

01-03 SYMPTOM TROUBLESHOOTING**CONTROL SYSTEM DEVICE AND CONTROL****RELATIONSHIP CHART** 01-03-2

Engine Control System 01-03-2

Monitoring System 01-03-3

FOREWORD 01-03-4**INTERMITTENT CONCERN****TROUBLESHOOTING** 01-03-4

Vibration Method 01-03-4

Inspection Method for Switch

Connectors or Wires 01-03-4

Inspection Method for Sensor

Connectors or Wires 01-03-5

Inspection Method for Sensors 01-03-5

Inspection Method for Actuators

or Relays 01-03-5

Water Sprinkling Method 01-03-6

SYMPTOM DIAGNOSTIC INDEX 01-03-6**SYMPTOM QUICK DIAGNOSTIC****CHART** 01-03-9**DESCRIPTION OF DRIVABILITY****PROBLEMS** 01-03-13**FUEL PRESSURE RELEASE AND SERVICING****FUEL SYSTEM** 01-03-13**FUEL LINE SAFETY PROCEDURE** 01-03-13**NO.1 MELTING OF MAIN OR OTHER****FUSES** 01-03-14**NO.2 MIL ILLUMINATES** 01-03-15**NO.3 WILL NOT CRANK** 01-03-15**NO.4 HARD START/LONG CRANK/ERRATIC****START/ERRATIC CRANK** 01-03-16**NO.5 ENGINE STALLS-AFTER START,****AT IDLE** 01-03-19**NO.6 CRANKS NORMALLY BUT WILL****NOT START** 01-03-22**NO.7 SLOW RETURN TO IDLE** 01-03-25**NO.8 ENGINE RUNS ROUGH/ROLLING****IDLE** 01-03-26**NO.9 FAST IDLE/RUNS ON** 01-03-28**NO.10 LOW IDLE/STALLS DURING****DECELERATION** 01-03-29**NO.11 ENGINE STALLS/QUITS, ENGINE RUNS****ROUGH, MISSES, BUCK/JERK, HESITATION/****STUMBLE, SURGES** 01-03-30**NO.12 LACK/LOSS OF POWER—****ACCELERATION/CRUISE** 01-03-33**NO.13 KNOCKING/PINGING** 01-03-35**NO.14 POOR FUEL ECONOMY** 01-03-36**NO.15 EMISSION COMPLIANCE** 01-03-38**NO.16 HIGH OIL CONSUMPTION/****LEAKAGE** 01-03-39**NO.17 COOLING SYSTEM CONCERNS—****OVERHEATING** 01-03-40**NO.18 COOLING SYSTEM CONCERNS—RUNS****COLD** 01-03-41**NO.19 EXHAUST SMOKE** 01-03-42**NO.20 FUEL ODOR****(IN ENGINE COMPARTMENT)** 01-03-44**NO.21 ENGINE NOISE** 01-03-45**NO.22 VIBRATION CONCERNS****(ENGINE)** 01-03-46**NO.23 A/C DOES NOT WORK****SUFFICIENTLY** 01-03-46**NO.24 A/C ALWAYS ON OR A/C COMPRESSOR****RUNS CONTINUOUSLY** 01-03-47**NO.25 A/C DOES NOT CUT OFF UNDER WIDE****OPEN THROTTLE CONDITIONS** 01-03-48**NO.26 EXHAUST SULPHUR SMELL** ... 01-03-48**NO.27 INTERMITTENT CONCERNS** ... 01-03-49**NO.28 FUEL REFILL CONCERNS** 01-03-50**NO.29 FUEL FILLING SHUT OFF****ISSUES** 01-03-51**NO.30 REFERENCE VOLTAGE** 01-03-51**NO.31 SPARK PLUG CONDITION** 01-03-53**ENGINE CONTROL SYSTEM OPERATION****INSPECTION** 01-03-56

Intake Manifold Vacuum Inspection ... 01-03-56

Idle Air Control (IAC) Inspection 01-03-56

Variable Tumble Control System (VTCS)

Operation Inspection 01-03-57

Variable Valve Timing System Operation

Inspection 01-03-57

Evaporative Emission (EVAP) System Leak

Inspection Using Leak Tester 01-03-58

Evaporative Emission (EVAP) System Leak

Inspection Using Vacuum Pump 01-03-59

Spark Test 01-03-60

Fuel Injector Operation Inspection ... 01-03-60

SYMPTOM TROUBLESHOOTING

CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART

A5U010318881W01

Engine Control System

× :Applicable

Component		Idle air control (IAC)	Fuel Injection control	Electronic spark advance (ESA) control	Fuel pump control	Heated oxygen sensor (HO2S) heater control	Electrical fan control	Purge control	EGR control	Variable tumble control system (VTCS)	A/C cut-off control	Generator control	Immobilizer system
Input device	Brake switch	×	×	×									
	Refrigerant pressure switch(A/C equipped only)	×	×	×			×				×		
	PSP switch	×	×	×							×		
	DLC (TEN terminal)	×		×			×						
	Neutral switch (MT only)	×	×	×									
	Clutch switch (MT only)	×	×	×									
	TCM (Reduce torque signal) (AT only)		×	×									
	CKP sensor (NE signal)	×	×	×	×	×	×	×	×	×	×	×	
	CMP sensor (SGC signal)		×	×									
	VSS	×							×				
	Knock sensor			×									
	MAF sensor	×	×	×		×		×	×				
	ECT sensor	×	×	×		×	×	×	×	×	×		
	IAT sensor	×	×	×				×				×	
	TP sensor	×	×	×			×	×	×	×	×		
	HO2S (Rear)		×										
	EGR boost sensor	×	×				×				×		
	B+		×				×					×	
	Generator (Output voltage)											×	
	HO2S (Front)		×				×						
	Immobilizer unit												×
Output device	IAC valve	×											
	Fuel injector		×										×
	Ignition coil			×									×
	FP relay				×								
	HO2S heater (Front,Rear)					×							
	Cooling fan relay						×						
	Condenser fan relay						×						
	Purge solenoid valve							×					
	EGR valve								×				
	VTCS solenoid valve									×			
	A/C relay										×		
	Generator (Field coil)											×	
	Generator warning light											×	
	TCM (Torque reduce signal)		×	×									

A5U0103W001

SYMPTOM TROUBLESHOOTING

Monitoring System

× : Applicable

Component		Monitoring items						
		Catalyst monitor	Misfire monitor	Evaporative system monitor	Fuel system monitor	HO2S monitor	O2S heater monitor	EGR system monitor
Input device	Brake switch		×					
	Refrigerant pressure switch (A/C equipped only)		×		×			×
	PSP switch		×		×			×
	CKP sensor (NE signal)	×	×	×	×	×	×	×
	CMP sensor (SGC signal)	×	×	×	×	×	×	×
	VSS	×	×	×	×	×		×
	MAF sensor	×	×	×	×	×	×	×
	ECT sensor	×	×	×	×	×	×	×
	IAT sensor	×	×	×		×		×
	TP sensor	×	×	×	×	×		×
	HO2S (Front)				×	×		
	EGR boost sensor							×
	FTP sensor			×				
	Fuel gauge sender unit			×				
	HO2S (Rear)	×					×	
Output device	DLC-2 (Terminal KLN)	×	×	×	×	×	×	×
	MIL	×	×	×	×	×	×	×
	Purge solenoid valve			×	×	×		
	EGR valve							×
	EGR boost sensor solenoid valve							×
	Canister drain cut valve (CDCV)			×				
	Fuel injectors				×			

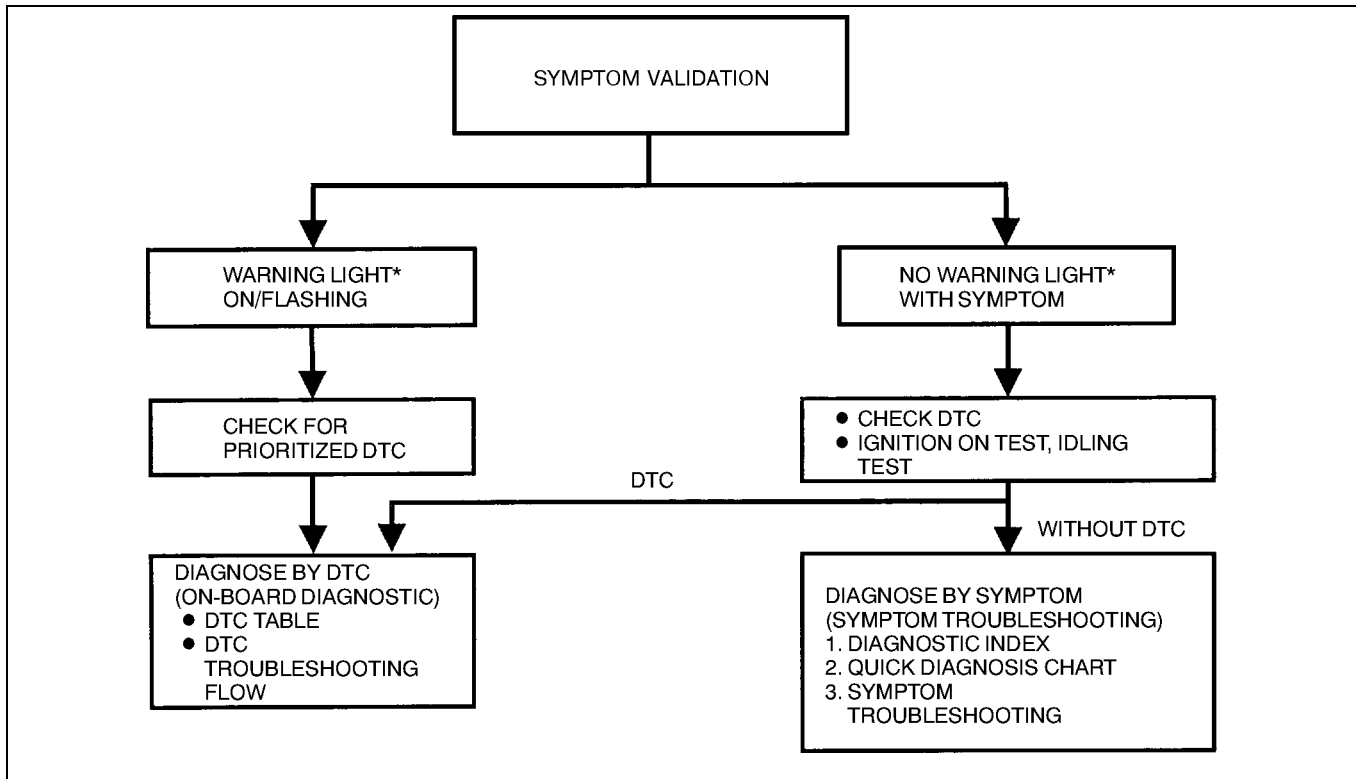
A5U0103W002

SYMPTOM TROUBLESHOOTING

FOREWORD

A5U010318881W02

- When the customer reports a vehicle malfunction, check the malfunction indicator light (MIL) indication and diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
 - If a DTC exists, diagnose the applicable DTC inspection. (See 01-02A-13 DTC TABLE.)
 - If no DTC exists and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01-03-6 SYMPTOM DIAGNOSTIC INDEX.)



Y5U103WA2

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

INTERMITTENT CONCERN TROUBLESHOOTING

A5U010318881W03

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. Check the following:
 - Connectors not fully seated.
 - Wiring 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 wiring harnesses pass through the firewall, body panels, etc. are the major areas to be checked.

Inspection Method for Switch Connectors or Wires

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

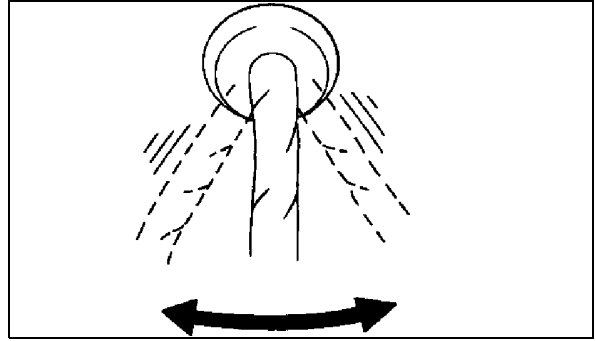
Note

- If engine starts and runs, perform the following steps while idling engine.

- Access PIDs for the switch you are inspecting.
- Turn switch on manually.

SYMPTOM TROUBLESHOOTING

5. Shake each connector or wiring harness a bit vertically and horizontally while monitoring the PID.
 - If PID value is unstable, check for poor connection.



Y5U103WA3

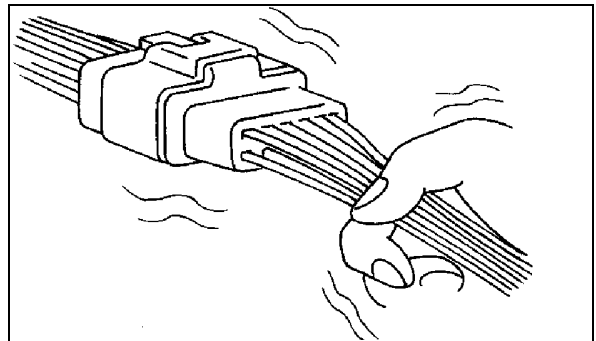
01-03

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 while idling engine.
3. Access PIDs for the switch you are inspecting.
 4. Shake each connector or wiring harness a bit vertically and horizontally while monitoring the PID.
 - If PID value is unstable, check for poor connection.



