operate:</p> <ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Cooling fan relay is stuck open. — Cooling fan motor malfunction — Cooling fan motor GND open — Open circuit between cooling fan motor and relay — Open circuit between cooling fan relay and PCM terminal 47 — Open battery power circuit for cooling fan relay <p>Condenser fan motor does not operate:</p> <ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Condenser fan relay is stuck open. — Condenser fan motor malfunction — Condenser fan motor GND open — Open circuit between condenser fan motor and relay — Open circuit between condenser fan relay and PCM terminal 45 — Open battery power circuit for condenser fan relay
5	<ul style="list-style-type: none"> • Is drive belt okay? 	Yes	Go to next step.
		No	Replace drive belt.
6	<ul style="list-style-type: none"> • Is there any leakage around heater unit in passenger compartment? 	Yes	Inspect and service heater for leakage.
		No	Go to next step.
7	<ul style="list-style-type: none"> • Is there any leakage at coolant hoses and/or radiator? 	Yes	Replace malfunctioning part.
		No	Go to next step.
8	<ul style="list-style-type: none"> • Cool down the engine. • Remove thermostat and inspect operation. (See 01-12-5 THERMOSTAT REMOVAL/INSTALLATION.) (See 01-12-7 THERMOSTAT INSPECTION.) • Is thermostat okay? 	Yes	Engine coolant temperature and thermostat are okay. Inspect engine block for leakage or blockage.
		No	<p>Access ECT PID on WDS or equivalent. Inspect for both ECT and temperature gauge readings.</p> <ul style="list-style-type: none"> • If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor. • If temperature gauge on instrument cluster indicates overheating but ECT is normal, inspect temperature gauge and heat gauge unit.
9	<ul style="list-style-type: none"> • Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [FS]

A3U010318881W23

18	Cooling system concerns — Runs cold
DESCRIPTION	<ul style="list-style-type: none"> • Engine does not reach normal operating temperature.
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Thermostat malfunction • Condenser fan system malfunction • Cooling fan system malfunction

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> • Is customer complaint "Lack of passenger compartment heat" only? 	Yes	Inspect A/C and heater system.
		No	Go to next step.
2	<ul style="list-style-type: none"> • Does engine speed continue at fast idle? 	Yes	Go to symptom troubleshooting "NO.9 FAST IDLE/ RUNS ON [FS]."
		No	Go to next step.
3	<ul style="list-style-type: none"> • Remove thermostat and inspect operation. (See 01-12-5 THERMOSTAT REMOVAL/ INSTALLATION.) (See 01-12-7 THERMOSTAT INSPECTION.) • Is thermostat okay? 	Yes	Inspect cooling fan and condenser fan operation. <ul style="list-style-type: none"> • If both or either fan operate abnormally, inspect for following: <ul style="list-style-type: none"> — Cooling fan relay is stuck closed. — Condenser fan relay is stuck closed. — Short to GND between cooling fan relay and PCM terminal 47 — Short to GND between condenser fan relay and PCM terminal 45 — Circuit between cooling fan relay and fan motor shorts to battery supply line — Circuit between condenser fan relay and fan motor shorts to battery supply line
		No	Access ECT PID on WDS or equivalent. Inspect both ECT and temperature gauge on instrument cluster readings. <ul style="list-style-type: none"> • If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor. • If temperature gauge on instrument cluster indicates cold range but ECT is normal, inspect temperature gauge and heat gauge unit.
4	<ul style="list-style-type: none"> • Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.19 EXHAUST SMOKE [FS]

A3U010318881W24

19	Exhaust smoke
DESCRIPTION	<ul style="list-style-type: none"> • Blue, black, or white smoke from exhaust system
POSSIBLE CAUSE	<p>Blue smoke (Burning oil):</p> <ul style="list-style-type: none"> • PCV valve malfunction • Engine internal oil leakage <p>White smoke (Water in combustion):</p> <ul style="list-style-type: none"> • Cooling system malfunction (coolant loss) • Engine internal coolant leakage <p>Black smoke (Rich fuel mixture):</p> <ul style="list-style-type: none"> • Air cleaner restriction • Intake-air system is collapsed or restricted. • Fuel return line is restricted. • Excessive fuel pressure • Improper engine compression • Injector fuel leakage • Ignition system malfunction <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. (See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)

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Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> • What color is smoke coming from exhaust system? 	Blue	Burning oil is indicated. Go to next step.
		White	Water in combustion is indicated. Go to Step 3.
		Black	Rich fuel mixture is indicated. Go to Step 4.
2	<ul style="list-style-type: none"> • Remove and shake PCV valve. • Does PCV valve rattle? 	Yes	Inspect for following: <ul style="list-style-type: none"> • Damaged valve guide, stems or valve seals • Blocked oil drain passage in cylinder head • Piston rings for not seated, seized or worn • Damaged cylinder bore If other drivability symptoms are present, return to diagnostic index to service any additional symptoms.
		No	Replace PCV valve.
3	<ul style="list-style-type: none"> • Does cooling system hold pressure? 	Yes	Inspect for following: <ul style="list-style-type: none"> • Cylinder head gasket leakage • Intake manifold gasket leakage • Engine block cracks or porosity If other driveability symptoms are present, return to diagnostic index to service any additional symptoms.
		No	Inspect for cause.
4	<ul style="list-style-type: none"> • Inspect for following: <ul style="list-style-type: none"> — Air cleaner restriction — Collapsed or restricted intake-air system — Restricted fuel return line • Are all items okay? 	Yes	Go to next step.
		No	Service as necessary. Repeat Step 4.
5	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Turn ignition key to ON. • Retrieve any DTC. • Is "DTC" displayed? 	Yes	No DTC displayed: <ul style="list-style-type: none"> • Go to next step.
		No	DTC displayed: <ul style="list-style-type: none"> • Go to appropriate DTC test.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
6	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Start engine and run it at idle. Measure fuel line pressure at idle. Is fuel line pressure correct at idle? Fuel line pressure 210—250 kPa {2.1—2.6 kgf/cm², 30—36 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect for open fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. High: <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
7	<ul style="list-style-type: none"> Is strong blue spark visible at each disconnected high-tension lead while cranking engine? 	Yes	Inspect spark plugs and CMP sensor.
		No	Inspect following: <ul style="list-style-type: none"> High-tension leads Ignition coil and connector
8	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [FS]

