

## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

### 2005 ENGINE PERFORMANCE

Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

## CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [BP]

### ENGINE CONTROL SYSTEM

x :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	x	x	x									
	Refrigerant pressure switch(A/C equipped only)	x	x	x			x				x		
	PSP switch	x	x	x							x		
	DLC (TEN terminal)	x		x			x						
	Neutral switch (MT only)	x	x	x									
	Clutch switch (MT only)	x	x	x									
	TCM (Reduce torque signal) (AT only)		x	x									
	CKP sensor (NE signal)	x	x	x	x	x	x	x	x	x	x	x	
	CMP sensor (SGC signal)		x	x									
	VSS	x							x				
	Knock sensor			x									
	MAF sensor	x	x	x		x		x	x				
	ECT sensor	x	x	x		x		x	x	x	x		
	IAT sensor	x	x	x				x	x			x	
	TP sensor	x	x	x				x	x	x	x		
	HO2S (Rear)			x									
	EGR boost sensor	x	x								x		
	B+			x									x
	Generator (Output voltage)												x
	HO2S (Front)			x				x					
Immobilizer unit													x
Output device	IAC valve	x											
	Fuel injector		x										x
	Ignition coil			x									x
	FP relay				x								
	HO2S heater (Front,Rear)					x							
	Cooling fan relay						x						
	Condenser fan relay							x					
	Purge solenoid valve							x					
	EGR valve								x				
	VTCS solenoid valve									x			
	A/C relay										x		
	Generator (Field coil)											x	
	Generator warning light											x	
	TCM (Torque reduce signal)		x	x									

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**Fig. 1: Control System Device And Control Relationship Chart - Engine Control System [BP]**

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Courtesy of MAZDA MOTORS CORP.

### MONITORING SYSTEM

X :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		X					
	Refrigerant pressure switch (A/C equipped only)		X		X			X
	PSP switch		X		X			X
	CKP sensor (NE signal)	X	X	X	X	X	X	X
	CMP sensor (SGC signal)	X	X	X	X	X	X	X
	VSS	X	X	X	X	X		X
	MAF sensor	X	X	X	X	X	X	X
	ECT sensor	X	X	X	X	X	X	X
	IAT sensor	X	X	X	X	X		X
	TP sensor	X	X	X	X	X		X
	HO2S (Front)				X	X		
	EGR boost sensor							X
	Fuel gauge sender unit			X				
	HO2S (Rear)	X					X	
	Output device	DLC-2 (Terminal KLN)	X	X	X	X	X	X
MIL		X	X	X	X	X	X	X
Purge solenoid valve				X	X	X		
EGR valve								X
EGR boost sensor solenoid valve								X
EVAP leak detection pump				X				
Fuel injectors					X			

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**Fig. 2: Control System Device And Control Relationship Chart - Monitoring System [BP]**

Courtesy of MAZDA MOTORS CORP.

## CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [BP WITH TC]

### ENGINE CONTROL SYSTEM

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X: 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	Air charging pressure control	Variable tumble control system (VTCS)	A/C cut-off control	Generator control	Immobilizer system
Input device	Brake switch	X	X	X										
	Refrigerant pressure switch (A/C equipped only)	X	X	X			X					X		
	PSP switch	X	X	X								X		
	DLC (TEN)	X		X			X							
	Neutral switch	X	X	X										
	Clutch switch	X	X	X										
	CKP sensor (NE signal)	X	X	X	X	X	X	X	X	X	X	X	X	X
	CMP sensor (SGC signal)		X	X										
	Vehicle speed signal	X							X					
	Knock sensor			X										
	MAF sensor	X	X	X		X		X	X	X				
	ECT sensor	X	X	X		X	X	X	X	X	X	X		
	IAT sensor No.1	X	X	X				X		X				X
	IAT sensor No.2		X	X				X						
	TP sensor	X	X	X			X	X	X	X	X	X		
	HO2S (Rear)		X											
	BARO/MAP sensor	X	X				X			X		X		
	B+		X				X							X
	Generator (Output voltage)													X
	HO2S (Front)		X				X							
Immobilizer unit														X
Output device	IAC valve	X												
	Fuel injector		X											X
	Ignition coil			X										X
	FP relay				X									
	HO2S heater (Front, Rear)					X								
	Fan relay No.1, No.2, No.3						X							
	Purge solenoid valve							X						
	EGR valve								X					
	Turbocharger wastegate regulating valve									X				
	VTCS solenoid valve										X			
	A/C relay											X		
	Generator (Field coil)												X	
	Generator warning light													X

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**Fig. 3: Control System Device And Control Relationship Chart - Engine Control System [BP With TC]**  
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### MONITORING SYSTEM

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X: 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)		X		X			X
	PSP switch		X		X			X
	CKP sensor (NE signal)	X	X	X	X	X	X	X
	CMP sensor (SGC signal)	X	X	X	X	X	X	X
	Vehicle speed signal	X	X	X		X		X
	MAF sensor	X	X	X	X	X	X	X
	ECT sensor	X	X	X	X	X	X	X
	IAT sensor No.1	X	X	X		X		X
	IAT sensor No.2				X			
	TP sensor	X	X	X	X	X		X
	HO2S (Front)	X			X	X		
	BARO/MAP sensor							X
	Fuel gauge sender unit			X				
HO2S (Rear)	X				X			
Output device	DLC-2 (Terminal KLN)	X	X	X	X	X	X	X
	MIL	X	X	X	X	X	X	X
	Purge solenoid valve			X	X	X		
	EGR valve							X
	EGR boost sensor solenoid valve							X
	EVAP leak detection pump			X				
	Fuel injectors				X			

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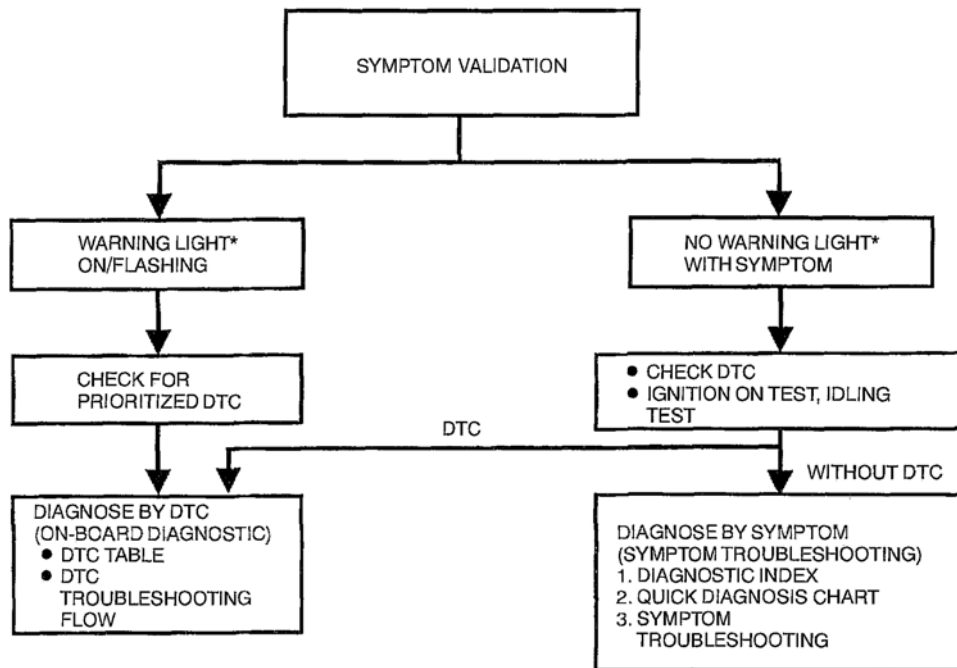
**Fig. 4: Control System Device And Control Relationship Chart - Monitoring System [BP With TC]**  
 Courtesy of MAZDA MOTORS CORP.

### FOREWORD [BP, BP WITH TC]

- 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 **DTC TABLE [BP, BP WITH TC]** .)
  - If no DTC exists and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See **SYMPTOM DIAGNOSTIC INDEX [BP, BP WITH TC]**.)

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

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**Fig. 5: Vehicle Malfunction Flow Chart**  
Courtesy of MAZDA MOTORS CORP.

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

## TURBOCHARGER SYSTEM SYMPTOM TROUBLESHOOTING [BP WITH TC]

### ENGINE LACKS POWER OR ENGINE EXHAUST EMITS BLACK SMOKE

#### SYMPTOM TROUBLESHOOTING - ENGINE LACKS POWER OR ENGINE EXHAUST EMITS BLACK SMOKE

Possible Causes	Remedies
Dirty air cleaner element	Inspect and replace air cleaner if necessary.
Loose compressor-to-intake manifold duct connections	Tighten duct connections as required.
Leakage at engine intake manifold	Locate the leak and repair as necessary.
Leakage at engine exhaust manifold	Locate the leak and repair as necessary.
Leakage at turbocharger mounting flange	Check condition of gasket at turbocharger mounting flange and tighten loose bolts.
Turbocharger rotating assembly binding	Refer to this symptom troubleshooting chart for <b>"TURBOCHARGER ROTATING ASSEMBLY BINDING"</b>

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or dragging	<b>OR DRAGGING".</b>
Restricted duct between air cleaner and turbocharger compressor	Locate and remove restriction or replace damaged parts as necessary.
Restricted duct between compressor and engine intake manifold	Locate and remove restriction or replace damaged parts as necessary.
Restricted engine exhaust system (after turbocharger)	Locate and remove restriction or replace damaged parts as necessary.
Restricted engine intake or exhaust manifold	Locate and remove restriction or replace damaged parts as necessary.
Engine malfunction (fuel system component, valves, valve timing, rings, pistons, etc.)	Diagnose and correct as necessary.

### ENGINE EXHAUST EMITS WHITE OR BLUE SMOKE

#### SYMPTOM TROUBLESHOOTING - ENGINE EXHAUST EMITS WHITE OR BLUE SMOKE

Possible Causes	Remedies
Dirty air cleaner element	Inspect and replace air cleaner if necessary.
Restricted duct between air cleaner and turbocharger compressor	Remove restriction or replace damaged parts as necessary.
Seal leakage at the compressor end of turbocharger	Refer to this symptom troubleshooting chart for " <b><u>OIL SEAL LEAKAGE AT COMPRESSOR END OF TURBOCHARGER</u></b> ".
Engine malfunction (rings, pistons, valves, etc.)	Diagnose and correct as necessary.
Seal leakage at turbine end of turbocharger	Refer to this symptom troubleshooting chart for " <b><u>OIL SEAL LEAKAGE AT TURBINE END OF TURBOCHARGER</u></b> ".

### EXCESSIVE ENGINE OIL CONSUMPTION

#### SYMPTOM TROUBLESHOOTING - EXCESSIVE ENGINE OIL CONSUMPTION

Possible Causes	Remedies
Wrong type or viscosity of engine oil	Replace engine oil with specified viscosity and grade.
Seal leakage at compressor end of turbocharger (indicated by oil in housing or on wheel)	Refer to this symptom troubleshooting chart for " <b><u>OIL SEAL LEAKAGE AT COMPRESSOR END OF TURBOCHARGER</u></b> ".
Seal leakage at turbine end of turbocharger (indicated by oil in housing or on wheel)	Refer to this symptom troubleshooting chart for " <b><u>OIL SEAL LEAKAGE AT TURBINE END OF TURBOCHARGER</u></b> ".
Oil in engine exhaust manifold (indicating malfunction of rings, pistons, valves, etc.)	Diagnose and correct as necessary.

### EXCESSIVE NOISE FROM TURBOCHARGER

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### SYMPTOM TROUBLESHOOTING - EXCESSIVE NOISE FROM TURBOCHARGER

Possible Causes	Remedies
Dirty air cleaner element	Inspect and replace air cleaner if necessary.
Foreign object or material in compressor inlet ducting or compressor housing	Remove foreign object. Repair air intake system and inspect turbocharger. Replace if damaged.
Foreign object or material in compressor-to-intake manifold ducting	Remove foreign object. Repair air intake system and inspect turbocharger. Replace if damaged.
Foreign object or material in engine exhaust system	Remove foreign object. Repair air intake system and inspect turbocharger. Replace if damaged.
Carbon build-up in turbine housing	Clean housing if possible or replace turbocharger if damaged. Inspect engine control system for possible cause.
Turbocharger rotating assembly binding or dragging	Refer to this symptom troubleshooting chart for " <b>TURBOCHARGER ROTATING ASSEMBLY BINDING OR DRAGGING</b> ".
Loose intake or exhaust ducting systems	Locate and correct all loose and leaking connections.

### TURBOCHARGER ROTATING ASSEMBLY BINDING OR DRAGGING

### SYMPTOM TROUBLESHOOTING - TURBOCHARGER ROTATING ASSEMBLY BINDING OR DRAGGING

Possible Causes	Remedies
Damaged compressor wheel due to foreign object impact	Clean and repair air intake system as necessary. Replace turbocharger.
Damaged turbine wheel due to foreign object impact	Clean and repair engine exhaust system as necessary. Replace turbocharger.
Compressor wheel or turbine wheel rubbing on housing (worn bearings, shaft journals, or bearing bores)	Replace turbocharger.
Excessive dirt build up in compressor (on housing or wheel)	Clean and repair air intake system as necessary. Clean compressor. Replace turbocharger if damaged.
Excessive carbon build-up behind turbine wheel (coked oil or combustion deposits)	Inspect the turbocharger, replace if damaged.
Sludge or coked deposits in center housing	Inspect restriction in oil feed and oil drain lines for turbocharger, replace if necessary. Inspect the engine oil condition, replace oil and filter if necessary. Inspect engine oil pressure, repair as necessary. Inspect oil cooler for proper function, replace if damaged or plugged. Replace turbocharger.

### OIL SEAL LEAKAGE AT COMPRESSOR END OF TURBOCHARGER

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### SYMPTOM TROUBLESHOOTING - OIL SEAL LEAKAGE AT COMPRESSOR END OF TURBOCHARGER

Possible Causes	Remedies
Dirty air cleaner element	Inspect and replace air cleaner if necessary.
Restricted turbocharger oil drain line	Clean and remove restriction or replace oil drain lines as necessary.
Excessive pressure in crankcase	Diagnose and correct as necessary.
Worn or damaged compressor wheel	Clean and repair air intake system as necessary. Replace turbocharger.
Turbocharger bearings, bearing bores, or shaft journals worn	Replace turbocharger.
Engine malfunction (excessive piston blow-by or high internal crankcase pressure)	Diagnose and correct as necessary.
Crankcase over-filled	Adjust oil level in crankcase to proper level.

### OIL SEAL LEAKAGE AT TURBINE END OF TURBOCHARGER

#### SYMPTOM TROUBLESHOOTING - OIL SEAL LEAKAGE AT TURBINE END OF TURBOCHARGER

Possible Causes	Remedies
Excessive pre-oiling	No action required (oil will burn away)
Excessive pressure in crankcase	Diagnose and correct as necessary.
Restricted turbocharger oil drain line	Clean and remove restriction or replace oil drain lines as necessary.
Sludge or coked deposits in center housing	Inspect restriction in oil feed and oil drain lines for turbocharger, replace if necessary. Inspect the engine oil condition, replace oil and filter if necessary. Inspect engine oil pressure, repair as necessary. Inspect oil cooler for proper function, replace if damaged or plugged. Replace turbocharger.
Turbocharger bearings, bearing bores, or shaft journals worn	Replace turbocharger.
Engine malfunction (excessive piston blow-by or high internal crankcase pressure)	Diagnose and correct as necessary.
Crankcase over-filled	Adjust oil level in crankcase to proper level.

### INTERMITTENT CONCERN TROUBLESHOOTING [BP, BP WITH TC]

#### 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.**

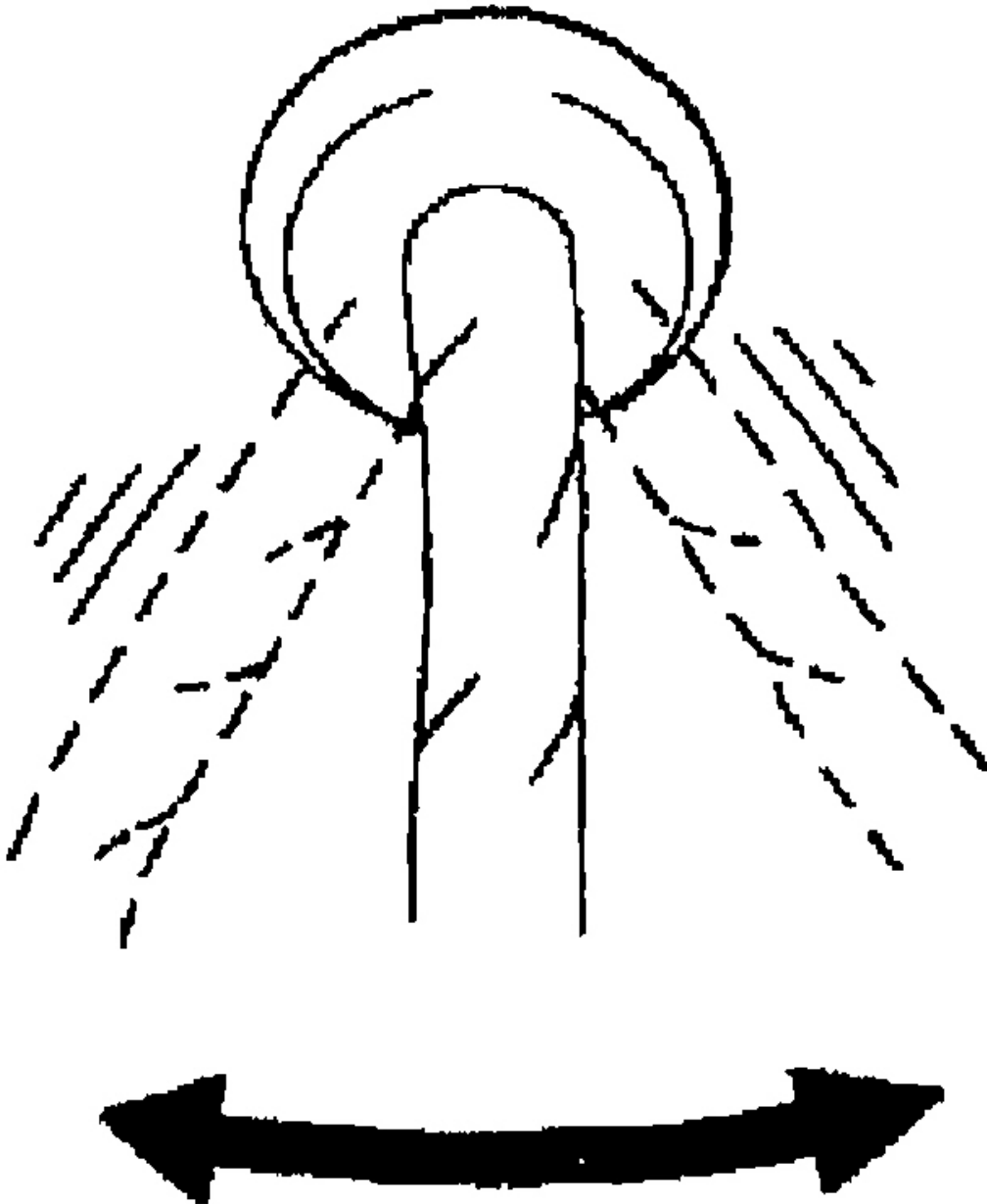
**INSPECTION METHOD FOR SWITCH CONNECTORS OR WIRES**

1. Connect WDS or equivalent to DLC-2.
2. Turn the ignition switch to the ON position (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. Turn switch on manually.
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.



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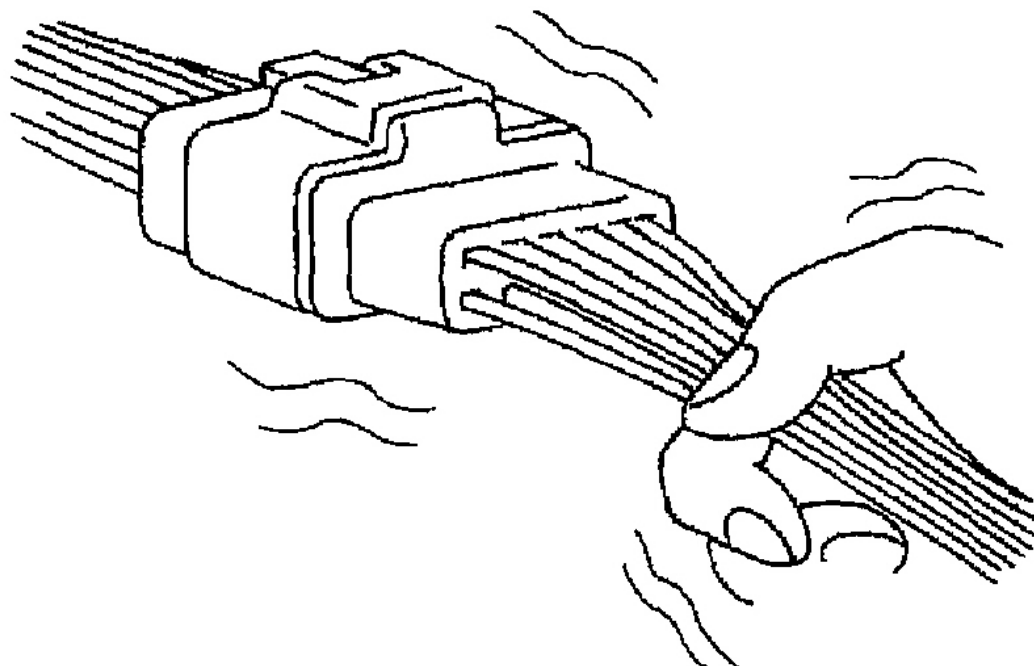
**Fig. 6: Inspecting Switch Connectors Or Wires**  
Courtesy of MAZDA MOTORS CORP.

1. Connect WDS or equivalent to DLC-2.
2. Turn the ignition switch to the ON position (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.



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**Fig. 7: Inspecting Sensor Connectors Or Wires**  
Courtesy of MAZDA MOTORS CORP.

**INSPECTION METHOD FOR SENSORS**

1. Connect WDS or equivalent to DLC-2.
2. Turn the ignition switch to the ON position (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 the ignition switch to the ON position (Engine off).

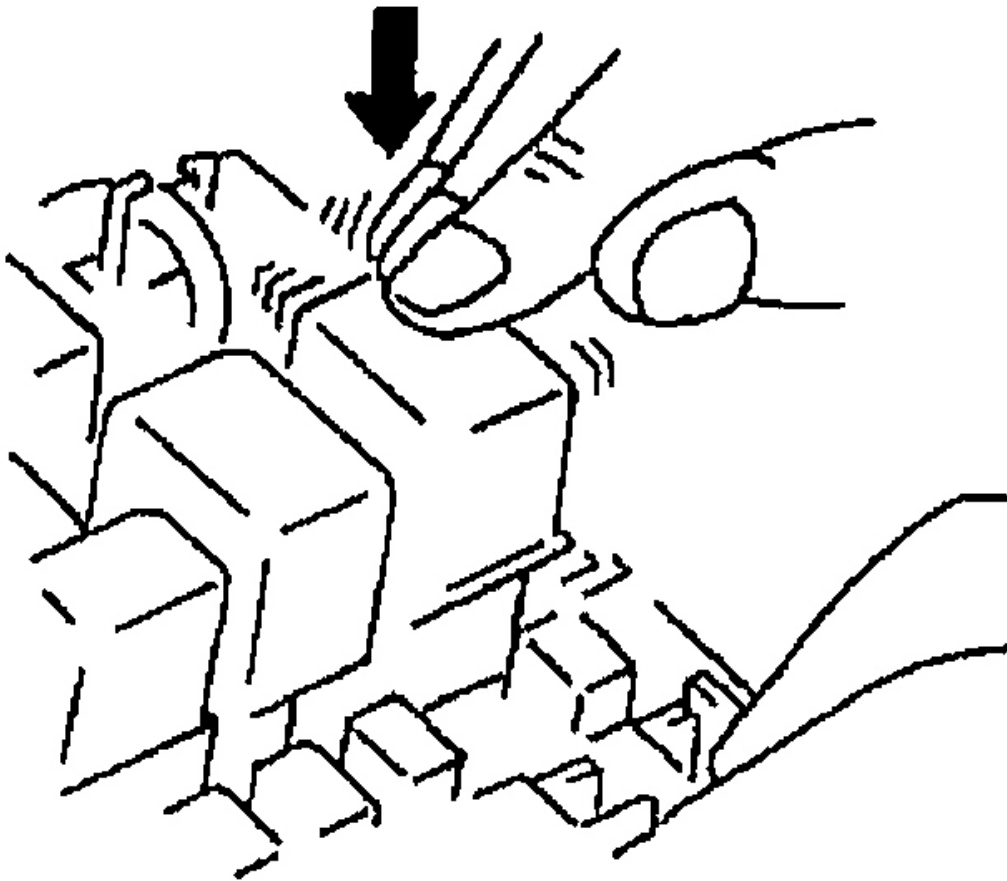
**NOTE:**

- **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.
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.**



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**Fig. 8: Inspecting Actuators Or Relays**  
Courtesy of MAZDA MOTORS CORP.

