

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Note <ul style="list-style-type: none"> The following test should be performed for vehicles with immobilizer system. Go to Step 9 for vehicles without immobilizer system. <p>Connect the WDS or equivalent to the DLC-2. Do the following conditions appear?</p> <ul style="list-style-type: none"> The engine is not completely started. DTC P1260 is displayed. 	Yes	Both conditions appear: Go to Step 3.
		No	Either or other condition appears: Go to the next step.
2	Does the engine stall after approx. 2 s since the engine is started?	Yes	Go to the next step.
		No	Immobilizer system is normal. Go to Step 9.
3	Is the coil connector securely connected to the coil?	Yes	Go to the next step.
		No	Connect the coil connector securely. Return to Step 2.
4	Does the security light illuminate?	Yes	Go to the next step.
		No	Inspect the instrument cluster and wiring harness.
5	Connect the WDS or equivalent to the DLC-2 and retrieve DTC. Are any of following DTCs displayed? DTC B1213, B1600, B1601, B1602, B1681, B2103, B2139, B2141, B2431, U2510	Yes	Go to the appropriate DTC inspection. (See 01-02A-9 DTC TABLE [L8, LF].)
		No	Advanced keyless entry system not equipped; Go to the next step. Advanced keyless entry system equipped; Go to Step 8.
6	Inspect for the following wiring harnesses and connectors: <ul style="list-style-type: none"> Between coil terminal A and instrument cluster terminal 2Q Between coil terminal B and instrument cluster terminal 2S Is there any malfunction?	Yes	Repair or replace the suspected wiring harness and connector.
		No	Go to the next step.
7	Inspect for the following wiring harnesses and connectors: <ul style="list-style-type: none"> Between PCM terminal 1Al and instrument cluster terminal 1I Between PCM terminal 1AM and instrument cluster terminal 1K Is there any malfunction?	Yes	Repair or replace the suspected wiring harness and connector.
		No	Go to the next step.
8	Inspect the following wiring harnesses and connectors. <ul style="list-style-type: none"> Between keyless CM terminal 3Y and coil A Between keyless CM terminal 3AA and coil B Between keyless CM terminal 4Z and PCM 1Al Between keyless CM terminal 4AA and PCM 1AM Is there any malfunction (open or short circuit, terminal corrosion, etc.)?	Yes	Repair or replace malfunctioning part.
		No	Go to the next step.
9	Verify the following: <ul style="list-style-type: none"> Vacuum connection Air cleaner element No air leakage from intake-air system No restriction of intake-air system Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve Ignition wiring Fuel quality: proper octane, contamination, winter/summer blend Electrical connections Smooth operation of throttle valve Are all items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 9.

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STEP	INSPECTION	RESULTS	ACTION
10	Connect the WDS or equivalent to the DLC-2. Retrieve any continuous memory, KOEO and KOER DTCs using WDS or equivalent. If the engine stalls, retrieve continuous memory and KOEO DTCs. Are there any DTCs displayed?	Yes	DTC is displayed: Go to the appropriate DTC inspection. (See 01-02A-9 DTC TABLE [L8, LF].) Communication error message is displayed: Inspect for the following: <ul style="list-style-type: none"> Open circuit in wiring harness between main relay and PCM terminal 1BE Open circuit in wiring harness between main relay terminal B and PCM terminal 1AT The main relay is stuck open. Open or poor GND circuit (PCM terminal 1BH, 1AZ or 1BC) Poor connection of vehicle body GND
		No	No DTC is displayed: Go to the next step.
11	Attempt to start engine at part throttle. Does engine run smoothly at part throttle?	Yes	Inspect the IAC valve and wiring harness. (See 01-13-6 IDLE AIR CONTROL (IAC) VALVE INSPECTION [L8, LF].)
		No	Go to the next step.
12	Connect the WDS or equivalent to the DLC-2. Access RPM PID. Is RPM PID indicating engine speed during engine cranking?	Yes	Go to the next step.
		No	Inspect for following: <ul style="list-style-type: none"> Open or short circuit in CKP sensor Open or short circuit between CKP sensor terminal A and PCM terminal 2Y Open or short circuit in between CKP sensor terminal B and PCM terminal 2Z Open or short circuit in CKP sensor wiring harnesses If CKP sensor and wiring harness are normal, go to the next step.
13	Visually inspect CKP sensor and teeth of crankshaft pulley. Are CKP sensor and teeth of crankshaft pulley normal?	Yes	Go to the next step.
		No	Replace the malfunctioning part.
14	Measure gap between CKP sensor and teeth of crankshaft pulley. Specification 0.5—1.9 mm {0.020—0.75 in} Is gap within specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor. (See 01-40-29 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
15	Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) for all cylinders. Are harness conditions normal?	Yes	Go to the next step.
		No	Repair the wiring harnesses.
16	Perform the spark test. (See 01-03A-60 Spark Test.) Is strong blue spark visible at each cylinder?	Yes	Go to the next step. If symptoms occurs with the A/C on, go to Step 22.
		No	Repair or replace the malfunctioning part according to spark test result.
17	Inspect spark plug condition. Is the spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: Inspect for fuel leakage from injector. Spark plug is grayish white: Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to the next step.
18	Remove and shake PCV valve. Does PCV valve rattle?	Yes	Go to the next step.
		No	Replace the PCV valve.
19	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Replace the suspected part.
		No	Go to the next step.

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STEP	INSPECTION	RESULTS	ACTION
20	Install the fuel pressure gauge between the fuel pipe and fuel distributor. Connect the WDS or equivalent to the DLC-2. Turn the fuel pump on using FP PID in output state control of datalogger function. Is the fuel line pressure correct? (See 01-14-3 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Zero or low: Inspect the fuel pump and fuel pump relay related circuit. Inspect the fuel line for clogging. <ul style="list-style-type: none"> If normal, replace fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) High: Replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
21	Visually inspect the fuel injector for fuel leakage O-ring and fuel line. Service if necessary. Is the fuel line pressure held after the ignition switch is turned off? (See 01-14-3 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Inspect the fuel injector. <ul style="list-style-type: none"> If fuel injector is normal, replace fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
22	Note <ul style="list-style-type: none"> Following test is for stall concerns with the A/C on. If other symptoms exist, go to the next step. Connect pressure gauges to A/C low and high pressure side lines. Turn A/C on and measure low side and high side pressures. Are pressures within specifications? (See 07-10-5 REFRIGERANT PRESSURE CHECK.)	Yes	Go to the next step.
		No	If the A/C is always on, go to symptom troubleshooting "No.24 A/C is always on or A/C compressor runs continuously". (See 01-03A-49 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].) For other symptoms, inspect the following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation
23	Disconnect vacuum hose between the purge valve and intake manifold from purge valve side. Plug the opening end of vacuum hose. Start the engine. Is the engine stall now eliminated?	Yes	Inspect if the purge valve is stuck open. Inspect the evaporative emission control system.
		No	Go to the next step.
24	Is air leakage felt or heard at the intake-air system components while racing the engine to higher speed?	Yes	Repair or replace the malfunctioning part.
		No	Go to the next step.
25	Inspect engine condition while tapping the EGR valve housing. Does the engine condition improve?	Yes	Replace the EGR valve.
		No	Go to the next step.
26	Is the engine compression correct?	Yes	Inspect the valve timing.
		No	Inspect for cause.
27	Verify test results. <ul style="list-style-type: none"> If normal, return to diagnostic index to service any additional symptoms. (See 01-03A-1 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) If malfunction remains, inspect related Service information perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle repaired, troubleshooting completed. If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-5 PCM REMOVAL/INSTALLATION [L8, LF].) 		