A3U010318881W25

20	Fuel odor (in engine compartment)
DESCRIPTION	<ul style="list-style-type: none"> Gasoline fuel smell or visible leakage
POSSIBLE CAUSE	<ul style="list-style-type: none"> Excessive fuel pressure Purge solenoid valve malfunction Fuel tank vent system blockage Charcoal canister malfunction <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. (See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Visually inspect for fuel leakage at fuel injector, O-ring, and fuel line. Service as necessary. Is fuel line pressure held after ignition key is turned to LOCK? (See 01-14-28 Operation Inspection.) 	Yes	Go to next step.
		No	Inspect pressure regulator diaphragm condition. <ul style="list-style-type: none"> If condition is okay, inspect fuel injector. If condition is not okay, replace pressure regulator.
2	<ul style="list-style-type: none"> Inspect for blockage/restriction or open between engine vacuum port and charcoal canister. Inspect for blockage in fuel tank vent system. Is fault indicated? 	Yes	Replace vacuum hose.
		No	Go to next step.
3	<ul style="list-style-type: none"> Inspect purge solenoid valve. (See 01-16-12 PURGE SOLENOID VALVE INSPECTION.) Is solenoid operating properly? 	Yes	Go to next step.
		No	Replace purge solenoid valve.
4	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is "DTC" displayed? 	Yes	No DTC displayed: <ul style="list-style-type: none"> Inspect charcoal canister for fuel saturation. <ul style="list-style-type: none"> — If excess amount of liquid fuel is present, replace charcoal canister.
		No	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
5	<ul style="list-style-type: none"> • Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

NO.21 ENGINE NOISE [FS]

A3U010318881W26

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21	Engine noise
DESCRIPTION	<ul style="list-style-type: none"> • Engine noise from under hood or driveline
POSSIBLE CAUSE	<p>Squeal, click or chirp noise:</p> <ul style="list-style-type: none"> • Improper engine oil level • Improper drive belt tension <p>Rattle sound noise:</p> <ul style="list-style-type: none"> • Loose parts <p>Hiss sound noise:</p> <ul style="list-style-type: none"> • Vacuum leakage • Loose spark plug • Air leakage from intake-air system <p>Rumble or grind noise:</p> <ul style="list-style-type: none"> • Improper drive belt tension <p>Rap or roar sound noise:</p> <ul style="list-style-type: none"> • Exhaust system looseness <p>Other noise:</p> <ul style="list-style-type: none"> • Camshaft friction gear noise or MLA noise

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> • Is squeal, click or chirp sound present? 	Yes	Inspect engine oil level or drive belts.
		No	Go to next step.
2	<ul style="list-style-type: none"> • Is rumble or grind sound present? 	Yes	Inspect drive belts.
		No	Go to next step.
3	<ul style="list-style-type: none"> • Is rattle sound present? 	Yes	Inspect location of rattle for loose parts.
		No	Go to next step.
4	<ul style="list-style-type: none"> • Is hiss sound present? 	Yes	Inspect for following: <ul style="list-style-type: none"> • Vacuum leakage • Spark plug looseness • Intake-air system leakage
		No	Go to next step.
5	<ul style="list-style-type: none"> • Is rap or roar sound present? 	Yes	Inspect exhaust system for loose parts.
		No	Go to next step.
6	<ul style="list-style-type: none"> • Is knock sound present? 	Yes	Go to symptom troubleshooting "NO.13 KNOCKING/ PINGING — ACCELERATION/CRUISE [FS]."
		No	If noise comes from engine internal, inspect for friction gear or MLA noise.
7	<ul style="list-style-type: none"> • Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.22 VIBRATION CONCERNS (ENGINE) [FS]

A3U010318881W27

22	Vibration concerns (engine)
DESCRIPTION	<ul style="list-style-type: none"> Vibration from under hood or driveline
POSSIBLE CAUSE	<ul style="list-style-type: none"> Loose attaching bolts or worn parts Components malfunction such as worn parts

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Inspect following components for loose attaching bolts or worn parts: <ul style="list-style-type: none"> Cooling fan Drive belt and pulleys Engine mounts Are all items okay? 	Yes	Inspect following systems: <ul style="list-style-type: none"> Wheels Automatic transaxle Driveline Suspension
		No	Readjust or retighten engine mount installation position. Service as necessary for other parts.
2	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

NO.23 A/C DOES NOT WORK SUFFICIENTLY [FS]

A3U010318881W28

23	A/C does not work sufficiently
DESCRIPTION	<ul style="list-style-type: none"> A/C compressor magnetic clutch does not engage when A/C switch is turned on.
POSSIBLE CAUSE	<ul style="list-style-type: none"> Improper refrigerant charging amount Open A/C magnetic clutch Open circuit between A/C relay and A/C magnetic clutch Poor GND of A/C magnetic clutch Refrigerant pressure switch is stuck open. A/C relay is stuck open. Seized A/C compressor Open circuit between A/C switch and PCM through both refrigerant pressure switch and A/C amplifier

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is "DTC" displayed? 	Yes	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.
		No	No DTC displayed: <ul style="list-style-type: none"> Go to next step.
2	<ul style="list-style-type: none"> Disconnect A/C compressor connector. Start engine and turn A/C switch to ON. Is there correct voltage at terminal of A/C compressor magnetic clutch connector? <p>Specification More than 10.5 V</p>	Yes	Inspect for GND condition of magnetic clutch on A/C compressor. If GND condition is okay, inspect for open circuit of magnetic clutch coil.
		No	Go to next step.
3	<ul style="list-style-type: none"> Disconnect refrigerant pressure switch connector. Connect jumper wires between terminals of refrigerant pressure switch connector. Turn ignition key to ON. Turn A/C switch on and set blower fan at any speed. Does A/C work? 	Yes	Inspect refrigerant pressure switch operation. <ul style="list-style-type: none"> If switch is okay, go to next step.
		No	Inspect for following: <ul style="list-style-type: none"> A/C switch is stuck open. Open circuit between refrigerant pressure switch and PCM terminal 41 Open circuit of blower motor fan switch and resistor (if blower motor does not operate) Evaporator temperature sensor and A/C amplifier
4	<ul style="list-style-type: none"> Remove jumper wires from switch connector. Reconnect connector to refrigerant pressure switch. Start engine and turn A/C switch on. Does fan operate? 	Yes	Inspect for stuck open A/C relay. Replace as necessary.
		No	Inspect following and repair or replace as necessary: <ul style="list-style-type: none"> Refrigerant charging amount A/C compressor for being seized

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
5	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS]

A3U010318881W29

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24	A/C is always on or A/C compressor runs continuously
DESCRIPTION	<ul style="list-style-type: none"> A/C compressor magnetic clutch does not disengage.
POSSIBLE CAUSE	<ul style="list-style-type: none"> Stuck engagement A/C relay is stuck closed. Short to GND between A/C switch and PCM Short to GND circuit between A/C relay and PCM A/C relay to magnetic clutch circuit shorts to battery power