Y5U103WA4

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 while idling engine.
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.

Inspection Method for Actuators or Relays

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

Note

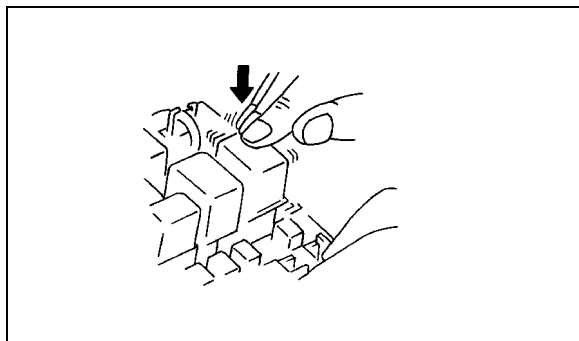
- If engine starts and runs, perform the following steps while idling engine.
3. Prepare the output state control for actuators or relays that you are inspecting.

SYMPTOM TROUBLESHOOTING

4. Vibrate the actuator or relay with your finger for 3 s after output state control 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.



Y5U103WA5

Water Sprinkling Method

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

Caution

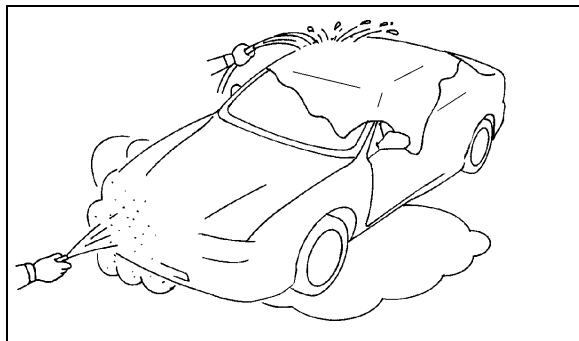
- **Change the temperature and humidity indirectly by spraying water onto the front of the radiator.**
- **If a vehicle is subject to water leakage, the leakage may damage the control module. When testing a vehicle with a water leakage problem, special caution must be taken.**

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 while idling engine.

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.



Y5U103WA6

SYMPTOM DIAGNOSTIC INDEX

A5U010318881W04

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
1	Melting of main or other fuses		—	(See 01-03-14 NO.1 MELTING OF MAIN OR OTHER FUSES)
2	MIL illuminates		MIL is illuminated incorrectly.	(See 01-03-15 NO.2 MIL ILLUMINATES)
3	Will not crank		Starter does not work.	(See 01-03-15 NO.3 WILL NOT CRANK)
4	Hard start/long crank/erratic start/erratic crank		Starter cranks engine at normal speed but engine requires excessive cranking time before starting.	(See 01-03-16 NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK)
5	Engine stalls	After start/at idle	Engine stops unexpectedly at idle and/or after start.	(See 01-03-19 NO.5 ENGINE STALLS-AFTER START, AT IDLE)
6	Crank normally but will not start		Starter cranks engine at normal speed but engine will not run.	(See 01-03-22 NO.6 CRANKS NORMALLY BUT WILL NOT START)
7	Slow return to idle		Engine takes more time than normal to return to idle speed.	(See 01-03-25 NO.7 SLOW RETURN TO IDLE)

SYMPTOM TROUBLESHOOTING

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
8	Engine runs rough/rolling idle		Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively.	(See 01–03–26 NO.8 ENGINE RUNS ROUGH/ROLLING IDLE)
9	Fast idle/runs on		Engine speed continues at fast idle after warm-up. Engine runs after ignition switch is turned off.	(See 01–03–28 NO.9 FAST IDLE/RUNS ON)
10	Low idle/stalls during deceleration		Engine stops unexpectedly at beginning of deceleration or recovery from deceleration.	(See 01–03–29 NO.10 LOW IDLE/STALLS DURING DECELERATION)
11	Engine stalls/quits	Acceleration/ cruise	Engine stops unexpectedly at beginning of acceleration or during acceleration. Engine stops unexpectedly while cruising.	(See 01–03–30 NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES)
	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 01–03–33 NO.12 LACK/ LOSS OF POWER— ACCELERATION/CRUISE)
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 01–03–35 NO.13 KNOCKING/PINGING)
14	Poor fuel economy		Fuel economy is unsatisfactory.	(See 01–03–36 NO.14 POOR FUEL ECONOMY)
15	Emissions compliance		Fails emissions test	(See 01–03–38 NO.15 EMISSION COMPLIANCE)
16	High oil consumption/leakage		Oil consumption is excessive.	(See 01–03–39 NO.16 HIGH OIL CONSUMPTION/ LEAKAGE)
17	Cooling system concerns	Overheating	Engine runs at higher than normal temperature/overheats.	(See 01–03–40 NO.17 COOLING SYSTEM CONCERNS— OVERHEATING)
18	Cooling system concerns	Runs cold	Engine does not reach normal operating temperature.	(See 01–03–41 NO.18 COOLING SYSTEM CONCERNS—RUNS COLD)
19	Exhaust smoke		Blue, black, or white smoke from exhaust system	(See 01–03–42 NO.19 EXHAUST SMOKE)
20	Fuel odor (in engine compartment)		Gasoline fuel smell or visible leakage	(See 01–03–44 NO.20 FUEL ODOR (IN ENGINE COMPARTMENT))
21	Engine noise		Engine noise from under hood	(See 01–03–45 NO.21 ENGINE NOISE)
22	Vibration concerns (engine)		Vibration from under hood or driveline	(See 01–03–46 NO.22 VIBRATION CONCERNS (ENGINE))
23	A/C does not work sufficiently		A/C compressor magnetic clutch does not engage when A/C is turned on.	(See 01–03–46 NO.23 A/C DOES NOT WORK SUFFICIENTLY)
24	A/C always ON or A/C compressor runs continuously		A/C compressor magnetic clutch does not disengage.	(See 01–03–47 NO.24 A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY)

SYMPTOM TROUBLESHOOTING

No.	TROUBLESHOOTING ITEM		DESCRIPTION	PAGE
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 01-03-48 NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS)
26	Exhaust sulphur smell		Rotten egg smell (sulphur) from exhaust	(See 01-03-48 NO.26 EXHAUST SULPHUR SMELL)
27	Intermittent concerns		Symptom occurs randomly and difficult to diagnose.	(See 01-03-49 NO.27 INTERMITTENT CONCERNS)
28	Fuel refill concerns		Fuel tank does not fill smoothly.	(See 01-03-50 NO.28 FUEL REFILL CONCERNS)
29	Fuel filling shut off issues		Fuel does not shut off properly.	(See 01-03-51 NO.29 FUEL FILLING SHUT OFF ISSUES)
30	Reference voltage		Incorrect reference voltage	(See 01-03-51 NO.30 REFERENCE VOLTAGE)
31	Spark plug condition		Incorrect spark plug condition	(See 01-03-53 NO.31 SPARK PLUG CONDITION)
32	AT concerns	Upshift/downshift/engagement	AT concerns not related to engine performance	(See 05-03-4 Diagnostic Index)

SYMPTOM TROUBLESHOOTING

SYMPTOM QUICK DIAGNOSTIC CHART

A5U010318881W05

X : Applicable

01-03

Possible factor																						
Troubleshooting Item			Starter motor malfunction (Mechanical or electrical)	Starter interlock switch (Open)	Starter circuit including ignition switch open	Improper engine oil level	Low or dead battery	Charging system malfunction	Cruise control 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 damaged drive belts	Improper engine coolant level	Water and anti-freeze mixture improper	Cooling system malfunction (Radiator, hoses, overflow system, thermostat, etc.)	Cooling fan system malfunction	
1	Melting of main or other fuses																					
2	MIL illuminates																					
3	Will not crank		X	X	X		X	X				X					X					
4	Hard start/long crank/erratic start/erratic crank																					
5	Engine stalls	Engine start/at idle								X	X	X										
6	Cranks normally but will not start									X	X	X										
7	Slow return to idle																					
8	Engine runs rough/rolling idle									X	X										X	
9	Fast idle/runs on																					
10	Low idle/stalls during deceleration																					
11	Engine stalls/quits	Acceleration/cruise							X	X	X											
	Engine runs rough	Acceleration/cruise																				
	Misses	Acceleration/cruise																				
	Buck/jerk	Acceleration/cruise/ deceleration																				
	Hesitation/stumble	Acceleration																				
	Surges	Acceleration/cruise																				
12	Lack/loss power	Acceleration/cruise								X	X											
13	Knocking pinging	Acceleration/cruise								X											X	
14	Poor fuel economy									X	X							X		X	X	
15	Emission compliance									X	X				X						X	
16	High oil consumption/leakage																					
17	Cooling system concerns	Overheats											X	X	X							
18	Cooling system concerns	Runs cold															X	X	X	X	X	
19	Exhaust smoke																				X	
20	Fuel odor (in engine compartment)														X						X	
21	Engine noise																					
22	Vibration concerns (engine)														X			X				
23	A/C does not work sufficiency																	X				
24	A/C 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	Intermittent concerns						X															
28	Fuel refill concerns																					
29	Fuel filling shut off issues																					
30	Reference voltage																					
31	Spark plug condition									X			X		X				X			
32	AT concerns	Upshift/downshift/ engagement																				

See 05-03, SYMPTOM TROUBLESHOOTING

See 05-03, SYMPTOM TROUBLESHOOTING

A5U0103W003

SYMPTOM TROUBLESHOOTING

X : Applicable

Possible factor		Engine or transmission mounts are improperly installed	Cooling fan or condenser fan seat improper	Accelerator cable free play misadjustment	Cruise control cable free play misadjustment	Fuel quality	Engine overheating	ACL element clogging or restriction	Air leakage from intake-air system (Loose tubes, cracks, gaskets breakage)	IAC valve improper operation	TB malfunction	Variable valve timing system malfunction	Improper variable tumble control system (VTCS) solenoid valve operation	Vacuum leakage (Vacuum hose damage, misrouting)	Initial ignition timing misadjustment (CKP sensor and crankshaft pulley misadjustment)	Ignition coil malfunction (e.g. open, short or cracks)	Spark plug malfunction (e.g. open, short or cracks)	High-tension leads malfunction (Cracks, open, low resistance)	CKP sensor is damaged e.g. open or short circuits)	Crank shaft pulley is damaged
Troubleshooting item																				
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
5	Engine stalls Engine start/at idle					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
7	Cranks normally but will not start										x									
8	Engine runs rough/rolling idle					x	x		x	x		x		x	x		x	x	x	x
9	Fast idle/runs on			x	x															
10	Low idle/stalls during deceleration								x	x		x								
11	Engine stalls/quits	Acceleration/cruise				x	x	x	x		x		x	x			x		x	x
	Engine runs rough	Acceleration/cruise																		
	Misses	Acceleration/cruise														x	x	x		x
	Buck/jerk	Acceleration/cruise/ deceleration																		
	Hesitation/stumble	Acceleration																		
	Surges	Acceleration/cruise																		
12	Lack/loss power	Acceleration/cruise				x	x	x	x			x	x	x			x		x	x
13	Knocking pinging	Acceleration/cruise					x													
14	Poor fuel economy						x	x				x					x	x		
15	Emission compliance							x	x					x			x	x	x	
16	High oil consumption/leakage																			
17	Cooling system concerns	Overheats																		
18	Cooling system concerns	Runs cold																		
19	Exhaust smoke							x												
20	Fuel odor (in engine compartment)																x	x		
21	Engine noise								x					x						
22	Vibration concerns (engine)		x	x																
23	A/C does not wrk sufficiency																			
24	A/C 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	Intermittent concerns									x				x		x	x	x	x	
28	Fuel refill concerns																			
29	Fuel filling shut off issues																			
30	Reference voltage																			
31	Spark plug condition					x		x									x			
32	AT concerns	Upshift/downshift/ engagement	See 05-03, SYMPTOM TROUBLESHOOTING																	