NO.6 CRANKS NORMALLY BUT WILL NOT START [L8, LF]

DPE01030000W08

6	CRANKS NORMALLY BUT WILL NOT START
DESCRIPTION	<ul style="list-style-type: none"> The starter cranks engine at normal speed but the engine will not run. Refer to symptom troubleshooting "No.5 Engine stalls" if this symptom appears after engine stall. Fuel is in tank. Battery is in normal condition.

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6	CRANKS NORMALLY BUT WILL NOT START
POSSIBLE CAUSE	<ul style="list-style-type: none"> • No battery power supply to PCM • Air leakage from intake-air system • Open PCM GND or vehicle body GND • Improper operation of IAC valve • EGR valve malfunction • No signal from CKP sensor due to sensor, related wire or incorrect installation • No signal from CMP sensor due to sensor, related wire or incorrect installation • Low engine compression • Engine overheating • Vacuum leakage • Erratic signal to ignition coil • Improper air/fuel mixture ratio control • Poor fuel quality • PCV valve malfunction • Restriction in intake-air system • Restriction in exhaust system • Disconnected electrical connector • Open or short circuit in fuel pump body and related wiring harness • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel leakage from injector • Fuel injector is clogged. • Purge valve malfunction • Spark plug malfunction • Ignition coil malfunction • Improper valve timing • Immobilizer system and/or circuit malfunction (if equipped) • Immobilizer system operating properly. (Ignition key is not registered) • Pressure regulator malfunction <p>Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual. (See 01-14-3 BEFORE SERVICE PRECAUTION [L8, LF].) (See 01-14-3 AFTER SERVICE PRECAUTION [L8, LF].) <p>Caution</p> <ul style="list-style-type: none"> • 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.

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Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Note <ul style="list-style-type: none"> Following test should be performed for vehicles with immobilizer system. Go to Step 9 for vehicles without immobilizer system. <p>Connect the WDS or equivalent to the DLC-2. Do any of the following conditions appear?</p> <ul style="list-style-type: none"> The engine is not completely started. DTC P1260 is displayed. 	Yes	Both conditions appear: Go to Step 3.
		No	Either or other condition appears: Go to the next step.
2	Does the engine stall after approx. 2 s since the engine is started?	Yes	Go to the next step.
		No	Immobilizer system is normal. Go to Step 9.
3	Is the coil connector securely connected to the coil?	Yes	Go to the next step.
		No	Connect the coil connector securely. Return to Step 2.
4	Does the security light illuminate?	Yes	Go to the next step.
		No	Inspect the instrument cluster and wiring harness.
5	Connect the WDS equivalent to the DLC-2 and retrieve DTC. Are any of the following DTCs displayed? DTC B1213, B1600, B1601, B1602, B1681, B2103, B2139, B2141, B2431, U2510	Yes	Go to appropriate DTC inspection. (See 01-02A-9 DTC TABLE [L8, LF].)
		No	Advanced keyless entry system not equipped; Go to the next step. Advanced keyless entry system equipped; Go to Step 8.
6	Inspect the following wiring harnesses and connectors: <ul style="list-style-type: none"> Between coil terminal A and instrument cluster terminal 2Q Between coil terminal B and instrument cluster terminal 2S Is there any malfunction?	Yes	Repair or replace the suspected wiring harness and connector.
		No	Go to the next step.
7	Inspect the following wiring harnesses and connectors: <ul style="list-style-type: none"> Between PCM terminal 1AI and instrument cluster terminal 1I Between PCM terminal 1AM and instrument cluster terminal 1K Is there any malfunction?	Yes	Repair or replace the suspected wiring harness and connector.
		No	Go to the next step.
8	Inspect the following wiring harnesses and connectors: <ul style="list-style-type: none"> Between keyless CM terminal 3Y and coil A Between keyless CM terminal 3AA and coil B Between keyless CM terminal 4Z and PCM 1AI Between keyless CM terminal 4AA and PCM 1AM Is there any malfunction (open or short circuit, terminal corrosion, etc.)?	Yes	Repair or replace malfunctioning part.
		No	Go to the next step.
9	Verify following: <ul style="list-style-type: none"> Vacuum connection External fuel shut off or accessory (such as kill switch, alarm) Fuel quality: proper octane, contamination, winter/summer blend No air leakage from intake-air system Intake-air system restriction (such as air cleaner element, fresh air duct) Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve Ignition wiring Electrical connections Fuses Smooth operation of throttle valve Are all items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 9.