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is "DTC" displayed? 	Yes	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.
		No	No DTC displayed: <ul style="list-style-type: none"> Go to next step.
2	<ul style="list-style-type: none"> Start engine and run it at idle. Turn A/C switch on. Remove A/C relay. Does A/C magnetic clutch disengage? 	Yes	Inspect for following: <ul style="list-style-type: none"> A/C relay is stuck closed. Short to GND circuit between A/C relay and PCM terminal 96 If both items are okay, go to next step.
		No	Inspect if circuit between A/C relay and magnetic clutch shorts to battery power circuit. <ul style="list-style-type: none"> If circuit is okay, inspect magnetic clutch stuck engagement or clearance.
3	<ul style="list-style-type: none"> Disconnect refrigerant pressure switch connector. Start engine and turn A/C switch on. <p>Note</p> <ul style="list-style-type: none"> A/C should not work when disconnecting connector. If A/C remains working, short to GND circuit may be present. <ul style="list-style-type: none"> Does A/C reading remain working? 	Yes	Inspect for short to GND circuit between refrigerant pressure switch and PCM terminal 41.
		No	Go to next step.
4	<ul style="list-style-type: none"> Reconnect refrigerant pressure switch connector. Turn off A/C switch. <p>Note</p> <ul style="list-style-type: none"> A/C should not work when turning the A/C switch off. If A/C remains working, short to GND circuit may be present. <ul style="list-style-type: none"> Does A/C reading remain working? 	Yes	Inspect following: <ul style="list-style-type: none"> Short to GND circuit between A/C switch and A/C amplifier Short to GND circuit between A/C amplifier and refrigerant pressure switch
		No	Inspect if A/C switch is stuck closed.
5	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.25 A/C IS NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS [FS]

A3U010318881W30

25	A/C is not cut off under wide open throttle conditions
DESCRIPTION	<ul style="list-style-type: none"> A/C compressor magnetic clutch does not disengage under wide open throttle.
POSSIBLE CAUSE	<ul style="list-style-type: none"> TP sensor malfunction TP sensor misadjustment TP sensor not securely installed

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Does A/C compressor disengage when A/C switch is turned off? 	Yes	Go to next step.
		No	Go to symptom troubleshooting "NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [FS]."
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is "DTC" displayed? 	Yes	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.
		No	No DTC displayed: <ul style="list-style-type: none"> Inspect TP sensor for proper adjustment.
3	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

NO.26 EXHAUST SULPHUR SMELL [FS]

A3U010318881W31

26	Exhaust sulphur smell
DESCRIPTION	<ul style="list-style-type: none"> Rotten egg smell (sulphur) from exhaust
POSSIBLE CAUSE	<ul style="list-style-type: none"> Electrical connectors are disconnected or connected poorly Charcoal canister malfunction Vacuum lines are disconnected or connected improperly. Improper fuel pressure <p>Warning</p> <p>The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. <p>(See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)</p>

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Are any driveability or exhaust smoke concerns present? 	Yes	Go to appropriate flow chart.
		No	Go to next step.
2	<ul style="list-style-type: none"> Inspect following: <ul style="list-style-type: none"> Electrical connections Vacuum lines Are all items okay? 	Yes	Go to next step.
		No	Service as necessary. Repeat Step 2.
3	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition key to ON. Retrieve any DTC. Is "DTC" displayed? 	Yes	DTC displayed: <ul style="list-style-type: none"> Go to appropriate DTC test.
		No	No DTC displayed: <ul style="list-style-type: none"> Go to next step.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
4	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Start engine and run it at idle. Is fuel line pressure correct at idle? Fuel line pressure 210—250 kPa {2.1—2.6 kgf/cm², 30—36 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect for open fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. High: <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
5	<ul style="list-style-type: none"> Inspect charcoal canister for fuel saturation. Is excess amount of liquid fuel present in canister? 	Yes	Replace charcoal canister.
		No	Inspect fuel tank vent system. <ul style="list-style-type: none"> If fuel tank vent system is okay, since sulfur content can vary in different fuels, suggest trying a different brand. If fuel tank vent system is not okay, repair or replace malfunctioning parts.
6	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

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NO.27 FUEL REFILL CONCERNS [FS]

A3U010318881W32

27	Fuel refill concerns
DESCRIPTION	<ul style="list-style-type: none"> Fuel tank does not fill smoothly.
POSSIBLE CAUSE	<ul style="list-style-type: none"> Clogged evaporative emission pipes Nonreturn valve malfunction Pressure control valve malfunction Improper use of fuel nozzle Inadequate fuel filling speed <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual. (See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Retrieve DTCs. Are there any DTCs displayed? 	Yes	Go to appropriate DTC test.
		No	Go to next step.
2	<ul style="list-style-type: none"> Remove fuel-filler pipe. Make sure nonreturn valve is installed properly. Inspect nonreturn valve operation. Is nonreturn valve okay? 	Yes	Inspect following: <ul style="list-style-type: none"> Improper use of fuel nozzle Inadequate fuel filling speed Pressure control valve
		No	If nonreturn valve is installed improperly: <ul style="list-style-type: none"> Reinstall nonreturn valve to proper position. If nonreturn valve does not operate properly: <ul style="list-style-type: none"> Replace non return valve.
3	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

NO.28 FUEL FILLING SHUT OFF ISSUES [FS]

A3U010318881W33

28	Fuel filling shut off issues
DESCRIPTION	<ul style="list-style-type: none"> Fuel does not shut off properly.
POSSIBLE CAUSE	<ul style="list-style-type: none"> Clogged evaporative emission pipes Nonreturn valve malfunction Fuel shut-off valve malfunction Fuel nozzle malfunction Fuel nozzle is not inserted correctly. <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing fuel system services:</p> <ul style="list-style-type: none"> Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual. (See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Retrieve DTCs. Are there any DTCs displayed? 	Yes	Go to appropriate DTC test.
		No	Go to next step.
2	<ul style="list-style-type: none"> Remove fuel-filler pipe. Make sure nonreturn valve is installed properly. Inspect nonreturn valve operation. Is nonreturn valve okay? 	Yes	Inspect for following: <ul style="list-style-type: none"> Improper use of fuel nozzle Fuel nozzle is not inserted correctly. Inspect fuel shut-off valve
		No	If nonreturn valve installed improperly: <ul style="list-style-type: none"> Reinstall nonreturn valve to proper position. If nonreturn valve does not operate properly: <ul style="list-style-type: none"> Replace nonreturn valve.
3	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> — If okay, return to diagnostic index to service any additional symptoms. — If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

NO.29 INTERMITTENT CONCERNS [FS]

A3U010318881W34

29	Intermittent concerns
DESCRIPTION	<ul style="list-style-type: none"> Symptom occurs randomly and is difficult to diagnose.