#### WATER SPRINKLING METHOD

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

**CAUTION:**

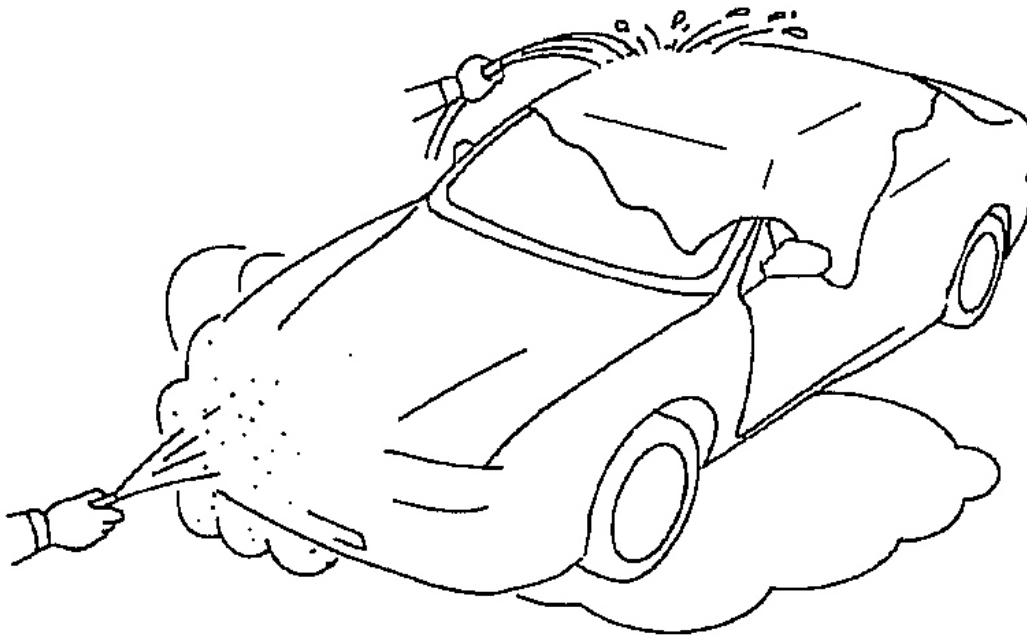
- Change the temperature and humidity Indirectly by spraying water onto the front of the radiator.
- If a vehicle is subject to water leakage, the leakage may damage the control module. When testing a vehicle with a water leakage problem, special caution must be taken.

1. Connect WDS or equivalent to DLC-2 if you are inspecting sensors or switches.
2. Turn the ignition switch to the ON position (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.



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**Fig. 9: Identifying Water Sprinkling Method**  
 Courtesy of MAZDA MOTORS CORP.

**SYMPTOM DIAGNOSTIC INDEX [BP, BP WITH TC]**

**SYMPTOM DIAGNOSTIC INDEX [BP, BP WITH TC]**

No.	TROUBLESHOOTING ITEM	DESCRIPTION	REFERENCE
1	Melting of main or other fuses	--	(See <b>NO.1 MELTING OF</b>

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			<b><u>MAIN OR OTHER FUSES [BP, BP WITH TC].)</u></b>
2	MIL illuminates	MIL is illuminated incorrectly.	<b><u>(See NO.2 MIL ILLUMINATES [BP, BP WITH TC])</u></b>
3	Will not crank	Starter does not work.	<b><u>(See NO.3 WILL NOT CRANK [BP, BP WITH TC])</u></b>
4	Hard start/long crank/erratic start/erratic crank	Starter cranks engine at normal speed but engine requires excessive cranking time before starting.	<b><u>(See NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [BP, BP WITH TC])</u></b>
5	Engine stalls	After start/at idle	<b><u>(See NO.5 ENGINE STALLS-AFTER START, AT IDLE [BP, BP WITH TC])</u></b>
6	Cranks normally but will not start	Starter cranks engine at normal speed but engine will not run.	<b><u>(See NO.6 CRANKS NORMALLY BUT WILL NOT START [BP, BP WITH TC])</u></b>
7	Slow return to idle	Engine takes more time than normal to return to idle speed.	<b><u>(See NO.7 SLOW RETURN TO IDLE [BP, BP WITH TC])</u></b>
8	Engine runs rough/rolling idle	Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively.	<b><u>(See NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [BP, BP WITH TC])</u></b>
9	Fast idle/runs on	Engine speed continues at fast idle after warm-up. Engine runs after ignition switch is turned off.	<b><u>(See NO.9 FAST IDLE/RUNS ON [BP, BP WITH TC])</u></b>
10	Low idle/stalls during deceleration	Engine stops unexpectedly at beginning of deceleration or recovery from deceleration.	<b><u>(See NO.10 LOW IDLE/STALLS DURING DECELERATION [BP, BP WITH TC])</u></b>
11	Engine stalls/quits	Acceleration/cruise	<b><u>(See NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [BP, BP WITH</u></b>

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			unexpectedly while cruising.	TC)
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 <b><u>NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [BP, BP WITH TC]</u></b> )
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 <b><u>NO.13 KNOCKING/PINGING [BP, BP WITH TC]</u></b> )
14	Poor fuel economy		Fuel economy is unsatisfactory.	(See <b><u>NO.14 POOR FUEL ECONOMY [BP, BP WITH TC]</u></b> )
15	Emissions compliance		Fails emissions test	(See <b><u>NO.15 EMISSION COMPLIANCE [BP, BP WITH TC]</u></b> )
16	High oil consumption/leakage		Oil consumption is excessive.	(See <b><u>NO.16 HIGH OIL CONSUMPTION/LEAKAGE [BP, BP WITH TC]</u></b> )
17	Cooling system concerns	Overheating	Engine runs at higher than normal temperature/overheats.	(See <b><u>NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [BP, BP WITH TC]</u></b> )
18	Cooling system	Runs cold	Engine does not reach	(See <b><u>NO.18 COOLING</u></b> )



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	concerns	normal operating temperature.	<b>SYSTEM CONCERNS- RUNS COLD [BP, BP WITH TC]</b>
19	Exhaust smoke	Blue, black, or white smoke from exhaust system	(See <b><u>NO.19 EXHAUST SMOKE [BP, BP WITH TC]</u></b> )
20	Fuel odor (in engine compartment)	Gasoline fuel smell or visible leakage	(See <b><u>NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [BP, BP WITH TC]</u></b> )
21	Engine noise	Engine noise from under hood	(See <b><u>NO.21 ENGINE NOISE [BP, BP WITH TC]</u></b> )
22	Vibration concerns (engine)	Vibration from under hood or driveline	(See <b><u>NO.22 VIBRATION CONCERNS (ENGINE) [BP, BP WITH TC]</u></b> )
23	A/C does not work sufficiently	A/C compressor magnetic clutch does not engage when A/C is turned on.	(See <b><u>NO.23 A/C DOES NOT WORK SUFFICIENTLY [BP, BP WITH TC]</u></b> )
24	A/C always ON or A/C compressor runs continuously	A/C compressor magnetic clutch does not disengage.	(See <b><u>NO.24 A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [BP, BP WITH TC]</u></b> )
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 <b><u>NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS [BP, BP WITH TC]</u></b> )
26	Exhaust sulphur smell	Rotten egg smell (sulphur) from exhaust	(See <b><u>NO.26 EXHAUST SULPHUR SMELL [BP, BP WITH TC]</u></b> )
27	Intermittent concerns	Symptom occurs randomly and difficult to diagnose.	(See <b><u>NO.27 INTERMITTENT CONCERNS [BP, BP WITH TC]</u></b> )
28	Fuel refill concerns	Fuel tank does not fill smoothly.	(See <b><u>NO.28 FUEL REFILL CONCERNS [BP, BP WITH TC]</u></b> )
29	Fuel filling shut off issues	Fuel does not shut off properly.	(See <b><u>NO.29 FUEL FILLING SHUT OFF ISSUES [BP, BP WITH TC]</u></b> )
30	Reference voltage	Incorrect reference voltage	(See <b><u>NO.30 REFERENCE VOLTAGE [BP, BP WITH TC]</u></b> )
31	Spark plug condition	Incorrect spark plug condition	(See <b><u>NO.31 SPARK PLUG CONDITION [BP, BP WITH TC]</u></b> )

## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

				<b>TC)</b>
32	AT concerns	Upshift/downshift/engagement	AT concerns not related to engine performance	(See <b>DIAGNOSTIC INDEX</b> )

### SYMPTOM QUICK DIAGNOSTIC CHART [BP, BP WITH TC]

## 2005 Mazda MX-5 Miata

### 2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

X : Applicable

Possible factor		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
<b>Troubleshooting Item</b>																				
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							X	X	X										
	Engine runs rough																			
	Misses																			
	Buck/jerk																			
	Hesitation/stumble																			
12	Lack/loss power								X	X										
13	Knocking/pinging								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	X
20	Fuel odor (in engine compartment)													X					X	
21	Engine noise																			
22	Vibration concerns (engine)													X		X				
23	A/C does not work sufficiently															X				
24	A/C always ON or A/C compressor runs continuously															X				
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, TROUBLESHOOTING

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**Fig. 10: Quick Diagnostic Symptom Chart [BP, BP With TC] (1 Of 4)**  
 Courtesy of MAZDA MOTORS CORP.

## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

X: Applicable

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 A/C: 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											Possible factor	
Troubleshooting item												
											Melting of main or other fuses	1
											ML illuminates	2
											Will not crank	3
				X							Hard start/long crank/erratic start/erratic crank	4
				X	X	X					Engine stalls   Engine start/at idle	5
				X	X		X	X			Cranks normally but will not start	6
							X				Cranks normally but will not start	7
				X	X		X	X			Engine runs rough/rolling idle	8
	X	X									Fast idle/runs on	9
						X	X				Low idle/stalls during deceleration	10
				X	X	X	X			X	Engine stalls/quits   Acceleration/cruise	11
										X	Engine runs rough   Acceleration/cruise	
										X	Misses   Acceleration/cruise	
										X	Buck/jerk   Acceleration/cruise/ deceleration	
										X	Hesitation/stumble   Acceleration	
											Surges   Acceleration/cruise	12
				X	X	X	X			X	Lack/loss power   Acceleration/cruise	
											Knocking/pinging   Acceleration/cruise	13
				X	X						Poor fuel economy	14
				X	X					X	Emission compliance	15
											High oil consumption/leakage	16
											Cooling system concerns   Overheats	17
											Cooling system concerns   Runs cold	18
					X						Exhaust smoke	19
										X	Fuel odor (in engine compartment)	20
										X	Engine noise	21
X	X										Vibration concerns (engine)	22
											A/C does not wrk sufficiency	23
											A/C always ON or A/C compressor runs continuously	24
											A/C does not cut off under wide open throttle conditions	25
				X							Exhaust sulphur smell	26
						X		X	X	X	Intermittent concerns	27
											Fuel refill concerns	28
											Fuel filling shut off issues	29
											Reference voltage	30
				X	X					X	Spark plug condition	31
											AT concerns   Upshift/downshift/ engagement	32
											See 05-03, TROUBLESHOOTING	

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**Fig. 11: Quick Diagnostic Symptom Chart [BP, BP With TC] (2 Of 4)**  
 Courtesy of MAZDA MOTORS CORP.

## 2005 Mazda MX-5 Miata

### 2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

X: Applicable

Possible factor																					
Troubleshooting item		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 (AT)	P/N position switch in TR switch is open (AT)
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 normally but will not start	X	X	X	X	X	X		X		X	X		X	X	X	X	X	X		
7	Slow return to idle																		X		
8	Engine runs rough/rolling idle	X	X	X	X	X		X	X	X	X			X	X	X				X	
9	Fast idle/runs on																		X		
10	Low idle/stalls during deceleration										X				X						
11	Engine stalls/quits	X	X	X	X	X		X	X	X	X			X	X	X	X	X			
	Engine runs rough							X		X											
	Misses	X						X													
	Buck/jerk																				
	Hesitation/stumble				X						X										
	Surges	X		X					X		X										
12	Lack/loss power	X	X	X	X	X		X	X		X			X	X	X					
13	Knocking/pinging		X	X																	
14	Poor fuel economy		X	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				X	
16	High oil consumption/leakage																				
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			X	X	X	X
28	Fuel refill concerns															X					
29	Fuel filling shut off issues															X					
30	Reference voltage																				
31	Spark plug condition	X	X	X	X		X														
32	AT concerns   Upshift/downshift/engagement																				

See 05-03, TROUBLESHOOTING

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**Fig. 12: Quick Diagnostic Symptom Chart [BP, BP With TC] (3 Of 4)**  
 Courtesy of MAZDA MOTORS CORP.

## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

X: Applicable

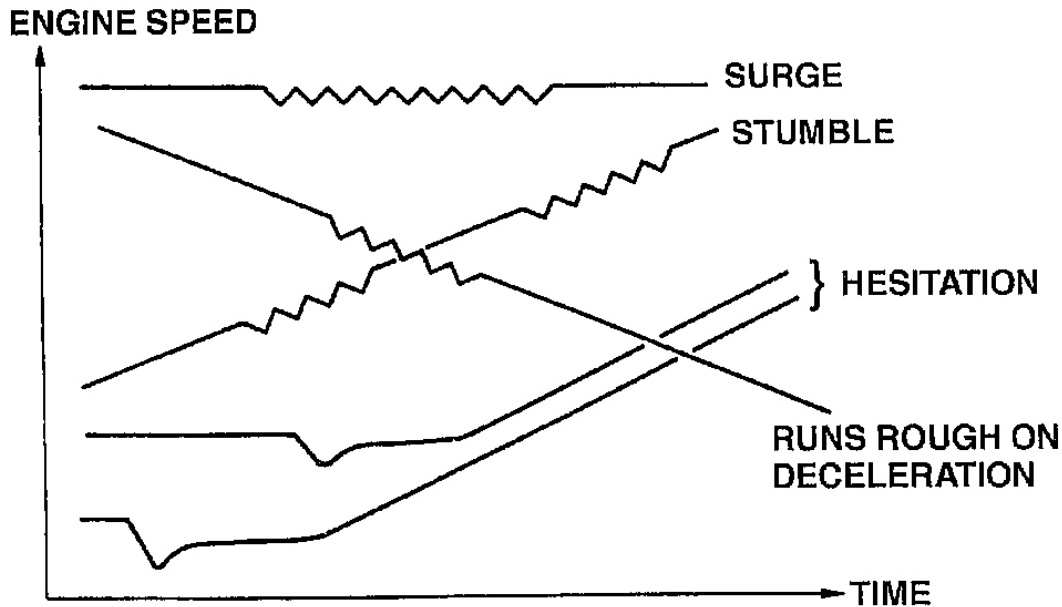
Possible factor										Troubleshooting item	1									
Brake switch and related circuit malfunction	Neutral or clutch switch and related circuit malfunction	MAF sensor and related circuit malfunction	TP sensor and related circuit malfunction	TP sensor misadjustment (including looseness)	KS and related 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 (MT)	AT related parts malfunction (AT)	VSS and related circuit malfunction	Improper ATF level (AT)	Loose parts	Improper balance of wheels and tires	Driveline malfunction	Suspension malfunction
																		Melting of main or other fuses	1	
																		MIL comes on	2	
																		Will not crank	3	
																		Hard start/long crank/erratic start/erratic crank	4	
						X												Engine stalls   Engine start/at idle	5	
										X								Cranks normally but will not start	6	
											X							Slow return to idle	7	
					X	X		X	X									Engine runs rough/rolling idle	8	
									X									Fast idle/runs on	9	
X	X	X	X	X								X	X					Low idle/stalls during deceleration	10	
		X	X	X			X				X	X						Engine stalls/quits   Acceleration/cruise	11	
																		Engine runs rough   Acceleration/cruise		
																		Misses   Acceleration/cruise		
																		Buck/jerk   Acceleration/cruise/ deceleration		
		X																Hesitation/stumble   Acceleration		
																		Surges   Acceleration/cruise	12	
		X	X				X	X			X	X			X			Lack/loss power   Acceleration/cruise		
		X	X	X				X						X	X			Knocking/pinging   Acceleration/cruise	13	
		X	X	X														Poor fuel economy	14	
																		Emission compliance	15	
																		High oil consumption/leakage	16	
							X	X										Cooling system concerns   Overheats	17	
								X										Cooling system concerns   Runs cold	18	
																		Exhaust smoke	19	
																		Fuel odor (in engine compartment)	20	
														X				Engine noise	21	
															X	X	X	Vibration concerns (engine)	22	
						X	X	X										A/C does not work sufficiently	23	
							X	X										A/C always ON or A/C compressor runs continuously	24	
		X	X															A/C does not cut off under wide open throttle conditions	25	
X	X	X		X	X		X					X						Exhaust sulphur smell	26	
																		Intermittent concerns	27	
																		Fuel refill concerns	28	
																		Fuel filling shut off issues	29	
	X	X										X						Reference voltage	30	
	X				X		X											Spark plug	31	
See 05-03, TROUBLESHOOTING																		AT concerns	Upshift/downshift/ engagement	32

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**Fig. 13: Quick Diagnostic Symptom Chart [BP, BP With TC] (4 Of 4)**  
 Courtesy of MAZDA MOTORS CORP.

### DESCRIPTION OF DRIVEABILITY PROBLEMS [BP, BP WITH TC]

- **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.



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**Fig. 14: Driveability Problems Graph [BP, BP With TC]**

Courtesy of MAZDA MOTORS CORP.

## FUEL PRESSURE RELEASE AND SERVICING FUEL SYSTEM [BP, BP WITH TC]

### WARNING:

- Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.

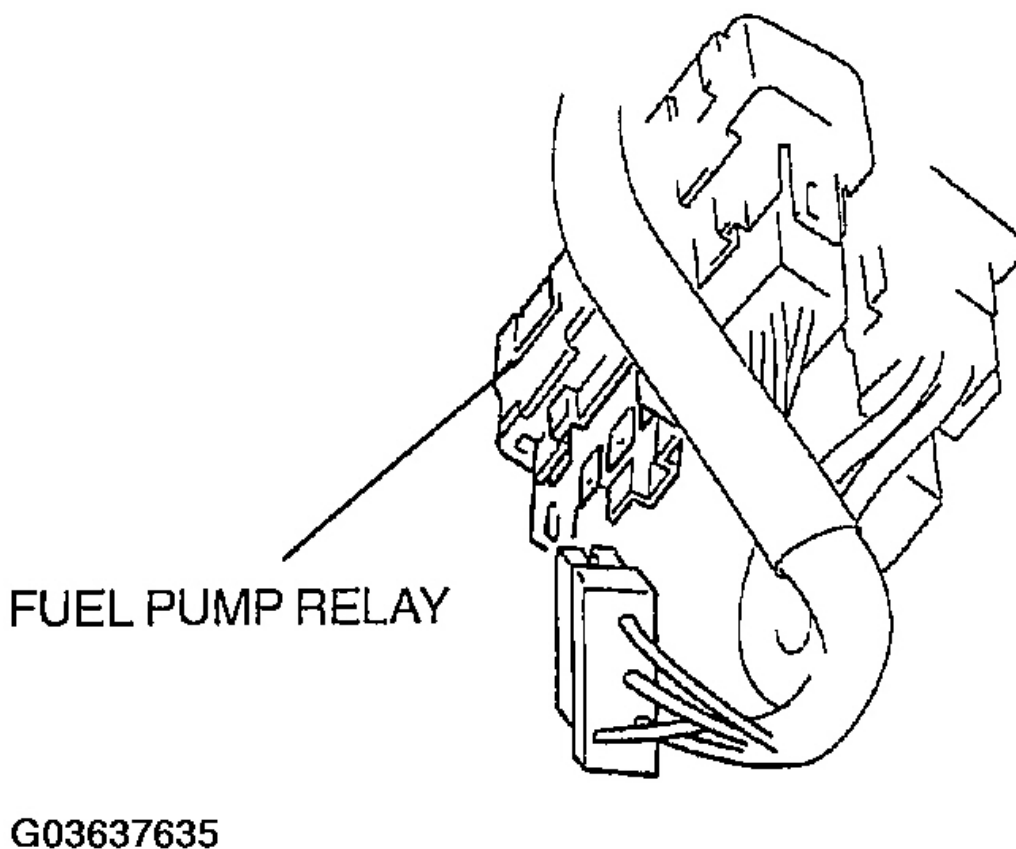
- Fuel in the fuel system is under high pressure when the engine is not running.

### 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 [BP, BP WITH TC]

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



**Fig. 15: Installing Fuel Pump Relay**  
Courtesy of MAZDA MOTORS CORP.

## NO.1 MELTING OF MAIN OR OTHER FUSES [BP, BP WITH TC]



## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

**1**    **Melting of main or other fuses**

**[TROUBLESHOOTING HINTS]**  
Inspect condition of fuse.

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

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**Fig. 16: Identifying Melting Of Main Or Other Fuses [BP, BP With TC]**  
Courtesy of MAZDA MOTORS CORP.

### NO.2 MIL ILLUMINATES [BP, BP WITH TC]

#### NO.2 MIL ILLUMINATES [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

2	MIL illuminates
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• MIL is illuminated.</li> </ul>
	<ul style="list-style-type: none"> <li>• PCM illuminates for emission-related concern (DTC is stored in PCM).</li> </ul>

## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Short to ground circuit between MIL (located on instrument cluster) and PCM</li> </ul> <p style="margin-top: 10px;"><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• If MIL blinks at steady rate, misfire condition could possibly exist.</li> </ul>
-----------------------	---

### DIAGNOSTIC PROCEDURE

#### NO.2 MIL ILLUMINATES [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

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

#### NO.3 WILL NOT CRANK [BP, BP WITH TC]

#### NO.3 WILL NOT CRANK [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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

### DIAGNOSTIC PROCEDURE

#### NO.3 WILL NOT CRANK [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

STEP	INSPECTION	ACTION	
1	<ul style="list-style-type: none"> <li>• Verify following:                             <ul style="list-style-type: none"> <li>○ Battery connection</li> <li>○ Transmission in Park or Neutral (AT)</li> <li>○ Clutch fully depressed (MT)</li> <li>○ Fuses</li> </ul> </li> <li>• Are all items okay?</li> </ul>	Yes	Go to the next step.
		No	Service if necessary and repeat Step 1.
2	<ul style="list-style-type: none"> <li>• Is click sound heard from starter when ignition switch is turned to START?</li> </ul>	Yes	Go to the next step.
		No	Go to Step 4.
3	<ul style="list-style-type: none"> <li>• Inspect starting system.</li> <li>• Is starting system okay?</li> </ul>	Yes	Inspect for seized/hydrolocked engine, flywheel (MT) or drive plate (AT). (See <b>FLYWHEEL INSPECTION</b> )
		No	Service as required. (See <b>STARTER INSPECTION</b> )
4	<ul style="list-style-type: none"> <li>• Do any other electrical accessories work?</li> </ul>	Yes	Go to the next step.
		No	Inspect charging system. (See <b>BATTERY INSPECTION</b> ) (See <b>GENERATOR INSPECTION</b> )
5	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>Following test should be performed on automatic transmissions only. For manual transmissions, go to the next step.</b></li> <li>• Inspect TR sensor adjustment.</li> <li>• Is TR sensor adjusted properly?</li> </ul>	Yes	Go to the next step.
		No	Inspect TR sensor adjustment. <ul style="list-style-type: none"> <li>• If TR sensor is adjusted properly, inspect between TR sensor and PCM terminal 4H or starter for open circuit.</li> </ul>
6	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Turn ignition switch to ON.</li> <li>• Retrieve any DTC.</li> <li>• Is "PASSED" displayed?</li> </ul>	Yes	<p><b>No DTC displayed:</b></p> <ul style="list-style-type: none"> <li>• Inspect following:                             <ul style="list-style-type: none"> <li>○ START circuit in ignition switch</li> <li>○ Open circuit between ignition switch and starter</li> <li>○ Starter interlock switch (MT)</li> </ul> </li> </ul>
		No	<p><b>DTC displayed:</b></p> <ul style="list-style-type: none"> <li>• Go to appropriate DTC test.</li> </ul> <p><b>Communication error message displayed:</b></p>

## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

		<ul style="list-style-type: none"> <li>• Inspect for following:             <ul style="list-style-type: none"> <li>○ Open circuit between main relay and PCM terminal 4AF</li> <li>○ Open main relay GND circuit</li> <li>○ Main relay is stuck open.</li> <li>○ Open or poor ground circuit (PCM terminal 3A or 3B)</li> <li>○ Poor connection of vehicle body GND</li> </ul> </li> </ul>
7	<ul style="list-style-type: none"> <li>• Verify test results.             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                 <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>	

### NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [BP, BP WITH TC]

#### NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

4	Hard start/long crank/erratic start/erratic crank
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Starter cranks engine at normal speed but engine requires excessive cranking time before starting.</li> <li>• Battery is in normal condition.</li> </ul>
	<ul style="list-style-type: none"> <li>• Spark leakage from high-tension leads</li> <li>• Vacuum leakage</li> <li>• Poor fuel quality</li> <li>• Starting system malfunction</li> <li>• Spark plug malfunction</li> <li>• Air leakage from intake-air system</li> <li>• Erratic signal from CKP sensor</li> <li>• Erratic signal from CMP sensor</li> <li>• ACL restriction</li> <li>• IAC valve malfunction</li> <li>• PCV valve malfunction</li> <li>• Inadequate fuel pressure</li> </ul>

## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

### POSSIBLE CAUSE

- Purge solenoid valve malfunction
- MAF sensor contamination
- Restriction in exhaust system
- EGR valve malfunction
- Immobilizer system activation
- Variable valve timing system malfunction

#### WARNING:

- **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**
  - **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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".**

(See **BEFORE SERVICE PRECAUTION [BP, BP WITH TC]** )

(See **AFTER SERVICE PRECAUTION [BP, BP WITH TC]** )

#### CAUTION:

- **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

### DIAGNOSTIC PROCEDURE

#### NO.4 HARD START/LONG CRANK/ERRATIC START/ERRATIC CRANK [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION				
1	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>The following test should be performed on vehicles with immobilizer system. Go to Step 12 for vehicles without immobilizer system.</b></li> <li>• Connect WDS or equivalent to DLC-2.</li> </ul>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 10%;">Yes</td> <td>Both conditions appear: Go to Step 4.</td> </tr> <tr> <td style="text-align: center;">No</td> <td>Either or other condition appears: Go to the next step.</td> </tr> </table>	Yes	Both conditions appear: Go to Step 4.	No	Either or other condition appears: Go to the next step.
Yes	Both conditions appear: Go to Step 4.					
No	Either or other condition appears: Go to the next step.					