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STEP	INSPECTION	RESULTS	ACTION
10	Connect the WDS or equivalent to the DLC-2. Retrieve any continuous memory and KOEO DTCs using WDS or equivalent. Are there any DTCs displayed?	Yes	DTC is displayed: Go to the appropriate DTC inspection. (See 01-02A-9 DTC TABLE [L8, LF].) Communication error message is displayed: Inspect for the following: <ul style="list-style-type: none"> Open circuit in wiring harness between main relay and PCM terminal 1BE Open circuit in wiring harness between main relay terminal B and PCM terminal 1AT Main relay is stuck open. Open or poor GND circuit (PCM terminal 1BH,1AZ or 1BD) Poor connection of vehicle body GND
		No	No DTC is displayed: Go to the next step.
11	Does the engine start with the throttle valve closed?	Yes	Go to Step 29.
		No	Go to the next step.
12	Will the engine start and run smoothly at part throttle?	Yes	Inspect the IAC valve and wiring harness.
		No	Go to the next step.
13	Connect the WDS or equivalent to the DLC-2. Access RPM PID. Is RPM PID indicating the engine speed when cranking the engine?	Yes	Go to the next step.
		No	Inspect for the following: <ul style="list-style-type: none"> Open or short circuit in CKP sensor Open or short circuit between CKP sensor terminal A and PCM terminal 2Y Open or short circuit between CKP sensor terminal B and PCM terminal 2Z Open or short circuit in CKP sensor wiring harnesses If CKP sensor and wiring harness are normal, go to the next step.
14	Visually inspect the CKP sensor and teeth of crankshaft pulley. Are the CKP sensor and teeth of crankshaft pulley normal?	Yes	Go to the next step.
		No	Replace the malfunctioning part.
15	Measure the gap between the CKP sensor and teeth of crankshaft pulley. Specification 0.5—1.9 mm {0.020—0.75 in} Is the gap within the specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor. (See 01-40-29 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)
16	Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) for all cylinders. Are wiring harness conditions normal?	Yes	Go to the next step.
		No	Repair the wiring harnesses.
17	Perform the spark test. (See 01-03A-60 Spark Test.) Is strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to spark test result.
18	Inspect spark plug conditions. Is the spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: Inspect for fuel leakage from injector. Spark plug is grayish white: Inspect the fuel injector for clogging.
		No	Install the spark plugs on original cylinders. Go to the next step.
19	Remove and shake the PCV valve. Does the PCV valve rattle?	Yes	Go to the next step.
		No	Replace the PCV valve.
20	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Replace the suspected part.
		No	Go to the next step.

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STEP	INSPECTION	RESULTS	ACTION
21	Install fuel pressure gauge between the fuel pipe and the fuel distributor. Connect the WDS or equivalent to the DLC-2. Turn ON and/or OFF using FP PID in output state control of datalogger function. Is fuel line pressure correct when FP PID is turned On/Off five times ? (See 01-14-3 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Zero or low: Inspect the fuel pump and the fuel pump relay related circuit. Inspect the fuel line for clogging. <ul style="list-style-type: none"> If there is no malfunction, replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) High: Replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
22	Visually inspect the fuel injector O-ring and fuel line for fuel leakage. Service as necessary. Is fuel line pressure held after the ignition switch is turned off? (See 01-14-3 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Inspect the fuel injector. (See 01-14-15 FUEL INJECTOR INSPECTION [L8, LF].) <ul style="list-style-type: none"> If fuel injector is normal, replace fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
23	Disconnect the vacuum hose between the purge valve and the intake manifold from the purge valve side. Plug the opening end of vacuum hose. Start the engine. Is starting condition improved?	Yes	Inspect if the purge valve is stuck open mechanically. Inspect evaporative emission control system.
		No	Go to the next step.
24	Is air leakage felt or heard at the intake-air system components while racing the engine to higher speed?	Yes	Repair or replace the malfunctioning part.
		No	Go to the next step.
25	Inspect engine condition while tapping the EGR valve housing. Is engine condition improved?	Yes	Replace the EGR valve.
		No	Go to the next step.
26	Is engine compression correct?	Yes	Inspect the valve timing.
		No	Inspect for causes.
27	Verify test results. <ul style="list-style-type: none"> If normal, return to diagnostic index to service any additional symptoms. (See 01-03A-1 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) If malfunction remains, inspect related Service information perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle repaired, troubleshooting completed. If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-5 PCM REMOVAL/INSTALLATION [L8, LF].) 		

NO.7 SLOW RETURN TO IDLE [L8, LF]

DPE01030000W09

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

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STEP	INSPECTION	RESULTS	ACTION
1	Connect the WDS or equivalent to the DLC-2. Retrieve any continuous memory, KOEO and KOER DTCs using WDS or equivalent. Are there DTCs displayed?	Yes	DTC is displayed: Go to the appropriate DTC inspection. (See 01-02A-9 DTC TABLE [L8, LF].)
		No	No DTC is displayed: Go to the next step.
2	Remove thermostat and inspect operation. (See 01-12-8 THERMOSTAT REMOVAL/ INSTALLATION [L8, LF].) (See 01-12-8 THERMOSTAT INSPECTION [L8, LF].) Is thermostat normal?	Yes	ECT sensor and thermostat are normal. Go to the next step.
		No	Access ECT PID on the WDS or equivalent. Inspect for both ECT PID and temperature gauge on instrument cluster readings. <ul style="list-style-type: none"> If temperature gauge on instrument cluster indicates normal range but ECT PID is not same as temperature gauge reading, inspect ECT sensor. If temperature gauge on instrument cluster indicates cold range but ECT PID is normal, inspect temperature gauge and heat gauge unit.
3	Is throttle body free of contaminations?	Yes	Inspect for air leakage from the intake-air system components while racing engine to higher speed.
		No	Clean or replace the throttle body.
4	Verify test results. <ul style="list-style-type: none"> If normal, return to diagnostic index to service any additional symptoms. (See 01-03A-1 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) If malfunction remains, inspect related Service information perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle repaired, troubleshooting completed. If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-5 PCM REMOVAL/INSTALLATION [L8, LF].) 		

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NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [L8, LF]

DPE01030000W10

8	ENGINE RUNS ROUGH/ROLLING IDLE
DESCRIPTION	<ul style="list-style-type: none"> Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively. Idle speed is too slow and engine shakes excessively.

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8	ENGINE RUNS ROUGH/ROLLING IDLE
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Air leakage from intake-air system parts • A/C system operation is improper • Erratic signal to ignition coil • Spark plug malfunction • Purge valve malfunction • IAC valve improper operation • Idle learning of IAC system is not completed • EGR valve malfunction • Erratic or no signal from CMP sensor • Low engine compression • Improper valve timing • Erratic signal from CKP sensor • Improper air/fuel ratio mixture ratio control operation (abnormal signal from MAF sensor or HO2S) • Poor fuel quality • PCV valve malfunction • Air cleaner restriction • Restriction in exhaust system • Disconnected electrical connectors • Inadequate fuel pressure • Fuel pump body mechanical malfunction • Improper load signal input • Fuel line restriction or clogging • Improper fuel injection control operation • Fuel leakage from fuel injector • Fuel injector clogging • Engine overheating • Vacuum leakage • Pressure regulator malfunction (built-in fuel pump unit) <p>Warning The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual. (See 01-14-3 BEFORE SERVICE PRECAUTION [L8, LF].) (See 01-14-3 AFTER SERVICE PRECAUTION [L8, LF].) <p>Caution</p> <ul style="list-style-type: none"> • 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.