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Talk to customer. Retrieve vehicle service history. Does vehicle have a number of previous repairs and components replaced for a certain symptom? 	Yes	Go to next step.
		No	Go to Symptom Index.
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. If input is switch-type component, turn on manually. Turn ignition key to ON. Access PIDs for suspect component. Lightly tap on suspect component, wiggle and pull each wire/connector at suspect component or PCM. Are any PID values out of range, or do they suddenly change and go back into range? 	Yes	Inspect each wire for corrosion, bent or loose terminal crimps.
		No	Go to next step.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
3	<ul style="list-style-type: none"> Start engine. Lightly tap on suspect component, wiggle and pull each wire/connector at suspect component or PCM. Are any PID values out of range, or do they suddenly change and go back into range? 	Yes	Inspect each wire for corrosion, bent or loose terminal crimps.
		No	Go to next step.
4	<ul style="list-style-type: none"> Start engine. Accurately spray water on suspect component wire, component or vacuum line related to possible fault area. Are any PID values out of range, or suddenly change and go back into range, or was there a noticeable engine misfire/stumble? 	Yes	Fault occurred while spraying on component: <ul style="list-style-type: none"> Replace part and verify repair. Fault occurred while spraying wiring: <ul style="list-style-type: none"> Inspect each wire for corrosion, bent or loose terminals and poor wire terminal crimps. Fault occurred while spraying vacuum line: <ul style="list-style-type: none"> Repair vacuum hoses.
		No	Inspect wire and connector at suspect component for corrosion, bent or loose terminals, poor wire terminal crimps and high tension of wire. Repair as necessary.

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NO.30 REFERENCE VOLTAGE [FS]

A3U010318881W35

30	Reference voltage
DESCRIPTION	<ul style="list-style-type: none"> Incorrect reference voltage
POSSIBLE CAUSE	<ul style="list-style-type: none"> Reference voltage circuit malfunction <p>Note</p> <ul style="list-style-type: none"> TP sensor, EGR boost sensor and fuel tank pressure sensor use reference voltage.

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Disconnect appropriate sensor connector when reference voltage circuit inspection failed. Turn ignition key to ON. Measure voltage between following appropriate sensor connector terminals: <ul style="list-style-type: none"> Reference voltage terminal — GND terminal Is reference voltage greater than 6.0 V? 	Yes	Go to Step 13.
		No	Go to next step.
2	<ul style="list-style-type: none"> Is voltage across battery terminals greater than 10.5 V? 	Yes	Go to next step.
		No	Inspect charging system.
3	<ul style="list-style-type: none"> Turn ignition key to LOCK. Leave appropriate sensor connector disconnected. Measure voltage between battery positive terminal and GND (between PCM and appropriate sensor) circuit at appropriate sensor connector. Is voltage greater than 10.5 V and within 1.0 V of battery voltage? 	Yes	Go to next step.
		No	Go to Step 8.
4	<p>Note</p> <ul style="list-style-type: none"> The purpose of this step is to determine if WDS or equivalent is communicating with PCM. Turn ignition key to ON. Attempt to access ECT PID. Can ECT PID be accessed? 	Yes	Go to Step 7.
		No	Go to next step.
5	<ul style="list-style-type: none"> Turn ignition key to LOCK. Disconnect TP sensor, EGR boost sensor, FTP sensor and PCM connectors. Turn ignition key to ON. Measure voltage between PCM connector terminals 71/97 and 24/51/76/77/103. Is voltage greater than 10.5 V? 	Yes	Go to next step.
		No	Repair open circuit between PCM terminal 71/97 and main relay.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
6	<ul style="list-style-type: none"> • Leave TP sensor, EGR boost sensor, FTP sensor and PCM connectors disconnected. • Measure resistance between PCM connector terminals 90 and 24/51/76/77/103. • Is resistance greater than 10,000 ohms? 	Yes	Inspect for reference voltage at suspect sensor connector again. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM and repeat Step 6.
		No	Repair constant voltage circuit short to GND.
7	<ul style="list-style-type: none"> • Turn ignition key to LOCK. • Leave TP sensor disconnected. • Disconnect PCM connector. • Measure resistance between PCM connector terminal 90 and constant voltage circuit at appropriate sensor connector. • Is resistance less than 5.0 ohms? 	Yes	Inspect for reference voltage at suspect sensor connector again. If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, replace PCM and repeat Step 7.
		No	Repair open constant voltage circuit.
8	<p>Note</p> <ul style="list-style-type: none"> • The purpose of this step is to determine if WDS or equivalent is communicating with PCM. • Reconnect TP sensor connector. • Turn ignition key to ON. • Attempt to access ECT PID. • Can ECT PID be accessed? 	Yes	Go to next step.
		No	Go to Step 11.
9	<ul style="list-style-type: none"> • Are DTCs present for two or more sensors connected to PCM terminal 91? • Sensor connected to PCM terminal 91: <ul style="list-style-type: none"> — TP sensor (P0122, P0123, P1122, P1123) — EGR boost sensor (P0106, P0107, P0108) — FTP sensor (P0452, P0453) — ECT sensor (P0117, P0118, P0125) — IAT sensor (P0111, P0112, P0113) — HO2S (front) (P0130, P0134) — HO2S (rear) (P0138, P0140) 	Yes	Go to next step.
		No	Repair open GND circuit to sensor where reference voltage circuit inspection failed.
10	<ul style="list-style-type: none"> • Turn ignition key to LOCK. • Disconnect WDS or equivalent from DLC-2. • Disconnect PCM connector. • Measure resistance between GND circuit at appropriate sensor connector and PCM connector terminal 91. • Is resistance less than 5.0 ohms? 	Yes	Reconnect sensor connector. Go to appropriate DTC test.
		No	Repair open GND circuit.
11	<ul style="list-style-type: none"> • Turn ignition key to LOCK. • Disconnect PCM connector. • Measure resistance between battery negative terminal and PCM terminals 24/51/76/77/103. • Is each resistance less than 5.0 ohms? 	Yes	Go to next step.
		No	Repair open GND circuit.
12	<ul style="list-style-type: none"> • Turn ignition key to LOCK. • Measure resistance between GND circuit at following sensor connector and GND: <ul style="list-style-type: none"> — TP sensor — EGR boost sensor — FTP sensor — ECT sensor — IAT sensor — HO2S sensor (front) — HO2S sensor (rear) • Is each resistance less than 5.0 ohms? 	Yes	GND circuits are okay. Inspect for reference voltage at suspect sensor connector again. <ul style="list-style-type: none"> • If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> — If vehicle is repaired, troubleshooting completed. — If vehicle is not repaired or additional diagnostic information is not available, replace PCM and repeat Step 12.
		No	Inspect for open GND circuit.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
13	<ul style="list-style-type: none"> Turn ignition key to LOCK. Disconnect TP sensor, EGR boost sensor, fuel tank pressure sensor and PCM connectors. Turn ignition key on. Measure voltage between reference voltage circuit at TP sensor connector and battery negative terminal. Is voltage less than 0.5 V? 	Yes	Inspect for reference voltage at suspect sensor connector again. <ul style="list-style-type: none"> If malfunction remains, refer to related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM and repeat Step 13.
		No	Repair constant voltage circuit short to power in harness.