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	<ul style="list-style-type: none"> <li>• Do following conditions appear?                             <ul style="list-style-type: none"> <li>○ Engine dose not start completely.</li> <li>○ DTC P1624 is displayed.</li> </ul> </li> </ul>		
2	<ul style="list-style-type: none"> <li>• Does engine stall after approx. <b>2 s</b> since engine is started?</li> </ul>	Yes	Go to the next step.
		No	Immobilizer system is okay. Go to Step 12.
3	<ul style="list-style-type: none"> <li>• Is immobilizer control module connector securely connected to immobilizer control module?</li> </ul>	Yes	Go to the next step.
		No	Connect immobilizer control module connector securely. Return to Step 2.
4	<ul style="list-style-type: none"> <li>• Does immobilizer indicator light flash and indicate any of following immobilizer system DTCs?                             <ul style="list-style-type: none"> <li>○ DTC: 01, 02, 03,11,21</li> </ul> </li> </ul>	Yes	Go to "ON-BOARD DIAGNOSTIC FUNCTION " of immobilizer system
		No	Go to the next step.
5	<ul style="list-style-type: none"> <li>• Does immobilizer indicator light illuminate?</li> </ul>	Yes	Go to step 8.
		No	Go to the next step.
6	<ul style="list-style-type: none"> <li>• Does immobilizer indicator light flash and indicate any of following immobilizer system DTCs <b>more than 135 s</b> after ignition switch is turned to ON?                             <ul style="list-style-type: none"> <li>○ DTC: 24, 30</li> </ul> </li> </ul>	Yes	Go to "ON-BOARD DIAGNOSTIC FUNCTION " of immobilizer system
		No	Install spark plugs on original cylinders. Go to the next step.
7	<ul style="list-style-type: none"> <li>• Turn ignition switch to OFF.</li> <li>• Disconnect immobilizer control module connector.</li> <li>• Connect jumper wire between immobilizer control module connector terminal M and GND.</li> <li>• Turn ignition switch to ON.</li> <li>• Does immobilizer indicator light illuminate?</li> </ul>	Yes	Reconnect immobilizer control module connector. Go to the next step.
		No	<ul style="list-style-type: none"> <li>• Inspect for open circuit between immobilizer control module connector terminal M and instrument cluster.</li> <li>• If okay, inspect immobilizer indicator light bulb.</li> <li>• Repair or replace if necessary.</li> <li>• Reconnect immobilizer control module connector, then return to Step 4.</li> </ul>
8	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2 and retrieve DTC.</li> <li>• Is any of following DTCs displayed?                             <ul style="list-style-type: none"> <li>○ DTC: P1602, P1603, P1604, P1621, P1622, P1624</li> </ul> </li> </ul>	Yes	Go to appropriate DTC test.
		No	Go to the next step.
9	<ul style="list-style-type: none"> <li>• Is there continuity between PCM GND terminals 3A / 3B and GND?</li> </ul>	Yes	Go to the next step.
		No	Repair or replace wiring harness.
10		Yes	Go to the next step.

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	<ul style="list-style-type: none"> <li>• Turn ignition switch to ON.</li> <li>• Measure PCM terminal 4AF.</li> <li>• Is PCM terminal 4AF voltage okay?                             <ul style="list-style-type: none"> <li>○ <b>PCM terminal 4AF voltage:</b></li> <li><b>Battery voltage</b></li> </ul> </li> </ul>	No	Repair or replace wiring harness.
11	<ul style="list-style-type: none"> <li>• Disconnect immobilizer control module connector.</li> <li>• Turn ignition switch on.</li> <li>• Is there battery voltage at immobilizer control module connector terminal J?</li> </ul>	Yes	Inspect for open circuit between PCM connector terminal 3S and immobilizer control module connector terminal A.
		No	Repair or replace wiring harness between immobilizer control module connector terminal J and fuse panel.
12	<ul style="list-style-type: none"> <li>• Verify following:                             <ul style="list-style-type: none"> <li>○ Vacuum leakage</li> <li>○ Fuel quality (i.e proper octane, contamination, winter/summer blend)</li> <li>○ Loose bands on intake-air system</li> <li>○ Cracks on intake-air system parts</li> <li>○ ACL restriction</li> </ul> </li> <li>• Are all items okay?</li> </ul>	Yes	Go to the next step.
		No	Service if necessary. Repeat step 12.
13	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Turn ignition switch to ON.</li> <li>• Retrieve any DTC.</li> <li>• Is "PASSED" displayed?</li> </ul>	Yes	<b>No DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to the next step.</li> </ul>
		No	<b>DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to appropriate DTC test.</li> </ul>
14	<ul style="list-style-type: none"> <li>• Is engine overheating?</li> </ul>	Yes	Go to flowchart 17 for " <b>COOLING SYSTEM CONCERNS OVERHEATING</b> "
		No	Go to the next step.
15	<ul style="list-style-type: none"> <li>• Inspect for cracks on high-tension leads.</li> <li>• Is there any crack on high-tension leads?</li> </ul>	Yes	Repair suspected high-tension lead.
		No	Go to the next step.
16	<ul style="list-style-type: none"> <li>• Inspect variable valve timing operation.</li> <li>• Is variable valve timing operation okay?</li> </ul>	Yes	Go to the next step.
		No	Repair or replace malfunctioning parts.
17	<ul style="list-style-type: none"> <li>• Inspect spark plug conditions.</li> </ul>	Yes	<b>Spark plug is wet or covered with</b>

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	<ul style="list-style-type: none"> <li>Is spark plug wet, grayish white, or covered with carbon?</li> </ul>		<p><b>carbon:</b></p> <ul style="list-style-type: none"> <li>Inspect for fuel leakage from fuel injector.</li> </ul> <p><b>Spark plug is grayish white:</b></p> <ul style="list-style-type: none"> <li>Inspect for clogged fuel injector.</li> </ul>
		No	Install spark plugs on original cylinders. Go to the next step.
18	<ul style="list-style-type: none"> <li>Visually inspect CKP sensor and teeth of crankshaft pulley.</li> <li>Are CKP sensor and teeth of crankshaft pulley okay?</li> </ul>	Yes	Go to the next step.
		No	Replace malfunctioning parts.
19	<ul style="list-style-type: none"> <li>Measure gap between CKP sensor and teeth of crankshaft pulley.</li> </ul> <p><b>Specification</b></p> <p><b>0.5-1.5 mm {0.020-0.59 in}</b></p> <ul style="list-style-type: none"> <li>Is gap within specification?</li> </ul>	Yes	Go to the next step.
		No	Adjust CKP sensor.
20	<ul style="list-style-type: none"> <li>Remove and inspect PCV valve.</li> <li>Does PCV valve rattle?</li> </ul>	Yes	Go to the next step.
		No	Replace PCV valve.
21	<ul style="list-style-type: none"> <li>Install fuel gauge between fuel filter and fuel distributor.</li> <li>Connect a jumper wire between terminal F/P at DLC in engine compartment and GND. (See <b><u>AFTER SERVICE PRECAUTION [BP, BP WITH TC]</u></b> )</li> <li>Turn ignition switch to ON.</li> <li>Is fuel line pressure correct?</li> </ul> <p><b>Fuel line pressure</b></p> <p><b>370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Go to the next step.
		No	<p><b>Zero or low:</b></p> <ul style="list-style-type: none"> <li>Inspect FP circuit</li> <li>Inspect for open FP relief valve</li> <li>Inspect for fuel leakage inside pressure regulator</li> <li>Inspect for clogged main fuel line</li> <li>Inspect pulsation damper</li> </ul> <p><b>High</b></p> <ul style="list-style-type: none"> <li>Inspect pressure regulator for high pressure cause</li> <li>Inspect for clogged fuel return line</li> </ul>
22	<ul style="list-style-type: none"> <li>Is fuel line pressure fluctuation within</li> </ul>	Yes	Go to the next step.
		No	Inspect pressure regulator diaphragm



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	<p>specification after ignition switch is turned off?</p> <p><b>Fuel pressure fluctuation</b></p> <p><b>370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>		<p>condition.</p> <ul style="list-style-type: none"> <li>• If condition is okay, inspect fuel injector.</li> <li>• If condition is not okay, replace pressure regulator.</li> </ul>
23	<ul style="list-style-type: none"> <li>• Disconnect vacuum hose from purge solenoid valve and plug opening end of vacuum hose.</li> <li>• Attempt to start engine.</li> <li>• Is starting condition improved?</li> </ul>	Yes	Inspect if purge solenoid valve is stuck open.
		No	Go to the next step.
24	<ul style="list-style-type: none"> <li>• Inspect MAF sensor for contamination.</li> <li>• Is there any contamination?</li> </ul>	Yes	Replace MAF sensor.
		No	Go to the next step.
25	<ul style="list-style-type: none"> <li>• Is there restriction in exhaust system?</li> </ul>	Yes	Inspect exhaust system.
		No	Go to the next step.
26	<ul style="list-style-type: none"> <li>• Inspect engine condition while tapping EGR valve housing.</li> <li>• Does engine condition improve?</li> </ul>	Yes	Replace EGR valve.
		No	Go to the next step.
27	<ul style="list-style-type: none"> <li>• Inspect starting system.</li> </ul> <p>(See <b>STARTER INSPECTION</b> )</p> <ul style="list-style-type: none"> <li>• Is starting system normal?</li> </ul>	Yes	<p>Inspect for loose connectors or poor terminal contact.</p> <ul style="list-style-type: none"> <li>• If okay, remove EGR valve and visually inspect for mechanically stuck EGR valve.</li> </ul>
		No	Inspect continuity of stepping motor coil.
28	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.5 ENGINE STALLS-AFTER START, AT IDLE [BP, BP WITH TC]

#### NO.5 ENGINE STALLS-AFTER START, AT IDLE [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

<b>5</b>	<b>Engine stalls-after start, at idle</b>
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Engine stops unexpectedly at idle and/or after start.</li> </ul>

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### POSSIBLE CAUSE

- 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

#### WARNING:

- **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**
  - **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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".**

(See **BEFORE SERVICE PRECAUTION [BP, BP WITH TC]** )

(See **AFTER SERVICE PRECAUTION [BP, BP WITH TC]** )

#### CAUTION:

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- **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

### DIAGNOSTIC PROCEDURE

#### NO.5 ENGINE STALLS-AFTER START, AT IDLE [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

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

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	<p>module connector.</p> <ul style="list-style-type: none"> <li>• Connect jumper wire between immobilizer control module connector terminal M and GND.</li> <li>• Turn ignition switch to ON.</li> <li>• Does immobilizer indicator light illuminate?</li> </ul>	No	<ul style="list-style-type: none"> <li>• Inspect open circuit between immobilizer control module connector terminal M and instrument cluster.</li> <li>• If okay, inspect immobilizer indicator light bulb.</li> <li>• Repair or replace if necessary.</li> <li>• Reconnect immobilizer control module connector, then return to Step 4.</li> </ul>
8	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2 and retrieve DTC.</li> <li>• Is any of following DTCs displayed?                             <ul style="list-style-type: none"> <li>○ DTC: P1602, P1603, P1604, P1621, P1622, P1624</li> </ul> </li> </ul>	Yes	Go to appropriate DTC test.
		No	Go to the next step.
9	<ul style="list-style-type: none"> <li>• Is there continuity between PCM GND terminals 3A / 3B and GND?</li> </ul>	Yes	Go to the next step.
		No	Repair or replace wiring harness.
10	<ul style="list-style-type: none"> <li>• Turn ignition switch to ON.</li> <li>• Measure PCM terminal 4AF voltage.</li> <li>• Is PCM terminal 4AF voltage okay?                             <ul style="list-style-type: none"> <li>○ <b>PCM terminal 4AF voltage: Battery voltage</b></li> </ul> </li> </ul>	Yes	Go to the next step.
		No	Repair or replace wiring harness.
11	<ul style="list-style-type: none"> <li>• Disconnect immobilizer control module connector.</li> <li>• Turn ignition switch on.</li> <li>• Is there battery voltage at immobilizer control module connector terminal J?</li> </ul>	Yes	Inspect for open circuit between PCM connector terminal 3S and immobilizer control module connector terminal A.
		No	Repair or replace wiring harness between immobilizer control module connector terminal J and fuse panel.
12	<ul style="list-style-type: none"> <li>• Verify following:                             <ul style="list-style-type: none"> <li>○ Vacuum connection</li> <li>○ ACL element</li> <li>○ No air leakage from intake-air system</li> <li>○ No restriction of intake-air system</li> <li>○ Proper sealing of intake manifold and components attached to intake manifold: (EGR valve, IAC valve)</li> <li>○ Ignition wiring</li> <li>○ Fuel quality; such as proper</li> </ul> </li> </ul>	Yes	Go to the next step.
		No	Service if necessary and repeat Step 12.

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	<ul style="list-style-type: none"> <li>○ octane, contamination, winter/summer blend</li> <li>○ Electrical connections</li> <li>○ Smooth operation of throttle valve</li> </ul> <ul style="list-style-type: none"> <li>● Are all items okay?</li> </ul>		
13	<ul style="list-style-type: none"> <li>● Turn ignition switch to ON.</li> <li>● Disconnect TP sensor connector.</li> <li>● Measure voltage at TP sensor connector A terminal with ignition switch ON.</li> </ul> <p><b>Voltage</b></p> <p><b>4.5-5.5 V</b></p> <ul style="list-style-type: none"> <li>● Is voltage okay?</li> </ul>	Yes	Go to the next step.
		No	Go to troubleshooting No.31 " <b><u>CONSTANT VOLTAGE</u></b> ".
14	<ul style="list-style-type: none"> <li>● Connect WDS or equivalent to DLC-2.</li> <li>● Turn ignition switch to ON.</li> <li>● Retrieve any DTC.</li> <li>● Is "PASSED" displayed?</li> </ul>	Yes	<p><b>No DTC displayed:</b></p> <ul style="list-style-type: none"> <li>● Go to the next step.</li> </ul>
		No	<p><b>DTC displayed:</b></p> <ul style="list-style-type: none"> <li>● Go to appropriate DTC test.</li> </ul> <p><b>Communication error message displayed:</b></p> <ul style="list-style-type: none"> <li>● Inspect for following:                             <ul style="list-style-type: none"> <li>○ Open circuit between main relay and PCM terminal 4AF</li> <li>○ Open main relay GND circuit</li> <li>○ Main relay is stuck open.</li> <li>○ Open PCM GND circuit (terminal 3A or 3B)</li> <li>○ Poor connection of vehicle body GND</li> </ul> </li> </ul>
15	<ul style="list-style-type: none"> <li>● Attempt to start engine at part throttle.</li> <li>● Does engine run smoothly at part throttle?</li> </ul>	Yes	Inspect IAC valve and wiring harness.
		No	Go to the next step.
16	<ul style="list-style-type: none"> <li>● Connect WDS or equivalent to DLC-2.</li> </ul>	Yes	Go to the next step.
		No	Inspect for following:

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	<ul style="list-style-type: none"> <li>• Access RPM PID.</li> <li>• Does RPM PID indicate engine speed during engine cranking?</li> </ul>		<ul style="list-style-type: none"> <li>• Open or short circuit in CKP sensor</li> <li>• Open or short circuit between CKP sensor and PCM terminal 3Y</li> <li>• Open or short circuit in CKP sensor harnesses                             <ul style="list-style-type: none"> <li>○ If CKP sensor and harness are okay, go to the next step.</li> </ul> </li> </ul>
17	<ul style="list-style-type: none"> <li>• Visually inspect CKP sensor and teeth of crankshaft pulley.</li> <li>• Are CKP sensor and teeth of crankshaft pulley okay?</li> </ul>	Yes	Go to the next step.
		No	Replace malfunctioning parts.
18	<ul style="list-style-type: none"> <li>• Measure gap between CKP sensor and teeth of crankshaft pulley.</li> </ul> <p><b>Specification</b></p> <p><b>0.5-1.5 mm {0.020-0.059 in}</b></p> <ul style="list-style-type: none"> <li>• Is gap within specification?</li> </ul>	Yes	Go to the next step.
		No	Adjust CKP sensor.
19	<ul style="list-style-type: none"> <li>• Inspect for cracks on high-tension leads.</li> <li>• Is there any crack on high-tension leads?</li> </ul>	Yes	Repair suspected high-tension lead.
		No	Go to the next step.
20	<ul style="list-style-type: none"> <li>• Is strong blue spark visible at each disconnected high-tension lead during engine cranking?</li> </ul>	Yes	Go to the next step. <ul style="list-style-type: none"> <li>• If symptom occurs with A/C on, go to Step 26.</li> </ul>
		No	Inspect for following: <ul style="list-style-type: none"> <li>• Open or short circuit in ignition coil</li> <li>• Open circuit in high-tension leads</li> <li>• Open circuit between ignition coil connector GND terminal and body GND</li> <li>• Open circuit between ignition switch and ignition coil</li> <li>• Open circuit between ignition coil and PCM terminal 3F or 31</li> </ul>
21	<ul style="list-style-type: none"> <li>• Inspect spark plug conditions.</li> <li>• Is spark plug wet, grayish white, or covered with carbon?</li> </ul>	Yes	<p><b>Spark plug is wet or covered with carbon:</b></p> <ul style="list-style-type: none"> <li>• Inspect for fuel leakage from injector.</li> </ul>

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			<p><b>Spark plug is grayish white:</b></p> <ul style="list-style-type: none"> <li>Inspect for clogged fuel injector.</li> </ul>
		No	Install spark plugs on original cylinders. Go to the next step.
22	<ul style="list-style-type: none"> <li>Remove and shake PCV valve.</li> <li>Does PCV valve rattle?</li> </ul>	Yes	Go to the next step.
		No	Replace PCV valve.
23	<ul style="list-style-type: none"> <li>Is there restriction in exhaust system?</li> <li>Is there any restriction?</li> </ul>	Yes	Inspect exhaust system.
		No	Go to the next step.
24	<ul style="list-style-type: none"> <li>Install fuel gauge between fuel filter and fuel distributor.</li> <li>Connect a jumper wire between terminal F/P at DLC in engine compartment and GND.</li> <li>Turn ignition switch to ON.</li> <li>Is fuel line pressure correct with ignition switch ON?</li> </ul> <p><b>Fuel line pressure 370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Go to the next step.
		No	<p><b>Zero or low:</b></p> <ul style="list-style-type: none"> <li>Inspect FP circuit.</li> <li>Inspect for open FP relief valve.</li> <li>Inspect for fuel leakage inside pressure regulator.</li> <li>Inspect for clogged main fuel line.</li> <li>Inspect pulsation damper.</li> </ul> <p><b>High:</b></p> <ul style="list-style-type: none"> <li>Inspect pressure regulator for the cause of high pressure.</li> <li>Inspect for clogged fuel return line.</li> </ul>
25	<ul style="list-style-type: none"> <li>Visually inspect for fuel leakage at fuel injector O-ring and fuel line.</li> <li>Service if necessary.</li> <li>Is fuel line pressure fluctuating within specification after ignition switch is turned off?</li> </ul> <p>(See <b>FUEL LINE PRESSURE INSPECTION [BP, BP WITH TC]</b> )</p>	Yes	Go to the next step.
		No	<p>Inspect pressure regulator diaphragm condition.</p> <ul style="list-style-type: none"> <li>If condition is okay, inspect fuel injector.</li> <li>If condition is not okay, replace pressure regulator.</li> </ul>
26	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>The following test is for stall concerns with A/C on. If other symptoms exist, go to the next step.</li> </ul>	Yes	Go to the next step.
		No	<p>If A/C is always on, go to symptom troubleshooting No.24 "<b>A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY TBR BP WITH TC]</b>". For other symptoms, inspect following:</p>

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	<ul style="list-style-type: none"> <li>• Connect pressure gauges to A/C low and high pressure side lines.</li> <li>• Turn A/C on and measure low side and high side pressures.</li> <li>• Are pressures within specifications?</li> </ul> <p>(See <b>REFRIGERANT PRESSURE CHECK</b>)</p>		<ul style="list-style-type: none"> <li>• Refrigerant charging amount</li> <li>• Condenser fan operation</li> </ul>
27	<ul style="list-style-type: none"> <li>• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid side.</li> <li>• Plug opening end of vacuum hose.</li> <li>• Start engine.</li> <li>• Is engine stall now eliminated?</li> </ul>	Yes	Inspect if purge solenoid valve is stuck open. Inspect EVAP control system.
		No	Go to the next step.
28	<ul style="list-style-type: none"> <li>• Is air leakage felt or heard at intake-air system components while engine is racing to higher speed?</li> </ul>	Yes	Repair or replace.
		No	Go to the next step.
29	<ul style="list-style-type: none"> <li>• Inspect engine condition while tapping EGR valve housing.</li> <li>• Does engine condition improve?</li> </ul>	Yes	Replace EGR valve.
		No	Go to the next step.
30	<ul style="list-style-type: none"> <li>• Is engine compression correct?</li> </ul>	Yes	Inspect for valve timing.
		No	Inspect for cause.
31	<ul style="list-style-type: none"> <li>• Verify test results. <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.6 CRANKS NORMALLY BUT WILL NOT START [BP, BP WITH TC]

#### NO.6 CRANKS NORMALLY BUT WILL NOT START [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

6	Crankes normally but will not start
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Starter cranks engine at normal speed but engine will not run.</li> <li>• See <b>ENGINE STALLS</b> if this symptom appears after engine stall.</li> <li>• Fuel is in tank.</li> <li>• Battery is in normal condition.</li> </ul>
	<ul style="list-style-type: none"> <li>• No battery power supply to PCM</li> </ul>



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### POSSIBLE CAUSE

- 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
- Immobilizer system activation

### WARNING:

- **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**
  - **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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".**

(See **BEFORE SERVICE PRECAUTION [BP, BP WITH TC]** )

(See **AFTER SERVICE PRECAUTION [BP, BP WITH TC]** )

### CAUTION:

- **Disconnecting/connecting quick release connector without**

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**cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

### DIAGNOSTIC PROCEDURE

#### NO.6 CRANKS NORMALLY BUT WILL NOT START [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

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

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	<p>module, connector.</p> <ul style="list-style-type: none"> <li>• Connect jumper wire between immobilizer control module connector terminal M and GND.</li> <li>• Turn ignition switch to ON.</li> <li>• Does immobilizer indicator light illuminate?</li> </ul>		<ul style="list-style-type: none"> <li>• Inspect open circuit between immobilizer control module connector terminal M and instrument cluster.</li> <li>• If okay, inspect immobilizer indicator light bulb.</li> <li>• Repair or replace if necessary.</li> <li>• Reconnect immobilizer control module connector, then return to Step 4.</li> </ul>
8	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2 and retrieve DTC.</li> <li>• Is any of following DTCs displayed?                             <ul style="list-style-type: none"> <li>○ DTC: P1602, P1603, P1604, P1621, P1622, P1624</li> </ul> </li> </ul>	Yes	Go to appropriate DTC test.
		No	Go to the next step.
9	<ul style="list-style-type: none"> <li>• Is there continuity between PCM GND terminals 3A / 3B and GND?</li> </ul>	Yes	Go to the next step.
		No	Repair or replace wiring harness.
10	<ul style="list-style-type: none"> <li>• Turn ignition switch to ON.</li> <li>• Measure PCM terminal 4AF voltage.</li> <li>• Is PCM terminal 4AF voltage okay?                             <ul style="list-style-type: none"> <li>○ <b>PCM terminal 4AF voltage: Battery voltage</b></li> </ul> </li> </ul>	Yes	Go to the next step.
		No	Repair or replace wiring harness.
11	<ul style="list-style-type: none"> <li>• Disconnect immobilizer control module connector.</li> <li>• Turn ignition switch on.</li> <li>• Is there battery voltage at immobilizer control module connector terminal J?</li> </ul>	Yes	Inspect for open circuit between PCM connector terminal 3S and immobilizer control module connector terminal A.
		No	Repair or replace wiring harness between immobilizer control module connector terminal J and fuse panel.
12	<ul style="list-style-type: none"> <li>• Verify following:                             <ul style="list-style-type: none"> <li>○ Vacuum connection</li> <li>○ External fuel shut off or accessory (kill switch, alarm, etc.)</li> <li>○ Fuel quality; such as proper octane, contamination, winter/summer blend</li> <li>○ No air leakage from intake-air system</li> <li>○ Proper sealing of intake manifold and components attached to intake manifold: (EGR valve, IAC valve)</li> </ul> </li> </ul>	Yes	Go to the next step.
		No	Service if necessary and repeat Step 12.