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Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Warm up the engine. Idle the engine for 5 min. Is the symptom disappeared?	Yes	Troubleshooting completed. (Cause of this symptom is that the idle learning of IAC system is not completed.)
		No	Go to the next step.
2	Verify following: <ul style="list-style-type: none"> External fuel shut off or accessory (such as kill switch, alarm) Fuel quality (such as proper octane, contamination, winter/summer blend) No air leakage from intake-air system Proper sealing of intake manifold and components attached to intake manifold: EGR valve, IAC valve Ignition wiring Electrical connections Fuses Smooth operation of throttle valve PCM GND circuit (PCM terminal 1AZ, 1BC, 1BD, 1BG and/or 1BH) Are all items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 2.
3	Connect the WDS or equivalent to the DLC-2. Retrieve any continuous memory, KOEO and KOER using WDS or equivalent. Are there any DTCs displayed?	Yes	DTC is displayed: Go to the appropriate DTC inspection. (See 01-02A-9 DTC TABLE [L8, LF].)
		No	No DTC is displayed: Go to the next step.
4	Is the engine overheating?	Yes	Go to symptom troubleshooting "No.17 Cooling system concerns - Overheating". (See 01-03A-41 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [L8, LF].)
		No	Go to the next step.
5	Connect the WDS or equivalent to the DLC-2. Access MAF PID. Drive vehicle with monitoring PID. Is MAF PID within specification? (See 01-40-7 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Inspect for open or short circuit of MAF sensor and related wiring harness.
6	Note <ul style="list-style-type: none"> Following test is for engine running rough idle with A/C on concerns. If other symptoms exist, go to the next step. Connect pressure gauge to A/C low and high pressure side lines. Start engine and run it at idle. Turn A/C switch on. Measure low side and high side pressures. Are pressures within specifications? (See 07-10-5 REFRIGERANT PRESSURE CHECK.)	Yes	Go to the next step.
		No	If A/C is always on, go to symptom troubleshooting "No.24 A/C is always on or A/C compressor runs continuously". (See 01-03A-49 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].) For other symptoms, inspect the following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation
7	Note <ul style="list-style-type: none"> Following test is for engine running rough with P/S on. If other symptoms exist, go to the next step. Start engine and idle it. Access PSP PID. Inspect if PSP PID is On while turning the steering wheel right to left. Is PSP PID normal?	Yes	Inspect the EHPAS. <ul style="list-style-type: none"> If there is no malfunction, inspect the following wiring harnesses: <ul style="list-style-type: none"> Between PCM terminal 1AI and EHPAS module terminal 1F Between PCM terminal 1AM and EHPAS module terminal 1D
		No	Go to the next step.
8	Visually inspect the CKP sensor and teeth of crankshaft pulley. Are the CKP sensor and teeth of crankshaft pulley normal?	Yes	Go to the next step.
		No	Replace the malfunctioning part.
9	Measure the gap between the CKP sensor and teeth of crankshaft pulley. Specification 0.5—1.9 mm {0.020—0.75 in} Is the gap within the specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor. (See 01-40-29 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [L8, LF].)

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STEP	INSPECTION	RESULTS	ACTION
10	Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) for all cylinders. Are wiring harness conditions normal?	Yes	Go to the next step.
		No	Repair the wiring harnesses.
11	Inspect spark plug condition. Is the spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: Inspect for fuel leakage from injector. Spark plug is grayish white: Inspect for clogged fuel injector.
		No	Install spark plugs on original cylinders. Go to the next step.
12	Start engine and disconnect IAC valve connector. Does rpm drop or engine stall?	Yes	Go to the next step.
		No	Inspect IAC valve and wiring harness. (See 01-13-6 IDLE AIR CONTROL (IAC) VALVE INSPECTION [L8, LF].)
13	Install fuel pressure gauge between fuel pipe and fuel distributor. Start engine and run it at idle. Measure fuel line pressure at idle. Is fuel line pressure correct at idle? (See 01-14-3 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Low: Inspect the fuel line for clogging. <ul style="list-style-type: none"> If there is no malfunction, replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) High: Replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
14	Visually inspect for fuel leakage at fuel injector, O-ring, and fuel line. Service as necessary. Does fuel line pressure hold after ignition switch is turned off? (See 01-14-3 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Inspect fuel injector. <ul style="list-style-type: none"> If fuel injector is normal, replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
15	Connect the WDS or equivalent to the DLC-2. Warm up the engine and idle it. Access O2S11 PID. Is O2S11 PID normal? <ul style="list-style-type: none"> More than 0.45 V when the accelerator pedal is suddenly depressed: rich condition. Less than 0.45 V during fuel cut: lean condition. 	Yes	Go to the next step.
		No	Inspect and repair or replace the front HO2S, wiring harness, connector or terminal, then go to the next step. (See 01-40-35 FRONT HEATED OXYGEN SENSOR (HO2S) INSPECTION [L8, LF].)
16	Disconnect the vacuum hose between purge valve and intake manifold from purge valve side. Plug opening end of vacuum hose. Start engine. Does engine condition improve?	Yes	Inspect if the purge valve is stuck open mechanically. Inspect EVAP control system.
		No	Go to the next step.
17	Remove and shake the PCV valve. Does the PCV valve rattle?	Yes	Go to the next step.
		No	Replace the PCV valve.
18	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Replace the part.
		No	Go to the next step.
19	Visually inspect the CMP sensor and teeth of camshaft. Are CMP sensor and teeth of camshaft normal?	Yes	Go to the next step.
		No	Replace the malfunctioning part.
20	Inspect engine condition while tapping the EGR valve housing. Does engine condition improve?	Yes	Replace the EGR valve.
		No	Go to the next step.
21	Is engine compression correct?	Yes	Inspect valve timing.
		No	Inspect for causes.
22	Verify test results. <ul style="list-style-type: none"> If normal, return to diagnostic index to service any additional symptoms. (See 01-03A-1 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) If malfunction remains, inspect related Service information perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle repaired, troubleshooting completed. If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-5 PCM REMOVAL/INSTALLATION [L8, LF].) 		