A5U0103W004

SYMPTOM TROUBLESHOOTING

X:Applicable

01-03

Possible factor			Possible factor																				
			Improper gap between CKP sensor and crankshaft pulley	FP malfunction (Mechanical or electrical)	Pressure regulator malfunction	Fuel hoses restriction or clogging	Injectors malfunction (Leakage or clogging, inoperative)	Fuel leakage from fuel system(including insulator, injector O-ring)	Fuel filters restriction or clogging	CMP sensor is damaged (e.g.open or short circuit)	Camshaft is damaged.	Improper air/fuel mixture ratio control	Exhaust system restriction or clogging	TWC malfunction	EGR system malfunction	EVAP control system malfunction	PCV valve malfunction	V-reference supply circuit malfunction	Main relay malfunction (Mechanical or electrical)	ECT sensor malfunction	TR switch misadjustment	P/N position switch in TR switch is open	
Troubleshooting item																							
1	Melting of main or other fuses																						
2	MIL comes on																						
3	Will not crank																			x	x		
4	Hard start/long crank/erratic start/erratic crank		x	x	x	x			x			x	x		x	x	x						
5	Engine stalls	Engine start/at idle	x	x	x	x	x	x				x	x		x	x	x		x				
6	Cranks nomally but will not start		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		
9	Fast idle/runs on																		x				
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	x				
	Engine runs rough	Acceleration/cruise									x		x										
	Misses	Acceleration/cruise	x								x												
	Buck/jerk	Accelerations/cruise/ deceleration																					
	Hesitation/stumble	Acceleration				x									x								
	Surges	Acceleration/cruise	x			x					x			x									
12	Lack/loss power	Acceleration/cruise	x	x	x	x	x				x	x			x		x	x					
13	Knocking pinging	Acceleration/cruise			x	x																	
14	Poor fuel economy				x	x	x	x			x	x	x			x				x			
15	Emission compliance		x	x	x	x	x			x	x	x	x	x	x	x	x			x			
16	High oil consumption/leakage																x						
17	Cooling system concerns	Overheats																					
18	Cooling system concerns	Runs cold																					
19	Exhaust smoke				x	x	x	x									x						
20	Fuel odor (in engine compartment)					x				x							x						
21	Engine noise																						
22	Vibration concerns (engine)																						
23	A/C does not work sufficiency																						
24	Initial ignition timing misadjustment(CKP sensor and crankshaft pulley misadjustment)																						
25	Acceleration/cruise/deceleration																						
26	Exhaust sulphur smell																	x					
27	Intermittent concerns				x	x			x							x	x	x					
28	Fuel refill concerns																	x					
29	Fuel filling shut off issues																	x					
30	Reference voltage																						
31	Sperk plug condition				x	x	x	x	x														
32	AT concerns	Upshift/downshift/ engagement	See 05-03, SYMPTOM TROUBLESHOOTING																				

See 05-03, SYMPTOM TROUBLESHOOTING

A5U0103W006

SYMPTOM TROUBLESHOOTING

× : Applicable

Possible factor		Brake switch and related circuit malfunction	Neutral or clutch switch and related circuit malfunction	MAF sensor and related circuit malfunction	TP sensor and related circuit malfunction	TP sensor misadjustment (including looseness)	KS and related circuit malfunction	PSP switch and related circuit malfunction	Improper refrigerant amount malfunction	A/C relay (A/C control signal) circuit malfunction	Condenser fan system malfunction	Improper load signal input	Clutch slippage	ATX related parts malfunction	VSS and related circuit malfunction	Improper ATF level	Loose parts	Improper balance of wheels and tires	Driveline malfunction	Suspension malfunction
Troubleshooting item																				
1	Melting of main or other fuses																			
2	MIL comes on																			
3	Will not crank																			
4	Hard start/long crank/erratic start/erratic crank																			
5	Engine stalls Engine 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 power Acceleration/cruise			×	×				×		×		×	×			×			
13	Knocking pinging Acceleration/cruise						×													
14	Poor fuel economy			×	×	×					×					×	×			
15	Emission compliance			×	×	×														
16	High oil consumption/leakage																			
17	Cooling system concerns Overheats								×		×									
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 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	Intermittent concerns	×	×	×		×	×		×					×						
28	Fuel refill concerns																			
29	Fuel filling shut off issues																			
30	Reference voltage		×	×										×						
31	Spark plug condition		×				×		×											
32	AT concerns Upshift/downshift/engagement	See 05-03, SYMPTOM TROUBLESHOOTING																		

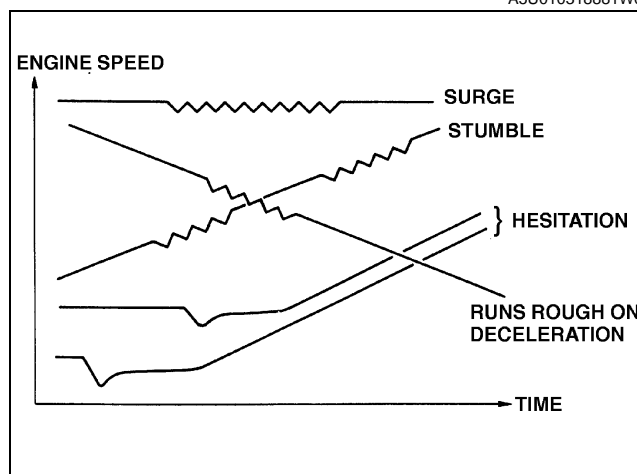
A5U0103W005

SYMPTOM TROUBLESHOOTING

DESCRIPTION OF DRIVABILITY PROBLEMS

- **STUMBLE:** Slightly irregular performance during acceleration.
- **HESITATION:** A dip or flat spot in performance just after the accelerator pedal is depressed.
- **SURGE:** Continuous irregular performance during cruising.

A5U010318881W06



X5U101WA7

FUEL PRESSURE RELEASE AND SERVICING FUEL SYSTEM

A5U010318881W07

Warning

- **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- Fuel in the fuel system is under high pressure when the engine is not running.

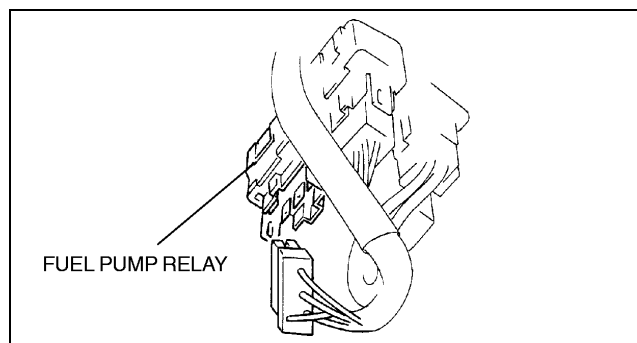
Warning

- **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 the following "FUEL LINE SAFETY PROCEDURE".**

FUEL LINE SAFETY PROCEDURE

A5U010318881W08

1. Remove the fuel-filler cap and release the pressure in the fuel tank.
2. Disconnect the fuel pump relay connector (6-pin type, 4 terminals) located above the accelerator pedal.
3. Start the engine.
4. After the engine stalls, crank the engine several times.
5. Turn the ignition key to OFF.
6. Install the fuel pump relay.



X5U101WA8

SYMPTOM TROUBLESHOOTING

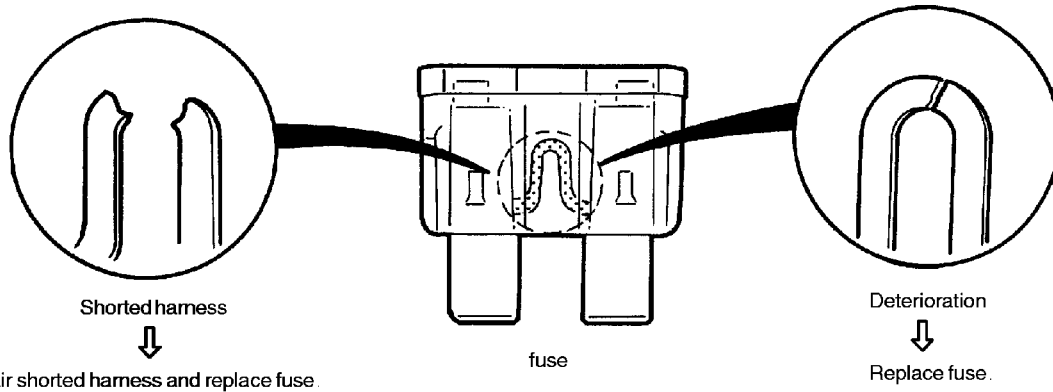
NO.1 MELTING OF MAIN OR OTHER FUSES

A5U010318881W09

1 Melting of main or other fuses

[TROUBLESHOOTING HINTS]

Inspect condition of fuse.



Damaged Fuse	Related Wiring Harness
MAIN (100 A)	Main fuse <ul style="list-style-type: none"> • Generator • Ignition switch
HEAD (40A)	HEAD fuse <ul style="list-style-type: none"> • ROOM fuse
ROOM (10A)	ROOM fuse <ul style="list-style-type: none"> • PCM • TCM • Immobilizer unit
FUEL INJ (30A)	Main relay <ul style="list-style-type: none"> • PCM • Fuel injectors • CMP sensor • EGR Boost sensor solenoid valve • CKP sensor • EGR valve • VTCS solenoid valve • Purge solenoid valve • CDCV • MAF sensor • FP RLY
ENGINE (15 A)	ENGINE fuse <ul style="list-style-type: none"> • Main relay • FP RLY • HO2S
METER (15 A)	METER fuse <ul style="list-style-type: none"> • TR switch • TCM

SYMPTOM TROUBLESHOOTING

NO.2 MIL ILLUMINATES

A5U010318881W10

2	MIL illuminates
DESCRIPTION	<ul style="list-style-type: none"> 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.

01-03

Diagnostic procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch ON. Retrieve any DTC. Is "PASSED" displayed? 	<p>No DTC displayed:</p> <ul style="list-style-type: none"> Inspect for short to ground circuit between MIL (located on instrument cluster) and PCM terminal 2R.
		<p>DTC displayed:</p> <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/or On-line Repair Information 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 or reprogram PCM. 	

NO.3 WILL NOT CRANK

A5U010318881W11

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 switch and starter TR sensor malfunction (AT) TR sensor misadjustment (AT) Starter interlock switch malfunction (MT) Starter malfunction Seized/hydrolocked engine, flywheel or drive plate

Diagnostic procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> Verify following: <ul style="list-style-type: none"> Battery connection Transmission in Park or Neutral (AT) Clutch fully depressed (MT) Fuses Are all items okay? 	<p>Yes: Go to next step.</p> <p>No: Service if necessary and repeat Step 1.</p>
2	<ul style="list-style-type: none"> Is click sound heard from starter when ignition switch is turned to START? 	<p>Yes: Go to next step.</p> <p>No: Go to Step 4.</p>
3	<ul style="list-style-type: none"> Inspect starting system. Is starting system okay? 	<p>Yes: Inspect for seized/hydrolocked engine, flywheel (MT) or drive plate (AT). (See 05-10-15 FLYWHEEL INSPECTION)</p> <p>No: Service as required. (See 01-19-2 STARTER INSPECTION)</p>
4	<ul style="list-style-type: none"> Do any other electrical accessories work? 	<p>Yes: Go to next step.</p> <p>No: Inspect charging system. (See 01-17-2 BATTERY INSPECTION) (See 01-17-4 GENERATOR INSPECTION)</p>
5	<p>Note</p> <ul style="list-style-type: none"> Following test should be performed on automatic transmissions only. For manual transmissions, go to next step. Inspect TR sensor adjustment. Is TR sensor adjusted properly? 	<p>Yes: Go to next step.</p> <p>No: Inspect TR sensor adjustment. <ul style="list-style-type: none"> If TR sensor is adjusted properly, inspect between TR sensor and PCM terminal 4H or starter for open circuit. </p>

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
6	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes	No DTC displayed: Inspect following: <ul style="list-style-type: none"> START circuit in ignition switch Open circuit between ignition switch and starter Starter interlock switch (MT)
		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 4AF Open main relay GND circuit Main relay is stuck open. Open or poor ground circuit (PCM terminal 3A or 3B) 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. 		