01-03B

NO.31 SPARK PLUG CONDITION [FS]

A3U010318881W36

31	Spark plug condition
DESCRIPTION	<ul style="list-style-type: none"> Incorrect spark plug condition
POSSIBLE CAUSE	<p>Note</p> <ul style="list-style-type: none"> Inspecting spark plugs condition can determine whether problem is related to a specific cylinder or possibly to all cylinders. <p>Wet/carbon is stuck on specific plug:</p> <ul style="list-style-type: none"> Spark—Weak, not visible Air/fuel mixture—Excessive fuel injection volume Compression—No compression, low compression Faulty spark plug <p>Grayish white with specific plug:</p> <ul style="list-style-type: none"> Air/fuel mixture—Insufficient fuel injection volume Faulty spark plug <p>Wet/carbon is stuck on all plugs:</p> <ul style="list-style-type: none"> Spark—Weak Air/fuel mixture—Too rich Compression—Low compression Clogging in intake/exhaust system <p>Grayish white with all plugs:</p> <ul style="list-style-type: none"> Air/fuel mixture—Too lean <p>Warning</p> <p>The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures.</p> <p>Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual. <p>(See 01-14-4 BEFORE REPAIR PROCEDURE.) (See 01-14-5 AFTER REPAIR PROCEDURE.)</p>

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Remove all spark plugs. Inspect each spark plug. Is condition of spark plugs okay? 	Yes	Troubleshooting completed.
		No	<p>Specific plug is wet or covered with carbon:</p> <ul style="list-style-type: none"> Go to next step. <p>Specific plug looks grayish white:</p> <ul style="list-style-type: none"> Go to Step 7. <p>All plugs are wet or covered with carbon:</p> <ul style="list-style-type: none"> Go to Step 9. <p>All plugs look grayish white:</p> <ul style="list-style-type: none"> Go to Step 15.
2	<ul style="list-style-type: none"> Are any of spark plug wet/covered with carbon from engine oil? 	Yes	Working up and down, inspect all areas related to oil.
		No	Go to next step.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
3	<ul style="list-style-type: none"> • Inspect spark plug for following. <ul style="list-style-type: none"> — Cracked insulator — Heating value — Air gap — Worn electrode • Are spark plugs okay? 	Yes	Go to next step.
		No	Replace spark plug.
4	<ul style="list-style-type: none"> • Inspect compression pressure at suspected faulty cylinder. • Is compression pressure correct? (See 01–10B–8 COMPRESSION INSPECTION [FS].) 	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
5	<ul style="list-style-type: none"> • Install all spark plugs. • Carry out spark test at suspected faulty cylinder. • Is strong blue spark visible? (Compare with normal cylinder.) 	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
6	<ul style="list-style-type: none"> • Perform fuel line pressure inspection. (See 01–14–28 PRESSURE REGULATOR INSPECTION.) • Is fuel line pressure okay? 	Yes	Inspect fuel injector for following: <ul style="list-style-type: none"> • Open or short in injector • Leakage • Injection volume
		No	Zero or low: <ul style="list-style-type: none"> • Inspect fuel pump circuit. • Inspect open for fuel pump relief valve. • Inspect for fuel leakage inside pressure regulator. • Inspect for clogged main fuel line. • Inspect pulsation damper. High: <ul style="list-style-type: none"> • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
7	<ul style="list-style-type: none"> • Inspect spark plugs for following. <ul style="list-style-type: none"> — Heating value — Air gap • Are they okay? 	Yes	Go to next step.
		No	Replace spark plug.
8	<ul style="list-style-type: none"> • Remove suspected fuel injector. • Inspect following: <ul style="list-style-type: none"> — Resistance (See 01–14–24 Resistance Inspection.) — Fuel injection volume (See 01–14–24 FUEL INJECTOR INSPECTION.) • Are all above items okay? 	Yes	Inspect for open circuit between suspected fuel injector connector terminal and PCM connector following terminals: <ul style="list-style-type: none"> • For #1 cylinder: 75 • For #2 cylinder: 101 • For #3 cylinder: 74 • For #4 cylinder: 100
		No	Replace fuel injector.
9	<ul style="list-style-type: none"> • Is air cleaner element free of restrictions? 	Yes	Go to next step.
		No	Replace air cleaner element.
10	<ul style="list-style-type: none"> • Carry out spark test. • Is strong blue spark visible at each cylinder? 	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
11	<ul style="list-style-type: none"> • Carry out fuel line pressure inspection • Is fuel line pressure correct? Fuel line pressure 260—310 kPa {2.6—3.2 kgf/cm², 37—45 psi} 	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> • Inspect fuel pump circuit. • Inspect open for fuel pump relief valve. • Inspect for fuel leakage inside pressure regulator. • Inspect for clogged main fuel line. • Inspect pulsation damper. High: <ul style="list-style-type: none"> • Inspect pressure regulator for high pressure cause. • Inspect for clogged fuel return line.
12	<ul style="list-style-type: none"> • Inspect following PIDs. <ul style="list-style-type: none"> — ECT — O2S11 — O2S12 — MAF • Are PIDs okay? 	Yes	Go to next step.
		No	Repair or replace malfunctioning part.
13	<ul style="list-style-type: none"> • Inspect purge solenoid valve. (When the engine can be started) • Is purge solenoid valve okay? 	Yes	Go to next step.
		No	Repair or replace malfunctioning part.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

STEP	INSPECTION	RESULTS	ACTION
14	<ul style="list-style-type: none"> Carry out compression inspection. Is compression correct? 	Yes	Inspect for clogging in exhaust system.
		No	Repair or replace malfunctioning part.
15	<ul style="list-style-type: none"> When engine cannot be started, inspect intake-air system for air leakage. When engine can be started, carry out intake manifold vacuum inspection. Is air sucked in from intake-air system? 	Yes	Repair or replace malfunctioning part.
		No	Go to next step.
16	<ul style="list-style-type: none"> Carry out fuel line pressure inspection. Is fuel line pressure correct? Fuel line pressure 260—310 kPa {2.6—3.2 kgf/cm², 37—45 psi}	Yes	Inspect following PIDs. <ul style="list-style-type: none"> ECT O2S11 O2S12 MAF Inspect PCM GND condition.
		No	Zero or low: <ul style="list-style-type: none"> Inspect fuel pump circuit. Inspect open for fuel pump relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. Inspect pulsation damper. High: <ul style="list-style-type: none"> Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
17	<ul style="list-style-type: none"> Verify test results. <ul style="list-style-type: none"> If okay, return to diagnostic index to service any additional symptoms. If malfunction remains, inspect related Service Bulletins and perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle is repaired, troubleshooting is completed. If vehicle is not repaired or additional diagnostic information is not available, replace PCM. 		