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

NO.9 FAST IDLE/RUNS ON [L8, LF]

DPE01030000W11

9	FAST IDLE/RUNS ON
DESCRIPTION	<ul style="list-style-type: none"> The engine speed continues at fast idle after warm-up. The engine runs after the ignition switch is turned off.
POSSIBLE CAUSE	<ul style="list-style-type: none"> ECT sensor malfunction Air leakage from intake-air system Throttle body malfunction Accelerator cable free play misadjustment Improper load signal input

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Connect the WDS or equivalent to the DLC-2. Access ECT PID. Start and warm up engine to normal operating temperature. Is ECT PID between 82—112°C {180—234°F} ?	Yes	Go to the next step.
		No	ECT PID is higher than 112°C {234°F}: Go to symptom troubleshooting "No.17 Cooling system concerns - Overheating". (See 01-03A-41 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [L8, LF].) ECT PID is less than 82°C {180°F}: Go to symptom troubleshooting "No.18 Cooling system concerns - Runs cold". (See 01-03A-43 NO.18 COOLING SYSTEM CONCERNS-RUNS COLD [L8, LF].)
2	Connect the WDS or equivalent to the DLC-2. Retrieve any continuous memory DTCs. Are there any DTCs displayed?	Yes	DTC is displayed: Go to the appropriate DTC inspection. (See 01-02A-9 DTC TABLE [L8, LF].)
		No	No DTC is displayed: Go to the next step.
3	Connect the WDS or equivalent to the DLC-2. Access following PIDs. <ul style="list-style-type: none"> AC_REQ CPP (MTX) CPP/PNP (MTX) TR (ATX) PSP Monitor each PID. (See 01-40-7 PCM INSPECTION [L8, LF].) Are PIDs normal?	Yes	Go to the next step.
		No	AC_REQ PID: Inspect the A/C switch, refrigerant pressure switch and the fan switch. (See 01-40-25 CLUTCH PEDAL POSITION (CPP) SWITCH INSPECTION [L8, LF].) CPP PID: (MTX) Inspect the clutch pedal position switch. (See 01-40-25 CLUTCH PEDAL POSITION (CPP) SWITCH INSPECTION [L8, LF].) CPP/PNP PID: (MTX) Inspect neutral switch. (See 01-40-25 NEUTRAL SWITCH INSPECTION [L8, LF].) TR PID: (ATX) Inspect the TR switch. (See 05-17-9 TRANSAXLE RANGE (TR) SWITCH INSPECTION [FN4A-EL].) PSP PID: Inspect EHPAS.
4	Is there air leakage felt or heard at the intake-air system components while racing engine to higher speed?	Yes	Repair or replace part if necessary.
		No	Verify the accelerator cable free play. (See 01-13-10 ACCELERATOR CABLE INSPECTION/ADJUSTMENT [L8, LF].)
5	Verify test results. <ul style="list-style-type: none"> If normal, return to diagnostic index to service any additional symptoms. (See 01-03A-1 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) If malfunction remains, inspect related Service information perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle repaired, troubleshooting completed. If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-5 PCM REMOVAL/INSTALLATION [L8, LF].) 		

NO.10 LOW IDLE/STALLS DURING DECELERATION [L8, LF]

DPE01030000W12

10	LOW IDLE/STALLS DURING DECELERATION
DESCRIPTION	<ul style="list-style-type: none"> Engine stops unexpectedly at the beginning of deceleration or recovery from deceleration.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

10	LOW IDLE/STALLS DURING DECELERATION
POSSIBLE CAUSE	<ul style="list-style-type: none">• Vacuum leakage• IAC valve malfunction• Air leakage from intake-air system• Improper air/fuel mixture ratio control• Evaporative emission control system malfunction• TP sensor misadjustment• TP sensor or related circuit malfunction• MAF sensor or related circuit malfunction• Brake switch or related circuit malfunction• Neutral/clutch pedal position switch or related circuit malfunction (MTX)• TR switch or related circuit malfunction (ATX)• Improper A/C magnetic clutch operation

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	<ul style="list-style-type: none"> Does the engine idle rough? 	Yes	Go to symptom troubleshooting "No.8 Engine runs rough/rolling idle". (See 01-03A-21 NO.8 ENGINE RUNS ROUGH/ROLLING IDLE [L8, LF].)
		No	Go to the next step.
2	Turn off the A/C switch and fan switch. Does the A/C magnetic clutch engage?	Yes	Go to symptom troubleshooting "No.24 A/C is always on or A/C compressor runs continuously." (See 01-03A-49 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].)
		No	Go to the next step.
3	Verify the following: <ul style="list-style-type: none"> Proper routing and no damage of vacuum lines IAC valve is connected properly. No air leakage from intake-air system Are all items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 3.
4	Connect the WDS or equivalent to the DLC-2. Retrieve any continuous memory, KOEO and KOER DTCs using WDS or equivalent. Are there any DTCs displayed?	Yes	DTC is displayed: Go to the appropriate DTC inspection. (See 01-02A-9 DTC TABLE [L8, LF].)
		No	No DTC is displayed: Go to the next step.
5	Does the idle speed drop or stall when disconnecting the IAC valve?	Yes	Go to the next step.
		No	Inspect the following: <ul style="list-style-type: none"> Circuit from IAC valve to the PCM terminal 2E or 2F for open and short IAC valve for sticking If normal, go to the next step.
6	Disconnect the vacuum hose between the purge solenoid valve and the intake manifold from the purge solenoid valve side. Plug opening end of vacuum hose. Drive vehicle. Does engine condition improve?	Yes	Inspect the evaporative emission control system.
		No	Go to the next step.
7	Connect the WDS or equivalent to the DLC-2. Access following PIDs. <ul style="list-style-type: none"> TP MAT VSS BOO CPP (MTX) CPP/PNP (MTX) TR (ATX) Monitor each PID while driving the vehicle. (See 01-40-7 PCM INSPECTION [L8, LF].) Are PIDs normal?	Yes	Intermittent concern exists. (See 01-03A-55 INTERMITTENT CONCERN TROUBLESHOOTING [L8, LF].)
		No	TP PID: Inspect the TP sensor. (See 01-40-31 THROTTLE POSITION (TP) SENSOR INSPECTION [L8, LF].) MAF PID: Inspect the MAF sensor. (See 01-40-32 MASS AIR FLOW (MAF) SENSOR INSPECTION [L8, LF].) VSS PID: Inspect the VSS. (See 01-02A-9 DTC TABLE [L8, LF].) BOO PID: Inspect the brake switch. (See 04-11-9 BRAKE SWITCH INSPECTION.) CPP PID: (MTX) Inspect the clutch pedal position switch. (See 01-40-25 CLUTCH PEDAL POSITION (CPP) SWITCH INSPECTION [L8, LF].) CPP/PNP PID: (MTX) Inspect the neutral switch. (See 01-40-25 NEUTRAL SWITCH INSPECTION [L8, LF].) TR PID: (ATX) Inspect the TR switch. (See 05-17-9 TRANSAXLE RANGE (TR) SWITCH INSPECTION [FN4A-EL].)