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK

A5U010318881W12

4	Hard 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 ACL restriction IAC valve malfunction PCV valve malfunction Inadequate fuel pressure Purge solenoid valve malfunction MAF sensor contamination Restriction in exhaust system EGR valve malfunction Immobilizer system activation Variable valve timing system malfunction <p>Warning</p> <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01-14-3 BEFORE REPAIR PROCEDURE) (See 01-14-3 AFTER REPAIR PROCEDURE)</p>

SYMPTOM TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	Note <ul style="list-style-type: none"> The following test should be performed on vehicles with immobilizer system. Go to Step 12 for vehicles without immobilizer system. Connect WDS or equivalent to DLC-2. Do following conditions appear? <ul style="list-style-type: none"> — Engine dose not start completely. — DTC P1624 is displayed. 	Yes
		Both conditions appear: Go to Step 4.
2	<ul style="list-style-type: none"> Does engine stall after approx. 2 s since engine is started? 	No
		Either or other condition appears: Go to next step.
3	<ul style="list-style-type: none"> Is immobilizer unit connector securely connected to immobilizer unit? 	Yes
		Go to next step.
4	<ul style="list-style-type: none"> Does immobilizer indicator light flash and indicate any of following immobilizer system DTCs? — DTC: 01, 02, 03, 11, 21 	No
		Connect immobilizer unit connector securely. Return to Step 2.
5	<ul style="list-style-type: none"> Does immobilizer indicator light illuminate? 	Yes
		Go to "ON-BOARD DIAGNOSTIC FUNCTION" of immobilizer system
6	<ul style="list-style-type: none"> Does immobilizer indicator light flash and indicate any of following immobilizer system DTCs more than 135 s after ignition switch is turned to ON? — DTC: 24, 30 	No
		Go to next step.
7	<ul style="list-style-type: none"> Turn ignition switch to OFF. Disconnect immobilizer unit connector. Connect jumper wire between immobilizer unit connector terminal M and GND. Turn ignition switch to ON. Does immobilizer indicator light illuminate? 	Yes
		Go to step 8.
8	<ul style="list-style-type: none"> Does immobilizer indicator light flash and indicate any of following immobilizer system DTCs more than 135 s after ignition switch is turned to ON? — DTC: 24, 30 	No
		Go to next step.
9	<ul style="list-style-type: none"> Turn ignition switch to OFF. Disconnect immobilizer unit connector. Connect jumper wire between immobilizer unit connector terminal M and GND. Turn ignition switch to ON. Does immobilizer indicator light illuminate? 	Yes
		Go to "ON-BOARD DIAGNOSTIC FUNCTION" of immobilizer system
10	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2 and retrieve DTC. Is any of following DTCs displayed? — DTC: P1602, P1603, P1604, P1621, P1622, P1624 	No
		Install spark plugs on original cylinders. Go to next step.
11	<ul style="list-style-type: none"> Is there continuity between PCM GND terminals 3A / 3B and GND? 	Yes
		Reconnect immobilizer unit connector. Go to next step.
12	<ul style="list-style-type: none"> Inspect for open circuit between immobilizer unit connector terminal M and instrument cluster. If okay, inspect immobilizer indicator light bulb. Repair or replace if necessary. Reconnect immobilizer unit connector, then return to Step 4. 	No
		Go to appropriate DTC test.
13	<ul style="list-style-type: none"> Is any of following DTCs displayed? — DTC: P1602, P1603, P1604, P1621, P1622, P1624 	No
		Go to next step.
14	<ul style="list-style-type: none"> Is there continuity between PCM GND terminals 3A / 3B and GND? 	Yes
		Go to next step.
15	<ul style="list-style-type: none"> Turn ignition switch to ON. Measure PCM terminal 4AF. Is PCM terminal 4AF voltage okay? — PCM 4AF terminal voltage: Battery voltage 	No
		Repair or replace wiring harness.
16	<ul style="list-style-type: none"> Disconnect immobilizer unit connector. Turn ignition switch on. Is there battery voltage at immobilizer unit connector terminal J? 	Yes
		Inspect for open circuit between PCM connector terminal 3S and immobilizer unit connector terminal A.
17	<ul style="list-style-type: none"> Verify following: <ul style="list-style-type: none"> — Vacuum leakage — Fuel quality (i.e proper octane, contamination, winter/summer blend) — Loose bands on intake-air system — Cracks on intake-air system parts — ACL restriction Are all items okay? 	No
		Repair or replace wiring harness between immobilizer unit connector terminal J and fuse panel.
18	<ul style="list-style-type: none"> Verify following: <ul style="list-style-type: none"> — Vacuum leakage — Fuel quality (i.e proper octane, contamination, winter/summer blend) — Loose bands on intake-air system — Cracks on intake-air system parts — ACL restriction Are all items okay? 	Yes
		Go to next step.
19	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	No
		Service if necessary. Repeat step 12.
20	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes
		No DTC displayed: Go to next step.
21	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	No
		DTC displayed: Go to appropriate DTC test.

01-03

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION	
14	<ul style="list-style-type: none"> Is engine overheating? 	Yes	Go to flowchart 17 for "COOLING SYSTEM CONCERNS OVERHEATING"
		No	Go to next step.
15	<ul style="list-style-type: none"> Inspect for cracks on high-tension leads. Is there any crack on high-tension leads? 	Yes	Repair suspected high-tension lead.
		No	Go to next step.
16	<ul style="list-style-type: none"> Inspect variable valve timing operation. Is variable valve timing operation okay? 	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
17	<ul style="list-style-type: none"> Inspect spark plug conditions. Is spark plug wet, grayish white, or covered with carbon? 	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.
18	<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.
19	<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.
20	<ul style="list-style-type: none"> Remove and inspect PCV valve. Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
21	<ul style="list-style-type: none"> Install fuel gauge between fuel filter and fuel distributor. Connect a jumper wire between F/P terminal at DLC in engine compartment and GND. (See 01-14-3 AFTER REPAIR PROCEDURE) Turn ignition switch to ON. Is fuel line pressure correct? Fuel line pressure 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect FP circuit Inspect for open FP 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
22	<ul style="list-style-type: none"> Is fuel line pressure fluctuation within specification after ignition switch is turned off? Fuel pressure fluctuation 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	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.
23	<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.
24	<ul style="list-style-type: none"> Inspect MAF sensor for contamination. Is there any contamination? 	Yes	Replace MAF sensor.
		No	Go to next step.
25	<ul style="list-style-type: none"> Is there restriction in exhaust system? 	Yes	Inspect exhaust system.
		No	Go to next step.
26	<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.
27	<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. <ul style="list-style-type: none"> If okay, remove EGR valve and visually inspect for mechanically stuck EGR valve.
		No	Inspect continuity of stepping motor coil.
28	<ul style="list-style-type: none"> Verify test results. — If okay, return to diagnostic index to service any additional symptoms. 		

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

SYMPTOM TROUBLESHOOTING

NO.5 ENGINE STALLS-AFTER START, AT IDLE

A5U010318881W13

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 or CMP 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 ACL restriction Restriction in exhaust system Electrical connector disconnection Open or short circuit in FP body and related harness No battery power supply to PCM or poor GND Inadequate fuel pressure FP mechanical malfunction Fuel leakage from fuel injector Fuel injector clogging Immobilizer system activation <p>Warning</p> <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01-14-3 BEFORE REPAIR PROCEDURE) (See 01-14-3 AFTER REPAIR PROCEDURE)</p>

01-03

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	<p>Note</p> <ul style="list-style-type: none"> The following test should be performed on vehicles with immobilizer system. Go to Step 12 for vehicles without immobilizer system. Connect WDS or equivalent to DLC-2. Do following condition appear? <ul style="list-style-type: none"> Engine is not completely started. DTC P1624 is displayed. 	Yes Both conditions appear: Go to Step 4.
		No Either or other condition appears: Go to next step.
2	<ul style="list-style-type: none"> Does engine stall after approx. 2 s since engine is started? 	Yes Go to next step.
		No Immobilizer system is okay. Go to Step 12.
3	<ul style="list-style-type: none"> Is immobilizer unit connector securely connected to immobilizer unit? 	Yes Go to next step.
		No Connect immobilizer unit connector securely. Return to Step 2.
4	<ul style="list-style-type: none"> Does immobilizer indicator light flash and indicate any of following immobilizer system DTCs? — DTC: 01, 02, 03, 11, 21 	Yes Go to "ON-BOARD DIAGNOSTIC FUNCTION" of immobilizer system
		No Go to next step.
5	<ul style="list-style-type: none"> Does immobilizer indicator light illuminate? 	Yes Go to step 8.
		No Go to next step.
6	<ul style="list-style-type: none"> Does immobilizer indicator light flash and indicate any of following immobilizer system DTCs more than 135 s after ignition switch is turned to ON? — DTC: 24, 30 	Yes Go to "ON-BOARD DIAGNOSTIC FUNCTION" of immobilizer system
		No Install spark plugs on original cylinders. Go to next step.

01-03-19

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
7	<ul style="list-style-type: none"> Turn ignition switch to OFF. Disconnect immobilizer unit connector. Connect jumper wire between immobilizer unit connector terminal M and GND. Turn ignition switch to ON. Does immobilizer indicator light illuminate? 	Yes	Reconnect immobilizer unit connector. Go to next step.
		No	<ul style="list-style-type: none"> Inspect open circuit between immobilizer unit connector terminal M and instrument cluster. If okay, inspect immobilizer indicator light bulb. Repair or replace if necessary. Reconnect immobilizer unit connector, then return to Step 4.
8	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2 and retrieve DTC. Is any of following DTCs displayed? — DTC: P1602, P1603, P1604, P1621, P1622, P1624 	Yes	Go to appropriate DTC test.
		No	Go to next step.
9	<ul style="list-style-type: none"> Is there continuity between PCM GND terminals 3A / 3B and GND? 	Yes	Go to next step.
		No	Repair or replace wiring harness.
10	<ul style="list-style-type: none"> Turn ignition switch to ON. Measure PCM terminal 4AF voltage. Is PCM terminal 4AF voltage okay? — PCM terminal 4AF voltage: Battery voltage 	Yes	Go to next step.
		No	Repair or replace wiring harness.
11	<ul style="list-style-type: none"> Disconnect immobilizer unit connector. Turn ignition switch on. Is there battery voltage at immobilizer unit connector terminal J? 	Yes	Inspect for open circuit between PCM connector terminal 3S and immobilizer unit connector terminal A.
		No	Repair or replace wiring harness between immobilizer unit connector terminal J and fuse panel.
12	<ul style="list-style-type: none"> Verify following: <ul style="list-style-type: none"> — Vacuum connection — ACL 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; such as proper octane, contamination, winter/summer blend — Electrical connections — Smooth operation of throttle valve Are all items okay? 	Yes	Go to next step.
		No	Service if necessary and repeat Step 12.
13	<ul style="list-style-type: none"> Turn ignition switch to ON. Disconnect TP sensor connector. Measure voltage at TP sensor connector A terminal with ignition switch ON. Voltage 4.5—5.5 V <ul style="list-style-type: none"> Is voltage okay? 	Yes	Go to next step.
		No	Go to troubleshooting No.31 "CONSTANT VOLTAGE".
14	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes	No DTC displayed: Go to next step.
		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 4AF — Open main relay GND circuit — Main relay is stuck open. — Open PCM GND circuit (terminal 3A or 3B) — Poor connection of vehicle body GND
15	<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.
16	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Access RPM PID. Does RPM PID indicate engine speed during engine cranking? 	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 3Y Open or short circuit in CKP sensor harnesses <ul style="list-style-type: none"> — If CKP sensor and harness are okay, go to next step.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
17	<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.
18	<ul style="list-style-type: none"> Measure gap between CKP sensor and teeth of crankshaft pulley. Specification 0.5—1.5 mm {0.020—0.059 in} <ul style="list-style-type: none"> Is gap within specification? 	Yes	Go to next step.
		No	Adjust CKP sensor.
19	<ul style="list-style-type: none"> Inspect for cracks on high-tension leads. Is there any crack on high-tension leads? 	Yes	Repair suspected high-tension lead.
		No	Go to next step.
20	<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. <ul style="list-style-type: none"> If symptom occurs with A/C on, go to Step 26.
		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 switch and ignition coil Open circuit between ignition coil and PCM terminal 3F or 3I
21	<ul style="list-style-type: none"> Inspect spark plug conditions. Is spark plug wet, grayish white, or covered with carbon? 	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.
22	<ul style="list-style-type: none"> Remove and shake PCV valve. Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
23	<ul style="list-style-type: none"> Is there restriction in exhaust system? Is there any restriction? 	Yes	Inspect exhaust system.
		No	Go to next step.
24	<ul style="list-style-type: none"> Install fuel gauge between fuel filter and fuel distributor. Connect a jumper wire between F/P terminal at DLC in engine compartment and GND. Turn ignition switch to ON. Is fuel line pressure correct with ignition switch ON? Fuel line pressure 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect FP circuit. Inspect for open FP 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 the cause of high pressure. Inspect for clogged fuel return line.
25	<ul style="list-style-type: none"> Visually inspect for fuel leakage at fuel injector O-ring and fuel line. Service if necessary. Is fuel line pressure fluctuating within specification after ignition switch is turned off? (See 01-14-4 FUEL LINE PRESSURE 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.
26	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. <ul style="list-style-type: none"> 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 always ON or A/C compressor runs continuously". For other symptoms, inspect following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation

01-03

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION
27	<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 EVAP control system.
		No Go to next step.
28	<ul style="list-style-type: none"> Is air leakage felt or heard at intake-air system components while engine is racing to higher speed? 	Yes Repair or replace.
		No Go to next step.
29	<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.
30	<ul style="list-style-type: none"> Is engine compression correct? 	Yes Inspect for valve timing.
		No Inspect for cause.
31	<ul style="list-style-type: none"> Verify test results. — If okay, return to diagnostic index to service any additional symptoms. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.6 CRANKS NORMALLY BUT WILL NOT START

A5U010318881W14

6	Cranks normally but will not start
DESCRIPTION	<ul style="list-style-type: none"> Starter cranks engine at normal speed but engine will not run. See "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 or 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 ACL restriction Restriction in exhaust system Disconnected electrical connector Open or short circuit in FP and related harness Inadequate fuel pressure FP mechanical malfunction Fuel leakage from injector Fuel injector clogged Purge solenoid valve malfunction <p>Warning</p> <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01-14-3 BEFORE REPAIR PROCEDURE) (See 01-14-3 AFTER REPAIR PROCEDURE)</p>

SYMPTOM TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION		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; such as 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 valve. Are all items okay? 	Yes	Go to next step.
		No	Service if necessary and repeat Step 1.
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes	No DTC displayed: Go to next step.
		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 4AF — Open main relay GND circuit — Main relay is stuck open. — Open PCM GND circuit (terminal 3A or 3B) — Poor connection of vehicle body GND
3	<ul style="list-style-type: none"> Turn ignition switch to ON. Disconnect TP sensor connector. Measure voltage at TP sensor connector A terminal with ignition switch ON. Voltage 4.5—5.5 V <ul style="list-style-type: none"> Is voltage okay? 	Yes	Go to next step.
		No	Go to troubleshooting No.30 "REFERENCE VOLTAGE".
4	<ul style="list-style-type: none"> Does engine start with TP 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. Does RPM PID indicate engine speed while 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 3Y • 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. Specification 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. Is there any crack on high-tension leads? 	Yes	Repair suspected high-tension lead.
		No	Go to next step.