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	<ul style="list-style-type: none"> <li>○ Ignition wiring</li> <li>○ Electrical connections</li> <li>○ Fuses</li> <li>○ Smooth operation of throttle valve.</li> </ul> <ul style="list-style-type: none"> <li>● Are all items okay?</li> </ul>		
13	<ul style="list-style-type: none"> <li>● Connect WDS or equivalent to DLC-2.</li> <li>● Turn ignition switch to ON.</li> <li>● Retrieve any DTC.</li> <li>● Is "PASSED" displayed?</li> </ul>	Yes	<b>No DTC displayed:</b> <ul style="list-style-type: none"> <li>● Go to the next step.</li> </ul>
		No	<b>DTC displayed:</b> <ul style="list-style-type: none"> <li>● Go to appropriate DTC test.</li> </ul> <b>Communication error message displayed:</b> <ul style="list-style-type: none"> <li>● Inspect for following:                             <ul style="list-style-type: none"> <li>○ Open circuit between main relay and PCM terminal 4AF</li> <li>○ Open main relay GND circuit</li> <li>○ Main relay is stuck open.</li> <li>○ Open PCM GND circuit (terminal 3A or 3B)</li> <li>○ Poor connection of vehicle body GND</li> </ul> </li> </ul>
14	<ul style="list-style-type: none"> <li>● Turn ignition switch to ON.</li> <li>● Disconnect TP sensor connector.</li> <li>● Measure voltage at TP sensor connector A terminal with ignition switch ON.</li> </ul> <p style="margin-left: 20px;"><b>Voltage</b></p> <p style="margin-left: 20px;"><b>4.5-5.5 V</b></p> <ul style="list-style-type: none"> <li>● Is voltage okay?</li> </ul>	Yes	Go to the next step.
		No	Go to troubleshooting No.30 " <b>REFERENCE VOLTAGE</b> ".
15	<ul style="list-style-type: none"> <li>● Does engine start with TP closed?</li> </ul>	Yes	Go to Step 31.
		No	Go to the next step.
16	<ul style="list-style-type: none"> <li>● Will engine start and run smoothly at part throttle?</li> </ul>	Yes	Inspect IAC valve and wiring harness.
		No	Go to the next step.
17	<ul style="list-style-type: none"> <li>● Connect WDS or equivalent to DLC-</li> </ul>	Yes	Go to the next step.
		No	Inspect for following:

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	<p>2.</p> <ul style="list-style-type: none"> <li>• Access RPM PID.</li> <li>• Does RPM PID indicate engine speed while cranking engine?</li> </ul>		<ul style="list-style-type: none"> <li>• Open or short circuit in CKP sensor</li> <li>• Open or short circuit between CKP sensor and PCM terminal 3Y</li> <li>• Open or short circuit in CKP sensor harnesses                             <ul style="list-style-type: none"> <li>○ If CKP sensor and harness are okay, go to the next step.</li> </ul> </li> </ul>
18	<ul style="list-style-type: none"> <li>• Visually inspect CKP sensor and teeth of crankshaft pulley.</li> <li>• Are CKP sensor and teeth of crankshaft pulley okay?</li> </ul>	Yes	Go to the next step.
		No	Replace malfunctioning parts.
19	<ul style="list-style-type: none"> <li>• Measure gap between CKP sensor and teeth of crankshaft pulley.</li> </ul> <p><b>Specification</b></p> <p><b>0.5-1.5 mm {0.020-0.059 in}</b></p> <ul style="list-style-type: none"> <li>• Is gap within specification?</li> </ul>	Yes	Go to the next step.
		No	Adjust CKP sensor.
20	<ul style="list-style-type: none"> <li>• Inspect for cracks on high-tension leads.</li> <li>• Is there any crack on high-tension leads?</li> </ul>	Yes	Repair suspected high-tension lead.
		No	Go to the next step.
21	<ul style="list-style-type: none"> <li>• Is strong blue spark visible at each disconnected high-tension lead during engine cranking?</li> </ul>	Yes	Go to the next step.
		No	Inspect for following: <ul style="list-style-type: none"> <li>• Open or short circuit in ignition coil</li> <li>• Open circuit in high-tension leads</li> <li>• Open circuit between ignition coil connector GND terminal and GND</li> <li>• Open circuit between ignition switch and ignition coil</li> <li>• Open circuit between ignition coil and PCM terminal 3F or 31</li> </ul>
22	<ul style="list-style-type: none"> <li>• Inspect spark plug conditions.</li> <li>• Is spark plug wet, grayish white, or covered with carbon?</li> </ul>	Yes	<p><b>Spark plug is wet or covered with carbon:</b></p> <ul style="list-style-type: none"> <li>• Inspect for fuel leakage from fuel injector.</li> </ul> <p><b>Spark plug is grayish white:</b></p>

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			<ul style="list-style-type: none"> <li>Inspect for clogged fuel injector.</li> </ul>
		No	Install spark plugs on original cylinders. Go to the next step.
23	<ul style="list-style-type: none"> <li>Remove and shake PCV valve.</li> <li>Does PCV valve rattle?</li> </ul>	Yes	Go to the next step.
		No	Replace PCV valve.
24	<ul style="list-style-type: none"> <li>Is there any restriction in exhaust system?</li> </ul>	Yes	Inspect exhaust system.
		No	Go to the next step.
25	<ul style="list-style-type: none"> <li>Install fuel gauge between fuel filter and fuel distributor.</li> <li>Connect a jumper wire between terminal F/P at DLC in engine compartment and GND.</li> <li>Turn ignition switch to ON.</li> <li>Is fuel line pressure correct when ignition switch is turned ON/OFF 5 times?</li> </ul> <p><b>Fuel line pressure 250 kPa {2.55 kgf/cm<sup>2</sup>, 36.3 psi}</b></p>	Yes	Go to the next step.
		No	<p><b>Zero or low: :</b></p> <ul style="list-style-type: none"> <li>Inspect FP circuit.</li> <li>Inspect for open FP relief valve.</li> <li>Inspect for fuel leakage inside pressure regulator.</li> <li>Inspect for clogged main fuel line.</li> <li>Inspect pulsation damper.</li> </ul> <p><b>High:</b></p> <ul style="list-style-type: none"> <li>Inspect pressure regulator for the cause of high pressure.</li> <li>Inspect for clogged fuel return line.</li> </ul>
26	<ul style="list-style-type: none"> <li>Visually inspect for fuel leakage at fuel injector O-ring, pulsation damper, and fuel line.</li> <li>Service if necessary.</li> <li>Is fuel line pressure fluctuating after ignition switch is turned off?</li> </ul> <p>(See <b>FUEL LINE PRESSURE INSPECTION [BP, BP WITH TC]</b> )</p>	Yes	Go to the next step.
		No	Inspect pressure regulator diaphragm condition. <ul style="list-style-type: none"> <li>If condition is okay, inspect fuel injector.</li> <li>If condition is not okay, replace pressure regulator.</li> </ul>
27	<ul style="list-style-type: none"> <li>Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side.</li> <li>Plug opening end of vacuum hose.</li> <li>Attempt to start engine.</li> <li>Is starting condition improved?</li> </ul>	Yes	Inspect if purge solenoid valve is stuck open mechanically. Inspect EVAP control system.
		No	Go to the next step.
28	<ul style="list-style-type: none"> <li>Is air leakage felt or heard at intake-</li> </ul>	Yes	Repair or replace.

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	air system components while racing engine to higher speed?	No	Go to the next step.
29	<ul style="list-style-type: none"> <li>• Inspect engine condition while tapping EGR valve housing.</li> <li>• Does engine condition improve?</li> </ul>	Yes	Replace EGR valve.
		No	Go to the next step.
30	<ul style="list-style-type: none"> <li>• Is engine compression correct?</li> </ul>	Yes	Inspect valve timing.
		No	Inspect for causes.
31	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.7 SLOW RETURN TO IDLE [BP, BP WITH TC]

#### NO.7 SLOW RETURN TO IDLE [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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

#### DIAGNOSTIC PROCEDURE

#### NO.7 SLOW RETURN TO IDLE [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Turn ignition switch to ON.</li> <li>• Retrieve any DTC.</li> <li>• Is "PASSED" displayed?</li> </ul>	Yes <b>No DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to the next step.</li> </ul>
		No <b>DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to appropriate DTC test.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Remove thermostat and inspect operation.</li> </ul> <p>(See <b><u>THERMOSTAT REMOVAL/INSTALLATION</u></b> )</p> <p>(See <b><u>THERMOSTAT INSPECTION</u></b> )</p>	Yes ECT and thermostat are okay. Go to the next step.
		No Access ECT PID on WDS or equivalent. Inspect for both ECT and temperature gauge on instrument cluster readings.

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	<ul style="list-style-type: none"> <li>• Is thermostat okay?</li> </ul>		<ul style="list-style-type: none"> <li>• If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor.</li> <li>• If temperature gauge on instrument cluster indicates cold range but ECT is normal, inspect temperature gauge and heat gauge unit.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Is TB free of contaminations?</li> </ul>	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"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

## NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [BP, BP WITH TC]

### NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

<b>8</b>	<b>Engine runs rough/rolling idle</b>
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively.</li> <li>• Idle speed is too slow and engine shakes excessively.</li> </ul>
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Air leakage from intake-air system parts</li> <li>• A/C system improper operation</li> <li>• Spark leakage from high-tension leads</li> <li>• Purge solenoid valve malfunction</li> <li>• Improper operation of IAC valve</li> <li>• EGR valve malfunction</li> <li>• Erratic or no signal from CMP sensor</li> <li>• Low engine compression</li> <li>• Erratic signal from CMP sensor</li> <li>• Poor fuel quality</li> </ul>



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- 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

**WARNING:**

- **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**
  - 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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".

(See **BEFORE SERVICE PRECAUTION [BP, BP WITH TC]** )

(See **AFTER SERVICE PRECAUTION [BP, BP WITH TC]** )

**CAUTION:**

- **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

### DIAGNOSTIC PROCEDURE

#### NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> <li>• Verify following:                             <ul style="list-style-type: none"> <li>○ External fuel shut off or accessory (kill switch, alarm</li> </ul> </li> </ul>	Yes Go to the next step.

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	<p>etc.)</p> <ul style="list-style-type: none"> <li>○ Fuel quality; such as proper octane, contamination, winter/summer blend</li> <li>○ No air leakage from intake-air system</li> <li>○ Proper sealing of intake manifold and components attached to intake manifold; such as EGR valve, IAC valve</li> <li>○ Ignition wiring</li> <li>○ Electrical connections</li> <li>○ Fuses</li> <li>○ Smooth operation of throttle valve</li> </ul> <p>● Are all items okay?</p>	No	Service if necessary and repeat Step 1.
2	<ul style="list-style-type: none"> <li>● Connect WDS or equivalent to DLC-2.</li> <li>● Turn ignition switch to ON.</li> <li>● Retrieve any DTC.</li> <li>● Is "PASSED" displayed?</li> </ul>	Yes	<p><b>No DTC displayed:</b></p> <ul style="list-style-type: none"> <li>● Go to the next step.</li> </ul>
		No	<p><b>DTC displayed:</b></p> <ul style="list-style-type: none"> <li>● Go to appropriate DTC test.</li> </ul>
3	<ul style="list-style-type: none"> <li>● Is engine overheating?</li> </ul>	Yes	Go to symptom troubleshooting No.17 " <b><u>COOLING SYSTEM CONCERNS OVERHEATING</u></b> ".
		No	Go to the next step.
4	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>● <b>Following test is for engine running rough idle with A/C ON concerns. If other symptoms exist, go to the next step.</b></li> <li>● Connect pressure gauge to A/C low and high pressure side lines.</li> <li>● Start engine and run it at idle.</li> <li>● Turn A/C switch on.</li> <li>● Measure low side and high side pressures.</li> <li>● Are reading pressures within specification?</li> </ul> <p>(See <b><u>REFRIGERANT PRESSURE CHECK</u></b> )</p>	Yes	Go to the next step.
		No	<p>If A/C is always on, go to symptom troubleshooting No.24 "<b><u>A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY TBR BP WITH TC</u></b>".</p> <p>For other symptoms, inspect following:</p> <ul style="list-style-type: none"> <li>● Refrigerant charging amount</li> <li>● Condenser fan operation</li> </ul>

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5	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>Following test is for engine running rough with P/S ON. If other symptoms exist, go to the next step.</b></li> <li>• Start engine and idle it.</li> <li>• Turn steering wheel right to left.</li> <li>• Does engine run rough while turning steering wheel right to left?</li> </ul>	Yes	Inspect PSP switch operation and wiring harness between PSP switch connector and PCM connector terminal 4C.
		No	Go to the next step.
6	<ul style="list-style-type: none"> <li>• Inspect variable valve timing operation.</li> <li>• Is variable valve timing operation okay?</li> </ul>	Yes	Go to the next step.
		No	Repair or replace malfunctioning parts.
7	<ul style="list-style-type: none"> <li>• Visually inspect CKP sensor and teeth of crankshaft pulley.</li> <li>• Are CKP sensor and teeth of crankshaft pulley okay?</li> </ul>	Yes	Go to the next step.
		No	Replace malfunctioning parts.
8	<ul style="list-style-type: none"> <li>• Measure gap between CKP sensor and teeth of crankshaft pulley.</li> </ul> <p><b>Specification</b></p> <p><b>0.5-1.5 mm {0.020-0.059 in}</b></p> <ul style="list-style-type: none"> <li>• Is gap within specification?</li> </ul>	Yes	Go to the next step.
		No	Adjust CKP sensor.
9	<ul style="list-style-type: none"> <li>• Inspect for cracks on high-tension leads.</li> <li>• Is there any crack on high-tension leads?</li> </ul>	Yes	Repair suspected high-tension lead.
		No	Go to the next step.
10	<ul style="list-style-type: none"> <li>• Inspect spark plug conditions.</li> <li>• Is spark plug wet, covered with carbon or grayish white?</li> </ul>	Yes	<p><b>Spark plug is wet or covered with carbon:</b></p> <ul style="list-style-type: none"> <li>• Inspect for fuel leakage from fuel injector.</li> </ul> <p><b>Spark plug is grayish white:</b></p> <ul style="list-style-type: none"> <li>• Inspect for clogged fuel injector.</li> </ul>
		No	Install spark plugs on original cylinders. Go to the next step.
11	<ul style="list-style-type: none"> <li>• Start engine and disconnect IAC valve connector.</li> </ul>	Yes	Go to the next step.

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	<ul style="list-style-type: none"> <li>Does engine speed drop or engine stall?</li> </ul>	No	Inspect IAC valve and wiring harness.
12	<ul style="list-style-type: none"> <li>Install fuel pressure gauge between fuel filter and fuel distributor.</li> <li>Start engine and idle it.</li> <li>Measure fuel line pressure while engine idling.</li> <li>Is fuel line pressure correct while engine idling?</li> </ul> <p><b>Fuel line pressure 370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Go to the next step.
		No	<p><b>Zero or low:</b></p> <ul style="list-style-type: none"> <li>Inspect FP circuit</li> <li>Inspect for open FP relief valve</li> <li>Inspect for fuel leakage inside pressure regulator</li> <li>Inspect for clogged main fuel line</li> <li>Inspect pulsation damper</li> </ul> <p><b>High:</b></p> <ul style="list-style-type: none"> <li>Inspect pressure regulator for high pressure cause</li> <li>Inspect for clogged fuel return line</li> </ul>
13	<ul style="list-style-type: none"> <li>Visually inspect for fuel leakage at fuel injector O-ring, pulsation damper, and fuel line.</li> <li>Service if necessary.</li> <li>Is fuel line pressure fluctuation within specification after ignition switch is turned off?</li> </ul> <p>(See <b>FUEL LINE PRESSURE INSPECTION [BP, BP WITH TC]</b> )</p>	Yes	Go to the next step.
		No	<p>Inspect pressure regulator diaphragm condition.</p> <ul style="list-style-type: none"> <li>If condition is okay, inspect fuel injector.</li> <li>If condition is not okay, replace pressure regulator.</li> </ul>
14	<ul style="list-style-type: none"> <li>Connect WDS or equivalent to DLC-2.</li> <li>Start the engine and idle it.</li> <li>Access LONGFT1 PID.</li> <li>Measure LONGFT1 PID at idle.</li> <li>Is PID value between -15% and +15%?</li> </ul>	Yes	Go to the next step.
		No	<p>LONGFT1 PID is out of specification.</p> <ul style="list-style-type: none"> <li><b>Less than specification (too rich):</b> <ul style="list-style-type: none"> <li>Inspect EVAP control system.</li> <li>If system is okay, go to Step 16.</li> </ul> </li> <li><b>Greater than specification (too lean):</b> <ul style="list-style-type: none"> <li>Inspect for air leakage at intake-air system components.</li> <li>If system is okay, go to the next step.</li> </ul> </li> </ul>
15	<ul style="list-style-type: none"> <li>Disconnect vacuum hose between</li> </ul>	Yes	Inspect if purge solenoid valve is stuck open

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	<p>purge solenoid valve and intake manifold from purge solenoid valve side.</p> <ul style="list-style-type: none"> <li>• Plug opening end of vacuum hose.</li> <li>• Start engine.</li> <li>• Does engine condition improve?</li> </ul>		mechanically. Inspect EVAP control system.
		No	Go to the next step.
16	<ul style="list-style-type: none"> <li>• Remove and shake PCV valve.</li> <li>• Does PCV valve rattle?</li> </ul>	Yes	Go to the next step.
		No	Replace PCV valve.
17	<ul style="list-style-type: none"> <li>• Is there restriction in exhaust system?</li> </ul>	Yes	Inspect exhaust system.
		No	Go to the next step.
18	<ul style="list-style-type: none"> <li>• Visually inspect CMP sensor and teeth of camshaft pulley.</li> <li>• Are CMP sensor and teeth of camshaft okay?</li> </ul>	Yes	Go to the next step.
		No	Replace malfunctioning parts.
19	<ul style="list-style-type: none"> <li>• Inspect engine condition while tapping EGR valve housing.</li> <li>• Does engine condition improve?</li> </ul>	Yes	Replace EGR valve.
		No	Go to the next step.
20	<ul style="list-style-type: none"> <li>• Is engine compression correct?</li> </ul>	Yes	Inspect valve timing.
		No	Inspect for causes.
21	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.9 FAST IDLE/RUNS ON [BP, BP WITH TC]

#### NO.9 FAST IDLE/RUNS ON [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

<b>9</b>	<b>Fast idle/runs on</b>
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Engine speed continues at fast idle after warm-up</li> <li>• Engine runs after ignition switch is turned off</li> </ul>
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• ECT malfunction</li> <li>• Air leakage from intake-air system</li> <li>• TB malfunction</li> <li>• Misadjustment of accelerator cable free play</li> <li>• Misadjustment of cruise control cable</li> </ul>

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### DIAGNOSTIC PROCEDURE

#### NO.9 FAST IDLE/RUNS ON [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

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

#### NO.10 LOW IDLE/STALLS DURING DECELERATION [BP, BP WITH TC]

##### NO.10 LOW IDLE/STALLS DURING DECELERATION [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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

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- 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

#### NO.10 LOW IDLE/STALLS DURING DECELERATION [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION	
1	<ul style="list-style-type: none"> <li>• Does engine idle rough?</li> </ul>	Yes	Go to flow chart 8 for " <b>NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [BP, BP WITH TC]</b> ".
		No	Go to the next step.
2	<ul style="list-style-type: none"> <li>• Verify following:                             <ul style="list-style-type: none"> <li>○ Proper routing and no damage of vacuum lines</li> <li>○ IAC valve is properly connected.</li> <li>○ No air leakage from intake-air system</li> </ul> </li> <li>• Are all items okay?</li> </ul>	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 2.
3	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Turn ignition switch to ON.</li> <li>• Retrieve any DTC.</li> <li>• Is "PASSED" displayed?</li> </ul>	Yes	<b>No DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to the next step.</li> </ul>
		No	<b>DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to appropriate DTC test.</li> </ul>
4	<ul style="list-style-type: none"> <li>• Does idle speed drop or stall when disconnecting IAC valve?</li> </ul>	Yes	Go to the next step.
		No	Inspect following: <ul style="list-style-type: none"> <li>• Circuit from IAC valve to PCM connector terminal 2P or 2Q for open and short</li> <li>• IAC valve for being stuck                                     <ul style="list-style-type: none"> <li>○ If okay, go to the next step.</li> </ul> </li> </ul>
5	<ul style="list-style-type: none"> <li>• Inspect variable valve timing operation.</li> <li>• Is variable valve timing operation okay?</li> </ul>	Yes	Go to next step
		No	Repair or replace malfunctioning parts.
6	<ul style="list-style-type: none"> <li>• Disconnect vacuum hose between</li> </ul>	Yes	Inspect EVAP control system.

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	<p>purge solenoid valve and intake manifold from purge solenoid valve side.</p> <ul style="list-style-type: none"> <li>• Plug opening end of vacuum hose.</li> <li>• Drive vehicle.</li> <li>• Does engine condition improve?</li> </ul>	No	Go to the next step.
7	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Access TP, MAF, VSS PIDs.</li> <li>• Monitor each PIDs while driving vehicle.</li> </ul> <p>(See <b>PCM INSPECTION [BP, BP WITH TC]</b> )</p> <ul style="list-style-type: none"> <li>• Are PIDs okay?</li> </ul>	Yes	Go to flow chart 27 for " <b>INTERMITTENT CONCERNS</b> ".
		No	<p>TP PID: Inspect for TP sensor.                      MAF PID: Inspect for MAF sensor.                      VSS PID: Inspect VSS.</p>
8	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [BP, BP WITH TC]

#### NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

11	<p><b>Engine stalls/quits-acceleration/cruise</b>  <b>Engine runs rough-acceleration/cruise</b>  <b>Misses-acceleration/cruise</b>  <b>Buck/jerk-acceleration/cruise/deceleration</b>  <b>Hesitation/stumble-acceleration</b>  <b>Surges-acceleration/cruise</b></p>
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Engine stops unexpectedly at beginning of acceleration or during acceleration</li> <li>• Engine stops unexpectedly while cruising</li> <li>• Engine speed fluctuates during acceleration or cruising</li> <li>• Engine misses during acceleration or cruising</li> <li>• Vehicle bucks/jerks during acceleration, cruising or deceleration.</li> </ul>



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	<ul style="list-style-type: none"><li>• Momentary pause at beginning of acceleration or during acceleration</li><li>• Momentary minor irregularity in engine output</li></ul>
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"><li>• A/C system improper operation</li><li>• Erratic signal or no signal from CMP sensor</li><li>• Air leakage from intake-air system parts</li><li>• Purge solenoid valve malfunction</li><li>• Improper operation of IAC valve</li><li>• EGR valve malfunction</li><li>• Erratic signal from CKP sensor</li><li>• Low engine compression</li><li>• Vacuum leakage</li><li>• Poor fuel quality</li><li>• Spark leakage from high-tension leads</li><li>• ACL restriction</li><li>• PCV valve malfunction</li><li>• Improper valve timing due to jumping out of timing belt</li><li>• Restriction in exhaust system</li><li>• Intermittent open or short in FP circuit</li><li>• Inadequate fuel pressure</li><li>• FP mechanical malfunction</li><li>• Fuel leakage from fuel injector</li><li>• Fuel injector clogged</li><li>• Intermittent open or short of MAF sensor, TP sensor and VSS</li><li>• Automatic transmission malfunction (AT)</li><li>• Clutch slippage</li><li>• Improper VTCS operation</li></ul> <p><b>WARNING:</b></p> <ul style="list-style-type: none"><li>• <b>The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</b><ul style="list-style-type: none"><li>○ <b>Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</b></li><li>○ <b>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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".</b></li></ul></li></ul>

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(See **BEFORE SERVICE PRECAUTION [BP, BP WITH TC]** )

(See **AFTER SERVICE PRECAUTION [BP, BP WITH TC]** )

**CAUTION:**

- **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

### DIAGNOSTIC PROCEDURE

#### NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION	
1	<ul style="list-style-type: none"> <li>• Verify following:                             <ul style="list-style-type: none"> <li>○ Vacuum connection</li> <li>○ ACL element</li> <li>○ No air leakage from intake-air system</li> <li>○ No restriction of intake-air system</li> <li>○ Proper sealing of intake manifold and components attached to intake manifold: (EGR valve, IAC valve)</li> <li>○ Ignition wiring</li> <li>○ Fuel quality: Proper octane, contamination, winter/summer blend</li> <li>○ Electrical connections</li> <li>○ Smooth operation of throttle valve</li> </ul> </li> <li>• Are all items okay?</li> </ul>	Yes	Go to the next step.
		No	Service if necessary and repeat Step 1.
2	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Turn ignition switch to ON.</li> <li>• Retrieve any DTC.</li> <li>• Is "PASSED" displayed?</li> </ul>	Yes	<b>No DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to the next step.</li> </ul>
		No	<b>DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to appropriate DTC test.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Is engine overheating?</li> </ul>	Yes	Go to symptom troubleshooting No.17 " <b>COOLING SYSTEM CONCERNS</b> "

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		<b>OVERHEATING".</b>	
		No	Go to the next step.
4	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Access RPM, MAF, TP, and VSS PIDs.</li> <li>• Drive vehicle while monitoring PIDs.</li> <li>• Are PIDs within specification?</li> </ul> <p>(See <b>PCM INSPECTION [BP, BP WITH TC]</b> )</p>	Yes	Go to the next step.
		No	<b>RPM PID:</b> <ul style="list-style-type: none"> <li>• Inspect CKP sensor and related harness; such as vibration, intermittent open/short circuit.</li> </ul> <b>MAF PID:</b> <ul style="list-style-type: none"> <li>• Inspect for open circuit of MAF sensor and related wiring harness intermittently.</li> </ul> <b>TP PID:</b> <ul style="list-style-type: none"> <li>• Inspect if output signal from TP sensor changes smoothly.</li> </ul> <b>VSS PID:</b> <ul style="list-style-type: none"> <li>• Inspect for open circuit of VSS and related wiring harness intermittently.</li> </ul>
5	<ul style="list-style-type: none"> <li>• Visually inspect CKP sensor and teeth of crankshaft pulley.</li> <li>• Are CKP sensor and teeth of crankshaft pulley okay?</li> </ul>	Yes	Go to the next step.
		No	Replace malfunctioning parts.
6	<ul style="list-style-type: none"> <li>• Measure gap between CKP sensor and teeth of crankshaft pulley.</li> </ul> <p><b>Specification 0.5-1.5 mm {0.020-0.059 in}</b></p> <ul style="list-style-type: none"> <li>• Is gap within specification?</li> </ul>	Yes	Go to the next step.
		No	Adjust CKP sensor.
7	<ul style="list-style-type: none"> <li>• Inspect spark plug conditions.</li> <li>• Is spark plug wet, grayish white, or converted with carbon?</li> </ul>	Yes	<b>Spark plug is wet or covered with carbon:</b> <ul style="list-style-type: none"> <li>• Inspect for fuel leakage from fuel injector.</li> </ul> <b>Spark plug is grayish white:</b>