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

STEP	INSPECTION	RESULTS	ACTION
8	Verify test results. <ul style="list-style-type: none">• If normal, return to diagnostic index to service any additional symptoms. (See 01-03A-1 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].)• If malfunction remains, inspect related Service information perform repair or diagnosis.<ul style="list-style-type: none">— If vehicle repaired, troubleshooting completed.— If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-5 PCM REMOVAL/INSTALLATION [L8, LF].)		

NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES [L8, LF]

DPE01030000W13

11	ENGINE STALLS/QUITS — ACCELERATION/CRUISE ENGINE RUNS ROUGH — ACCELERATION/CRUISE MISSES — ACCELERATION/CRUISE BUCK/JERK — ACCELERATION/CRUISE/DECELERATION HESITATION/STUMBLE — ACCELERATION SURGES — ACCELERATION/CRUISE
DESCRIPTION	<ul style="list-style-type: none">• Engine stops unexpectedly at the beginning of acceleration or during acceleration.• Engine stops unexpectedly while cruising.• Engine speed fluctuates during acceleration or cruising.• Engine misses during acceleration or cruising.• Vehicle bucks/jerks during acceleration, cruising, or deceleration.• Momentary pause at beginning of acceleration or during acceleration• Momentary minor irregularity in engine output

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

11	<p>ENGINE STALLS/QUITS — ACCELERATION/CRUISE ENGINE RUNS ROUGH — ACCELERATION/CRUISE MISSSES — ACCELERATION/CRUISE BUCK/JERK — ACCELERATION/CRUISE/DECELERATION HESITATION/STUMBLE — ACCELERATION SURGES — ACCELERATION/CRUISE</p>
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Improper A/C system operation • Erratic signal or no signal from CMP sensor • Air leakage from intake-air system parts • Purge valve malfunction • IAC valve improper operation • EGR valve malfunction • Erratic signal from CKP sensor • Low engine compression • Vacuum leakage • Poor fuel quality • Main relay intermittent malfunction • Throttle body malfunction • Engine overheating • Erratic signal to ignition coil • Improper air/fuel mixture ratio control operation • Improper variable tumble control operation • Erratic signal to ignition coil • Air cleaner restriction • PCV valve malfunction • Fuel flow into evaporative purge hose • Improper valve timing due to jumping out timing belt • Restriction in exhaust system • Intermittent open or short circuit in fuel body pump circuit • Inadequate fuel pressure • Fuel pump mechanical malfunction • Check valve (two-way) malfunction (integrated with fuel tank) • Fuel leakage from fuel injector • Fuel injector clogging • Fuel line restriction or clogging • Pressure regulator malfunction (built-in fuel pump unit) • TP sensor misadjustment • Intermittent open or short circuit of MAF sensor, TP sensor and VSS • Clutch slippage (MTX) • ATX malfunction (ATX) • Loose attaching bolts or worn engine mounts <p>Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual. (See 01-14-3 BEFORE SERVICE PRECAUTION [L8, LF].) (See 01-14-3 AFTER SERVICE PRECAUTION [L8, LF].) <p>Caution</p> <ul style="list-style-type: none"> • 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.

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SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Verify for the following: <ul style="list-style-type: none"> • Vacuum connection • Air cleaner element • No air leakage from intake-air system • No restriction of intake-air system • Proper sealing of intake manifold and components attached to intake manifold: such as EGR valve, IAC valve • Ignition wiring • Fuel quality (e.g. proper octane, contamination, winter/summer blend) • Electrical connections • Smooth operation of throttle valve Are all items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 1.
2	Connect the WDS or equivalent to the DLC-2. Retrieve any continuous memory, KOEO and KOER DTCs using WDS or equivalent. If stall, condition exists retrieve continuous memory and KOEO DTCs. Are there any DTCs displayed?	Yes	DTC is displayed: Go to the appropriate DTC inspection. (See 01–02A–9 DTC TABLE [L8, LF].)
		No	No DTC is displayed: Go to the next step.
3	Is the engine overheating?	Yes	Go to symptom troubleshooting "No.17 Cooling system concerns - Overheating".
		No	Go to the next step.
4	Connect the WDS or equivalent to the DLC-2. Access RPM, VPWR, MAF, TP and VSS PIDs. Drive the vehicle with monitoring PIDs. Are PIDs within specifications? (See 01–40–7 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	RPM PID: Inspect the CKP sensor and related wiring harness for such as vibration, intermittent open/short circuit. VPWR PID: Inspect for open circuit intermittently. MAF PID: Inspect for open circuit of the MAF sensor and related wire harness intermittently. TP PID: Inspect if output signal from the TP sensor changes smoothly. VSS PID: Inspect for open circuit of the VSS and related wire harness intermittently.
5	Visually inspect the CKP sensor and teeth of crankshaft pulley. Are the CKP sensor and teeth of crankshaft pulley normal?	Yes	Go to the next step.
		No	Replace the malfunctioning part.
6	Measure the gap between the CKP sensor and teeth of crankshaft pulley. Specification 0.5—1.9 mm {0.020—0.75 in} Is the gap within specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor.
7	Inspect spark plug conditions. Is the spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: Inspect for fuel leakage from the fuel injector. Spark plug is grayish white: Inspect the fuel injector for clogging.
		No	Install the spark plugs on original cylinders. Go to the next step.
8	Remove and shake the PCV valve. Does the PCV valve rattle?	Yes	Go to the next step.
		No	Replace the PCV valve.
9	Verify that throttle lever is resting on throttle valve stop screw and/or throttle valve orifice plug. Is the lever in correct position?	Yes	Go to the next step.
		No	Adjust if necessary.
10	Visually inspect deformed exhaust system part. Is there any deformed exhaust system part?	Yes	Replace the suspected part.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