01-03

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION	
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 switch and ignition coil Open circuit between ignition coil and PCM terminal 3F or 3I
11	<ul style="list-style-type: none"> Inspect spark plug conditions. Is spark plug wet, grayish white, or covered with carbon? 	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.
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.
14	<ul style="list-style-type: none"> Install fuel gauge between fuel filter and fuel distributor. Connect a jumper wire between F/P terminal at DLC in engine compartment and GND. Turn ignition switch to ON. Is fuel line pressure correct when ignition switch is turned ON/OFF 5 times? Fuel line pressure 250 kPa {2.55 kgf/cm², 36.3 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect FP circuit. Inspect for open FP 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 the cause of high pressure. Inspect for clogged fuel return line.
15	<ul style="list-style-type: none"> Visually inspect for fuel leakage at fuel injector O-ring, pulsation damper, and fuel line. Service if necessary. Is fuel line pressure fluctuating after ignition switch is turned off? (See 01-14-4 FUEL LINE PRESSURE 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.
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 is stuck open mechanically. Inspect EVAP 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. — If okay, return to diagnostic index to service any additional symptoms. 		

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

SYMPTOM TROUBLESHOOTING

NO.7 SLOW RETURN TO IDLE

A5U010318881W15

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"> Malfunction of ECT sensor Thermostat is stuck open. TB malfunction Air leakage from intake-air system

01-03

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes No DTC displayed: Go to next step.
		No DTC displayed: Go to appropriate DTC test.
2	<ul style="list-style-type: none"> Remove thermostat and inspect operation. (See 01-12-5 THERMOSTAT REMOVAL/ INSTALLATION) (See 01-12-6 THERMOSTAT INSPECTION) Is thermostat okay? 	Yes ECT 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.
3	<ul style="list-style-type: none"> Is TB free of contaminations? 	Yes Inspect for air leakage from intake-air system components while racing engine to higher speed.
		No Clean or replace TB.
4	<ul style="list-style-type: none"> Verify test results. — If okay, return to diagnostic index to service any additional symptoms. 	

Note

- If malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors

SYMPTOM TROUBLESHOOTING

NO.8 ENGINE RUNS ROUGH/ROLLING IDLE

A5U010318881W16

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 Improper operation of IAC valve EGR valve malfunction Erratic or no signal from CMP sensor Low engine compression Erratic signal from CMP sensor Poor fuel quality PCV valve malfunction ACL restriction Restriction in exhaust system Disconnected electrical connectors Inadequate fuel pressure FP mechanical malfunction Fuel leakage from fuel injector Fuel injector clogged Engine overheating Vacuum leakage Variable valve timing system malfunction <p>Warning</p> <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01-14-3 BEFORE REPAIR PROCEDURE) (See 01-14-3 AFTER REPAIR PROCEDURE)</p>

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> Verify following: <ul style="list-style-type: none"> External fuel shut off or accessory (kill switch, alarm etc.) Fuel quality; such as proper octane, contamination, winter/summer blend No air leakage from intake-air system Proper sealing of intake manifold and components attached to intake manifold; such as EGR valve, IAC valve Ignition wiring Electrical connections Fuses Smooth operation of throttle valve Are all items okay? 	Yes Go to next step.
		No Service if necessary and repeat Step 1.
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes No DTC displayed: Go to next step.
		No DTC displayed: 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".
		No Go to next step.

SYMPTOM TROUBLESHOOTING

01-03

STEP	INSPECTION	ACTION
4	Note <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 specification? (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 always ON or A/C compressor runs continuously." For other symptoms, inspect following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation
5	Note <ul style="list-style-type: none"> Following test is for engine running rough with P/S ON. If other symptoms exist, go to next step. Start engine and idle it. Turn steering wheel right to left. Does engine run rough while turning steering wheel right to left? 	Yes Inspect PSP switch operation and wiring harness between PSP switch connector and PCM connector terminal 4C.
		No Go to next step.
6	<ul style="list-style-type: none"> Inspect variable valve timing operation. Is variable valve timing operation okay? 	Yes Go to next step.
		No Repair or replace malfunctioning parts.
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. Specification 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. Is there any crack on high-tension leads? 	Yes Repair suspected high-tension lead.
		No Go to next step.
10	<ul style="list-style-type: none"> Inspect spark plug conditions. 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.
11	<ul style="list-style-type: none"> Start engine and disconnect IAC valve connector. Does engine speed drop or engine stall? 	Yes Go to next step.
		No Inspect IAC valve and wiring harness.
12	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Start engine and idle it. Measure fuel line pressure while engine idling. Is fuel line pressure correct while engine idling? Fuel line pressure 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes Go to next step.
		No Zero or low: <ul style="list-style-type: none"> Inspect FP circuit Inspect for open FP 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
13	<ul style="list-style-type: none"> Visually inspect for fuel leakage at fuel injector O-ring, pulsation damper, and fuel line. Service if necessary. Is fuel line pressure fluctuation within specification after ignition switch is turned off? (See 01-14-4 FUEL LINE PRESSURE 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

STEP	INSPECTION	ACTION
14	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Start the engine and idle it. Access LONGFT1 PID. Measure LONGFT1 PID at idle. Is PID value between -15% and +15%? 	Yes Go to next step.
		No LONGFT1 PID is out of specification. <ul style="list-style-type: none"> Less than specification (too rich): <ul style="list-style-type: none"> Inspect EVAP control system. If system is okay, go to Step 16. Greater than specification (too lean): <ul style="list-style-type: none"> Inspect for air leakage at intake-air system components. If system is okay, go to next step.
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. Start engine. Does engine condition improve? 	Yes Inspect if purge solenoid valve is stuck open mechanically. Inspect EVAP control system.
		No Go to next step.
16	<ul style="list-style-type: none"> Remove and shake PCV valve. Does PCV valve rattle? 	Yes Go to next step.
		No Replace PCV valve.
17	<ul style="list-style-type: none"> Is there restriction in exhaust system? 	Yes Inspect exhaust system.
		No Go to next step.
18	<ul style="list-style-type: none"> Visually inspect CMP sensor and teeth of camshaft pulley. Are CMP sensor and teeth of camshaft okay? 	Yes Go to next step.
		No Replace malfunctioning parts.
19	<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.
20	<ul style="list-style-type: none"> Is engine compression correct? 	Yes Inspect valve timing.
		No Inspect for causes.
21	<ul style="list-style-type: none"> Verify test results. — If okay, return to diagnostic index to service any additional symptoms. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.9 FAST IDLE/RUNS ON

A5U010318881W17

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 switch is turned off
POSSIBLE CAUSE	<ul style="list-style-type: none"> ECT malfunction Air leakage from intake-air system TB malfunction Misadjustment of accelerator cable free play Misadjustment of cruise control cable

Diagnostic Procedure

STEP	INSPECTION	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 112°C {234°F} and 82°C {180°F}? 	Yes Go to next step.
		No If ECT PID is higher than 112°C {234°F} : Go to No.17 COOLING SYSTEM CONCERNS—OVERHEATING. If ECT PID is less than 82°C {180°F} : Go to No.18 COOLING SYSTEM CONCERNS — RUNS COLD.
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes No DTC displayed: Go to next step.
		No DTC displayed: Go to appropriate DTC test.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION
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 if necessary.
		No: Verify accelerator control cable free play. (See 01-13-9 ACCELERATOR CABLE INSPECTION/ADJUSTMENT)
4	<ul style="list-style-type: none"> Verify test results. If okay, return to diagnostic index to service any additional symptoms. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.10 LOW IDLE/STALLS DURING DECELERATION

A5U010318881W18

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 on/off switch or related circuit malfunction Clutch position and/or neutral position switch or related circuit malfunction Variable valve timing system malfunction

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> Does engine idle rough? 	Yes: Go to flow chart 8 for "Engine runs rough/Rolling idle".
		No: Go to next step.
2	<ul style="list-style-type: none"> Verify following: <ul style="list-style-type: none"> Proper routing and no damage of vacuum lines IAC valve is properly connected. No air leakage from intake-air system Are all items okay? 	Yes: Go to next step.
		No: Service if necessary. Repeat Step 2.
3	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes: No DTC displayed: Go to next step.
		No: DTC displayed: Go to appropriate DTC test.
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 2P or 2Q for open and short IAC valve for being stuck <ul style="list-style-type: none"> If okay, go to next step.
5	<ul style="list-style-type: none"> Inspect variable valve timing operation. Is variable valve timing operation okay? 	Yes: Go to next step
		No: Repair or replace malfunctioning parts.
6	<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 EVAP control system.
		No: Go to next step.
7	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Access TP, MAF, VSS PIDs. Monitor each PIDs while driving vehicle. (See 01-40-6 PCM INSPECTION) Are PIDs okay? 	Yes: Go to flow chart 27 for "Intermittent concerns".
		No: TP PID: Inspect for TP sensor. MAF PID: Inspect for MAF sensor. VSS PID: Inspect VSS.
8	<ul style="list-style-type: none"> Verify test results. If okay, return to diagnostic index to service any additional symptoms. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

01-03

SYMPTOM TROUBLESHOOTING

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

A5U010318881W19

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
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 • Improper operation of IAC valve • EGR valve malfunction • Erratic signal from CKP sensor • Low engine compression • Vacuum leakage • Poor fuel quality • Spark leakage from high-tension leads • ACL restriction • PCV valve malfunction • Improper valve timing due to jumping out of timing belt • Restriction in exhaust system • Intermittent open or short in FP circuit • Inadequate fuel pressure • FP mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogged • Intermittent open or short of MAF sensor, TP sensor and VSS • Automatic transmission malfunction • Clutch slippage • Improper VTCS operation <p>Warning</p> <ul style="list-style-type: none"> • The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 style="padding-left: 40px;">(See 01–14–3 BEFORE REPAIR PROCEDURE) (See 01–14–3 AFTER REPAIR PROCEDURE)</p>

SYMPTOM TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	<ul style="list-style-type: none"> Verify following: <ul style="list-style-type: none"> — Vacuum connection — ACL 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 valve Are all items okay? 	Yes	Go to next step.
		No	Service if necessary and repeat Step 1.
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes	No DTC displayed: Go to next step.
		No	DTC displayed: 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".
		No	Go to next step.
4	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Access RPM, MAF, TP, and VSS PIDs. Drive vehicle while monitoring PIDs. Are PIDs within specification? (See 01-40-6 PCM INSPECTION) 	Yes	Go to next step.
		No	RPM PID: <ul style="list-style-type: none"> Inspect CKP sensor and related harness; such as 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. Specification 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 spark plug conditions. Is spark plug wet, grayish white, or converted with carbon? 	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 if necessary.
10	<ul style="list-style-type: none"> Are there restrictions in exhaust system? 	Yes	Inspect exhaust system.
		No	Go to next step.

01-03

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
11	<ul style="list-style-type: none"> Install fuel gauge between fuel filter and fuel distributor. Connect a jumper wire between F/P terminal at DLC in engine compartment and GND. Turn ignition switch to ON. Is fuel line pressure correct with ignition switch at ON? Fuel line pressure 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect FP circuit Inspect for open FP 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"> Visually inspect for fuel leakage at fuel injector O-ring, pulsation damper, and fuel line. Service if necessary. Is fuel line pressure fluctuation within specification after ignition switch is turned off? (See 01-14-4 FUEL LINE PRESSURE 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.
13	Note <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 a 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 always ON or A/C compressor runs continuously". For other symptoms, inspect following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation
14	Note <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.
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 EVAP control system.
		No	Go to next step.
16	<ul style="list-style-type: none"> Visually inspect CMP sensor and teeth of camshaft pulley. Are CMP sensor and teeth of camshaft pulley okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
17	<ul style="list-style-type: none"> Inspect VTCS operation. (See 01-03-57 Variable Tumble Control System (VTCS) Operation Inspection) <ul style="list-style-type: none"> Is VTCS okay? 	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
18	<ul style="list-style-type: none"> Inspect EGR system. Is EGR system okay? 	Yes	Go to next step.
		No	Replace malfunctioning parts.
19	<ul style="list-style-type: none"> Is engine compression correct? 	Yes	Inspect following: <ul style="list-style-type: none"> Valve timing Internal transmission part (AT only) Clutch (MT only)
		No	Inspect for cause.
20	<ul style="list-style-type: none"> Verify test results. — If okay, return to diagnostic index to service any additional symptoms. 		