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			<ul style="list-style-type: none"> <li>Inspect for clogged fuel injector.</li> </ul>
		No	Install spark plugs on original cylinders. Go to the next step.
8	<ul style="list-style-type: none"> <li>Remove and shake PCV valve.</li> <li>Does PCV valve rattle?</li> </ul>	Yes	Go to the next step.
		No	Replace PCV valve.
9	<ul style="list-style-type: none"> <li>Verify that throttle lever is resting on throttle valve stop screw and/or throttle valve orifice plug.</li> <li>Is lever in correct position?</li> </ul>	Yes	Go to the next step.
		No	Adjust if necessary.
10	<ul style="list-style-type: none"> <li>Are there restrictions in exhaust system?</li> </ul>	Yes	Inspect exhaust system.
		No	Go to the next step.
11	<ul style="list-style-type: none"> <li>Install fuel gauge between fuel filter and fuel distributor.</li> <li>Connect a jumper wire between terminal F/P at DLC in engine compartment and GND.</li> <li>Turn ignition switch to ON.</li> <li>Is fuel line pressure correct with ignition switch at ON?</li> </ul> <p><b>Fuel line pressure 370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Go to the next step.
		No	<p><b>Zero or low:</b></p> <ul style="list-style-type: none"> <li>Inspect FP circuit</li> <li>Inspect for open FP relief valve</li> <li>Inspect for fuel leakage inside pressure regulator</li> <li>Inspect for clogged main fuel line</li> <li>Inspect pulsation damper</li> </ul> <p><b>High:</b></p> <ul style="list-style-type: none"> <li>Inspect pressure regulator for high pressure cause</li> <li>Inspect for clogged fuel return line</li> </ul>
12	<ul style="list-style-type: none"> <li>Visually inspect for fuel leakage at fuel injector O-ring, pulsation damper, and fuel line.</li> <li>Service if necessary.</li> <li>Is fuel line pressure fluctuation within specification after ignition switch is turned off?</li> </ul> <p>(See <b>FUEL LINE PRESSURE INSPECTION [BP, BP WITH TC]</b> )</p>	Yes	Go to the next step.
		No	Inspect pressure regulator diaphragm condition. <ul style="list-style-type: none"> <li>If condition is okay, inspect fuel injector.</li> <li>If condition is not okay, replace pressure regulator.</li> </ul>
13	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>The following test is for engine stalling with A/C on. If other</li> </ul>	Yes	Go to the next step.
		No	If A/C is always on, go to symptom

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	<p><b>symptoms exist, go to the next step.</b></p> <ul style="list-style-type: none"> <li>• Connect a pressure gauge to A/C low and high pressure side lines.</li> <li>• Turn A/C on and measure low side and high side pressures.</li> <li>• Are pressures within specifications?</li> </ul> <p>(See <b><u>REFRIGERANT PRESSURE CHECK</u></b> )</p>		<p>troubleshooting No.24 "<b><u>A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY</u></b>".</p> <p>For other symptoms, inspect following:</p> <ul style="list-style-type: none"> <li>• Refrigerant charging amount</li> <li>• Condenser fan operation</li> </ul>
14	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>The following test is performed for symptom with cruise control ON. If other symptoms exist, go to the next step.</b></li> <li>• Inspect cruise control system.</li> <li>• Is cruise control system okay?</li> </ul>	Yes	Go to the next step.
		No	Repair or replace.
15	<ul style="list-style-type: none"> <li>• Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side.</li> <li>• Plug opening end of vacuum hose.</li> <li>• Drive vehicle.</li> <li>• Does engine condition improve?</li> </ul>	Yes	Inspect if purge solenoid valve is stuck open mechanically. Inspect EVAP control system.
		No	Go to the next step.
16	<ul style="list-style-type: none"> <li>• Visually inspect CMP sensor and teeth of camshaft pulley.</li> <li>• Are CMP sensor and teeth of camshaft pulley okay?</li> </ul>	Yes	Go to the next step.
		No	Replace malfunctioning parts.
17	<ul style="list-style-type: none"> <li>• Inspect VTCS operation.</li> </ul> <p>(See <b><u>VARIABLE TUMBLE CONTROL SYSTEM (VTCS) OPERATION INSPECTION</u></b>)</p> <ul style="list-style-type: none"> <li>• Is VTCS okay?</li> </ul>	Yes	Go to the next step.
		No	Repair or replace malfunctioning parts.
18	<ul style="list-style-type: none"> <li>• Inspect EGR system.</li> <li>• Is EGR system okay?</li> </ul>	Yes	Go to the next step.
		No	Replace malfunctioning parts.
19	<ul style="list-style-type: none"> <li>• Is engine compression correct?</li> </ul>	Yes	<p>Inspect following:</p> <ul style="list-style-type: none"> <li>• Valve timing</li> </ul>

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			<ul style="list-style-type: none"> <li>• Internal transmission part (AT only)</li> <li>• Clutch (MT only)</li> </ul>
		No	Inspect for cause.
20	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [BP, BP WITH TC]

#### NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

<b>12</b>	<b>Lack/loss of power-acceleration/cruise</b>
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Performance is poor under load (i.e., power down when climbing hills).</li> </ul>
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Improper A/C system operation</li> <li>• Erratic signal or no signal from CMP sensor</li> <li>• Air leakage from intake-air system parts</li> <li>• Purge solenoid malfunction</li> <li>• EGR valve malfunction</li> <li>• Brake dragging</li> <li>• Erratic signal from CKP sensor</li> <li>• Low engine compression</li> <li>• Vacuum leakage</li> <li>• Poor fuel quality</li> <li>• Spark leakage from high-tension leads</li> <li>• ACL restriction</li> <li>• PCV valve malfunction</li> <li>• Improper valve timing due to jumping out of timing belt</li> <li>• Restriction in exhaust system</li> <li>• Intermittent open or short in FP circuit</li> <li>• Inadequate fuel pressure</li> <li>• FP mechanical malfunction</li> <li>• Fuel leakage from fuel injector</li> <li>• Fuel injector clogged</li> <li>• Intermittent open or short of MAF sensor, TP sensor and VSS</li> </ul>

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- Automatic transmission malfunction
- Clutch slippage
- Improper VTCS operation
- Variable valve timing system malfunction

**WARNING:**

- **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**
  - **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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".**

(See **BEFORE SERVICE PRECAUTION [BP, BP WITH TC]** )

(See **AFTER SERVICE PRECAUTION [BP, BP WITH TC]** )

**CAUTION:**

- **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

### DIAGNOSTIC PROCEDURE

#### NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

TEP	INSPECTION	ACTION				
1	<ul style="list-style-type: none"> <li>• Verify following:                             <ul style="list-style-type: none"> <li>○ Vacuum connection</li> <li>○ ACL element</li> <li>○ No air leakage from intake-air system</li> <li>○ No restriction of intake-air system</li> <li>○ Proper sealing of intake manifold and components attached to intake manifold:</li> </ul> </li> </ul>	<table border="0" style="width: 100%;"> <tr> <td style="width: 10%; text-align: center; vertical-align: top;">Yes</td> <td style="vertical-align: top;">Go to the next step.</td> </tr> <tr> <td style="width: 10%; text-align: center; vertical-align: top;">No</td> <td style="vertical-align: top;">Service if necessary and repeat Step 1.</td> </tr> </table>	Yes	Go to the next step.	No	Service if necessary and repeat Step 1.
Yes	Go to the next step.					
No	Service if necessary and repeat Step 1.					

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	<p>(EGR valve, IAC valve)</p> <ul style="list-style-type: none"> <li>○ Fuel quality: Proper octane, contamination, winter/summer blend</li> </ul> <ul style="list-style-type: none"> <li>● Are all items okay?</li> </ul>		
2	<ul style="list-style-type: none"> <li>● Connect WDS or equivalent to DLC-2.</li> <li>● Turn ignition switch to ON.</li> <li>● Retrieve any DTC.</li> <li>● Is "PASSED" displayed?</li> </ul>	Yes	<p><b>No DTC displayed:</b></p> <ul style="list-style-type: none"> <li>● Go to the next step.</li> </ul>
		No	<p><b>DTC displayed:</b></p> <ul style="list-style-type: none"> <li>● Go to appropriate DTC test.</li> </ul>
3	<ul style="list-style-type: none"> <li>● Is engine overheating?</li> </ul>	Yes	Go to symptom troubleshooting No.17 " <b><u>COOLING SYSTEM CONCERNS OVERHEATING</u></b> ".
		No	Go to the next step.
4	<ul style="list-style-type: none"> <li>● Connect WDS or equivalent to DLC-2.</li> <li>● Access RPM, MAF, TP and VSS PIDs.</li> <li>● Drive vehicle while monitoring PIDs.</li> <li>● Are PIDs within specifications?</li> </ul> <p>(See <b><u>PCM INSPECTION [BP, BP WITH TC]</u></b> )</p>	Yes	Go to the next step.
		No	<p>RPM PID:</p> <ul style="list-style-type: none"> <li>● Inspect CKP sensor and related harness for vibration and/or intermittent open/short circuit.</li> </ul> <p>MAF PID:</p> <ul style="list-style-type: none"> <li>● Inspect for intermittent open circuit of MAF sensor and related wiring harness.</li> </ul> <p>TP PID:</p> <ul style="list-style-type: none"> <li>● Inspect if TP sensor output increases smoothly.</li> </ul> <p>VSS PID:</p> <ul style="list-style-type: none"> <li>● Inspect for intermittent open circuit of VSS and related wiring harness.</li> </ul>
5	<ul style="list-style-type: none"> <li>● Inspect variable valve timing operation.</li> <li>● Is variable valve timing operation okay?</li> </ul>	Yes	Go to the next step.
		No	Repair or replace malfunctioning parts.



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6	<ul style="list-style-type: none"> <li>• Visually inspect CKP sensor and teeth of crankshaft pulley.</li> <li>• Are CKP sensor and teeth of crankshaft pulley okay?</li> </ul>	Yes	Go to the next step.
		No	Replace malfunctioning parts.
7	<ul style="list-style-type: none"> <li>• Measure gap between CKP sensor and teeth of crankshaft pulley.</li> </ul> <p><b>Specification</b></p> <p><b>0.5-1.5 mm {0.020-0.059 in}</b></p> <ul style="list-style-type: none"> <li>• Is the gap within specification?</li> </ul>	Yes	Go to the next step.
		No	Adjust CKP sensor.
8	<ul style="list-style-type: none"> <li>• Inspect spark plug conditions.</li> <li>• Is spark plug wet, grayish white, or covered with carbon?</li> </ul>	Yes	<p><b>Spark plug is wet or covered with carbon:</b></p> <ul style="list-style-type: none"> <li>• inspect for fuel leakage from fuel injector.</li> </ul> <p><b>Spark plug is grayish white:</b></p> <ul style="list-style-type: none"> <li>• Inspect for clogged fuel injector.</li> </ul>
		No	Install spark plugs on original cylinders. Go to the next step.
9	<ul style="list-style-type: none"> <li>• Remove and shake PCV valve.</li> <li>• Does PCV valve rattle?</li> </ul>	Yes	Go to the next step.
		No	Replace PCV valve.
10	<ul style="list-style-type: none"> <li>• Is there any restriction in exhaust system?</li> </ul>	Yes	Inspect exhaust system.
		No	Go to the next step.
11	<ul style="list-style-type: none"> <li>• Install fuel gauge between fuel filter and fuel distributor.</li> <li>• Connect a jumper wire between terminal F/P at DLC in engine compartment and ground.</li> <li>• Turn ignition switch to ON.</li> <li>• Is fuel line pressure correct with ignition switch at ON?</li> </ul> <p><b>Fuel line pressure</b></p> <p><b>370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Go to the next step.
		No	<p><b>Zero or low:</b></p> <ul style="list-style-type: none"> <li>• Inspect FP circuit</li> <li>• Inspect for open FP relief valve</li> <li>• Inspect for fuel leakage inside pressure regulator</li> <li>• Inspect for clogged main fuel line</li> <li>• Inspect pulsation damper</li> </ul> <p><b>High:</b></p> <ul style="list-style-type: none"> <li>• Inspect pressure regulator for high pressure cause</li> </ul>

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			<ul style="list-style-type: none"> <li>Inspect for clogged fuel return line</li> </ul>
12	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li><b>Following test is for engine stalling with A/C on concern. If other symptoms exist, go to the next step.</b></li> <li>Connect pressure gauge to A/C low and high side pressure lines.</li> <li>Turn A/C on and measure low side and high side pressures.</li> <li>Are the pressures within specifications?</li> </ul> <p>(See <b><u>REFRIGERANT PRESSURE CHECK</u></b> )</p>	Yes	Go to the next step.
		No	<p>If A/C is always on, go to symptom troubleshooting No.24 "<b><u>A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY</u></b>".</p> <p>For other symptoms, inspect following:</p> <ul style="list-style-type: none"> <li>Refrigerant charging amount</li> <li>Condenser fan operation</li> </ul>
13	<ul style="list-style-type: none"> <li>Inspect for A/C cut-off operation.</li> <li>Does A/C cut-off work properly?</li> </ul>	Yes	Go to the next step.
		No	Inspect A/C cut-off system components.
14	<ul style="list-style-type: none"> <li>Disconnect vacuum hose between purge solenoid valve and intake manifold from purge solenoid valve side.</li> <li>Plug opening end of vacuum hose.</li> <li>Drive vehicle.</li> <li>Does engine condition improve?</li> </ul>	Yes	Inspect if purge solenoid valve is stuck open mechanically. Inspect EVAP control system.
		No	Go to the next step.
15	<ul style="list-style-type: none"> <li>Verify VTCS operation.</li> </ul> <p>(See <b><u>VARIABLE TUMBLE CONTROL SYSTEM (VTCS) OPERATION INSPECTION</u></b>)</p> <ul style="list-style-type: none"> <li>Is VTCS operation okay?</li> </ul>	Yes	Go to the next step.
		No	Repair or replace malfunctioning parts.
16	<ul style="list-style-type: none"> <li>Visually inspect CMP sensor and teeth of camshaft pulley.</li> <li>Are CMP sensor and teeth of camshaft okay?</li> </ul>	Yes	Go to the next step.
		No	Replace malfunctioning parts.
17	<ul style="list-style-type: none"> <li>Inspect EGR system.</li> <li>Is EGR system okay?</li> </ul>	Yes	Go to the next step.
		No	Replace malfunctioning parts.
18	<ul style="list-style-type: none"> <li>Is engine compression correct?</li> </ul>	Yes	<p>Inspect following:</p> <ul style="list-style-type: none"> <li>Valve timing</li> </ul>

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			<ul style="list-style-type: none"> <li>• Internal transmission components (AT only)</li> <li>• Clutch (MT only)</li> <li>• Brake system for dragging</li> </ul>
		No	Inspect for cause.
19	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.13 KNOCKING/PINGING [BP, BP WITH TC]

#### NO.13 KNOCKING/PINGING [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

13	<b>Knocking/pinging-acceleration/cruise</b>
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Sound is produced when air/fuel mixture is ignited by something other than spark plug (hot spot in combustion chamber).</li> </ul>
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Engine overheating due to cooling system malfunction</li> <li>• ECT sensor malfunction</li> <li>• IAT sensor malfunction</li> <li>• Inadequate engine compression</li> <li>• Inadequate fuel pressure</li> <li>• KS and related circuit malfunction</li> </ul> <p style="margin-top: 10px;"><b>WARNING:</b></p> <ul style="list-style-type: none"> <li>• <b>The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</b> <ul style="list-style-type: none"> <li>○ <b>Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</b></li> <li>○ <b>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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".</b></li> </ul> </li> </ul> <p style="margin-top: 10px; text-align: center;"><b>(See <u>BEFORE SERVICE PRECAUTION [BP, BP WITH TC]</u> )</b></p> <p style="margin-top: 10px; text-align: center;"><b>(See <u>AFTER SERVICE PRECAUTION [BP, BP WITH TC]</u> )</b></p>

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### CAUTION:

- **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

## DIAGNOSTIC PROCEDURE

### NO.13 KNOCKING/PINGING [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION	
1	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Access ECT PID.</li> <li>• Verify ECT PID is <b>less than 116°C {240°F}</b> during driving.</li> <li>• Is ECT PID less than specification?</li> </ul>	Yes	Go to the next step.
		No	Inspect cooling system for cause of overheating.
2	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Turn ignition switch to ON.</li> <li>• Retrieve any DTC.</li> <li>• Is "PASSED" displayed?</li> </ul>	Yes	<b>No DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to the next step.</li> </ul>
		No	<b>DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to appropriate DTC test.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Is engine compression correct?</li> </ul>	Yes	Go to the next step.
		No	Inspect for cause.
4	<ul style="list-style-type: none"> <li>• Install fuel pressure gauge between fuel filter and fuel distributor.</li> <li>• Start engine and run it at idle.</li> <li>• Measure fuel line pressure at idle.</li> <li>• Is fuel line pressure correct at idle?</li> </ul> <p><b>Fuel line pressure 370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Go to the next step.
		No	<b>Zero or low:</b> <ul style="list-style-type: none"> <li>• Inspect FP circuit</li> <li>• Inspect for open FP relief valve</li> <li>• Inspect for fuel leakage inside pressure regulator</li> <li>• Inspect for clogged main fuel line</li> <li>• Inspect pulsation damper</li> </ul> <b>High:</b> <ul style="list-style-type: none"> <li>• Inspect pressure regulator for high pressure cause</li> <li>• Inspect for clogged fuel return line</li> </ul>
5		Yes	Inspect ignition timing.

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	<ul style="list-style-type: none"> <li>• Measure resistance between KS terminal and KS body.</li> </ul> <p><b>Specification</b></p> <p><b>Approx.560 kilohms (20°C {68°F})</b></p> <ul style="list-style-type: none"> <li>• Is resistance okay?</li> </ul>	No	Replace KS.
6	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.14 POOR FUEL ECONOMY [BP, BP WITH TC]

#### NO.14 POOR FUEL ECONOMY [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

14	Poor fuel economy
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Fuel economy is unsatisfactory.</li> </ul>
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Contaminated air cleaner element</li> <li>• Engine cooling system malfunction</li> <li>• Improper transmission fluid level</li> <li>• Weak spark</li> <li>• Poor fuel quality</li> <li>• Erratic or no signal from CMP sensor</li> <li>• Improper coolant level</li> <li>• Inadequate fuel pressure</li> <li>• Spark plug malfunction</li> <li>• PCV valve malfunction</li> <li>• Brake dragging</li> <li>• Improper valve timing due to jumping out of timing belt</li> <li>• Contaminated MAF sensor</li> <li>• Improper engine compression</li> <li>• Exhaust system clogged</li> <li>• Variable valve timing system malfunction</li> </ul> <p style="margin-top: 10px;"><b>WARNING:</b></p>

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- The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:
  - 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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".

(See **BEFORE SERVICE PRECAUTION [BP, BP WITH TC]** )

(See **AFTER SERVICE PRECAUTION [BP, BP WITH TC]** )

**CAUTION:**

- Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.

### DIAGNOSTIC PROCEDURE

#### NO.14 POOR FUEL ECONOMY [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION	
1	<ul style="list-style-type: none"> <li>• Inspect following:                             <ul style="list-style-type: none"> <li>○ Contaminated air cleaner element</li> <li>○ Transmission fluid level</li> <li>○ Fuel quality</li> <li>○ Coolant level</li> </ul> </li> <li>• Are all items okay?</li> </ul>	Yes	Go to the next step.
		No	Service as necessary. Repeat Step 1.
2	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Turn ignition switch to ON.</li> <li>• Retrieve any DTC.</li> <li>• Is "PASSED" displayed?</li> </ul>	Yes	<b>No DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to the next step.</li> </ul>
		No	<b>DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to appropriate DTC test.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Access ECT PID.</li> </ul>	Yes	Go to the next step.
		No	Inspect for coolant leakage, cooling fan and condenser fan operations or thermostat

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	<ul style="list-style-type: none"> <li>• Drive vehicle while monitoring PID.</li> </ul> <p>(See <b>PCM INSPECTION [BP, BP WITH TC]</b> )</p> <ul style="list-style-type: none"> <li>• Is PID within specification?</li> </ul>		operation.
4	<ul style="list-style-type: none"> <li>• Inspect variable valve timing operation.</li> <li>• Is variable valve timing operation okay?</li> </ul>	Yes	Go to next step
		No	Repair or replace malfunctioning parts.
5	<ul style="list-style-type: none"> <li>• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?</li> </ul>	Yes	Inspect for following: <ul style="list-style-type: none"> <li>• Spark plugs malfunction</li> <li>• CMP sensor is improperly installed.</li> <li>• Trigger wheel damage on camshaft</li> <li>• Open or short circuit on CMP sensor</li> <li>• Open or short circuit between CMP sensor and PCM terminal 3V</li> </ul> Repair or replace malfunctioning part. If okay, go to the next step
		No	Inspect following: <ul style="list-style-type: none"> <li>• High-tension leads</li> <li>• Ignition coil and connector</li> </ul>
6	<ul style="list-style-type: none"> <li>• Install fuel pressure gauge between fuel filter and fuel distributor.</li> <li>• Start engine and run it at idle.</li> <li>• Measure fuel line pressure at idle.</li> <li>• Is fuel line pressure correct at idle?</li> </ul> <p><b>Fuel line pressure 370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Go to the next step.
		No	<p><b>Zero or low:</b></p> <ul style="list-style-type: none"> <li>• Inspect FP circuit.</li> <li>• Inspect for open FP relief valve.</li> <li>• Inspect for fuel leakage inside pressure regulator.</li> <li>• Inspect for clogged main fuel line.</li> <li>• Inspect pulsation damper.</li> </ul> <p><b>High:</b></p> <ul style="list-style-type: none"> <li>• Inspect pressure regulator for high pressure cause.</li> <li>• Inspect for clogged fuel return line.</li> </ul>

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7	<ul style="list-style-type: none"> <li>• Remove and shake PCV valve.</li> <li>• Does PCV valve rattle?</li> </ul>	Yes	Go to the next step.
		No	Replace PCV valve.
8	<ul style="list-style-type: none"> <li>• Is there restriction in exhaust system?</li> </ul>	Yes	Inspect exhaust system.
		No	Go to the next step.
9	<ul style="list-style-type: none"> <li>• Is brake system functioning properly?</li> </ul>	Yes	Go to the next step.
		No	Inspect for cause.
10	<ul style="list-style-type: none"> <li>• Inspect MAF sensor for communication.</li> <li>• Is there any contamination?</li> </ul>	Yes	Replace MAF sensor.
		No	Go to the next step.
11	<ul style="list-style-type: none"> <li>• Is engine compression correct?</li> </ul>	Yes	Inspect for valve timing.
		No	Inspect for cause.
12	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

## NO.15 EMISSION COMPLIANCE [BP, BP WITH TC]

### NO.15 EMISSION COMPLIANCE [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

15	Emission compliance
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Fails emissions test.</li> </ul>
	<ul style="list-style-type: none"> <li>• Vacuum lines leakage or blockage</li> <li>• Cooling system malfunction</li> <li>• Spark plug malfunction</li> <li>• Leakage from intake manifold</li> <li>• Erratic or no signal from CMP sensor</li> <li>• Inadequate fuel pressure</li> <li>• PCV valve malfunction or incorrect valve installation</li> <li>• EGR valve malfunction</li> <li>• Exhaust system clogged</li> <li>• Fuel tank ventilation system malfunction</li> <li>• Charcoal canister damage</li> <li>• Excessive carbon built up in combustion chamber</li> <li>• Improper engine compression</li> <li>• Improper valve timing</li> </ul>



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### POSSIBLE CAUSE

#### WARNING:

- The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:
  - 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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".

(See **BEFORE SERVICE PRECAUTION [BP, BP WITH TC]** )

(See **AFTER SERVICE PRECAUTION [BP, BP WITH TC]** )

#### CAUTION:

- Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.

### DIAGNOSTIC PROCEDURE

#### NO.15 EMISSION COMPLIANCE [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION	
1	<ul style="list-style-type: none"> <li>● Inspect following:                             <ul style="list-style-type: none"> <li>○ Vacuum lines for leakage or blockage</li> <li>○ Electrical connections</li> <li>○ Proper maintenance schedule followed</li> <li>○ Intake-air system and ACL element concerns: obstructions, leakage or dirtiness.</li> </ul> </li> <li>● Are all items okay?</li> </ul>	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 1.
2	<ul style="list-style-type: none"> <li>● Connect WDS or equivalent to DLC-2.</li> <li>● Turn ignition switch to ON.</li> <li>● Retrieve any DTC.</li> <li>● Is "PASSED" displayed?</li> </ul>	Yes	<b>No DTC displayed:</b> <ul style="list-style-type: none"> <li>● Go to the next step.</li> </ul>
		No	<b>DTC displayed:</b> <ul style="list-style-type: none"> <li>● Go to appropriate DTC test.</li> </ul>

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3	<ul style="list-style-type: none"> <li>• Is any other driveability concern present?</li> </ul>	Yes	Go to appropriate flow chart.
		No	Go to the next step.
4	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Access ECT PID.</li> <li>• Warm up engine and run it at idle.</li> <li>• Verify ECT PID is correct.</li> </ul> <p style="text-align: center;">(See <b>PCM INSPECTION [BP, BP WITH TC]</b> )</p> <ul style="list-style-type: none"> <li>• Is ECT PID correct?</li> </ul>	Yes	Go to the next step.
		No	Inspect for coolant leakage, cooling fan and condenser fan operation or thermostat operation.
5	<ul style="list-style-type: none"> <li>• Is strong blue spark visible at each disconnected high-tension lead while cranking engine?</li> </ul>	Yes	Inspect for following: <ul style="list-style-type: none"> <li>• Spark plugs malfunction</li> <li>• CMP sensor is improperly installed.</li> <li>• Damage of trigger wheel on camshaft</li> <li>• Open or short circuit on CMP sensor</li> <li>• Open or short circuit between CMP sensor and PCM terminal 3V</li> </ul> Repair or replace malfunctioning parts. <ul style="list-style-type: none"> <li>• If okay, go to the next step.</li> </ul>
		No	Inspect following: <ul style="list-style-type: none"> <li>• High-tension leads</li> <li>• Ignition coil and connector</li> </ul>
6	<ul style="list-style-type: none"> <li>• Install fuel pressure gauge between fuel filter and fuel distributor.</li> <li>• Start engine and run it at idle.</li> <li>• Measure fuel line pressure at idle.</li> <li>• Is fuel line pressure correct at idle?</li> </ul> <p><b>Fuel line pressure 370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Go to the next step.
		No	<p><b>Zero or low:</b></p> <ul style="list-style-type: none"> <li>• Inspect FP circuit.</li> <li>• Inspect for open FP relief valve.</li> <li>• Inspect for fuel leakage inside pressure regulator.</li> <li>• Inspect for clogged main fuel line.</li> <li>• Inspect pulsation damper.</li> </ul> <p><b>High:</b></p>

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			<ul style="list-style-type: none"> <li>• Inspect pressure regulator for high pressure cause.</li> <li>• Inspect for clogged fuel return line.</li> </ul>
7	<ul style="list-style-type: none"> <li>• Remove and shake PCV valve.</li> <li>• Does PCV valve rattle?</li> </ul>	Yes	Go to the next step.
		No	Replace PCV valve.
8	<ul style="list-style-type: none"> <li>• Inspect for fuel saturation inside charcoal canister.</li> <li>• Is excessive amount of liquid fuel present in canister?</li> </ul>	Yes	Replace charcoal canister.
		No	Go to the next step.
9	<ul style="list-style-type: none"> <li>• Is there restriction in exhaust system?</li> </ul>	Yes	Inspect exhaust system.
		No	Inspect EGR system.
10	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM</li> </ul> </li> </ul> </li> </ul>		

### NO.16 HIGH OIL CONSUMPTION/LEAKAGE [BP, BP WITH TC]

#### NO.16 HIGH OIL CONSUMPTION/LEAKAGE [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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

#### DIAGNOSTIC PROCEDURE

#### NO.16 HIGH OIL CONSUMPTION/LEAKAGE [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION	
1	<ul style="list-style-type: none"> <li>• Remove and shake PCV valve.</li> <li>• Does PCV valve rattle?</li> </ul>	Yes	Go to the next step.
		No	Replace PCV valve.
2	<ul style="list-style-type: none"> <li>• Verify following:                             <ul style="list-style-type: none"> <li>○ External leakage</li> <li>○ Proper dipstick</li> </ul> </li> </ul>	Yes	Inspect internal engine parts such as valves, valve guides, valve stem seals, cylinder head drain passage, and piston rings.