01-03B

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

A3U010318881W37

ENGINE CONTROL SYSTEM OPERATION INSPECTION [FS]

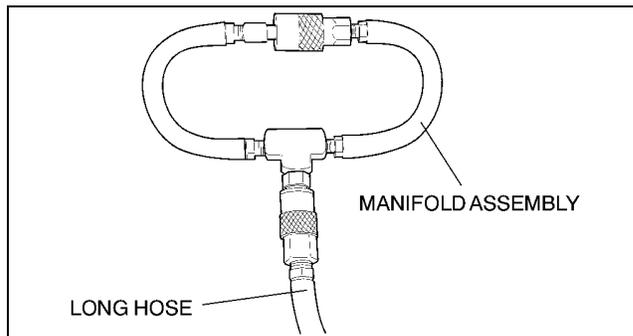
Evaporative System Leak Inspection Using Leak Tester

1. Perform the following **SST** (Evaporative Emission System Tester MZ254AT3641) self-test:

Note

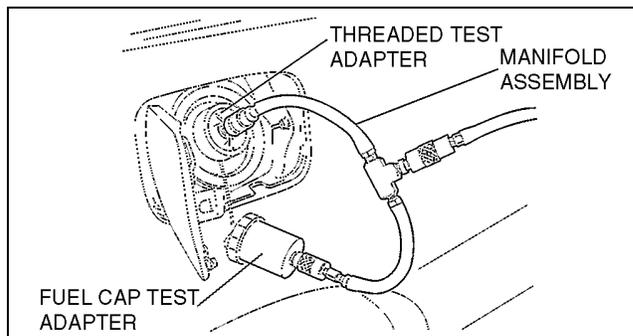
- If the tester does not work correctly during self-test, refer to the tester operators manual for more detailed self test procedures.

- (1) Verify the gas cylinder valve is closed and the control valve located on the tester is in the TEST position. All tester displays should be off at this time.
- (2) Connect the long hose (part of **SST**) to the tester.
- (3) Connect the manifold assembly (part of **SST**) to the long hose as shown.
- (4) Open the gas cylinder valve and verify the gas cylinder regulator left gauge reads **10 to 12 psi** (preset at factory).
 - If not, refer to the tester operators manual to contact tester manufacturer.
- (5) Press the ON/OFF switch to turn on the **SST** and make sure the left display reads **0.0**.
- (6) Turn the control valve on the tester to the FILL position.
- (7) Verify the left display reading is within **13.9 to 14.0 inches** of water.
 - If not, adjust the pressure using the regulator knob located on the right side of the tester.
- (8) Turn the control valve to TEST position and press the START switch.
- (9) After the 2-minute countdown (left display) is completed, the right display shows the total pressure loss for that period. A **0.5 inch** of water loss is acceptable on the self-test.
 - If the loss is more than **0.5 inch** of water, do one or more self-test. If the failed test repeats, check for leak using the ultrasonic leak detector (part of **SST**).



Y3U103WT0

2. Press the RESET switch to set the left display reading to **0.0**.
3. Connect the fuel cap test adapter (part of **SST**) to the manifold assembly and fuel-filler cap from the vehicle.
 - If the fuel-filler cap is not a genuine part, replace it.
4. Connect the threaded test adapter (part of **SST**) to the manifold assembly and fuel-filler neck.
5. Connect the WDS or equivalent to DLC-2.
6. Turn the ignition key to ON (engine OFF).
7. Close the canister drain cut valve (CDCV) using ON BOARD DEVICE CONTROL function.



Y3U103WT1

Note

- The CDCV is closed for **10 minutes unless** the following any action is done:
 - The engine is started.
 - The ignition key is turned to OFF.
 - The fuel tank pressure sensor signal exceeds **6.43 kPa {48.3 mmHg, 1.9 inHg}**.

8. Turn the control valve to the FILL position.
9. Wait (**maximum 40 seconds**) until the left display reads **13.5 to 14 inches** of water.
 - If the reading is slightly below, adjust it using the regulator knob.
 - If the reading is far below, the EVAP system has large leak. Check for leak (using the ultrasonic leak detector if necessary) and repair.
10. Turn the control valve to the TEST position and press the START switch.
11. After the **2-minute** countdown (left display) is completed, check the test result (the failed/passed light on the tester).
 - If the green light turns on, the EVAP system is OK.
 - If the red light turns on, the EVAP system has leakage. Check for leak using the ultrasonic leak detector and repair.
12. Close the gas cylinder valve.
13. Turn the control valve to the FILL position.
14. Press the ON/OFF switch to turn off the tester.

Evaporative System Leak Inspection Using Vacuum Pump

Whole system inspection

1. Disconnect the vacuum hose between the purge solenoid valve and the catch tank from the purge solenoid valve.
2. Insert hose on the vacuum pump.
3. Connect WDS or equivalent to DLC-2.
4. Turn ignition key to ON (Engine OFF).
5. Close the canister drain cut valve (CDCV) using ON BOARD DEVICE CONTROL function.

Note

- The CDCV is closed for **10 minutes unless** the following any action is done:
 - The engine is started.
 - The ignition key is turned to OFF.
 - The fuel tank pressure sensor signal **exceeds 6.43 kPa {48.3 mmHg, 1.9 inHg}**.

6. Apply 1.7 kPa vacuum and monitor FTP output voltage.
7. Verify that the voltage holds at the specified readings for a minimum of 2 minutes.
 - If the voltage does not hold, inspect the fuel tank pressure sensor.
 - If the fuel tank pressure sensor is okay, carry out the "Inspection from charcoal canister to fuel tank".

Inspection from charcoal canister to fuel tank

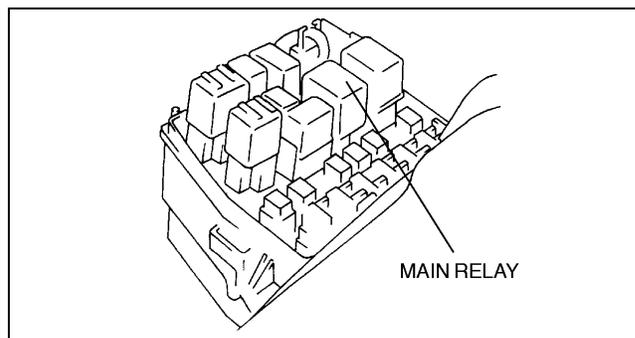
1. Inspect for loose and wrongly connected hoses between the charcoal canister and the fuel tank. (See 01-16-2 EMISSION SYSTEM LOCATION INDEX.)
2. Disconnect the vacuum hose between the charcoal canister and the fuel tank from the charcoal canister.
3. Insert hose on the vacuum pump.
4. Apply 1.7 kPa vacuum.
5. Verify that the vacuum holds at the specified readings for a minimum of 2 minutes.
 - If the vacuum does not hold, inspect the fuel tank, related vacuum hoses and fuel-filler cap.
 - If the the fuel tank, related vacuum hoses and fuel-filler cap are okay, carry out the "Inspection from charcoal canister to fuel tank".