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

SYMPTOM TROUBLESHOOTING

NO.12 LACK/LOSS OF POWER—ACCELERATION/CRUISE

A5U010318881W20

12	Lack/loss of power—acceleration/cruise
DESCRIPTION	<ul style="list-style-type: none"> • Performance is poor under load (i.e., 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 • Purge 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 • ACL restriction • PCV valve malfunction • Improper valve timing due to jumping out of timing belt • Restriction in exhaust system • Intermittent open or short in FP circuit • Inadequate fuel pressure • FP mechanical malfunction • Fuel leakage from fuel injector • Fuel injector clogged • Intermittent open or short of MAF sensor, TP sensor and VSS • Automatic transmission malfunction • Clutch slippage • Improper VTCS operation • Variable valve timing system malfunction <p>Warning</p> <ul style="list-style-type: none"> • The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01–14–3 BEFORE REPAIR PROCEDURE) (See 01–14–3 AFTER REPAIR PROCEDURE)</p>

01–03

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> • Verify following: <ul style="list-style-type: none"> — Vacuum connection — ACL 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 if necessary and repeat Step 1.
2	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Turn ignition switch to ON. • Retrieve any DTC. • Is “PASSED” displayed? 	Yes No DTC displayed: Go to next step.
		No DTC displayed: 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”.
		No Go to next step.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
4	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Access RPM, MAF, TP and VSS PIDs. Drive vehicle while monitoring PIDs. Are PIDs within specifications? (See 01-40-6 PCM INSPECTION) 	Yes	Go to next step.
		No	RPM PID: <ul style="list-style-type: none"> Inspect CKP sensor and related 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"> Inspect variable valve timing operation. Is variable valve timing operation okay? (See 01-40-6 PCM INSPECTION) 	Yes	Go to next step.
		No	Repair or replace malfunctioning parts.
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—0.059 in} <ul style="list-style-type: none"> Is the gap within specification? 	Yes	Go to next step.
		No	Adjust CKP sensor.
8	<ul style="list-style-type: none"> Inspect spark plug conditions. Is spark plug wet, grayish white, or covered with carbon? 	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.
9	<ul style="list-style-type: none"> Remove and shake PCV valve. Does PCV valve rattle? 	Yes	Go to next step.
		No	Replace PCV valve.
10	<ul style="list-style-type: none"> Is there any restriction in exhaust system? 	Yes	Inspect exhaust system.
		No	Go to next step.
11	<ul style="list-style-type: none"> Install fuel gauge between fuel filter and fuel distributor. Connect a jumper wire between F/P terminal at DLC in engine compartment and ground. Turn ignition switch to ON. Is fuel line pressure correct with ignition switch at ON? Fuel line pressure 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect FP circuit Inspect for open FP 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	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 always ON or A/C compressor runs continuously". For other symptoms, inspect following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation
13	<ul style="list-style-type: none"> Inspect for A/C cut-off operation. Does A/C cut-off work properly? 	Yes	Go to next step.
		No	Inspect A/C cut-off system components.
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 EVAP control system.
		No	Go to next step.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION
15	<ul style="list-style-type: none"> Verify VTCS operation. (See 01–03–57 Variable Tumble Control System (VTCS) Operation Inspection) Is VTCS operation okay? 	Yes Go to next step.
		No Repair or replace malfunctioning parts.
16	<ul style="list-style-type: none"> Visually inspect CMP sensor and teeth of camshaft pulley. Are CMP sensor and teeth of camshaft okay? 	Yes Go to next step.
		No Replace malfunctioning parts.
17	<ul style="list-style-type: none"> Inspect EGR system. Is EGR system 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 transmission components (AT only) Clutch (MT only) Brake system for dragging
		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. 	

01–03

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.13 KNOCKING/PINGING

A5U010318881W21

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 (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 KS and related circuit malfunction <p>Warning</p> <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01–14–3 BEFORE REPAIR PROCEDURE) (See 01–14–3 AFTER REPAIR PROCEDURE)</p>

Diagnostic Procedure

STEP	INSPECTION	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 {240°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 switch to ON. Retrieve any DTC. Is “PASSED” displayed? 	Yes No DTC displayed: Go to next step.
		No DTC displayed: 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

STEP	INSPECTION	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 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes Go to next step.
		No Zero or low: <ul style="list-style-type: none"> Inspect FP circuit Inspect for open FP 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
5	<ul style="list-style-type: none"> Measure resistance between KS terminal and KS body. Specification Approx. 560 kilohms (20°C {68°F}) <ul style="list-style-type: none"> Is resistance okay? 	Yes Inspect ignition timing.
		No Replace KS.
6	<ul style="list-style-type: none"> Verify test results. — If okay, return to diagnostic index to service any additional symptoms. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.14 POOR FUEL ECONOMY

A5U010318881W22

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 Engine cooling system malfunction Improper transmission fluid level 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 clogged Variable valve timing system malfunction Warning <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01–14–3 BEFORE REPAIR PROCEDURE) (See 01–14–3 AFTER REPAIR PROCEDURE)</p>

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> Inspect following: <ul style="list-style-type: none"> Contaminated air cleaner element Transmission fluid level Fuel quality Coolant level Are all items okay? 	Yes Go to next step.
		No Service as necessary. Repeat Step 1.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes No DTC displayed: Go to next step.
		No DTC displayed: Go to appropriate DTC test.
3	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Access ECT PID. Drive vehicle while monitoring PID. (See 01-40-6 PCM INSPECTION) Is PID within specification? 	Yes Go to next step.
		No Inspect for coolant leakage, cooling fan and condenser fan operations or thermostat operation.
4	<ul style="list-style-type: none"> Inspect variable valve timing operation. Is variable valve timing operation okay? 	Yes Go to next step
		No Repair or replace malfunctioning parts.
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. Trigger wheel damage on camshaft Open or short circuit on CMP sensor Open or short circuit between CMP sensor and PCM terminal 3V Repair or replace malfunctioning part. If okay, go to next step
		No Inspect following: <ul style="list-style-type: none"> High-tension leads Ignition coil and connector
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 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes Go to next step.
		No Zero or low: <ul style="list-style-type: none"> Inspect FP circuit. Inspect for open FP 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"> 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"> Is there restriction in exhaust system? 	Yes Inspect exhaust system.
		No Go to next step.
9	<ul style="list-style-type: none"> Is brake system functioning properly? 	Yes Go to next step.
		No Inspect for cause.
10	<ul style="list-style-type: none"> Inspect MAF sensor for communication. Is there any contamination? 	Yes Replace MAF sensor.
		No Go to next step.
11	<ul style="list-style-type: none"> Is engine compression correct? 	Yes Inspect for valve timing.
		No Inspect for cause.
12	<ul style="list-style-type: none"> Verify test results. — If okay, return to diagnostic index to service any additional symptoms. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

SYMPTOM TROUBLESHOOTING

NO.15 EMISSION COMPLIANCE

A5U010318881W23

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 clogged Fuel tank ventilation system malfunction Charcoal canister damage Excessive carbon built up in combustion chamber Improper engine compression Improper valve timing <p>Warning</p> <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01-14-3 BEFORE REPAIR PROCEDURE) (See 01-14-3 AFTER REPAIR PROCEDURE)</p>

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> Inspect following: <ul style="list-style-type: none"> Vacuum lines for leakage or blockage Electrical connections Proper maintenance schedule followed Intake-air system and ACL element concerns: obstructions, leakage or dirtiness. Are all items okay? 	Yes Go to next step.
		No Service if necessary. Repeat Step 1.
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes No DTC displayed: Go to next step.
		No DTC displayed: Go to appropriate DTC test.
3	<ul style="list-style-type: none"> Is any other drivability concern present? 	Yes Go to appropriate flow chart.
		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. (See 01-40-6 PCM INSPECTION) 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 3V Repair or replace malfunctioning parts. <ul style="list-style-type: none"> If okay, go to next step.
		No Inspect following: <ul style="list-style-type: none"> High-tension leads Ignition coil and connector

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	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 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes Go to next step.
		No Zero or low: <ul style="list-style-type: none"> Inspect FP circuit. Inspect for open FP 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"> 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 excessive amount of liquid fuel present in canister? 	Yes Replace charcoal canister.
		No Go to next step.
9	<ul style="list-style-type: none"> Is there restriction in exhaust system? 	Yes Inspect exhaust system.
		No Inspect EGR system.
10	<ul style="list-style-type: none"> Verify test results. — If okay, return to diagnostic index to service any additional symptoms. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.16 HIGH OIL CONSUMPTION/LEAKAGE

A5U010318881W24

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 part malfunction

Diagnostic Procedure

STEP	INSPECTION	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"> Verify 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 if necessary. Repeat Step 2.

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

01-03

SYMPTOM TROUBLESHOOTING

NO.17 COOLING SYSTEM CONCERNS—OVERHEATING

A5U010318881W25

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 inoperative • Improper or damaged radiator cap • Main cooling fan inoperative • Malfunction of coolant overflow system • Improper tension of drive belt • Drive belt damage

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> • Inspect 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 if necessary. Repeat Step 1.
2	<ul style="list-style-type: none"> • Connect WDS or equivalent to DLC-2. • Turn ignition switch to ON. • Retrieve any DTC. • Is "PASSED" displayed? 	Yes No DTC displayed: Go to next step.
		No DTC displayed: Go to appropriate DTC test.
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 Step 4.
		No Inspect following and repair or replace if necessary: <ul style="list-style-type: none"> • Refrigerant charging amount • Open circuit between A/C magnetic clutch relay and PCM terminal 2K • Seized A/C magnetic clutch • A/C magnetic clutch malfunction <ul style="list-style-type: none"> — If all items are okay, inspect for following: <ul style="list-style-type: none"> • A/C pressure switch operation • A/C switch is stuck open • Open or short circuit between A/C pressure switch and PCM terminal 4F • Open circuit of blower motor fan switch and resistor (if blower motor does not operate) • Evaporator temperature sensor and amplifier

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION
4	<ul style="list-style-type: none"> Start engine and run it at idle speed. Turn A/C switch on. Do condenser fan and main cooling fan operate? 	Yes Go to next step.
		No <ul style="list-style-type: none"> If condenser fan does not operate, 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 2C Open battery power circuit for condenser fan relay If main cooling fan motor does not operate, inspect for following: <ul style="list-style-type: none"> Main cooling fan relay is stuck open. Main cooling fan motor malfunction Main cooling fan motor GND open Open circuit between cooling fan motor and relay Open circuit between cooling fan relay and PCM terminal 2B Open battery power circuit for cooling 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 in coolant hoses and/or radiator? 	Yes Replace malfunctioning parts.
		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 01-12-6 THERMOSTAT INSPECTION) Is thermostat okay? 	Yes ECT and thermostat are okay, inspect engine block for leakage or blockage.
		No <ul style="list-style-type: none"> Access ECT PID on WDS or equivalent. Inspect for both ECT and temperature gauge 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 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. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.18 COOLING SYSTEM CONCERNS—RUNS COLD

A5U010318881W26

18	Cooling system concerns—runs cold
DESCRIPTION	<ul style="list-style-type: none"> Engine takes excessive period for reaching normal operating temperature.
POSSIBLE CAUSE	<ul style="list-style-type: none"> Thermostat malfunction Malfunction of condenser fan system Malfunction of main cooling fan system

Diagnostic Procedure

STEP	INSPECTION	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".
		No Go to next step.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION		ACTION
3	<ul style="list-style-type: none"> Remove thermostat and inspect operation. (See 01–12–5 THERMOSTAT REMOVAL/ INSTALLATION) Is thermostat okay? (See 01–12–6 THERMOSTAT INSPECTION) 	Yes	Inspect condenser fan and main fan operation. <ul style="list-style-type: none"> If both or either fan operate abnormally, inspect for following: <ul style="list-style-type: none"> Main cooling fan relay is stuck closed. Condenser fan relay is stuck closed. Short to ground between main cooling fan relay and PCM terminal 2B Short to ground between condenser fan relay and PCM terminal 2C Circuit between main 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 V 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.
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. 		

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.19 EXHAUST SMOKE

A5U010318881W27

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"> Malfunction of cooling system (coolant loss) Engine internal coolant leakage <p>Black smoke (Rich fuel mixture):</p> <ul style="list-style-type: none"> ACL restricted Intake-air system collapsed or restricted Fuel return line restricted Excessive fuel pressure Improper engine compression Injector fuel leakage Ignition system malfunction <p>Warning</p> <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01–14–3 BEFORE REPAIR PROCEDURE) (See 01–14–3 AFTER REPAIR PROCEDURE)</p>

SYMPTOM TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION		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 cracked or porous — If other drivability 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"> — ACL restriction — Collapsed or restricted intake-air system — Restricted fuel return line Are all items okay? 	Yes	Go to next step.
		No	Service if necessary. Repeat Step 5.
5	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes	No DTC displayed: Go to next Step.
		No	DTC displayed: Go to appropriate DTC test.
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 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes	Go to next step.
		No	Zero or low: <ul style="list-style-type: none"> Inspect FP circuit. Inspect for open FP 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"> 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. — If okay, return to diagnostic index to service any additional symptoms. 		