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	<ul style="list-style-type: none"> <li>○ Proper engine oil viscosity</li> <li>● Are all items okay?</li> </ul>	No	Service if necessary. Repeat Step 2.
3	<ul style="list-style-type: none"> <li>● Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>● If vehicle is repaired, troubleshooting completed.</li> <li>● If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [BP, BP WITH TC]

#### NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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

#### DIAGNOSTIC PROCEDURE

#### NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION		
1	<ul style="list-style-type: none"> <li>● Inspect following:</li> </ul>	<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">Yes</td> <td>Go to the next step.</td> </tr> </table>	Yes	Go to the next step.
Yes	Go to the next step.			

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	<ul style="list-style-type: none"> <li>○ Engine coolant level</li> <li>○ Coolant leakage</li> <li>○ Water and anti-freeze mixture</li> <li>○ Radiator condition</li> <li>○ Collapsed or restricted radiator hoses</li> <li>○ Radiator pressure cap</li> <li>○ Overflow system</li> <li>○ Fan rotational direction</li> <li>○ Fuses</li> <li>● Are all items okay?</li> </ul>	No	<p>Service if necessary. Repeat Step 1.</p>
2	<ul style="list-style-type: none"> <li>● Connect WDS or equivalent to DLC-2.</li> <li>● Turn ignition switch to ON.</li> <li>● Retrieve any DTC.</li> <li>● Is "PASSED" displayed?</li> </ul>	Yes	<p><b>No DTC displayed:</b></p> <ul style="list-style-type: none"> <li>● Go to the next step.</li> </ul>
		No	<p><b>DTC displayed:</b></p> <ul style="list-style-type: none"> <li>● Go to appropriate DTC test.</li> </ul>
3	<ul style="list-style-type: none"> <li>● Start engine and run it at idle speed.</li> <li>● Turn A/C switch on.</li> <li>● Does A/C compressor engage?</li> </ul>	Yes	<p>Go to Step 4.</p>
		No	<p>Inspect following and repair or replace if necessary:</p> <ul style="list-style-type: none"> <li>● Refrigerant charging amount</li> <li>● Open circuit between A/C magnetic clutch relay and PCM terminal 2K</li> <li>● Seized A/C magnetic clutch</li> <li>● A/C magnetic clutch malfunction                             <ul style="list-style-type: none"> <li>○ If all items are okay, inspect for following:                                     <ul style="list-style-type: none"> <li>● A/C pressure switch operation</li> <li>● A/C switch is stuck open</li> <li>● Open or short circuit between A/C pressure switch and PCM terminal 4F</li> <li>● Open circuit of blower motor fan switch and resistor (if blower motor does not operate)</li> </ul> </li> </ul> </li> <li>● Evaporator temperature</li> </ul>

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		sensor and amplifier	
4	<ul style="list-style-type: none"> <li>• Start engine and run it at idle speed.</li> <li>• Turn A/C switch on.</li> <li>• Do condenser fan and main cooling fan operate?</li> </ul>	Yes	Go to the next step.
		No	<ul style="list-style-type: none"> <li>• <b>If condenser fan does not operate, inspect for following:</b> <ul style="list-style-type: none"> <li>○ Condenser fan relay is stuck open.</li> <li>○ Condenser fan motor malfunction</li> <li>○ Condenser fan motor GND open</li> <li>○ Open circuit between condenser fan motor and relay</li> <li>○ Open circuit between condenser fan relay and PCM terminal 2C</li> <li>○ Open battery power circuit for condenser fan relay</li> </ul> </li> <li>• <b>If main cooling fan motor does not operate, inspect for following:</b> <ul style="list-style-type: none"> <li>○ Main cooling fan relay is stuck open.</li> <li>○ Main cooling fan motor malfunction</li> <li>○ Main cooling fan motor GND open</li> <li>○ Open circuit between cooling fan motor and relay</li> <li>○ Open circuit between cooling fan relay and PCM terminal 2B</li> <li>○ Open battery power circuit for cooling fan relay</li> </ul> </li> </ul>
5	<ul style="list-style-type: none"> <li>• Is drive belt okay?</li> </ul>	Yes	Go to the next step.
		No	Replace drive belt.
6	<ul style="list-style-type: none"> <li>• Is there any leakage around heater unit in passenger compartment?</li> </ul>	Yes	Inspect and service heater for leakage.
		No	Go to the next step.
7	<ul style="list-style-type: none"> <li>• Is there any leakage in coolant hoses and/or radiator?</li> </ul>	Yes	Replace malfunctioning parts.
		No	Go to the next step.
8	<ul style="list-style-type: none"> <li>• Cool down the engine.</li> <li>• Remove thermostat and inspect operation.</li> </ul>	Yes	ECT and thermostat are okay, inspect engine block for leakage or blockage.
		No	Access ECT PID on WDS or equivalent.

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	<p>(See <b><u>THERMOSTAT REMOVAL/INSTALLATION</u></b> )</p> <p>(See <b><u>THERMOSTAT INSPECTION</u></b> )</p> <ul style="list-style-type: none"> <li>• Is thermostat okay?</li> </ul>	<p>Inspect for both ECT and temperature gauge readings.</p> <ul style="list-style-type: none"> <li>• If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor.</li> <li>• If temperature gauge on instrument cluster indicates overheating but ECT is normal, inspect temperature gauge and heat gauge unit.</li> </ul>
9	<ul style="list-style-type: none"> <li>• Verify test results. <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>	

### NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [BP, BP WITH TC]

#### NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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

#### DIAGNOSTIC PROCEDURE

#### NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION	
1	<ul style="list-style-type: none"> <li>• Is customer complaint "Lack of passenger compartment heat" only?</li> </ul>	Yes	Inspect A/C and heater system.
		No	Go to the next step.
2	<ul style="list-style-type: none"> <li>• Does engine speed continue at fast idle?</li> </ul>	Yes	Go to symptom troubleshooting No.9 " <b>FAST IDLE/RUNS ON</b> ".
		No	Go to the next step.
3	<ul style="list-style-type: none"> <li>• Remove thermostat and inspect operation.</li> </ul>	Yes	Inspect condenser fan and main fan operation.

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	<p>(See <b><u>THERMOSTAT REMOVAL/INSTALLATION</u></b> )</p> <p>(See <b><u>THERMOSTAT INSPECTION</u></b> )</p> <ul style="list-style-type: none"> <li>• Is thermostat okay?</li> </ul>	<ul style="list-style-type: none"> <li>• If both or either fan operate abnormally, inspect for following:             <ul style="list-style-type: none"> <li>○ Main cooling fan relay is stuck closed.</li> <li>○ Condenser fan relay is stuck closed.</li> <li>○ Short to ground between main cooling fan relay and PCM terminal 2B</li> <li>○ Short to ground between condenser fan relay and PCM terminal 2C</li> <li>○ Circuit between main cooling fan relay and fan motor shorts to battery supply line</li> <li>○ Circuit between condenser fan relay and fan motor shorts to battery supply line</li> </ul> </li> </ul>
	<p style="text-align: center;">No</p>	<p>Access ECT V PID on WDS or equivalent.</p> <p>Inspect for both ECT and temperature gauge on instrument cluster readings.</p> <ul style="list-style-type: none"> <li>• If temperature gauge on instrument cluster indicates normal range but ECT is not same as temperature gauge reading, inspect ECT sensor.</li> <li>• If temperature gauge on instrument cluster indicates cold range but ECT is normal, inspect temperature gauge and heat gauge unit.</li> </ul>
4	<ul style="list-style-type: none"> <li>• Verify test results.             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                 <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>	

### NO.19 EXHAUST SMOKE [BP, BP WITH TC]

#### NO.19 EXHAUST SMOKE [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE



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19	Exhaust smoke
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Blue, black, or white smoke from exhaust system</li> </ul>
<b>POSSIBLE CAUSE</b>	<p><b>Blue smoke (Burning oil):</b></p> <ul style="list-style-type: none"> <li>• PCV valve malfunction</li> <li>• Engine internal oil leakage</li> </ul> <p><b>White smoke (Water in combustion):</b></p> <ul style="list-style-type: none"> <li>• Malfunction of cooling system (coolant loss)</li> <li>• Engine internal coolant leakage</li> </ul> <p><b>Black smoke (Rich fuel mixture):</b></p> <ul style="list-style-type: none"> <li>• ACL restricted</li> <li>• Intake-air system collapsed or restricted</li> <li>• Fuel return line restricted</li> <li>• Excessive fuel pressure</li> <li>• Improper engine compression</li> <li>• Injector fuel leakage</li> <li>• Ignition system malfunction</li> </ul> <p><b>WARNING:</b></p> <ul style="list-style-type: none"> <li>• <b>The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</b> <ul style="list-style-type: none"> <li>○ Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</li> <li>○ 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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".</li> </ul> </li> </ul> <p style="text-align: center;">(See <b>BEFORE SERVICE PRECAUTION [BP, BP WITH TC]</b> )</p> <p style="text-align: center;">(See <b>AFTER SERVICE PRECAUTION [BP, BP WITH TC]</b> )</p> <p><b>CAUTION:</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick</b></li> </ul>

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**release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

### DIAGNOSTIC PROCEDURE

#### NO.19 EXHAUST SMOKE [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION	
1	<ul style="list-style-type: none"> <li>• What color is smoke coming from exhaust system?</li> </ul>	Blue	Burning oil is indicated. Go to the 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"> <li>• Remove and shake PCV valve.</li> <li>• Does PCV valve rattle?</li> </ul>	Yes	Inspect for following: <ul style="list-style-type: none"> <li>• Damaged valve guide, stems or valve seals</li> <li>• Blocked oil drain passage in cylinder head</li> <li>• Piston rings for not seated, seized or worn</li> <li>• Damaged cylinder bore                             <ul style="list-style-type: none"> <li>○ If other driveability symptoms are present, return to diagnostic index to service any additional symptoms.</li> </ul> </li> </ul>
		No	Replace PCV valve.
3	<ul style="list-style-type: none"> <li>• Does cooling system hold pressure?</li> </ul>	Yes	Inspect for following: <ul style="list-style-type: none"> <li>• Cylinder head gasket leakage</li> <li>• Intake manifold gasket leakage</li> <li>• Engine block cracked or porous                             <ul style="list-style-type: none"> <li>○ If other driveability symptoms are present, return to diagnostic index to service any additional symptoms.</li> </ul> </li> </ul>
		No	Inspect for cause.
4	<ul style="list-style-type: none"> <li>• Inspect for following:                             <ul style="list-style-type: none"> <li>○ ACL restriction</li> <li>○ Collapsed or restricted intake-air system</li> </ul> </li> </ul>	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 5.

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	<ul style="list-style-type: none"> <li>○ Restricted fuel return line</li> <li>● Are all items okay?</li> </ul>		
5	<ul style="list-style-type: none"> <li>● Connect WDS or equivalent to DLC-2.</li> <li>● Turn ignition switch to ON.</li> <li>● Retrieve any DTC.</li> <li>● Is "PASSED" displayed?</li> </ul>	Yes	<b>No DTC displayed:</b> <ul style="list-style-type: none"> <li>● Go to next Step.</li> </ul>
		No	<b>DTC displayed:</b> <ul style="list-style-type: none"> <li>● Go to appropriate DTC test.</li> </ul>
6	<ul style="list-style-type: none"> <li>● Install fuel pressure gauge between fuel filter and fuel distributor.</li> <li>● Start engine and run it at idle.</li> <li>● Measure fuel line pressure at idle.</li> <li>● Is fuel line pressure correct at idle?</li> </ul> <p><b>Fuel line pressure 370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Go to the next step.
		No	<b>Zero or low:</b> <ul style="list-style-type: none"> <li>● Inspect FP circuit.</li> <li>● Inspect for open FP relief valve.</li> <li>● Inspect for fuel leakage inside pressure regulator.</li> <li>● Inspect for clogged main fuel line.</li> <li>● Inspect pulsation damper.</li> </ul> <b>High:</b> <ul style="list-style-type: none"> <li>● Inspect pressure regulator for high pressure cause.</li> <li>● Inspect for clogged fuel return line.</li> </ul>
7	<ul style="list-style-type: none"> <li>● Is strong blue spark visible at each disconnected high-tension lead while cranking engine?</li> </ul>	Yes	Inspect spark plugs and CMP sensor.
		No	Inspect following: <ul style="list-style-type: none"> <li>● High-tension leads</li> <li>● Ignition coil and connector</li> </ul>
8	<ul style="list-style-type: none"> <li>● Verify test results.               <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                   <ul style="list-style-type: none"> <li>● If vehicle is repaired, troubleshooting completed.</li> <li>● If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [BP, BP WITH TC]

#### NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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20	Fuel odor (in engine compartment)
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Gasoline fuel smell or visible leakage</li> </ul>
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Excessive fuel pressure</li> <li>• Purge solenoid malfunction</li> <li>• Charcoal canister malfunction</li> </ul> <p><b>WARNING:</b></p> <ul style="list-style-type: none"> <li>• 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"> <li>○ Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</li> <li>○ 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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".</li> </ul> </li> </ul> <p style="text-align: center;">(See <b>BEFORE SERVICE PRECAUTION [BP, BP WITH TC]</b> )</p> <p style="text-align: center;">(See <b>AFTER SERVICE PRECAUTION [BP, BP WITH TC]</b> )</p> <p><b>CAUTION:</b></p> <ul style="list-style-type: none"> <li>• Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.</li> </ul>

### DIAGNOSTIC PROCEDURE

#### NO.20 FUEL ODOR (IN ENGINE COMPARTMENT) [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION		ACTION
1	<ul style="list-style-type: none"> <li>• Visually inspect for fuel leakage at fuel injector O-ring, pulsation damper and fuel line.</li> <li>• Service if necessary.</li> <li>• Is fuel line pressure fluctuation within specification after ignition switch is turned off?</li> </ul> <p>(See <b>FUEL LINE PRESSURE</b></p>	Yes	Go to the next step.
		No	Inspect pressure regulator diaphragm condition. <ul style="list-style-type: none"> <li>• If condition is okay, inspect fuel injector.</li> <li>• If condition is not okay, replace pressure regulator.</li> </ul>

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	<b><u>INSPECTION [BP, BP WITH TC]</u></b>		
2	<ul style="list-style-type: none"> <li>• Inspect for blockage/restriction or open between engine vacuum port and charcoal canister.</li> <li>• Is fault indicated?</li> </ul>	Yes	Replace vacuum hose.
		No	Go to the next step.
3	<ul style="list-style-type: none"> <li>• Inspect purge solenoid valve.</li> </ul> <p style="text-align: center;">(See <b><u>PURGE SOLENOID VALVE INSPECTION [BP, BP WITH TC]</u></b>)</p> <ul style="list-style-type: none"> <li>• Is solenoid operating properly?</li> </ul>	Yes	Go to the next step.
		No	Replace purge solenoid valve.
4	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Turn ignition switch to ON.</li> <li>• Retrieve any DTC.</li> <li>• Is "PASSED" displayed?</li> </ul>	Yes	<b>No DTC displayed:</b> <ul style="list-style-type: none"> <li>• Inspect charcoal canister for fuel saturation.                             <ul style="list-style-type: none"> <li>○ If excess amount of liquid fuel present, replace charcoal canister.</li> </ul> </li> </ul>
		No	<b>DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to appropriate DTC test.</li> </ul>
5	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.21 ENGINE NOISE [BP, BP WITH TC]

#### NO.21 ENGINE NOISE [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

21	Engine noise
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Engine noise from under hood</li> </ul>
	Squeal, click or chirp noise: <ul style="list-style-type: none"> <li>• Improper engine oil level</li> <li>• Improper drive belt tension</li> </ul>

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POSSIBLE CAUSE	<p><b>Rattle sound noise:</b></p> <ul style="list-style-type: none"> <li>• Loose parts</li> <li>• Hiss sound noise:</li> <li>• Vacuum leakage</li> <li>• Loose spark plug</li> <li>• Air leakage from intake-air system</li> </ul> <p><b>Rumble or grind noise:</b></p> <ul style="list-style-type: none"> <li>• Improper drive belt tension</li> </ul> <p><b>Rap or roar sound noise:</b></p> <ul style="list-style-type: none"> <li>• Exhaust system loose</li> </ul> <p><b>Other noise:</b></p> <ul style="list-style-type: none"> <li>• Camshaft friction gear noise or MLA noise</li> </ul>
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### DIAGNOSTIC PROCEDURE

#### NO.21 ENGINE NOISE [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION		ACTION
1	<ul style="list-style-type: none"> <li>• Is squeal, click or chirp sound present?</li> </ul>	Yes	Inspect engine oil level or drive belts.
		No	Go to the next step.
2	<ul style="list-style-type: none"> <li>• Is rumble or grind sound present?</li> </ul>	Yes	Inspect drive belts.
		No	Go to the next step.
3	<ul style="list-style-type: none"> <li>• Is rattle sound present?</li> </ul>	Yes	Inspect location of rattle for loose parts.
		No	Go to the next step.
4	<ul style="list-style-type: none"> <li>• Is hiss sound present?</li> </ul>	Yes	Inspect for following: <ul style="list-style-type: none"> <li>• Vacuum leakage</li> <li>• Spark plug looseness</li> <li>• Intake-air system leakage</li> </ul>
		No	Go to the next step.
5	<ul style="list-style-type: none"> <li>• Is rap or roar sound present?</li> </ul>	Yes	Inspect exhaust system for loose parts.
		No	Go to the next step.
6	<ul style="list-style-type: none"> <li>• Is knock sound present?</li> </ul>	Yes	Go to symptom troubleshooting No.12 " " .
		No	If noise comes from engine internal, inspect for friction gear or MLA noise.

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7	<ul style="list-style-type: none"> <li>• Verify test results.             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                 <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>
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### NO.22 VIBRATION CONCERNS (ENGINE) [BP, BP WITH TC]

#### NO.22 VIBRATION CONCERNS (ENGINE) [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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

#### DIAGNOSTIC PROCEDURE

#### NO.22 VIBRATION CONCERNS (ENGINE) [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION				
1	<ul style="list-style-type: none"> <li>• Inspect following components for loose attaching bolts or worn parts:             <ul style="list-style-type: none"> <li>○ Cooling fan</li> <li>○ Drive belt and pulleys</li> <li>○ Engine mounts</li> </ul> </li> <li>• All items okay?</li> </ul>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 10%;">Yes</td> <td>Inspect following systems:             <ul style="list-style-type: none"> <li>• Wheels</li> <li>• Transmission</li> <li>• Driveline</li> <li>• Suspension</li> </ul> </td> </tr> <tr> <td style="text-align: center;">No</td> <td>Readjust or retighten engine mount installation position. Service if necessary for other parts.</td> </tr> </table>	Yes	Inspect following systems: <ul style="list-style-type: none"> <li>• Wheels</li> <li>• Transmission</li> <li>• Driveline</li> <li>• Suspension</li> </ul>	No	Readjust or retighten engine mount installation position. Service if necessary for other parts.
Yes	Inspect following systems: <ul style="list-style-type: none"> <li>• Wheels</li> <li>• Transmission</li> <li>• Driveline</li> <li>• Suspension</li> </ul>					
No	Readjust or retighten engine mount installation position. Service if necessary for other parts.					
2	<ul style="list-style-type: none"> <li>• Verify test results.             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                 <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>					

### NO.23 A/C DOES NOT WORK SUFFICIENTLY [BP, BP WITH TC]

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### NO.23 A/C DOES NOT WORK SUFFICIENTLY [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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

### DIAGNOSTIC PROCEDURE

#### NO.23 A/C DOES NOT WORK SUFFICIENTLY [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-2.</li> <li>• Turn ignition switch to ON.</li> <li>• Retrieve any DTC.</li> <li>• Is "PASSED" displayed?</li> </ul>	Yes <b>No DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to the next step.</li> </ul>
		No <b>DTC displayed:</b> <ul style="list-style-type: none"> <li>• Go to appropriate DTC test.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Disconnect A/C compressor connector.</li> <li>• Start the engine and turn A/C switch on.</li> <li>• Is there correct voltage at terminal of A/C compressor magnetic clutch connector?</li> </ul> <p><b>Specification More than 10.5 V</b></p>	Yes Inspect GND condition of magnetic clutch on A/C compressor. <ul style="list-style-type: none"> <li>• If ground condition is okay, inspect for open circuit of magnetic clutch coil.</li> </ul>
		No Go to the next step.
3	<ul style="list-style-type: none"> <li>• Disconnect A/C high-pressure switch connector.</li> <li>• Connect jumper wire between terminals of A/C high-pressure switch connector.</li> <li>• Turn ignition switch to ON.</li> <li>• Turn A/C switch on and set blower fan at any speed.</li> </ul>	Yes Inspect A/C high-pressure switch operation. Replace malfunctioning switch. <ul style="list-style-type: none"> <li>• If switch is okay, go to the next step.</li> </ul>
		No Inspect following: <ul style="list-style-type: none"> <li>• A/C switch for being stuck open</li> <li>• Open circuit between A/C pressure switch and PCM terminal 4F</li> </ul>



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	<ul style="list-style-type: none"> <li>Does A/C work?</li> </ul>		<ul style="list-style-type: none"> <li>Open circuit of blower motor fan switch and resistor (if blower motor does not operate)</li> <li>Evaporator temperature sensor and amplifier</li> </ul>
4	<ul style="list-style-type: none"> <li>Remove jumper wire from switch connector.</li> <li>Reconnect connector to A/C high-pressure switch.</li> <li>Start engine and turn A/C switch on.</li> <li>Verify fan operation.</li> <li>Does fan operate?</li> </ul>	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"> <li>Refrigerant charging amount</li> <li>A/C compressor for being seized</li> </ul>
5	<ul style="list-style-type: none"> <li>Verify test results. <ul style="list-style-type: none"> <li>If okay, return to diagnostic index to service any additional symptoms.</li> <li>If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. <ul style="list-style-type: none"> <li>If vehicle is repaired, troubleshooting completed.</li> <li>If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.24 A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY TBR BP WITH TC]

#### NO.24 A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY TBR BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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

#### DIAGNOSTIC PROCEDURE

#### NO.24 A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY TBR BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> <li>Connect WDS or equivalent to DLC-2.</li> </ul>	<ul style="list-style-type: none"> <li>Yes <b>No DTC displayed:</b></li> </ul>

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	<ul style="list-style-type: none"> <li>• Turn ignition switch to ON.</li> <li>• Retrieve any DTC.</li> <li>• Is "PASSED" displayed?</li> </ul>		<ul style="list-style-type: none"> <li>• Go to the next step.</li> </ul>
		No	<p><b>DTC displayed:</b></p> <ul style="list-style-type: none"> <li>• Go to appropriate DTC test.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Start engine and run it at idle.</li> <li>• Turn A/C switch on.</li> <li>• Remove A/C relay.</li> <li>• Does A/C magnetic clutch disengage?</li> </ul>	Yes	<p>Inspect for following:</p> <ul style="list-style-type: none"> <li>• A/C relay is stuck closed.</li> <li>• Short to GND circuit between A/C relay and PCM terminal 2K                             <ul style="list-style-type: none"> <li>○ If both items are okay, go to the next step.</li> </ul> </li> </ul>
		No	<p>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.</p>
3	<ul style="list-style-type: none"> <li>• Disconnect high-pressure switch connector.</li> <li>• Start engine and turn A/C switch on.</li> </ul> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>A/C should not work when disconnecting connector. If A/C system remains working, short to GND circuit may be present.</b></li> </ul>	Yes	<p>Inspect for short to GND circuit between high-pressure switch and PCM terminal 4F.</p>
	<ul style="list-style-type: none"> <li>• Does A/C remain working?</li> </ul>	No	<p>Go to the next step.</p>
4	<ul style="list-style-type: none"> <li>• Reconnect high-pressure switch connector.</li> <li>• Turn off A/C switch.</li> </ul> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>A/C should not work when disconnecting connector. If A/C remains working, short to GND circuit may be present.</b></li> </ul>	Yes	<p>Inspect for short to GND circuit between high-pressure switch and A/C switch.</p>
	<ul style="list-style-type: none"> <li>• Does A/C remain working?</li> </ul>	No	<p>Inspect if A/C switch is stuck closed.</p>
5	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.</li> </ul> </li> </ul>		

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- If vehicle is repaired, troubleshooting completed.
- If vehicle is not repaired or additional diagnostic information is not available, replace PCM.

### NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS [BP, BP WITH TC]

#### NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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

#### DIAGNOSTIC PROCEDURE

#### NO.25 A/C DOES NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

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

### NO.26 EXHAUST SULPHUR SMELL [BP, BP WITH TC]

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### NO.26 EXHAUST SULPHUR SMELL [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

26	Exhaust sulphur smell
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Rotten egg smell (sulphur) from exhaust</li> </ul>
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Electrical connectors disconnected or poor connection</li> <li>• Charcoal canister malfunction</li> <li>• Vacuum lines disconnected or improperly connected</li> <li>• Improper fuel pressure</li> </ul> <p><b>WARNING:</b></p> <ul style="list-style-type: none"> <li>• 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"> <li>○ Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</li> <li>○ 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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".</li> </ul> </li> </ul> <p style="text-align: center;">(See <b>BEFORE SERVICE PRECAUTION [BP, BP WITH TC]</b> )</p> <p style="text-align: center;">(See <b>AFTER SERVICE PRECAUTION [BP, BP WITH TC]</b> )</p> <p><b>CAUTION:</b></p> <ul style="list-style-type: none"> <li>• Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.</li> </ul>

### DIAGNOSTIC PROCEDURE

#### NO.26 EXHAUST SULPHUR SMELL [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION		ACTION
1	<ul style="list-style-type: none"> <li>• Are any driveability or exhaust smoke concerns present?</li> </ul>	Yes	Go to appropriate flow chart.
		No	Go to the next step.
2	<ul style="list-style-type: none"> <li>• Inspect following:                             <ul style="list-style-type: none"> <li>○ Electrical connections</li> <li>○ Vacuum lines</li> </ul> </li> <li>• Are all items okay?</li> </ul>	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 2.
3	<ul style="list-style-type: none"> <li>• Connect WDS or equivalent to DLC-</li> </ul>	Yes	<b>No DTC displayed:</b>

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	<p>2.</p> <ul style="list-style-type: none"> <li>• Turn ignition switch to ON.</li> <li>• Retrieve any DTC.</li> <li>• Is "PASSED" displayed?</li> </ul>		<ul style="list-style-type: none"> <li>• Go to the next step.</li> </ul>
		No	<p><b>DTC displayed:</b></p> <ul style="list-style-type: none"> <li>• Go to appropriate DTC test.</li> </ul>
4	<ul style="list-style-type: none"> <li>• Install fuel pressure gauge between fuel filter and fuel distributor.</li> <li>• Start engine and idle it.</li> <li>• Is fuel line pressure correct while engine idling?</li> </ul> <p><b>Fuel line pressure 370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Go to the next step.
		No	<p><b>Zero or low:</b></p> <ul style="list-style-type: none"> <li>• Inspect FP circuit.</li> <li>• Inspect for open FP relief valve.</li> <li>• Inspect for fuel leakage inside pressure regulator</li> <li>• Inspect for clogged main fuel line.</li> <li>• Inspect pulsation damper.</li> </ul> <p><b>High:</b></p> <ul style="list-style-type: none"> <li>• Inspect pressure regulator for the cause of high pressure.</li> <li>• Inspect for clogged fuel return line.</li> </ul>
5	<ul style="list-style-type: none"> <li>• Inspect charcoal canister for fuel saturation.</li> <li>• Is excess amount of liquid fuel present in canister?</li> </ul>	Yes	Replace charcoal canister.
		No	Replace or replace malfunctioning parts.
6	<ul style="list-style-type: none"> <li>• Verify test results. <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.27 INTERMITTENT CONCERNS [BP, BP WITH TC]

#### NO.27 INTERMITTENT CONCERNS [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

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

#### DIAGNOSTIC PROCEDURE

#### NO.27 INTERMITTENT CONCERNS [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

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STEP	INSPECTION	ACTION	
1	<ul style="list-style-type: none"> <li>• Talk to customer.</li> <li>• Review vehicle service history.</li> <li>• Does vehicle have a number of previous repairs and components replaced for a certain symptom?</li> </ul>	Yes	Go to the next step.
		No	Go to .
2	<ul style="list-style-type: none"> <li>• Turn ignition switch off.                             <ul style="list-style-type: none"> <li>○ If input is a switch-type component, turn on manually.</li> </ul> </li> <li>• Turn ignition switch to ON.</li> <li>• Engine is off.</li> <li>• Measure PCM terminal voltages for suspect component.</li> <li>• Lightly tap on suspect component, wiggle and pull each wire/connector at suspect component or PCM.</li> <li>• Are any PCM terminal voltages out of range, or do they suddenly change and go back into range?</li> </ul>	Yes	Inspect each wire for corrosion, bent or loose terminal crimps.
		No	Go to the next step.
3	<ul style="list-style-type: none"> <li>• Turn ignition switch to ON.</li> <li>• Engine is running.</li> <li>• Measure PCM terminal voltages for suspect component.</li> <li>• Lightly tap on suspect component, wiggle and pull each wire/connector at suspect component or PCM.</li> <li>• Are any PCM terminal voltages out of range, or do they suddenly change and go back into range?</li> </ul>	Yes	Inspect each wire for corrosion, bent or loose terminal crimps.
		No	Go to the next step.
4	<ul style="list-style-type: none"> <li>• Turn ignition switch to ON.</li> <li>• Engine is running.</li> <li>• Measure PCM terminal voltages for suspect component.</li> <li>• Accurately spray water on suspect component wire, component or vacuum line related to possible fault area.</li> <li>• Are any PCM terminal voltages out of range, or suddenly change and go back into range, or was there a noticeable engine misfire/stumble?</li> </ul>	Yes	Fault area is identified. <b>If fault occurred while spraying on component:</b> Replace part and verify repair. <b>If fault occurred while spraying wiring:</b> Inspect each wire for corrosion, bent or loose terminals and poor wire terminal crimps. <b>If fault occurred while spraying vacuum line:</b> Repair vacuum hoses.
		No	Inspect wire and connector at suspect component for corrosion, bent or loose

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		terminals, poor wire terminal crimps and high tension of wire.
		<ul style="list-style-type: none"> <li>• Repair if necessary.</li> </ul>
5	<ul style="list-style-type: none"> <li>• Verify test results.                         <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                 <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>	

### NO.28 FUEL REFILL CONCERNS [BP, BP WITH TC]

#### NO.28 FUEL REFILL CONCERNS [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

28	Fuel refill concerns
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Fuel tank does not fill smoothly.</li> </ul>
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Clogged EVAP pipes</li> <li>• Nonreturn valve malfunction</li> <li>• Improper use of fuel nozzle</li> <li>• Inadequate fuel filling speed</li> </ul> <p><b>WARNING:</b></p> <ul style="list-style-type: none"> <li>• <b>The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</b> <ul style="list-style-type: none"> <li>○ <b>Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.</b></li> <li>○ <b>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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".</b></li> </ul> </li> </ul> <p style="text-align: center;">(See <b>BEFORE SERVICE PRECAUTION [BP, BP WITH TC]</b> )</p> <p style="text-align: center;">(See <b>AFTER SERVICE PRECAUTION [BP, BP WITH TC]</b> )</p> <p><b>CAUTION:</b></p> <ul style="list-style-type: none"> <li>• <b>Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint</b></li> </ul>

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**area before disconnecting/connecting, and make sure that it is free of foreign material.**

### DIAGNOSTIC PROCEDURE

#### NO.28 FUEL REFILL CONCERNS [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

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

#### NO.29 FUEL FILLING SHUT OFF ISSUES [BP, BP WITH TC]

##### NO.29 FUEL FILLING SHUT OFF ISSUES [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

29	Fuel filling shut off issues
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Fuel does not shut off properly.</li> </ul>
	<ul style="list-style-type: none"> <li>• Clogged EVAP pipes</li> <li>• Nonreturn valve malfunction</li> <li>• Fuel shut off valve malfunction</li> <li>• Fuel nozzle malfunction</li> <li>• Fuel nozzle is not inserted correctly.</li> </ul> <p style="margin-top: 10px;"><b>WARNING:</b></p> <ul style="list-style-type: none"> <li>• <b>The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</b></li> </ul>



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### POSSIBLE CAUSE

- 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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".

(See **BEFORE SERVICE PRECAUTION [BP, BP WITH TC]** )

(See **AFTER SERVICE PRECAUTION [BP, BP WITH TC]** )

#### CAUTION:

- Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.

## DIAGNOSTIC PROCEDURE

### NO.29 FUEL FILLING SHUT OFF ISSUES [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

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

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### NO.30 REFERENCE VOLTAGE [BP, BP WITH TC]

#### NO.30 REFERENCE VOLTAGE [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

<b>30</b>	<b>Reference voltage</b>
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Incorrect reference voltage</li> </ul>
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Reference voltage circuit malfunction</li> </ul> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• EGR boost sensor (BP), BARO/MAP sensor (BP WITH TC), FTP sensor, TP sensor and TCM use reference voltage.</li> </ul>

#### DIAGNOSTIC PROCEDURE

#### NO.30 REFERENCE VOLTAGE [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION
1	<ul style="list-style-type: none"> <li>• Was reference voltage <b>greater than 6.0 V when</b> measured in previous step?</li> </ul>	Yes Go to Step 14.
		No Go to the next step.
2	<ul style="list-style-type: none"> <li>• Turn ignition switch to ON.</li> <li>• Engine is off.</li> <li>• Is voltage across battery terminals <b>greater than 10.5 V?</b></li> </ul>	Yes Go to the next step.
		No Inspect charging system.
3	<ul style="list-style-type: none"> <li>• Turn ignition switch to ON.</li> <li>• Engine is off.</li> <li>• Disconnect sensor where reference voltage circuit check failed.</li> <li>• Measure voltage between battery positive terminal and GND (between PCM and appropriate sensor) circuit at appropriate sensor connector.</li> <li>• Is voltage <b>greater than 10.5 V</b> and <b>within 1.0 V</b> of battery voltage?</li> </ul>	Yes Go to the next step.
		No Go to Step 9.
4	<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>The purpose of this step is to determine if WDS or equivalent is communicating with PCM.</b></li> <li>• Turn ignition switch to ON.</li> <li>• Engine is off.</li> <li>• Attempt to access ECT PID.</li> <li>• Can ECT PID be accessed?</li> </ul>	Yes Go to Step 8.
		No Go to the next step.

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5	<ul style="list-style-type: none"> <li>• Turn ignition switch off.</li> <li>• Leave TP sensor disconnected.</li> <li>• Disconnect EGR boost sensor (BP), BARO/MAP sensor (BP WITH TC) connector.</li> <li>• Turn ignition switch to ON.</li> <li>• Engine is off.</li> <li>• Measure voltage between reference voltage and GND circuits at TP sensor connector.</li> <li>• Is voltage <b>between 4.0 and 6.0 V?</b></li> </ul>	Yes	Replace EGR boost sensor (BP), BARO/MAP sensor (BP WITH TC).
		No	Go to the next step.
6	<ul style="list-style-type: none"> <li>• Turn ignition switch off.</li> <li>• Disconnect TP sensor connector.</li> <li>• Leave PCM disconnected.</li> <li>• Turn ignition switch to ON.</li> <li>• Engine is off.</li> <li>• Measure voltage between PCM connector terminals 4AF and 4O.</li> <li>• Is voltage <b>greater than 10.5 V?</b></li> </ul>	Yes	Go to the next step.
		No	Repair open circuit between PCM terminal 4AF and main relay.
7	<ul style="list-style-type: none"> <li>• Turn ignition switch off.</li> <li>• Leave TP, EGR boost and FTP sensor connectors disconnected.</li> <li>• Disconnect WDS or equivalent from DLC-2.</li> <li>• Measure resistance between PCM connector terminals 4L and 4O.</li> <li>• Is resistance <b>greater than 10,000 ohms?</b></li> </ul>	Yes	Inspect for reference voltage at suspect sensor connector again.  <b>NOTE:</b> <ul style="list-style-type: none"> <li>• <b>Get assistance from technical Hotline/your distributor, then replace PCM if necessary.</b></li> </ul>
		No	Repair reference voltage circuit short to GND.
8	<ul style="list-style-type: none"> <li>• Turn ignition switch off.</li> <li>• Disconnect sensor connector where reference voltage circuit inspection failed.</li> <li>• Leave PCM disconnected.</li> <li>• Measure resistance between PCM connector terminal 4L and reference voltage circuit at appropriate sensor connector.</li> <li>• Is resistance <b>less than 5.0 ohms?</b></li> </ul>	Yes	Inspect for reference voltage at suspect sensor connector again.  <b>NOTE:</b> <ul style="list-style-type: none"> <li>• <b>Get assistance from technical Hotline/your distributor, then replace PCM if necessary.</b></li> </ul>
		No	Repair open reference voltage circuit.
9	<b>NOTE:</b>	Yes	Go to the next step.

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	<ul style="list-style-type: none"> <li>• <b>The purpose of this step is to determine if WDS or equivalent is communicating with PCM.</b></li> <li>• Turn ignition switch to ON.</li> <li>• Engine is off.</li> <li>• Attempt to access ECT PID.</li> <li>• Can ECT PID be accessed?</li> </ul>	No	Go to Step 12.
10	<ul style="list-style-type: none"> <li>• Are DTCs present for two or more sensors connected to PCM terminal 4O circuit?</li> </ul> <p><b>Sensors connected to PCM terminal 4O:</b></p> <p>EGR boost sensor (BP), BARO/MAP sensor (BP WITH TC), TP sensor, IAT sensor, ECT sensor, FTP sensor, FHO2.</p>	Yes	Go to the next step.
		No	Repair open circuit to sensor where reference voltage circuit inspection failed.
11	<ul style="list-style-type: none"> <li>• Turn ignition switch off.</li> <li>• Disconnect WDS or equivalent from DLC-2.</li> <li>• Disconnect sensor connector where reference voltage circuit inspection failed.</li> <li>• Leave PCM disconnected.</li> <li>• Measure resistance between GND circuit at appropriate sensor connector and PCM connector terminal 4O.</li> <li>• Is resistance <b>less than 5.0 ohms?</b></li> </ul>	Yes	Reconnect sensor connector. Go to the next step.
		No	Repair open GND circuit.
12	<ul style="list-style-type: none"> <li>• Turn ignition switch off.</li> <li>• Disconnect WDS or equivalent from DLC-2.</li> <li>• Leave PCM disconnected.</li> <li>• Measure resistance between battery negative terminal and PCM connector terminals 3A and 3B.</li> <li>• Is each resistance <b>less than 5.0 ohms?</b></li> </ul>	Yes	Go to the next step.
		No	Repair open GND circuit to GND.
13	<ul style="list-style-type: none"> <li>• Turn ignition switch off.</li> </ul>	Yes	Ground circuits are okay.

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	<ul style="list-style-type: none"> <li>• Measure resistance between GND circuit at following sensor connectors and GND.                             <ul style="list-style-type: none"> <li>○ EGR boost sensor (BP)</li> <li>○ BARO/MAP sensor (BP WITH TC)</li> <li>○ FTP sensor</li> <li>○ TP sensor</li> <li>○ ECT sensor</li> <li>○ HO2S</li> <li>○ IAT sensor</li> </ul> </li> <li>• Is each resistance <b>less than 5.0 ohms?</b></li> </ul>	No	<p>Inspect for reference voltage at suspect sensor connector again.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>Get assistance from technical hotline/your distributor, then replace PCM if necessary.</b></li> </ul>
14	<ul style="list-style-type: none"> <li>• Turn ignition switch off.</li> <li>• Disconnect sensor connector where reference voltage inspection failed.</li> <li>• Disconnect TP sensor, FTP sensor, EGR boost sensor (BP), and BARO/MAP sensor (BP WITH TC) connectors.</li> <li>• Disconnect PCM connector.</li> <li>• Turn ignition switch to ON.</li> <li>• Engine is off.</li> <li>• Measure voltage between reference voltage circuit at TP sensor connector and battery negative terminal.</li> <li>• Is voltage <b>less than 5.0 V?</b></li> </ul>	Yes	<p>Inspect for reference voltage at suspect sensor connector again.</p> <p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>• <b>Get assistance from technical hotline/your distributor, then replace PCM if necessary.</b></li> </ul>
		No	<p>Repair reference voltage circuit for short to power in harness.</p>
15	<ul style="list-style-type: none"> <li>• Verify test results.                             <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                                     <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

### NO.31 SPARK PLUG CONDITION [BP, BP WITH TC]

#### NO.31 SPARK PLUG CONDITION [BP, BP WITH TC] DESCRIPTION & POSSIBLE CAUSE

31	Spark plug condition
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• Incorrect spark plug condition</li> </ul>

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### POSSIBLE CAUSE

#### NOTE:

- 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:

- Spark-Weak, not visible
- Air/fuel mixture-Excessive fuel injection volume
- Compression-No compression, low compression
- Faulty spark plug

#### Grayish white with specific plug:

- Air/fuel mixture-Insufficient fuel injection volume
- Faulty spark plug

#### Wet/carbon stuck on all plugs:

- Spark-Weak
- Air/fuel mixture-Too rich
- Compression-Low compression
- Clogging in intake/exhaust system

#### Grayish white with all plugs:

- Air/fuel mixture-Too lean

#### WARNING:

- The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:
  - 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 SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION".

(See **BEFORE SERVICE PRECAUTION [BP, BP WITH TC]** )

(See **AFTER SERVICE PRECAUTION [BP, BP WITH TC]** )

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### CAUTION:

- **Disconnecting/connecting quick release connector without cleaning it may possibly cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.**

## DIAGNOSTIC PROCEDURE

### NO.31 SPARK PLUG CONDITION [BP, BP WITH TC] DIAGNOSTIC PROCEDURE

STEP	INSPECTION	ACTION	
1	<ul style="list-style-type: none"> <li>• Remove all spark plugs.</li> <li>• Inspect spark plug condition.</li> <li>• Is spark plug condition okay?</li> </ul>	Yes	Troubleshooting completed.
		No	<b>Specific plug is wet or covered with carbon:</b> Go to the next step. <b>Specific plug looks grayish white:</b> Go to Step 7. <b>All plugs are wet or covered with carbon:</b> Go to Step 9. <b>All plugs look grayish white:</b> Go to Step 15.
2	<ul style="list-style-type: none"> <li>• Is spark plug wet/covered with carbon by engine oil?</li> </ul>	Yes	Inspect all areas related to oil pumping.
		No	Go to the next step.
3	<ul style="list-style-type: none"> <li>• Inspect spark plug for following.                             <ul style="list-style-type: none"> <li>○ Cracked insulator</li> <li>○ Heating value</li> <li>○ Air gap</li> <li>○ Worn electrode</li> </ul> </li> <li>• Is spark plug okay?</li> </ul>	Yes	Go to the next step.
		No	Replace spark plug.
4	<ul style="list-style-type: none"> <li>• Inspect compression pressure at suspected faulty cylinder.</li> <li>• Is compression pressure correct?</li> </ul> <p>(See <b>COMPRESSION INSPECTION</b> )</p>	Yes	Go to the next step.
		No	Repair or replace malfunctioning part.
5	<ul style="list-style-type: none"> <li>• Install all spark plugs.</li> <li>• Carry out spark test at suspected faulty cylinder.</li> <li>• Is strong blue spark visible? (Compare with normal cylinder.)</li> </ul>	Yes	Go to the next step.
		No	Repair or replace malfunctioning part.
6	<ul style="list-style-type: none"> <li>• Perform fuel line pressure inspection.</li> </ul>	Yes	Inspect fuel injector for following:

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	<p>(See <b>FUEL LINE PRESSURE INSPECTION [BP, BP WITH TC]</b> )</p> <ul style="list-style-type: none"> <li>• Is fuel line pressure okay?</li> </ul>		<ul style="list-style-type: none"> <li>• Open or short in injector</li> <li>• Leakage</li> <li>• Injection volume</li> </ul>
7	<ul style="list-style-type: none"> <li>• Inspect spark plug for following. <ul style="list-style-type: none"> <li>○ Heating value</li> <li>○ Air gap</li> </ul> </li> <li>• Are they okay?</li> </ul>	Yes	Go to the next step.
		No	Replace spark plug.
8	<ul style="list-style-type: none"> <li>• Remove suspected fuel injector.</li> <li>• Inspect following: <ul style="list-style-type: none"> <li>○ Resistance</li> </ul> <p>(See <b>FUEL INJECTOR INSPECTION [BP, BP WITH TC]</b> )</p> <li>○ Fuel injection volume</li> </li></ul> <p>(See <b>FUEL INJECTOR INSPECTION [BP, BP WITH TC]</b> )</p> <ul style="list-style-type: none"> <li>• Are all above items okay?</li> </ul>	Yes	<p>Inspect for open circuit between suspected fuel injector connector terminal and following PCM connector terminals:</p> <ul style="list-style-type: none"> <li>• <b>For #1 cylinder: 2A</b></li> <li>• <b>For #2 cylinder: 2D</b></li> <li>• <b>For #3 cylinder: 2G</b></li> <li>• <b>For #4 cylinder: 2J</b></li> </ul>
9	<ul style="list-style-type: none"> <li>• Is ACL element free of restrictions?</li> </ul>	Yes	Go to the next step.
		No	Replace ACL element.
10	<ul style="list-style-type: none"> <li>• Carry out spark test.</li> <li>• Is strong blue spark visible at each</li> </ul>	Yes	Go to the next step.
		No	Repair or replace malfunction part.



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2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

	cylinder?		
11	<ul style="list-style-type: none"> <li>• Carry out fuel line pressure inspection.</li> <li>• Is fuel line pressure correct?</li> </ul> <p><b>Fuel line pressure 370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Go to the next step.
		No	<p><b>Zero or low:</b></p> <ul style="list-style-type: none"> <li>• Inspect FP circuit.</li> <li>• Inspect for open FP relief valve.</li> <li>• Inspect for fuel leakage inside pressure regulator.</li> <li>• Inspect for clogged main fuel line.</li> <li>• Inspect pulsation damper.</li> </ul> <p><b>High:</b></p> <ul style="list-style-type: none"> <li>• Inspect pressure regulator for high pressure cause.</li> <li>• Inspect for clogged fuel return line.</li> </ul>
12	<ul style="list-style-type: none"> <li>• Inspect following PIDs.                             <ul style="list-style-type: none"> <li>○ ECT</li> <li>○ O2S11</li> <li>○ O2S12</li> <li>○ MAF</li> </ul> </li> </ul> <p style="text-align: center;">(See <b><u>PCM INSPECTION [BP, BP WITH TC]</u></b> )</p> <ul style="list-style-type: none"> <li>• Are PIDs okay?</li> </ul>	Yes	Go to the next step.
		No	Repair or replace malfunctioning part.
13	<ul style="list-style-type: none"> <li>• Inspect purge solenoid valve and related vacuum hoses. (When engine can be started)</li> </ul> <p style="text-align: center;">(See <b><u>PURGE SOLENOID VALVE INSPECTION [BP, BP WITH TC]</u></b> )</p> <ul style="list-style-type: none"> <li>• Are purge solenoid valve and related vacuum hoses okay?</li> </ul>	Yes	Go to the next step.
		No	Repair or replace malfunctioning part.
14	<ul style="list-style-type: none"> <li>• Carry out compression inspection.</li> <li>• Is compression correct?</li> </ul>	Yes	Inspect clogging in exhaust system.
		No	Repair or replace malfunctioning part.
15	<ul style="list-style-type: none"> <li>• When engine cannot be started, inspect intake-air system for air leakage.</li> </ul>	Yes	Repair or replace malfunctioning part.

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	<ul style="list-style-type: none"> <li>• When engine can be started, carry out intake manifold vacuum inspection.</li> <li>• Is air sucked in from intake-air system?</li> </ul>	No	Go to the next step.
16	<ul style="list-style-type: none"> <li>• Carry out fuel line pressure inspection.</li> <li>• Is fuel line pressure correct?</li> </ul> <p><b>Fuel line pressure 370-420 kPa {3.7-4.3 kgf/cm<sup>2</sup>, 53-61 psi}</b></p>	Yes	Inspect following PIDs. <ul style="list-style-type: none"> <li>• ECT</li> <li>• O2S11</li> <li>• O2S12</li> <li>• MAF</li> </ul> <p>(See <b>PCM INSPECTION [BP, BP WITH TC]</b> )</p>
		No	Inspect PCM GND condition.  <b>Zero or low:</b> <ul style="list-style-type: none"> <li>• Inspect FP circuit.</li> <li>• Inspect for open FP relief valve.</li> <li>• Inspect for fuel leakage inside pressure regulator.</li> <li>• Inspect for clogged main fuel line.</li> <li>• Inspect pulsation damper.</li> </ul> <b>High:</b> <ul style="list-style-type: none"> <li>• Inspect pressure regulator for high pressure cause.</li> <li>• Inspect for clogged fuel return line.</li> </ul>
17	<ul style="list-style-type: none"> <li>• Verify test results.               <ul style="list-style-type: none"> <li>○ If okay, return to diagnostic index to service any additional symptoms.</li> <li>○ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.                   <ul style="list-style-type: none"> <li>• If vehicle is repaired, troubleshooting completed.</li> <li>• If vehicle is not repaired or additional diagnostic information is not available, replace PCM.</li> </ul> </li> </ul> </li> </ul>		

## ENGINE CONTROL SYSTEM OPERATION INSPECTION [BP, BP WITH TC]

### INTAKE MANIFOLD VACUUM INSPECTION

## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

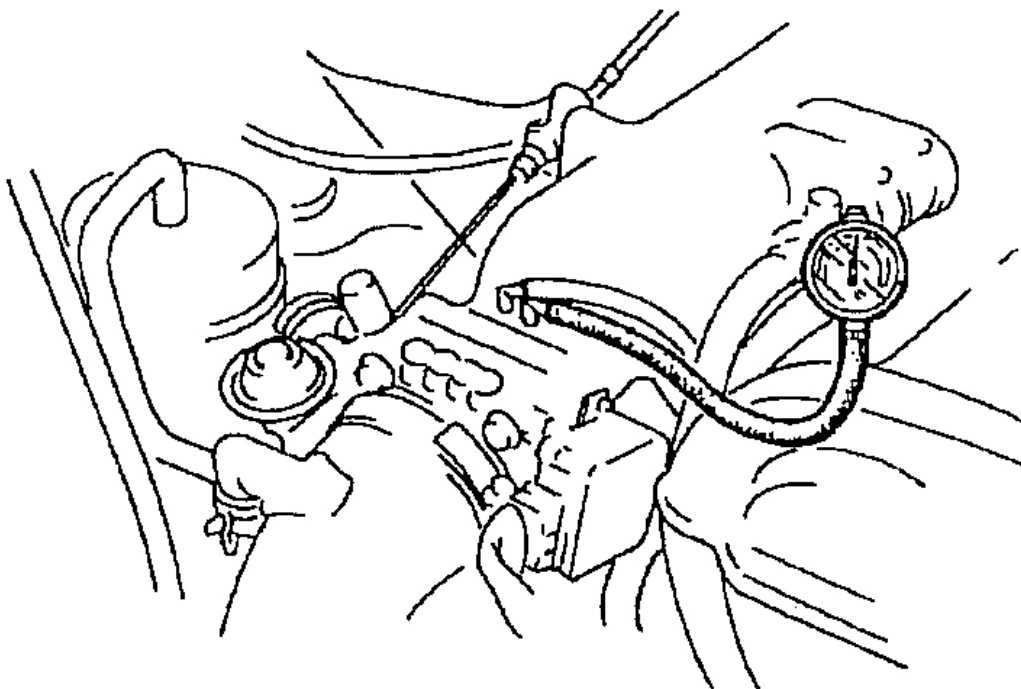
1. Verify air intake hoses are installed properly.
2. Start the engine and run at idle.
3. Measure the manifold vacuum using a vacuum gauge.
  - If not as specified, inspect the following.
    - Air suction at:
      - TB installation point
      - Intake manifold installation point
      - PCV valve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

### 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}**



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**Fig. 17: Measuring Manifold Vacuum**  
Courtesy of MAZDA MOTORS CORP.

