

NO.8 ENGINE RUNS ROUGH/ROLLING IDLE

BHE010300103W10

8	ENGINE RUNS ROUGH/ROLLING IDLE
DESCRIPTION	<ul style="list-style-type: none"> • The engine speed fluctuates between the specified idle speed and a lower speed, and the engine shakes excessively. • The idle speed is too slow and the engine shakes excessively.
POSSIBLE CAUSE	<ul style="list-style-type: none"> • Vacuum leakage • Air leakage from intake-air system parts • Air suction at intake-air system (between MAF sensor and intake ports) • Air cleaner restriction • Air cleaner improper installation • Improper operation of drive-by-wire control system (abnormal signals from APP sensor, TP sensor and load signal to PCM) • SSV stuck open • SSV solenoid valve malfunction (stuck open) • APV stuck open* • APV motor malfunction* • APV position sensor malfunction* • Carbon or foreign materials at primary intake port • Poor fuel quality • Inadequate fuel pressure • Pressure regulator (integrated in fuel pump unit) malfunction • Fuel pump body mechanical malfunction • Fuel line restriction or clogging • Fuel leakage from fuel injector • Fuel injector (FP1) (RP1) malfunction (leakage, clogging, improper injection amount) • Jet air mixing system malfunction (restriction or leakage at air passage) • Restriction in exhaust system • Improper operation of AIR system • Purge solenoid valve malfunction (stuck open) • Improper fuel injection control operation (abnormal signals from MAF, ECT and IAT sensors to PCM) • Erratic signal from eccentric shaft position sensor • Damaged or improper installed eccentric shaft position sensor pulse wheel • Disconnected electrical connectors • Improper load signal input • Engine overheating • Low engine compression <ul style="list-style-type: none"> – Engine internal malfunction – Abnormal engine oil condition (viscosity, deterioration) – Low oil pressure – Excessive fuel pressure – Air mixed in oil line – Metering oil pump malfunction <ul style="list-style-type: none"> Leakage or clogging in oil pipe Leakage or clogging in oil nozzle • Excessive engine mechanical loss • Metering oil pump improper operation (in fail-safe mode) • A/C system operation is improper • Spark leakage from high-tension leads • Spark plug malfunction

- Improper spark plug heat range
- Ignition coil malfunction
- Improper ignition timing

Warning

The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read the following warnings before servicing the fuel system:

- Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.
- Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.

(See [BEFORE REPAIR PROCEDURE.](#))

(See [AFTER REPAIR PROCEDURE.](#))

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

STEP	INSPECTION	RESULTS	ACTION
1	Does the engine knock/ping/detonate?	Yes	Go to the symptom troubleshooting "No.13 Knocking/pinging/detonation-Acceleration/cruise". (See NO.13 KNOCKING/PINGING/DETONATION-ACCELERATION/CRUISE.)
		No	Go to the next step.
2	Verify the following: <ul style="list-style-type: none"> • External fuel shut off or accessory (such as kill switch, alarm.) • Fuel quality (e.g. proper octane, contamination, winter/summer blend) • No air leakage from intake-air system • Air cleaner element (restriction, improper installation) • Blockage at intake-air system (between MAF sensor and intake ports) • Proper sealing of intake manifold • MAF sensor installation • Ignition wiring • Electrical connections • Fuses • Smooth operation of throttle valve Are all the 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	Yes	DTC is displayed: Go to the applicable DTC inspection. (See DTC TABLE.)

	and KOER DTCs. Are there any DTCs displayed?	No	No DTC is displayed: Go to the next step.
4	Is the engine overheating?	Yes	Go to the symptom troubleshooting "No.17 Cooling system concerns - Overheating". (See NO.17 COOLING SYSTEM CONCERNS-OVERHEATING.)
		No	Go to the next step.
5	<p>Note</p> <ul style="list-style-type: none"> The following test is for an engine running at rough idle with the A/C on. If other symptoms exist, go to the next step. <p>Connect the pressure gauge to the A/C low and high pressure side lines. Start the engine and run it at idle. Turn the A/C switch on. Measure the low side and high side pressures. Are the pressures within specifications? (See REFRIGERANT PRESSURE CHECK.)</p>	Yes	Go to the next step.
		No	If the A/C is always on, go to the symptom troubleshooting "No.24 A/C is always on or A/C compressor runs continuously". (See NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY.) For other symptoms, inspect the following: <ul style="list-style-type: none"> Refrigerant charging amount Cooling fans operation
6	<p>Note</p> <ul style="list-style-type: none"> The following test is for an engine running rough with the P/S on. If other symptoms exist, go to the next step. <p>Connect the WDS or equivalent to the DLC-2. Turn the ignition switch to the ON position (Engine off). Retrieve any DTCs for EPS CM. Are there any DTCs displayed?</p>	Yes	DTC is displayed: Go to the applicable DTC inspection. (See DTC TABLE [RC4A-EL].)
		No	No DTC is displayed: Go to the next step.
7	Visually inspect the eccentric shaft position sensor and the teeth of the pulse wheel. Are the eccentric shaft position sensor and the teeth of the pulse wheel normal?	Yes	Go to the next step.
		No	Replace the malfunctioning parts.
8	<p>Warning</p> <ul style="list-style-type: none"> High-voltage in ignition system can cause strong electrical shock which can result in serious injury. Avoid direct contact to the vehicle body during the rotor balance test. High-voltage spark will negatively effect the engine control. To prevent this, ground the high-tension leads and keep away from sensors and wiring harnesses. 	Yes	Go to Step 13.