Inspection from charcoal canister to purge solenoid valve

1. Inspect for loose and wrongly connected hoses between the charcoal canister and the purge solenoid valve. (See 01-16-2 EMISSION SYSTEM LOCATION INDEX.)
2. Disconnect the vacuum hose between the charcoal canister and the catch tank from the charcoal canister.
3. Insert hose on the vacuum pump.
4. Apply **3.3 kPa {25 mmHg, 1.0 inHg}** vacuum. Vacuum should hold at the specified readings for a minimum of 2 minutes.
 - If the vacuum does not hold, inspect the following:
 - Catch tank for plugging, damages and pinhole using vacuum pump
 - Purge solenoid valve (See 01-16-12 PURGE SOLENOID VALVE INSPECTION.)
 - Charcoal canister for damage and pinhole (See 01-16-9 CHARCOAL CANISTER INSPECTION.)
 - CDCV for damage and leakage (See 01-16-10 CANISTER DRAIN CUT VALVE (CDCV) INSPECTION .)
 - Detached, incorrectly installed or cracked hose from charcoal canister to CDCV

Main Relay Operation Inspection

1. Verify that the main relay clicks when the ignition key is turned to ON and LOCK.
2. If there is no operation sound, inspect the following:
 - Main relay
 - Harness and connector between ignition key and main relay



Y3U103WP6

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

Intake Manifold Vacuum Inspection

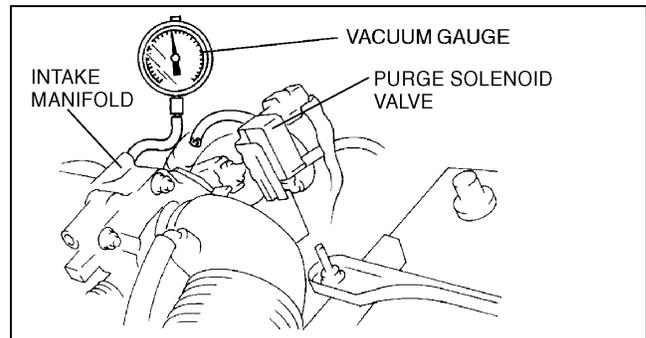
1. Verify air intake hoses are installed properly.
2. Start the engine and run it at idle.
3. Measure the intake manifold vacuum using a vacuum gauge.
 - If not as specified, inspect the following:
 - Air suction at throttle body, intake manifold and PCV valve installation points
 - Fuel injector insulator
 - Accelerator cable free play
 - Engine compression (See 01–10B–8 COMPRESSION INSPECTION [FS].)

Specification

More than 60 kPa {450 mmHg, 18 inHg}

Note

- Air suction can be located by engine speed change when lubricant is sprayed on the area where suction is occurring.



Y3U103WP7

Idle Air Control (IAC) Inspection

Engine coolant temperature compensation inspection

1. Connect the WDS or equivalent to DLC-2.
2. Select the following PIDs.
 - ECT
 - RPM
3. Verify that the engine is in cold condition, then start the engine.
4. Verify that the engine speed decreases as the engine warms up.
 - If the engine speed does not decrease or decreases slowly, carry out the following:
 - ECT sensor inspection
 - IAC valve inspection

Load compensation inspection

1. Warm up the engine to normal operating temperature and run it at idle.
2. Connect the WDS or equivalent to DLC-2.
3. Select the following PID.
 - RPM
4. Turn the electrical loads on and verify that the engine speed is within the specification.
 - If not as specified, carry out the following:
 - A/C switch inspection
 - P/S pressure switch inspection
 - IAC valve inspection

Engine speed (rpm)

Load condition	Idle-up speed (rpm)*
No load	650—750 (700±50)
Headlight switch is on.	
P/S on	700—800 (750±50)
A/C on	

* : Neutral or P position

Note

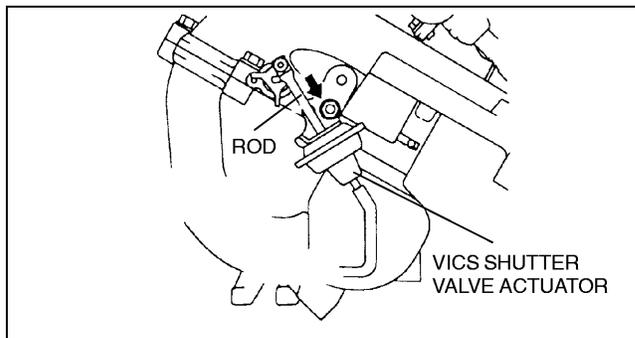
- Excludes temporary idle speed drop just after the loads are turned on.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

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VICS Operation Inspection

1. Start the engine.
2. Verify that the rod of VICS shutter valve actuator is pulled.
 - If the rod is pulled, proceed to next step .
 - If the rod is not pulled, inspect as follows.
 - Loose or damaged vacuum hose and vacuum chamber
 - Shutter valve actuator (See 01-13B-11 VARIABLE INERTIA CHARGING SYSTEM (VICS) SHUTTER VALVE ACTUATOR INSPECTION [FS].)
 - VICS solenoid valve inspection (See 01-13B-12 VARIABLE INERTIA CHARGING SYSTEM (VICS) SOLENOID VALVE INSPECTION [FS].)
3. Inspect the rod operation under the following condition.
 - If the rod operation is not as specified, inspect as follows.
 - Shutter valve actuator (See 01-13B-11 VARIABLE INERTIA CHARGING SYSTEM (VICS) SHUTTER VALVE ACTUATOR INSPECTION [FS].)
 - VICS solenoid valve inspection (See 01-13B-12 VARIABLE INERTIA CHARGING SYSTEM (VICS) SOLENOID VALVE INSPECTION [FS].)



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Note

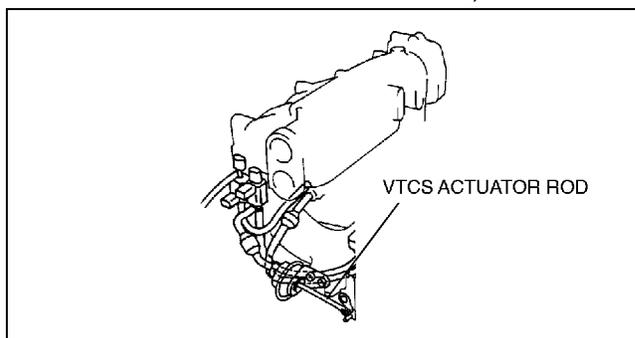
- The shutter valve actuator rod extends for five seconds after the engine is started.

