

## NO.4 HARD TO START/LONG CRANK/ERRATIC START/ERRATIC CRANK [LF]

B3E010318881W06

4	HARD TO START/LONG CRANK/ERRATIC START/ERRATIC CRANK
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>• The starter cranks engine at normal speed but engine requires excessive cranking time before starting.</li> <li>• The battery is in normal condition.</li> </ul>
<b>POSSIBLE CAUSE</b>	<ul style="list-style-type: none"> <li>• Erratic signal to ignition coil</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>• Improper air/fuel mixture ratio control</li> <li>• Air cleaner restriction</li> <li>• IAC valve malfunction</li> <li>• PCV valve malfunction</li> <li>• Inadequate fuel pressure</li> <li>• Purge valve malfunction</li> <li>• MAF sensor contamination</li> <li>• Incorrect MAF sensor GND voltage</li> <li>• Restriction in exhaust system</li> <li>• EGR valve malfunction</li> <li>• Pressure regulator malfunction (built-in fuel pump unit)</li> </ul> <p style="text-align: center;"><b>Warning</b></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"> <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" described in this manual.</li> </ul> <p>(See <a href="#">BEFORE SERVICE PRECAUTION [ZJ, Z6, LF]</a>.) (See <a href="#">AFTER SERVICE PRECAUTION [ZJ, Z6, LF]</a>.)</p> <p style="text-align: center;"><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

STEP	INSPECTION	RESULTS	ACTION
	Inspect for the following: <ul style="list-style-type: none"> <li>• Vacuum leakage</li> <li>• Proper fuel quality (such as proper</li> </ul>	Yes	Go to the next step.

1	<p>octane, contamination, winter/summer blend)</p> <ul style="list-style-type: none"> <li>• Loose bands on intake-air system</li> <li>• Cracks on intake-air system parts</li> <li>• Intake-air system restriction (e.g. air cleaner element, fresh air duct.)</li> </ul> <p>Are all items normal?</p>	No	Service if necessary. Repeat Step 1.
2	<p>Connect the WDS or equivalent to the DLC-2. Retrieve any KOEO and KOER DTCs using WDS or equivalent. Is any KOEO or KOER DTC displayed?</p>	Yes	<p><b>DTC is displayed:</b></p> <p>Go to the appropriate DTC inspection. (See <a href="#">DTC TABLE [LF]</a>.)</p>
		No	<p><b>No DTC is displayed:</b></p> <p>Go to the next step.</p>
3	Is the engine overheating?	Yes	Go to symptom troubleshooting "No.17 Cooling system concerns - Overheating". (See <a href="#">NO.17 COOLING SYSTEM CONCERNS-OVERHEATING [LF]</a> .)
		No	Go to the next step.
4	<p>Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) for all cylinders. Are wiring harness conditions normal?</p>	Yes	Go to the next step.
		No	Repair the wiring harnesses
5	<p>Inspect spark plug conditions. Is spark plug wet, covered with carbon or grayish white?</p>	Yes	<p><b>Spark plug is wet or covered with carbon:</b></p> <p>Inspect for fuel leakage from fuel injector.</p> <p><b>Spark plug is grayish white:</b></p> <p>Inspect the fuel injector for clogging.</p>
		No	Install the spark plugs on original cylinders. Go to the next step.
6	<p>Visually inspect the CKP sensor and teeth of crankshaft pulley. Are the CKP sensor and teeth of crankshaft pulley normal?</p>	Yes	Go to the next step.
		No	Replace the malfunctioning part.
7	<p>Measure the gap between the CKP sensor and teeth of crankshaft pulley.</p> <p><b>Specification</b></p> <p><b>0.5-1.9 mm {0.020-0.75 in}</b></p> <p>Is the gap within the specification?</p>	Yes	Go to the next step.
		No	Adjust the CKP sensor. (See <a href="#">CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION [LF]</a> .)
8	<p>Remove and shake the PCV valve. Does the PCV valve rattle?</p>	Yes	Go to the next step.
		No	Replace the PCV valve.
9	<p>Install fuel pressure gauge between the fuel pipe and the fuel distributor. Connect the WDS or equivalent to the DLC-2 in Turn the fuel pump on using FP PID in output state control of data logger function. Is fuel line pressure correct?</p>	Yes	Go to the next step.
		No	<p><b>Zero or low:</b></p> <p>Inspect the fuel pump and fuel pump relay related circuit. Inspect for clogged fuel line. • If normal, replace the fuel pump unit. (See <a href="#">FUEL PUMP UNIT REMOVAL/INSTALLATION [ZJ, Z6, LF]</a>.)</p>

	(See <a href="#">FUEL LINE PRESSURE INSPECTION [ZJ, Z6, LF].</a> )		<b>High:</b>  Replace the fuel pump unit. (See <a href="#">FUEL PUMP UNIT REMOVAL/INSTALLATION [ZJ, Z6, LF].</a> )
10	Is the fuel line pressure held after the ignition switch is turned off? (See <a href="#">FUEL LINE PRESSURE INSPECTION [ZJ, Z6, LF].</a> )	Yes	Go to the next step.
		No	Inspect the fuel injector. (See <a href="#">FUEL INJECTOR INSPECTION [ZJ, Z6, LF].</a> ) • If the fuel injector is normal, replace fuel pump unit. (See <a href="#">FUEL PUMP UNIT REMOVAL/INSTALLATION [ZJ, Z6, LF].</a> )
11	Disconnect a vacuum hose from the purge valve and plug opening end of vacuum hose. Start the engine. Is starting condition improved?	Yes	Inspect if the purge valve is stuck open.
		No	Go to the next step.
12	Inspect the MAF sensor for the following: • Contamination • MAF sensor terminal B voltage (GND circuit) Is there any contamination?	Yes	Repair or replace malfunctioning part.
		No	Go to the next step.
13	Visually inspect the exhaust system part. Is there any deformed exhaust system part?	Yes	Replace the suspected part.
		No	Go to the next step.
14	Inspect engine condition while tapping the EGR valve housing. Does engine condition improve?	Yes	Replace the EGR valve.
		No	Go to the next step.
15	Inspect the starting system. (See <a href="#">STARTER INSPECTION.</a> ) Is starting system normal?	Yes	Inspect for loose connectors or poor terminal contact. • If there is no malfunction, remove EGR valve and visually inspect for mechanically stuck EGR valve
		No	Repair or replace components as required.
16	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See <a href="#">ENGINE SYMPTOM TROUBLESHOOTING [LF].</a> ) • If malfunction remains, inspect related Service information perform repair or diagnosis.  - If vehicle repaired, troubleshooting completed. - If vehicle not repaired or additional diagnostic information not available, replace the PCM. (See <a href="#">PCM REMOVAL/INSTALLATION [LF].</a> )		