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

01-03

SYMPTOM TROUBLESHOOTING

NO.20 FUEL ODOR (IN ENGINE COMPARTMENT)

A5U010318881W28

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 malfunction Charcoal canister malfunction <p>Warning</p> <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01-14-3 BEFORE REPAIR PROCEDURE) (See 01-14-3 AFTER REPAIR PROCEDURE)</p>

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> Visually inspect for fuel leakage at fuel injector O-ring, pulsation damper and fuel line. Service if necessary. Is fuel line pressure fluctuation within specification after ignition switch is turned off? (See 01-14-4 FUEL LINE PRESSURE 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. Is fault indicated? 	Yes Replace vacuum hose.
		No Go to next step.
3	<ul style="list-style-type: none"> Inspect purge solenoid valve. (See 01-16-8 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 switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes No DTC displayed: Inspect charcoal canister for fuel saturation. <ul style="list-style-type: none"> If excess amount of liquid fuel present, replace charcoal canister.
		No DTC displayed: Go to appropriate DTC test.
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. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

SYMPTOM TROUBLESHOOTING

NO.21 ENGINE NOISE

A5U010318881W29

21	Engine noise
DESCRIPTION	<ul style="list-style-type: none"> Engine noise from under hood
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 loose <p>Other noise:</p> <ul style="list-style-type: none"> Camshaft friction gear noise or MLA noise

01-03

Diagnostic Procedure

STEP	INSPECTION		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.12 "KNOCKING/ PINGING - ACCELERATION/CRUISE."
		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. 		

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

SYMPTOM TROUBLESHOOTING

NO.22 VIBRATION CONCERNS (ENGINE)

A5U010318881W30

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	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 All items okay? 	Yes Inspect following systems: <ul style="list-style-type: none"> Wheels Transmission Driveline Suspension
		No Readjust or retighten engine mount installation position. Service if 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. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.23 A/C DOES NOT WORK SUFFICIENTLY

A5U010318881W31

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 is turned on.
POSSIBLE CAUSE	<ul style="list-style-type: none"> Improper refrigerant charging amount Open A/C magnet clutch Open circuit between A/C relay and A/C magnet clutch Poor GND of A/C magnet clutch A/C high pressure switch stuck open A/C relay stuck open Seized A/C compressor Open circuit between A/C switch and PCM through both A/C pressure switch and amplifier

Diagnostic Procedure

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

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION
5	<ul style="list-style-type: none"> Verify test results. — If okay, return to diagnostic index to service any additional symptoms. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

01-03

NO.24 A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY

A5U010318881W32

24	A/C 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	ACTION
1	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes No DTC displayed: Go to next step.
		No DTC displayed: Go to appropriate DTC test.
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 2K — If both items are okay, go to next step.
		No Inspect if circuit between A/C relay and magnetic clutch is shorted to battery power circuit. If circuit is okay, inspect magnetic clutch stuck engagement or clearance.
3	<ul style="list-style-type: none"> Disconnect high-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 system remains working, short to GND circuit may be present. <ul style="list-style-type: none"> Does A/C remain working? 	Yes Inspect for short to GND circuit between high-pressure switch and PCM terminal 4F.
		No Go to next step.
4	<ul style="list-style-type: none"> Reconnect high-pressure switch connector. Turn off A/C switch. <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 remain working? 	Yes Inspect for short to GND circuit between high-pressure switch and A/C switch.
		No Inspect if A/C switch is stuck closed.
5	<ul style="list-style-type: none"> Verify test results. — If okay, return to diagnostic index to service any additional symptoms. 	

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

SYMPTOM TROUBLESHOOTING

NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS

A5U010318881W33

25	A/C does 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 is loosely installed.

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	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 always ON or A/C compressor runs continuously".
2	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes	No DTC displayed: Inspect TP sensor for proper adjustment.
		No	DTC displayed: Go to appropriate DTC test.
3	<ul style="list-style-type: none"> Verify test results. — If okay, return to diagnostic index to service any additional symptoms. 		

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.26 EXHAUST SULPHUR SMELL

A5U010318881W34

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 disconnected or poor connection Charcoal canister malfunction Vacuum lines disconnected or improperly connected Improper fuel pressure <p>Warning</p> <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01-14-3 BEFORE REPAIR PROCEDURE) (See 01-14-3 AFTER REPAIR PROCEDURE)</p>

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	Are any drivability 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 if necessary. Repeat Step 2.
3	<ul style="list-style-type: none"> Connect WDS or equivalent to DLC-2. Turn ignition switch to ON. Retrieve any DTC. Is "PASSED" displayed? 	Yes	No DTC displayed: Go to next step.
		No	DTC displayed: Go to appropriate DTC test.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION
4	<ul style="list-style-type: none"> Install fuel pressure gauge between fuel filter and fuel distributor. Start engine and idle it. Is fuel line pressure correct while engine idling? Fuel line pressure 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes Go to next step.
		No Zero or low: <ul style="list-style-type: none"> Inspect FP circuit. Inspect for open FP 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 the cause of high pressure. 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 Replace or replace malfunctioning parts.

01-03

Note

- If the malfunction remains even though all inspections have been performed, get assistance from technical hotline/your distributors.

NO.27 INTERMITTENT CONCERNS

A5U010318881W35

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

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> Talk to customer. Review 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"> Turn ignition switch off. — If input is a switch-type component, turn on manually. Turn ignition switch to ON. Engine is off. Measure PCM terminal voltages for suspect component. Lightly tap on suspect component, wiggle and pull each wire/connector at suspect component or PCM. Are any PCM terminal voltages 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.
3	<ul style="list-style-type: none"> Turn ignition switch to ON. Engine is running. Measure PCM terminal voltages for suspect component. Lightly tap on suspect component, wiggle and pull each wire/connector at suspect component or PCM. Are any PCM terminal voltages 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

STEP	INSPECTION	ACTION
4	<ul style="list-style-type: none"> Turn ignition switch to ON. Engine is running. Measure PCM terminal voltages for suspect component. Accurately spray water on suspect component wire, component or vacuum line related to possible fault area. Are any PCM terminal voltages out of range, or suddenly change and go back into range, or was there a noticeable engine misfire/stumble? 	Yes Fault area is identified. If fault occurred while spraying on component: Replace part and verify repair. If fault occurred while spraying wiring: Inspect each wire for corrosion, bent or loose terminals and poor wire terminal crimps. If fault occurred while spraying vacuum line: 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. <ul style="list-style-type: none"> Repair if necessary.

NO.28 FUEL REFILL CONCERNS

A5U010318881W36

28	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 EVAP pipes Nonreturn valve malfunction Improper use of fuel nozzle Inadequate fuel filling speed <p>Warning</p> <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01–14–3 BEFORE REPAIR PROCEDURE) (See 01–14–3 AFTER REPAIR PROCEDURE)</p>

Diagnostic Procedure

STEP	INSPECTION	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 Inadequate fuel filling speed
		No If nonreturn valve installed improperly: Reinstall nonreturn valve to proper position. If nonreturn valve does not operate properly: Replace nonreturn valve.

SYMPTOM TROUBLESHOOTING

NO.29 FUEL FILLING SHUT OFF ISSUES

A5U010318881W37

29	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 EVAP pipes Nonreturn valve malfunction Fuel shut off valve malfunction Fuel nozzle malfunction Fuel nozzle is not inserted correctly. <p>Warning</p> <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01-14-3 BEFORE REPAIR PROCEDURE) (See 01-14-3 AFTER REPAIR PROCEDURE)</p>

01-03

Diagnostic Procedure

STEP	INSPECTION	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 that nonreturn valve is installed properly. Inspect nonreturn valve operation. Is nonreturn valve okay? 	Yes Inspect for following: <ul style="list-style-type: none"> Fuel nozzle malfunction Fuel nozzle is not inserted correctly Fuel shut off valve
		No If nonreturn valve installed improperly: Reinstall nonreturn valve to proper position. If nonreturn valve does not operate properly: Replace nonreturn valve.

NO.30 REFERENCE VOLTAGE

A5U010318881W38

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"> EGR boost sensor, FTP sensor, TP sensor and TCM use reference voltage.

Diagnostic Procedure

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> Was reference voltage greater than 6.0 V when measured in previous step? 	Yes Go to Step 14.
		No Go to next step.
2	<ul style="list-style-type: none"> Turn ignition switch to ON. Engine is off. 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 switch to ON. Engine is off. Disconnect sensor where reference voltage circuit check failed. 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 9.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION	
4	Note <ul style="list-style-type: none"> The purpose of this step is to determine if WDS or equivalent is communicating with PCM. Turn ignition switch to ON. Engine is off. Attempt to access ECT PID. Can ECT PID be accessed? 	Yes	Go to Step 8.
		No	Go to next step.
5	<ul style="list-style-type: none"> Turn ignition switch off. Leave TP sensor disconnected. Disconnect EGR boost sensor connector. Turn ignition switch to ON. Engine is off. Measure voltage between reference voltage and GND circuits at TP sensor connector. Is voltage between 4.0 and 6.0 V? 	Yes	Replace EGR boost sensor.
		No	Go to next step.
6	<ul style="list-style-type: none"> Turn ignition switch off. Disconnect TP sensor connector. Leave PCM disconnected. Turn ignition switch to ON. Engine is off. Measure voltage between PCM connector terminals 4AF and 4O. Is voltage greater than 10.5 V? 	Yes	Go to next step.
		No	Repair open circuit between PCM terminal 4AF and main relay.
7	<ul style="list-style-type: none"> Turn ignition switch off. Leave TP, EGR boost and FTP sensor connectors disconnected. Disconnect WDS or equivalent from DLC-2. Measure resistance between PCM connector terminals 4L and 4O. Is resistance greater than 10,000 ohms? 	Yes	Inspect for reference voltage at suspect sensor connector again. Note <ul style="list-style-type: none"> Get assistance from technical Hotline/your distributor, then replace PCM if necessary.
		No	Repair reference voltage circuit short to GND.
8	<ul style="list-style-type: none"> Turn ignition switch off. Disconnect sensor connector where reference voltage circuit inspection failed. Leave PCM disconnected. Measure resistance between PCM connector terminal 4L and reference voltage circuit at appropriate sensor connector. Is resistance less than 5.0 ohms? 	Yes	Inspect for reference voltage at suspect sensor connector again. Note <ul style="list-style-type: none"> Get assistance from technical Hotline/your distributor, then replace PCM if necessary.
		No	Repair open reference voltage circuit.
9	Note <ul style="list-style-type: none"> The purpose of this step is to determine if WDS or equivalent is communicating with PCM. Turn ignition switch to ON. Engine is off. Attempt to access ECT PID. Can ECT PID be accessed? 	Yes	Go to next step.
		No	Go to Step 12.
10	<ul style="list-style-type: none"> Are DTCs present for two or more sensors connected to PCM terminal 4O circuit? Sensors connected to PCM terminal 4O: EGR boost sensor, TP sensor, IAT sensor, ECT sensor, FTP sensor, FHO2.	Yes	Go to next step.
		No	Repair open circuit to sensor where reference voltage circuit inspection failed.
11	<ul style="list-style-type: none"> Turn ignition switch off. Disconnect WDS or equivalent from DLC-2. Disconnect sensor connector where reference voltage circuit inspection failed. Leave PCM disconnected. Measure resistance between GND circuit at appropriate sensor connector and PCM connector terminal 4O. Is resistance less than 5.0 ohms? 	Yes	Reconnect sensor connector. Go to next step.
		No	Repair open GND circuit.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION
12	<ul style="list-style-type: none"> Turn ignition switch off. Disconnect WDS or equivalent from DLC-2. Leave PCM disconnected. Measure resistance between battery negative terminal and PCM connector terminals 3A and 3B. Is each resistance less than 5.0 ohms? 	Yes Go to next step.
		No Repair open GND circuit to GND.
13	<ul style="list-style-type: none"> Turn ignition switch off. Measure resistance between GND circuit at following sensor connectors and GND. <ul style="list-style-type: none"> — EGR boost sensor — FTP sensor — TP sensor — ECT sensor — HO2S — IAT sensor Is each resistance less than 5.0 ohms? 	Yes Ground circuits are okay.
		No Inspect for reference voltage at suspect sensor connector again. Note <ul style="list-style-type: none"> Get assistance from technical hotline/your distributor, then replace PCM if necessary.
14	<ul style="list-style-type: none"> Turn ignition switch off. Disconnect sensor connector where reference voltage inspection failed. Disconnect TP sensor, FTP sensor and EGR boost sensor connectors. Disconnect PCM connector. Turn ignition switch to ON. Engine is off. Measure voltage between reference voltage circuit at TP sensor connector and battery negative terminal. Is voltage less than 5.0 V? 	Yes Inspect for reference voltage at suspect sensor connector again. Note <ul style="list-style-type: none"> Get assistance from technical hotline/your distributor, then replace PCM if necessary.
		No Repair reference voltage circuit for short to power in harness.