Rod operation

Engine speed (rpm)	5,250	
Shutter valve actuator	Not operate	Operate

Variable Tumble Control System (VTCS) Inspection

1. Connect the WDS or equivalent to the DLC-2.
2. Access ECT PID.
3. Verify ECT PID is **65 °C {149 °F}** or less.
4. Start the engine.
5. Verify that the rod of tumble swirl control actuator is pulled.
 - If the rod is not pulled, inspect the following.
 - VTCS shutter valve actuator
 - VTCS delay valve
 - VTCS chamber
 - Vacuum hose
 - Tumble swirl control solenoid valve
 - Wiring harness and connectors (Main relay — VTCS solenoid valve — PCM terminal 73)
6. Access RPM PID.
7. Inspect the rod operation under the following condition.
 - If the rod operation is not as specified, inspect the following:
 - Tumble swirl control actuator
 - Vacuum delay valve
 - Vacuum chamber
 - Vacuum hose
 - VTCS solenoid valve
 - Wiring harness and connectors (Main relay — VTCS solenoid valve — PCM terminal 73)



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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

Rod operation

Engine speed (RPM PID) (rpm)	Tumble swirl control actuator
3,000 or less	Operate
3,000 or more	Not operate

Pressure Regulator Control Inspection

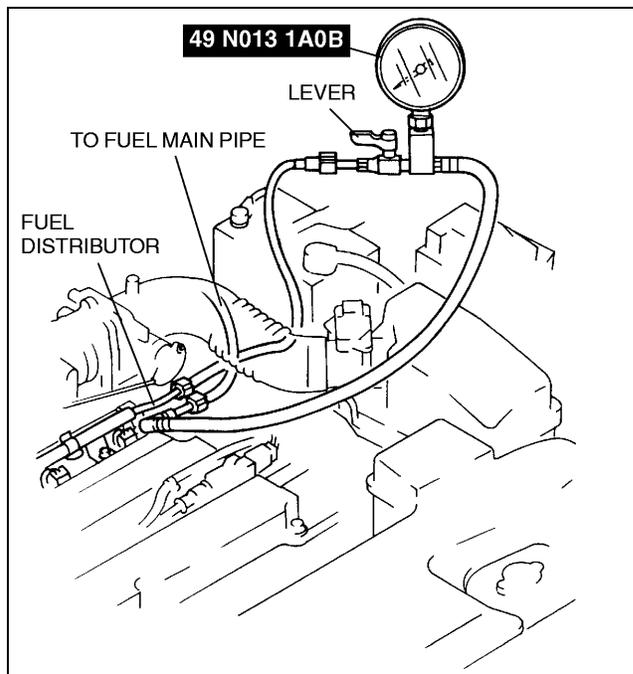
Warning

- Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death. Fuel can also irritate skin and eyes.
- To prevent this, always complete the “Before Repair Procedure.” (See 01-14-4 BEFORE REPAIR PROCEDURE.)

1. Disconnect the negative battery cable.
2. Connect a fuel **SST** between the fuel filter and fuel distributor.
3. Connect the negative battery cable.
4. Measure the fuel line pressure under the following conditions.

Specification

Condition	Fuel pressure (kPa {kgf/cm ² , psi})		
	Idling	210—250 {2.1—2.6, 30—36}	210—250 {2.1—2.6, 30—36}
During 100 sec. of hot start	270—310 {2.7—3.2, 39—45}		
After 100 sec. of hot start	210—250 {2.1—2.6, 30—36}		
Judgment	Normal	Not Normal (Perform Inspection 1)	Not Normal (Perform Inspection 2)



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Inspection 1

1. Inspect the following.
 - ECT, IAT, TP PIDs.
 - Pressure regulator
 - PRC solenoid valve

Inspection 2

1. Inspect the following.
 - Loose or damage vacuum hose (Pressure regulator —PRC solenoid valve— intake manifold)
 - PRC solenoid valve

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (FS)]

Fuel Injector Operation Inspection

STEP	INSPECTION	RESULTS	ACTION
1	While cranking engine, inspect for fuel injector operation sound at each cylinder using a soundscope. Is operation sound heard?	Yes	Fuel injector operation is okay.
		No	All cylinders no heard: Go to next step. Some cylinders no heard: Go to Step 3.
2	Carry out main relay operation inspection. Is main relay operation normal?	Yes	Inspect following: <ul style="list-style-type: none"> Fuel injector power system related wiring harness and connectors PCM connectors Fuel injector GND and related wiring harness and connectors
		No	Repair or replace malfunctioning parts.
3	Change fuel injector connector of not operating fuel injector and operating fuel injector. Is operation sound heard?	Yes	Go to next step.
		No	Replace fuel injector.
4	Are wiring harness and connectors of not operating fuel injector okay? (Open or short)	Yes	Inspect PCM terminal voltage of fuel injector signal.
		No	Repair or replace malfunctioning parts.

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Spark Test

1. Disconnect the fuel pump relay connector.
2. Verify that each high-tension lead and connector is connected properly.
3. Inspect the ignition system in the following procedure.

Warning

- **High voltage in the ignition system can cause strong electrical shock which can result in serious injury. Avoid direct contact to the vehicle body during the following spark test.**

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Remove high-tension lead from spark plug. Hold high-tension lead with installed pliers 5—10 mm {0.20—0.39 in} from GND. Crank engine and verify there is a strong blue spark. (Inspect each cylinder.) 	Yes	Ignition system is okay.
		No	Some cylinders do not spark: Go to next step. All cylinders do not spark: Go to Step 3.
2	<ul style="list-style-type: none"> Is high-tension lead resistance correct? 	Yes	Inspect for cracks or damage of high-tension lead and ignition coil.
		No	Replace high-tension lead.
3	<ul style="list-style-type: none"> Does PCM or ignition coil connector have poor connection? 	Yes	Repair or replace connector.
		No	Go to next step.
4	<ul style="list-style-type: none"> Is ignition coil winding resistance okay? 	Yes	Go to next step.
		No	Replace ignition coil.
5	<ul style="list-style-type: none"> Are following parts okay? <ul style="list-style-type: none"> — CKP sensor and crankshaft pulley (also, inspect gap) Specification 0.5—1.5 mm {0.020—0.059 in} — PCM terminal 21/22 voltage Specification Approx. 1.5 V 	Yes	Inspect for open or short in wiring harness and connector of CKP sensor.
		No	Repair or replace malfunctioning parts.