	<p>Caution</p> <ul style="list-style-type: none"> • Rotor balance test can overheat and damage the three-way catalytic converter. <p>Perform rotor balance test. (See Rotor Balance Test.) Is the engine speed drop value the same for each rotor?</p>	No	Go to the next step.
9	Inspect the high-tension lead for the rotor where the engine speed did not drop in Step 8 for cracks. Are there any cracks on the high-tension lead?	Yes	Repair the suspected high-tension lead.
		No	Go to the next step.
10	Is a strong blue spark visible while cranking at each disconnected high-tension lead for the rotor where the engine speed does not drop in Step 8?	Yes	Go to the next step.
		No	Inspect for the following: <ul style="list-style-type: none"> • Open or short circuit in ignition coil • Open circuit in high-tension leads • Open circuit between ignition coil connector GND terminal and GND • Open circuit between ignition switch and ignition coil • Open circuit between ignition coils terminal C and PCM terminal 2Z, 2AA, 2AC or 2AD
11	Inspect the spark plug for the rotor where the engine speed did not drop in Step 8. Is the spark plug wet, covered with carbon or grayish white?	Yes	<p>Spark plug is wet or covered with carbon:</p> <p>Inspect for fuel leakage from the fuel injector.</p> <p>Spark plug is grayish white:</p> <p>Inspect for clogged fuel injector (FP1) (RP1).</p>
		No	Go to the next step.
12	Perform the drive-by-wire control system operation inspection. (See Drive-by-wire Control System Inspection.) Does the drive-by-wire control system work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the drive-by-wire control system operation inspection results.
13	Inspect for cracks on the high-tension leads. Are there any cracks on the high-tension leads?	Yes	Repair the suspected high-tension leads.
		No	Go to the next step.
14	Is a strong blue spark visible at each disconnected high-tension lead while 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 ignition coil • Open circuit in high-tension leads • Open circuit between ignition coil connector GND terminal and GND • Open circuit between ignition switch and ignition coil • Open circuit between ignition coils terminal C and PCM terminal 2Z, 2AA, 2AC or 2AD
			Spark plug is wet or covered with carbon:

15	Inspect the spark plug condition. Is the spark plug wet, covered with carbon or grayish white?	Yes	Inspect for fuel leakage from the fuel injector. Spark plug is grayish white: Inspect for clogged fuel injector (FP1) (RP1).
		No	Install the spark plugs in the original positions. Go to the next step.
16	Perform the SSV operation inspection. (See Secondary Shutter Valve (SSV) Operation Inspection.) Does the SSV operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning parts, according to the SSV operation inspection results.
17	<p>Note</p> <ul style="list-style-type: none"> The following test is for 13B-MSP (High Power). Go to the next step for 13B-MSP (Standard Power). <p>Perform the APV control inspection. (See Auxiliary Port Valve (APV) Control Inspection.) Does the APV control operate properly?</p>	Yes	Go to the next step.
		No	Repair or replace the malfunctioning parts, according to the APV control inspection results.
18	Install the fuel pressure gauge to the fuel line quick release connector. Start the engine and run it at idle. Measure the fuel line pressure at idle. Is the fuel line pressure correct at idle? (See FUEL LINE PRESSURE INSPECTION.)	Yes	Go to the next step.
		No	<p>Zero or low:</p> <p>Inspect for clogged fuel line. If normal, replace the fuel pump unit. (See FUEL PUMP UNIT REMOVAL/INSTALLATION.)</p> <p>High:</p> <p>Replace the fuel pump unit. (See FUEL PUMP UNIT REMOVAL/INSTALLATION.)</p>
19	Visually inspect for fuel leakage at the fuel injector, O-ring, and fuel line. Service if necessary. Does the fuel line pressure hold after the ignition switch is turned off? (See FUEL LINE PRESSURE INSPECTION)	Yes	Go to the next step.
		No	Inspect the fuel injector. (See FUEL INJECTOR INSPECTION.) If the fuel injector is normal, replace the fuel pump unit. (See FUEL PUMP UNIT REMOVAL/INSTALLATION.)
20	Access the ECT PID. Does the ECT PID indicate the proper engine coolant temperature? (See PCM INSPECTION.)	Yes	Go to the next step.
		No	Inspect for the following: <ul style="list-style-type: none"> ECT sensor Open or short circuit between ECT sensor and PCM terminal 2K or 1U
21	Connect the WDS or equivalent to the DLC-2. Start the engine and run it at idle. Access the O2S11 PID. Is the O2S11 PID normal? • RICH is indicated when accelerator	Yes	Go to the next step.
			Inspect and repair or replace the front HO2S, the