STEP	INSPECTION	RESULTS	ACTION
11	Install fuel pressure gauge between the fuel pipe and fuel distributor. Connect the WDS or equivalent to the DLC-2. Turn the fuel pump on using FP PID in output state control of datalogger function. Is fuel line pressure correct? (See 01-14-3 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Zero or low: Inspect the fuel pump and the fuel pump relay related circuit. Inspect the fuel line for clogging. <ul style="list-style-type: none"> If there is no malfunction, replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) High: Replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
12	Visually inspect for fuel leakage at fuel injector O-ring and fuel line. Service if necessary. Is fuel line pressure held after the ignition switch is turned off? (See 01-14-3 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Inspect the fuel injector. <ul style="list-style-type: none"> If the fuel injector is normal, replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
13	Note <ul style="list-style-type: none"> Following test is for engine stall with the A/C on. If other symptom exists, go to the next step. Connect a pressure gauge to the A/C low and high pressure side lines. Turn the A/C on and measure low side and high side pressure. Are pressure within specifications? (See 07-10-5 REFRIGERANT PRESSURE CHECK.)	Yes	Go to the next step.
		No	If the A/C is always on, go to symptom troubleshooting "No.24 A/C is always on or A/C compressor runs continuously". (See 01-03A-49 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].) For other symptoms, inspect following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation
14	Connect the WDS or equivalent to the DLC-2. Warm up the engine and idle it. Access O2S11 PID. Is O2S11 PID normal? <ul style="list-style-type: none"> More than 0.45 V when the accelerator pedal is suddenly depressed: rich condition. Less than 0.45 V during fuel cut: lean condition. 	Yes	Go to the next step.
		No	Inspect and repair or replace the front HO2S, wiring harness, connector or terminal, then go to the next step. (See 01-40-35 FRONT HEATED OXYGEN SENSOR (HO2S) INSPECTION [L8, LF].)
15	Inspect the evaporative purge hose between the fuel tank and the purge valve. Dose fuel flow into evaporative purge hose?	Yes	Inspect the check valve (two-way). (See 01-14-7 FUEL TANK INSPECTION [L8, LF].)
		No	Go to the next step.
16	Disconnect the vacuum hose between the purge valve and the intake manifold from the purge valve side. Plug the opening end of vacuum hose. Drive the vehicle. Does the engine condition improve?	Yes	Go to the next step. Inspect if the purge valve is stuck open mechanically. Inspect the evaporative emission control system.
		No	Go to the next step.
17	Visually inspect the CMP sensor and projections of the camshaft pulley. Are the CMP sensor and projections of camshaft pulley normal?	Yes	Go to the next step.
		No	Replace the malfunctioning part.
18	Inspect the variable tumble control operation. (See 01-03A-59 Variable Tumble Control Operation Inspection.) Is the variable tumble control normal?	Yes	Go to the next step.
		No	Replace or replace the malfunctioning part.
19	Inspect the EGR system. (See 01-03A-61 EGR Control System Inspection.) Is EGR system normal?	Yes	Go to the next step.
		No	Replace the malfunctioning part.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

STEP	INSPECTION	RESULTS	ACTION
20	Is engine compression correct?	Yes	Inspect the following: <ul style="list-style-type: none"> • Valve timing • Clutch (MTX) • Internal ATX components (ATX) • EGR valve (mechanical stuck) • Engine mounts • Check valve (two-way)
		No	Inspect for cause.
21	Verify test results. <ul style="list-style-type: none"> • If normal, return to diagnostic index to service any additional symptoms. (See 01-03A-1 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) • If malfunction remains, inspect related Service information perform repair or diagnosis. <ul style="list-style-type: none"> — If vehicle repaired, troubleshooting completed. — If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-5 PCM REMOVAL/INSTALLATION [L8, LF].) 		

NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE [L8, LF]

DPE01030000W14

12	LACK/LOSS OF POWER — ACCELERATION/CRUISE
DESCRIPTION	Performance is poor under load (such as power down when climbing hills).
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Improper A/C system operation • Erratic signal or no signal from CMP sensor • Air leakage from intake-air system parts • Restriction in intake-air system • Intake-air temperature too hot • Improper variable intake-air control operation • Improper variable tumble control operation • Purge valve malfunction • Improper EGR valve operation • Brake dragging • Erratic signal from CKP sensor • Low engine compression • Vacuum leakage • Poor fuel quality • Erratic signal to ignition coil • Engine overheating • Throttle body malfunction • Spark plug malfunction • PCV valve malfunction • Improper valve timing due to jumping out of timing belt • Restriction in exhaust system • Intermittent open or short in fuel pump related circuit • Inadequate fuel pressure • Fuel pump mechanical malfunction • Fuel line restriction or clogging • Fuel leakage from fuel injector • Fuel injector clogging • Intermittent open or short circuit of MAF sensor, TP sensor, IAT sensor and VSS • Clutch slippage (MTX) • ATX malfunction (ATX)
	<p>Warning</p> <p>The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual. (See 01-14-3 BEFORE SERVICE PRECAUTION [L8, LF].) (See 01-14-3 AFTER SERVICE PRECAUTION [L8, LF].) <p>Caution</p> <ul style="list-style-type: none"> • 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.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Verify the following: <ul style="list-style-type: none"> • Vacuum connection • Restriction in the intake-air system (such as air cleaner element, fresh air duct) • No air leakage from intake-air system • No restriction of intake-air system • Proper sealing of intake manifold and components attached to intake manifold; such as EGR valve, IAC valve • Fuel quality (such as proper octane, contamination, winter/summer blend) Are all items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 1.
2	Connect the WDS or equivalent to the DLC-2. Retrieve any continuous memory, KOEO and KOER DTCs using WDS or equivalent. If engine stall condition exists, retrieve continuous memory and KOEO DTCs. Are there any DTCs displayed?	Yes	DTC is displayed: Go to the appropriate DTC inspection. (See 01-02A-9 DTC TABLE [L8, LF].)
		No	No DTC is displayed: Go to the next step.
3	Is the engine overheating?	Yes	Go to symptom troubleshooting "No.17 Cooling system concerns - Overheating". (See 01-03A-41 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [L8, LF].)
		No	Go to the next step.
4	Connect the WDS or equivalent to the DLC-2. Access RPM, MAF, TP, IAT and VSS PIDs. Drive the vehicle while monitoring PIDs. Are PIDs within specifications? (See 01-40-7 PCM INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	RPM PID: Inspect the CKP sensor and related wiring harness for vibration and/or intermittent open/short circuit. MAF PID: Inspect for intermittent open circuit of MAF sensor and related wiring harness. TP PID: Inspect if TP sensor output increases smoothly. IAT PID: Inspect for air suction in intake-air system. If normal, inspect intermittent short circuit of IAT sensor and related wiring harness. VSS PID: Inspect for intermittent open circuit of VSS and related wiring harness.
5	Visually inspect CKP sensor and teeth of crankshaft pulley. Are CKP sensor and teeth of crankshaft pulley normal?	Yes	Go to the next step.
		No	Replace the malfunctioning part.
6	Measure the gap between the CKP sensor and teeth of crankshaft pulley. Specification 0.5—1.9 mm {0.020—0.75 in} Is the gap within the specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor.
7	Inspect spark plug condition. Is the spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: Inspect the fuel injector for fuel leakage. Spark plug is grayish white: Inspect the fuel injector for clogging.
		No	Install spark plugs on original cylinders. Go to the next step.
8	Remove and shake the PCV valve. Does the PCV valve rattle?	Yes	Go to the next step.
		No	Replace PCV valve.
9	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Replace the part.
		No	Go to the next step.