01-03

NO.31 SPARK PLUG CONDITION

A5U010318881W39

31	Spark plug condition
DESCRIPTION	<ul style="list-style-type: none"> Incorrect spark plug condition
POSSIBLE CAUSE	Note <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.
	Wet/carbon stuck on specific plug: <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 Grayish white with specific plug: <ul style="list-style-type: none"> Air/fuel mixture—Insufficient fuel injection volume Faulty spark plug Wet/carbon stuck on all plugs: <ul style="list-style-type: none"> Spark—Weak Air/fuel mixture—Too rich Compression—Low compression Clogging in intake/exhaust system Grayish white with all plugs: <ul style="list-style-type: none"> Air/fuel mixture—Too lean Warning <ul style="list-style-type: none"> The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: <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 01-14-3 BEFORE REPAIR PROCEDURE) (See 01-14-3 AFTER REPAIR PROCEDURE)</p>

SYMPTOM TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION		ACTION
1	<ul style="list-style-type: none"> Remove all spark plugs. Inspect spark plug condition. Is spark plug condition okay? 	Yes	Troubleshooting completed.
		No	Specific plug is wet or covered with carbon: Go to next step. Specific plug looks grayish white: Go to Step 7. All plugs are wet or covered with carbon: Go to Step 9. All plugs look grayish white: Go to Step 15.
2	<ul style="list-style-type: none"> Is spark plug wet/covered with carbon by engine oil? 	Yes	Inspect all areas related to oil pumping.
		No	Go to next step.
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 Is spark plug 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 01-10-7 COMPRESSION INSPECTION) 	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 01-14-4 FUEL LINE PRESSURE 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: Inspect FP circuit. Inspect for FP relief valve open. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. Inspect pulsation damper. High: Inspect pressure regulator for high pressure cause. Inspect for clogged fuel return line.
7	<ul style="list-style-type: none"> Inspect spark plug 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 01-14-17 FUEL INJECTOR INSPECTION) Fuel injection volume (See 01-14-17 FUEL INJECTOR INSPECTION) Are all above items okay? 	Yes	Inspect for open circuit between suspected fuel injector connector terminal and following PCM connector terminals: <ul style="list-style-type: none"> For #1 cylinder: 2A For #2 cylinder: 2D For #3 cylinder: 2G For #4 cylinder: 2J
		No	Replace fuel injector.
9	<ul style="list-style-type: none"> Is ACL element free of restrictions? 	Yes	Go to next step.
		No	Replace ACL 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 malfunction part.

SYMPTOM TROUBLESHOOTING

STEP	INSPECTION	ACTION
11	<ul style="list-style-type: none"> Carry out fuel line pressure inspection. Is fuel line pressure correct? Fuel line pressure 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes Go to next step.
		No Zero or low: Inspect FP circuit. Inspect for open FP relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. Inspect pulsation damper. High: 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 (See 01—40—6 PCM INSPECTION) 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 and related vacuum hoses. (When engine can be started) (See 01—16—8 PURGE SOLENOID VALVE INSPECTION) Are purge solenoid valve and related vacuum hoses okay? 	Yes Go to next step.
		No Repair or replace malfunctioning part.
14	<ul style="list-style-type: none"> Carry out compression inspection. Is compression correct? 	Yes Inspect 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 370—420 kPa {3.7—4.3 kgf/cm², 53—61 psi}	Yes Inspect following PIDs. <ul style="list-style-type: none"> ECT O2S11 O2S12 MAF (See 01—40—6 PCM INSPECTION) Inspect PCM GND condition.
		No Zero or low: Inspect FP circuit. Inspect for open FP relief valve. Inspect for fuel leakage inside pressure regulator. Inspect for clogged main fuel line. Inspect pulsation damper. High: 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/or On-line Repair Information 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 or reprogram PCM. 	

01—03

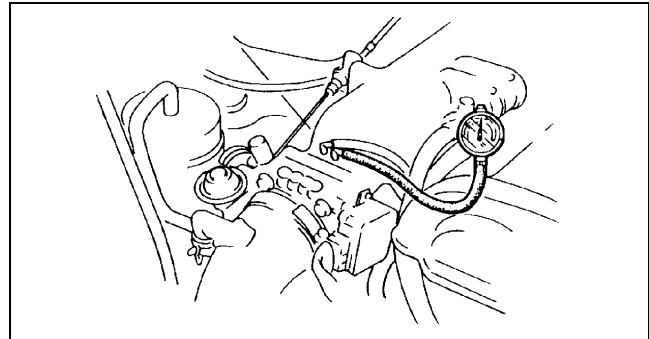
SYMPTOM TROUBLESHOOTING

ENGINE CONTROL SYSTEM OPERATION INSPECTION

A5U010318881W40

Intake Manifold Vacuum Inspection

1. Verify air intake hoses are installed properly.
2. Start the engine and run at idle.
3. Measure the manifold vacuum using a vacuum gauge.
 - If not as specified, inspect the following.
 - Air suction at:
 - Intake manifold installation point
 - PCV valve installation point
 - Fuel injector insulator
 - Accelerator cable free play
 - Engine compression (See 01-10-7 COMPRESSION INSPECTION.)



X5U101WAS

Note

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

Specification

More than 60 kPa {450 mmHg, 18 inHg}

Idle Air Control (IAC) Inspection

Engine coolant temperature compensation inspection

1. Connect the WDS or equivalent to DLC-2.
2. Select 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 idle it.
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 following:
 - Headlight switch inspection
 - A/C switch inspection
 - P/S pressure switch inspection
 - IAC valve inspection
 - Fan switch inspection
 - Cooling fan motor inspection
 - Rear window defroster inspection

Engine speed

Load condition	Idle-up speed (rpm)*1		
	MT	AT	
		N, P position	D range
E/L ON*2	750—850 (800 ± 50)	750—850 (800 ± 50)	700—800 (750 ± 50)
P/S ON*3			
A/C ON*4	950—1,050 (1,000 ± 50)		

*1 : Excludes temporary idle speed drop just after the electrical loads (E/L) are turned on.

*2 : Headlight is on, Fan switch (above 1st), Cooling fan are operating, Rear window defroster is on.

*3 : Steering wheel is fully turned.

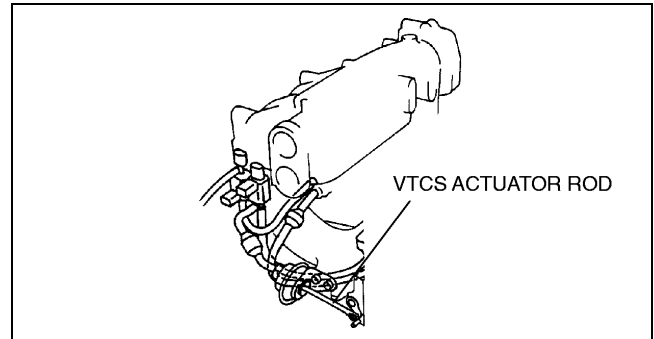
*4 : A/C switch and fan switch are on.

Note

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

Variable Tumble Control System (VTCS) Operation 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 VTCS shutter valve actuator is pulled.
 - If the rod is not pulled, inspect the following.
 - VTCS shutter valve actuator
 - VTCS check valve (one-way)
 - Vacuum hose
 - VTCS solenoid valve
 - Wiring harness and connectors (Main relay — VTCS solenoid valve — PCM terminal 2N)
6. Access RPM PID.
7. Inspect the rod operation under the following condition.
 - If the rod operation is not as specified, inspect the following:
 - VTCS shutter valve actuator
 - Delay valve
 - Vacuum chamber
 - Vacuum hose
 - VTCS solenoid valve
 - Wiring harness and connectors (Main relay — VTCS solenoid valve — PCM terminal 2N)



X3U101WEB

01-03

Rod operation

Engine speed (RPM PID) (rpm)	Tumble swirl control actuator
3,250 or less	Operate
3,250 or more	Not operate

Variable Valve Timing System Operation Inspection

When idling cannot be continued

1. Remove the OCV (oil control valve) and verify that the spool valve is at maximum retard position.
 - If the spool valve is stuck in advance direction, replace the OCV (oil control valve).
2. Connect the OCV (oil control valve) connector.
3. Turn the ignition switch on.
4. Verify that the spool valve is at maximum retard position.
 - If the spool valve is stuck in advance direction, inspect for the following.
 - Short circuit in harnesses or connectors between the OCV (oil control valve) and the PCM.
5. Inspect the VVT (variable valve timing) actuator.

SYMPTOM TROUBLESHOOTING

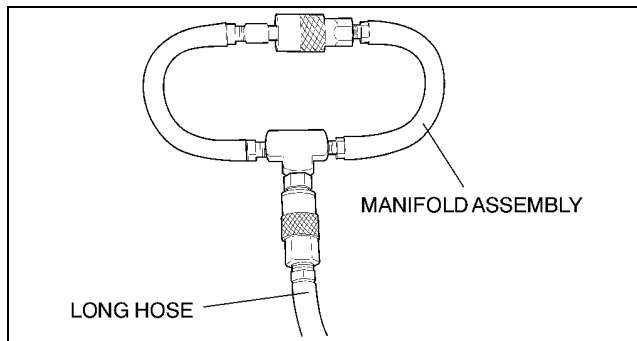
Evaporative Emission (EVAP) System Leak Inspection Using Leak Tester

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 20 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 in** 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 in** of water loss is acceptable on the self-test.
 - If the loss is more than **0.5 in** of water, perform one or more self-test. If the failed test repeats, check for leak using the ultrasonic leak detector (part of **SST**).



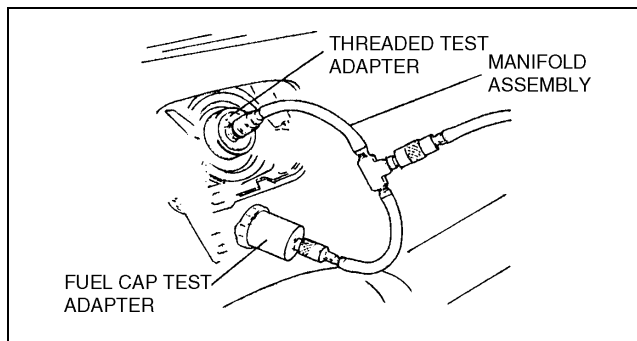
Y3U103WTO

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 component 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 component 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.



Y5U103WAH

Note

- If the CDCV is closed, CMD REVD is displayed.
- The CDCV is closed for **10 min** unless any of the following actions are performed:
 - 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 s**) until the left display reads **13.5 to 14 in** 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 Emission (EVAP) 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 the hose on the vacuum pump.
3. Connect the WDS or equivalent to the DLC-2.
4. Turn the ignition switch to ON.
5. Close the canister drain cut valve (CDCV) using ON BOARD DEVICE CONTROL function.

01-03

Note

- The CDCV is closed for **10 min** 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 {13 mmHg, 0.5 inHg}** vacuum and monitor FTP output voltage.
 7. Verify that the voltage holds at the specified readings for a minimum of **2 min**.
 - 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 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM LOCATION INDEX.)
2. Disconnect the vacuum hose between the charcoal canister and the fuel tank from the charcoal canister.
3. Insert the hose on the vacuum pump.
4. Apply **1.7 kPa {13 mmHg, 0.5 inHg}** vacuum.
5. Verify that the vacuum holds at the specified readings for a minimum of **2 min**.
 - If the vacuum does not hold, inspect the fuel tank, related vacuum hoses and fuel-filler cap.
 - If the fuel tank related vacuum hoses and fuel-filler cap are okay, carry out the "Inspection from charcoal canister to purge solenoid valve".

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 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM LOCATION INDEX.)
2. Disconnect the vacuum hose between the charcoal canister and the catch tank from the charcoal canister.
3. Insert the hose on the vacuum pump.
4. Apply vacuum to **3.3 kPa {25 mmHg, 1.0 inHg}** and it should remain at the specified readings for a minimum of **2 min**.
5. Return to the DTC Inspection Procedures, and answer questions.

SYMPTOM TROUBLESHOOTING

Spark Test

1. Disconnect the negative battery cable.
2. Disconnect the FP RLY connector.
3. Verify that each high-tension lead and connector is connected properly.
4. 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		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 ground. Turn ignition switch to START and verify that there is a strong blue spark. (Inspect each cylinder) 	Yes	Ignition system is okay.
		No	If some cylinders do not spark, go to Step 2. If all cylinders do not spark, go to Step 3.
2	<ul style="list-style-type: none"> Is high-tension lead resistance correct? 	Yes	Inspect high-tension lead and ignition coil for crack or damage.
		No	Replace the 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.) — PCM terminal 3F/3I voltage 	Yes	Inspect wiring harness and connectors of CKP sensor for open or short circuit.
		No	Repair or replace.

Fuel Injector Operation Inspection

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