	pedal is suddenly depressed: rich condition • LEAN is indicated during fuel cut: lean condition	No	wiring harness, the connector or terminal, then go to the next step.
22	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Replace the suspected part.
		No	Inspect the engine compression. (See COMPRESSION INSPECTION.)
23	Perform the metering oil pump control inspection. (See Metering Oil Pump Control Inspection.) Does the metering oil pump control operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
24	Perform the fuel injector (FP1) (RP1) operation inspection. (See Fuel Injector Operation Inspection.) Are the fuel injectors (FP1) (RP1) operating properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning parts, according to the fuel injector (FP1) (RP1) operation inspection results.
25	Inspect the fuel injector (FP1) (RP1) for the following: (See FUEL INJECTOR INSPECTION.) • Leakage • Clogging • Injection amount Are the fuel injectors (FP1) (RP1) normal?	Yes	Go to the next step.
		No	Replace the fuel injector (FP1) (RP1). (See FUEL INJECTOR REMOVAL/INSTALLATION.)
26	Perform the AIR inspection. (See Secondary Air Injection (AIR) System Inspection.) Does the AIR system operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning parts, according to the inspection results.
27	Inspect the engine compression. (See COMPRESSION INSPECTION.) Is it normal?	Yes	Go to Step 33.
		No	Go to the next step.
28	Perform the metering oil pump control inspection. (See Metering Oil Pump Control Inspection.) Does the metering oil pump control operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results. After that overhaul or replace the engine. (See Engine Workshop Manual.)
29	Check the engine oil condition. Is the engine oil low viscosity and/or is there a gasoline odor?	Yes	Replace the engine oil. Inspect the ECT sensor and the related wiring harnesses. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION.) After that overhaul or replace the engine. (See Engine Workshop Manual.)
		No	Go to the next step.
30	Inspect the oil pressure. (See OIL PRESSURE INSPECTION.) Is the oil pressure within the specification?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results. After that overhaul or replace the engine. (See Engine Workshop Manual.)
	Turn the ignition switch off. Disconnect the fuel line quick release	Yes	Go to the next step.

31	connector and install the fuel gauge to the fuel line. Start the engine and run it at idle. Measure the fuel line pressure at idle. Is the fuel line pressure correct at idle? (See FUEL LINE PRESSURE INSPECTION.)	No	Replace the fuel pump unit. (See FUEL PUMP UNIT REMOVAL/INSTALLATION.) After that overhaul or replace the engine. (See Engine Workshop Manual.)
32	Check the oil pipe between the metering oil pump and the metering oil nozzle. Is there any air and/or clogging in the oil pipe?	Yes	Inspect and repair for leakage and/or clogging in the oil passage at the engine. After that overhaul or replace the engine. (See Engine Workshop Manual.)
		No	Overhaul or replace the engine. (See Engine Workshop Manual.)
33	Disconnect the vacuum hose between the purge solenoid valve and the intake manifold at the quick release connector. Plug the opening end of vacuum hose. Start the engine. Does the engine condition improve?	Yes	Inspect if the purge solenoid valve sticks open mechanically. Inspect the evaporative emission control system.
		No	Inspect for the following: • Jet air mixing system (clogging or leakage) • Primary intake port (deposited carbon or foreign materials) • the eccentric shaft position sensor pulse wheel (damaged, improper installation)
34	Verify test results. • If normal, return to the diagnostic index to service any additional symptoms. • If the malfunction remains, inspect the related Service Information and perform the repair or diagnosis.		

* : 13B-MSP (High Power)