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

STEP	INSPECTION	RESULTS	ACTION
10	Install fuel pressure gauge between the fuel pipe and the fuel distributor. Connect the WDS or equivalent to the DLC-2. Turn the fuel pump on using FP PID in output state control of datalogger function. Is fuel line pressure correct? (See 01-14-3 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Go to the next step.
		No	Zero or low: Inspect the fuel pump and the fuel pump relay related circuit. Inspect the fuel line for clogging. <ul style="list-style-type: none"> If there is no malfunction, replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) High: Replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
11	Inspect the variable tumble control operation. (See 01-03A-59 Variable Tumble Control Operation Inspection.) Does the variable tumble control function properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part.
12	Inspect the variable intake-air operation. (See 01-03A-58 Variable Intake-air Control Operation Inspection.) Does the variable intake-air function properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part.
13	Note <ul style="list-style-type: none"> The following test is for engine stall with the A/C on concern. If other symptoms exist, go to the next step. Connect pressure gauge to A/C low and high side pressure lines. Turn the A/C on and measure low side and high side pressures. Are pressures within specifications? (See 07-10-5 REFRIGERANT PRESSURE CHECK.)	Yes	Go to the next step.
		No	If the A/C is always on, go to symptom troubleshooting "No.24 A/C is always on or A/C compressor runs continuously". (See 01-03A-49 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [L8, LF].) For other symptoms, inspect following: <ul style="list-style-type: none"> Refrigerant charging amount Condenser fan operation
14	Inspect A/C cut-off operation. (See 01-03A-62 A/C Cut-off Control System Inspection.) Does A/C cut-off work properly?	Yes	Go to the next step.
		No	Inspect the A/C cut-off system components.
15	Disconnect vacuum hose between the purge valve and the intake manifold from the purge valve side. Plug opening end of vacuum hose. Drive the vehicle. Does the engine condition improve?	Yes	Inspect if the purge valve is stuck open mechanically. Inspect the EVAP control system. (See 01-03A-61 Purge Control System Inspection.)
		No	Go to the next step.
16	Visually inspect the CMP sensor and projections of camshaft pulley. Are CMP sensor and projections of camshaft pulley normal?	Yes	Go to the next step.
		No	Replace the malfunctioning part.
17	Inspect the EGR system. (See 01-03A-61 EGR Control System Inspection.) Is the EGR system normal?	Yes	Go to the next step.
		No	Replace the malfunctioning part.
18	Is engine compression correct?	Yes	Inspect the following: <ul style="list-style-type: none"> Valve timing Clutch (MTX) Internal ATX components (ATX) Brake system for dragging
		No	Inspect for cause.
19	Verify test results. <ul style="list-style-type: none"> If normal, return to diagnostic index to service any additional symptoms. (See 01-03A-1 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) If malfunction remains, inspect related Service information perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle repaired, troubleshooting completed. If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-5 PCM REMOVAL/INSTALLATION [L8, LF].) 		

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

NO.13 KNOCKING/PINGING-ACCELERATION/CRUISE [L8, LF]

DPE01030000W15

13	KNOCKING/PINGING - ACCELERATION/CRUISE
DESCRIPTION	Sound is heard when air/fuel mixture is ignited by something other than spark plug (e.g. hot spot in combustion chamber).
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Engine overheating due to cooling system malfunction • ECT sensor malfunction • IAT sensor malfunction • MAF sensor malfunction • Knock sensor malfunction • Erratic signal from CMP sensor • Inadequate engine compression • Inadequate fuel pressure <p>Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:</p> <ul style="list-style-type: none"> • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual. (See 01-14-3 BEFORE SERVICE PRECAUTION [L8, LF].) (See 01-14-3 AFTER SERVICE PRECAUTION [L8, LF].) <p>Caution</p> <ul style="list-style-type: none"> • 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.

01

SYMPTOM TROUBLESHOOTING [ENGINE CONTROL SYSTEM (L8, LF)]

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	Connect the WDS or equivalent to the DLC-2. Access ECT PID. Verify ECT PID is less than 116°C {241°F} during driving. Is ECT PID less than specification?	Yes	Go to the next step.
		No	Inspect the cooling system for cause of overheating.
2	Connect the WDS or equivalent to the DLC-2. Access IAT, MAF and SPARKADV PIDs. Monitor each PID. (See 01-40-7 PCM INSPECTION [L8, LF].) Are PIDs normal?	Yes	Go to the next step.
		No	IAT PID: Inspect IAT sensor. MAF PID: Inspect MAF sensor. SPARKADV PID: Inspect CMP sensor and knock sensor.
3	Connect the WDS or equivalent to the DLC-2. Retrieve any continuous memory, KOEO and KOER DTCs using WDS or equivalent. Are there any DTCs displayed?	Yes	DTC is displayed: Go to the appropriate DTC inspection. (See 01-02A-9 DTC TABLE [L8, LF].)
		No	No DTC is displayed: Go to the next step.
4	Is engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause.
5	Install fuel pressure gauge between the fuel pipe and fuel distributor. Start the engine and idle it. Measure fuel line pressure during idle. Is fuel line pressure correct during idle? (See 01-14-3 FUEL LINE PRESSURE INSPECTION [L8, LF].)	Yes	Inspect ignition timing.
		No	Low: Inspect the fuel line for clogging. <ul style="list-style-type: none"> If there is no malfunction, replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].) High: Replace the fuel pump unit. (See 01-14-8 FUEL PUMP UNIT REMOVAL/ INSTALLATION [L8, LF].)
6	Verify test results. <ul style="list-style-type: none"> If normal, return to diagnostic index to service any additional symptoms. (See 01-03A-1 ENGINE SYMPTOM TROUBLESHOOTING [L8, LF].) If malfunction remains, inspect related Service information perform repair or diagnosis. <ul style="list-style-type: none"> If vehicle repaired, troubleshooting completed. If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See 01-40-5 PCM REMOVAL/INSTALLATION [L8, LF].) 		

NO.14 POOR FUEL ECONOMY [L8, LF]

DPE01030000W16

14	POOR FUEL ECONOMY
DESCRIPTION	Fuel economy is unsatisfactory.