## **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**

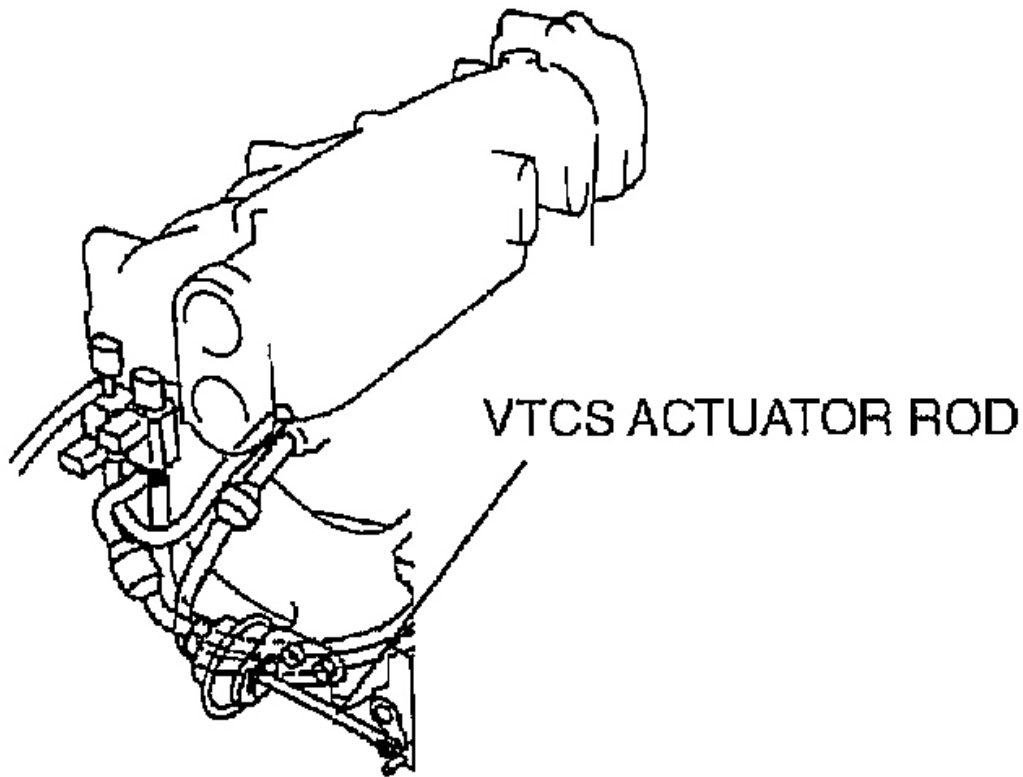
## 2005 Mazda MX-5 Miata

2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

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. (See **ENGINE TUNE-UP** .)
  - 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

### **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.



**Fig. 18: Inspecting VTCS Actuator Rod**  
Courtesy of MAZDA MOTORS CORP.

- 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

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2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

- Vacuum chamber
- Vacuum hose
- VTCS solenoid valve
- Wiring harness and connectors (Main relay - VTCS solenoid valve - PCM terminal 2N)

### Rod operation

### 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.

### EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK INSPECTION

- To verify that the problem has been fixed properly after repairs, the run drive cycle or EVAP system leak inspection must be performed.

#### EVAP system leak inspection using the WDS or equivalent

#### **NOTE:** EVAP system test outline

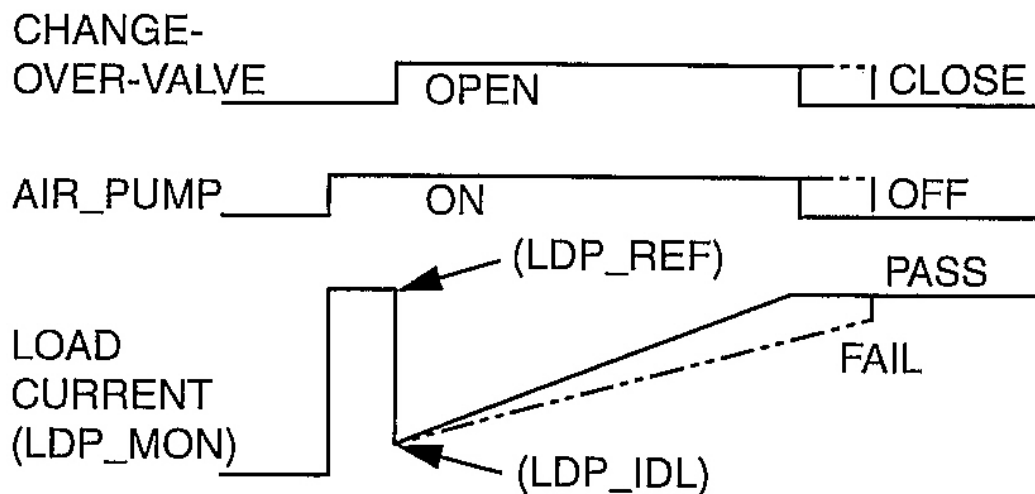
- The EVAP system test, which can substituted for the run drive cycle as an EVAP control system repair confirmation method, can be done while operating the WDS in the KOEO (Key On Engine Off) condition instead of actually driving the vehicle.

#### EVAP system test description

- The EVAP system test finds gas leaks in the system using the PCM to monitor changes in the air pump load current of the EVAP system leak detection pump. This test starts after sending an on-demand test signal from the WDS to the PCM. The PCM controls the air pump and change-over-valve operation and

also stores the load current of the air pump as follows:

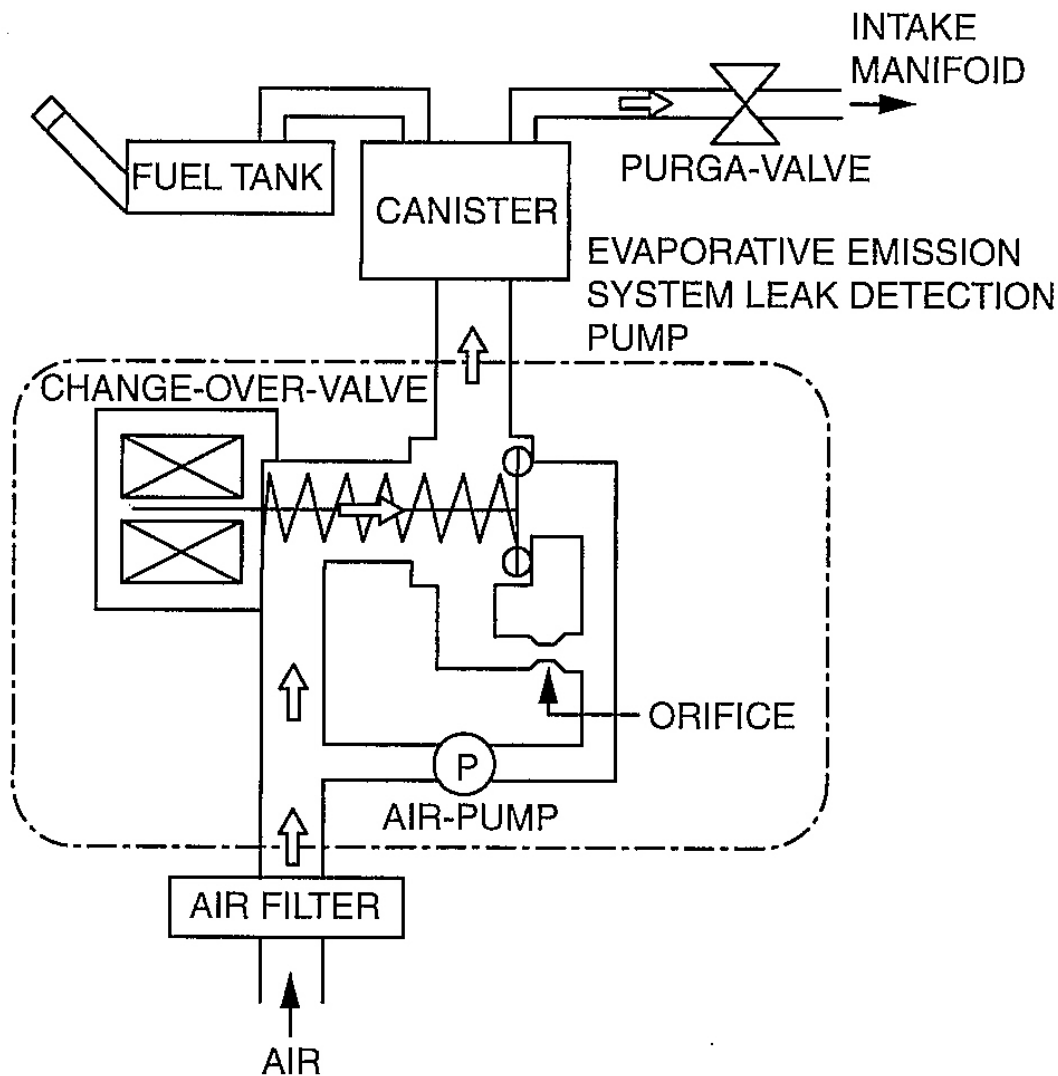
- i. The PCM commands turn the air pump on and retrieve the air pump load current value (LDP\_MON PID) as a reference current (LDP\_REF PID).
  - ii. After retrieving a reference current value, the PCM commands the change-over-valve to open, then captures the air pump load current value (LDP\_MON PID) as idle current (LDP\_IDL PID). The EVAP system will be pressurized from this phase,
  - iii. The PCM continues to monitor the air pump load current value (LDP\_MON PID) until the end of the test.
- You can confirm whether any evaporative gas leak occurred or not by reading the test results.



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**Fig. 19: EVAP System Test Inspection Graph**  
 Courtesy of MAZDA MOTORS CORP.





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**Fig. 20: EVAP System Test Description Diagram**  
 Courtesy of MAZDA MOTORS CORP.

#### EVAP system malfunction judgment

- The WDS calculates the stored air pump load current value and displays the results as follows:
  - Small leak results (DTC P0442) = LDP\_SLDV
  - Very small leak results (mA/S: DTC P0456) = LDP\_VSLDV
  - IMO result (air pump operation) = LDP\_MON (when test ended)
  - COV result (change-over-valve statuses) = LDP\_REF -LDP\_IDL

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2005 ENGINE PERFORMANCE Symptom Troubleshooting [Engine Control System (BP, BP With TC)] - MX-5 Miata

1. Select the EVAP system test from the Toolbox on the WDS display and follow the instructions.
2. Verify that all of the following PIDs are within the specifications at the pre-test confirmation screen.

### NOTE:

- To successfully perform this procedure, all PIDs must be within the following specifications before proceeding to the next step.
- Record the FTL\_V and VPWR values.
- The PCM will cancel the EVAP system test if the VPWR PID value falls lower than 11.0 V during the test.

### PID SPECIFICATION

PID	PID Range
BARO	72.2 kPa {543 mmHg, 21.3 inHg} or more
FTL_V	1.3-3.7 V
LAF	5-40 °C {41-104 °F}
VPWR	11.0-14.5 V

3. Start the engine.
4. Drive the vehicle or let the engine idle more than **20 min.**
5. Turn ignition switch Off, then turn it to the ON position again (Key On Engine Off).
6. Press the tick icon to start the test.
7. Verify that each test result is indicated with green.
  - If any test result is indicated with red, diagnose the problem using the following DTC troubleshooting procedure or component inspection procedure.

### DTC TROUBLESHOOTING

Failed Item	Troubleshooting
Small leak	DTC P0442
Very small leak (mA/S)	DTC P0456
IMO	Inspect, open or short to ground circuit between PCM and emission system leak detection pump
COV	Inspect change-over-valve to make sure it is not stuck closed

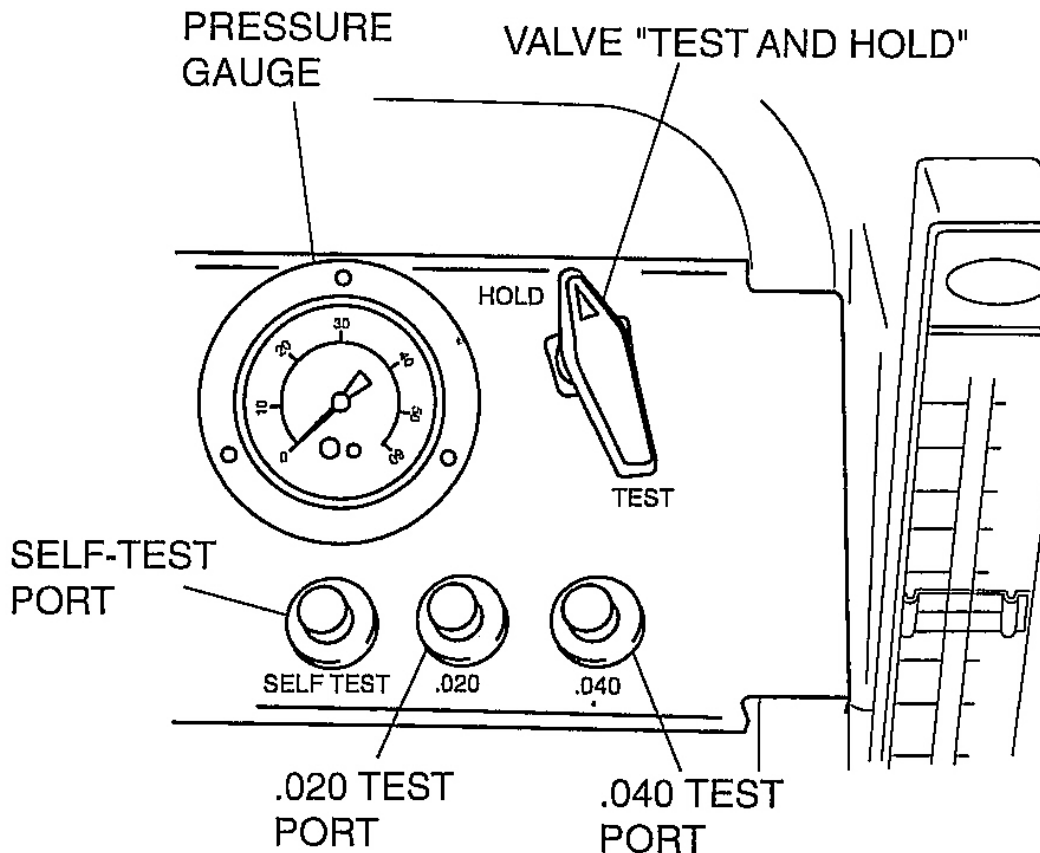
### EVAP system leak inspection using leak tester

1. Perform the following SST (EVAP System Tester 134-01049) self-test:

### NOTE:

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

1. Verify that the control valve on the panel is in the HOLD position then open the nitrogen bottle valve.



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**Fig. 21: Identifying EVAP System Leak Tester**  
 Courtesy of MAZDA MOTORS CORP.

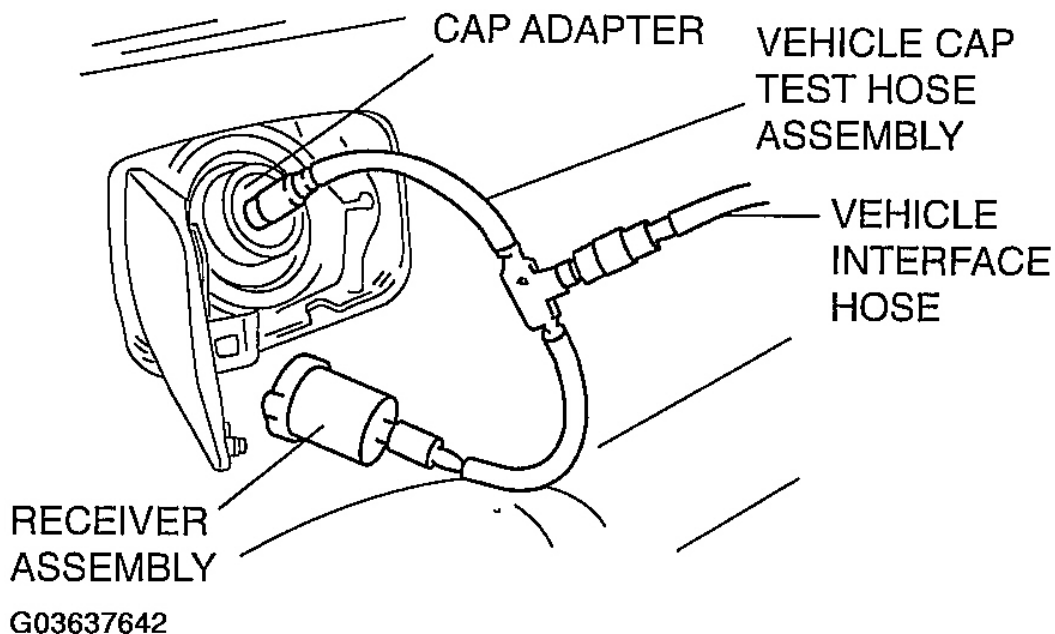
2. Connect the vehicle interface hose (part of the **SST**) to the SELF TEST port located on the control panel. Hand tighten the fitting. (Do not overtighten.)
  3. Turn the control valve to the TEST position.
  4. The gauge should read **331-381 mm {13-15 in}** of water.
    - If the gauge is not reading in this range, adjust the pressure by turning the black knob on the low pressure regulator at the nitrogen bottle.
  5. Turn the control valve to the HOLD position,
  6. Verify that the gauge holds pressure and that the flow meter reads no flow.
    - If there is no drop in pressure and no flow, the tester passes the self-test.
    - If the gauge leaks down, refer to the tester operators manual.
2. Connect the **SST** to the vehicle.
    1. Verify that the control valve on the panel is in the HOLD position then open the nitrogen bottle

valve.

2. Remove the fuel-filler cap from the vehicle.
    - If the fuel-filler cap is not a MAZDA part or equivalent, replace it.
  3. Connect the receiver assembly (SST: 134-01051) to the vehicle cap test hose assembly (part of the SST ) and the fuel-filler cap from the vehicle.
  4. Connect the cap adaptor (SST: 134-01050) to the vehicle cap test hose assembly (part of the SST ) and to the fuel-filler neck.
  5. Connect the vehicle interface hose (part of the SST) to the center fitting of the vehicle cap test hose assembly (part of the SST).
3. Connect the WDS or equivalent to the DLC-2.
  4. Turn the ignition switch to the ON position (Engine off).
  5. Request the PCM on-board device control (Mode 08) using the WDS or equivalent to close the change-over valve (COV) in the EVAP system leak detection pump.

**NOTE:**

- **The COV is closed for 10 min unless the following any actions are done:**
  - **The engine is started.**
  - **The ignition switch is turned off position.**



**Fig. 22: Connecting Cap Adaptor To Vehicle Cap Test Hose Assembly And To Fuel-Filler Neck**  
 Courtesy of MAZDA MOTORS CORP.

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6. Make sure the control valve on the 134-01049 is in the HOLD position and that the valve on the cylinder of nitrogen gas is open.
7. Turn the control valve to the open position and let the system fill. You should note a drop in the gauge pressure along with the flow meter being pegged at maximum flow for several minutes depending on how full or empty the fuel tank is, and how long it takes to completely fill and pressurize the evaporative emissions system hoses.
8. If the gauge and the flow meter do not settle to a measurable level after **2-3 min**, then refer to the Mazda Workshop Manual to verify that the cut or vent valve is properly closed.
9. Verify the pressure gauge and flow meter reading to determine if there is an evaporative emissions leak:

### **NO EVAPORATIVE LEAK:**

- The flow meter registers "zero flow" and the pressure gauge returns to the pre-set pressure of **356 mm {14 in}** of water (H<sub>2</sub>O).

### **EVAPORATIVE LEAK:**

- The pressure does not return to the preset level of **356 mm {14 in}** of water (H<sub>2</sub>O) when measuring the flow. See "SETTING LEAK STANDARD FOR TESTING" (.020 to .040 inch H<sub>2</sub>O) of the Evaporative Emissions Tester operators manual .

### **NOTE:**

- **Turn the control valve to the HOLD position then disconnect the SST.**

## **COOLING FAN CONTROL OPERATION INSPECTION (BP WITH TC)**

1. Connect the WDS or equivalent to DLC-2.
2. Access the ECT PID.
3. Verify that the ECT PID is **below 100°C {212°F}**
4. Verify that the fan motor No.1 and No.2 do not operate.
  - If the cooling fans are operating, inspect for following:
    - Short to GND circuit in wiring between A/C switch and PCM terminal 4F
    - Short to GND circuit in wiring between fan relay No.1 and PCM terminal 2B
    - Short to GND circuit in wiring between fan relay No.2 and PCM terminal 2C
    - Short to GND circuit in wiring between fan relay No.3 and PCM terminal 2C
    - Fan relay No.1 stuck close
5. Start the engine and warm up it to ECT PID is **above 100°C {212°F}**
6. Verify that fan motor No.1 and No.2 operate.
  - If the fan motor No.1 and No.2 do not operate inspect for following:
    - Open circuit in wiring between PCM terminal 2B and fan relay No.1
    - Open circuit in wiring between battery positive terminal and fan relay No.1
    - Fan relay No.1 stuck open

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- If the fan motor No.1 does not operate inspect for following:
    - Open circuit between fan relay No.1 and GND through fan motor No.1
    - Fan motor No.1 malfunction
  - If the fan motor No.2 does not operate inspect for following:
    - Open circuit between fan relay No.3 and GND through fan motor No.2
    - Fan motor No.2 malfunction
7. Verify that the fan motor No.1 and No.2 operate high speed while the A/C is operating.
- If the fan motor No.1 and No.2 do not operate high speed, inspect for following:
    - Open circuit between A/C switch and PCM terminal 4F
    - Open circuit between PCM terminal 2C and fan relay No.2
    - Open circuit between PCM terminal 2C and fan relay No.3
    - Open circuit between battery positive terminal and fan relay No.2
    - Open circuit between battery positive terminal and fan relay No.3
    - Open circuit between fan relay No.2 and GND
    - Fan relay No.2 stuck open
    - Fan relay No.3 stuck open
  - If the fan motor No.1 does not operate high speed, inspect for following:
    - Open circuit between fan relay No.2 and fan motor No.1
    - Open circuit between fan relay No.3 and fan motor No.1
    - Fan motor No.1 malfunction
  - If the fan motor No.2 does not operate high speed, inspect for following:
    - Open circuit between fan relay No.2 and fan motor No.2
    - Open circuit between fan relay No.3 and fan motor No.2
    - Fan motor No.2 malfunction

### 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.**

### SPARK TEST

STEP	INSPECTION	ACTION
1	Yes	Ignition system is okay.

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	<ul style="list-style-type: none"> <li>Remove high-tension lead from spark plug. Hold high-tension lead with installed pliers <b>5-10 mm {0.20-0.39 in}</b> from ground.</li> <li>Turn ignition switch to <b>START</b> and verify that there is a strong blue spark. (Inspect each cylinder)</li> </ul>	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"> <li>Is high-tension lead resistance correct?</li> </ul>	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"> <li>Does PCM or ignition coil connector have poor connection?</li> </ul>	Yes	Repair or replace connector.
		No	Go to the next step.
4	<ul style="list-style-type: none"> <li>Is ignition coil winding resistance okay?</li> </ul>	Yes	Go to the next step.
		No	Replace ignition coil.
5	<ul style="list-style-type: none"> <li>Are following parts okay?                             <ul style="list-style-type: none"> <li>CKP sensor and crankshaft pulley (Also, inspect gap.)</li> <li>PCM terminal 3F/3I voltage</li> </ul> </li> </ul>	Yes	Inspect wiring harness and connectors of CKP sensor for open or short circuit.
		No	Repair or replace.

### FUEL INJECTOR OPERATION INSPECTION

#### FUEL INJECTOR OPERATION INSPECTION

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

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4	<ul style="list-style-type: none"><li>• Are wiring harnesses and connectors of operating fuel injector okay? (Operating or not operating)</li></ul>	Yes	Repair or replace.
		No	Inspect PCM terminal voltage for fuel injector signal.