This Electronic Ignition (EI) system uses inductive or pick up type magnetic Crankshaft Position (CKP) sensor. The CKP sensor is located in the opposite side of the crankshaft pulley and triggers the pick-up wheel teeth which is equipped 60-2 teeth with gap of 2 teeth at 360 degree spacing. This sensor protrudes through its mount to within $1.1 \pm 0.14$ mm.

The output of the sensor is a sinusoidal signal. Each tooth of the pick-up 60-2 wheel generates a positive half wave.

The Engine Control Module (ECM) uses this sensor signal to generate timed ignition and injection pulses that it sends to the ignition coils and to the fuel injectors.
Circuit Description
The 58X reference signal is produced by the CKP sensor. During one crankshaft revolution, 58 crankshaft pulses will be produced. The ECM uses the 58X reference signal to calculate engine rpm and CKP. The ECM constantly monitors the number of pulses on the 58X reference circuit and compares them to the number of Camshaft Position (CMP) signal pulses being received. If the ECM receives an incorrect number of pulses on the 58X reference circuit, this failure code will set.

Crankshaft Position Sensor Resistance Inspection
1. Disconnect the coupling “E” of ECM while the ignition switch is in “OFF” position.
2. Measure the resistance between the coupling terminal pin No. 99 and No. 100 using a multimeter.

<table>
<thead>
<tr>
<th>Failure Code</th>
<th>Description</th>
<th>Trouble Area</th>
<th>Maintenance Hint</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Crankshaft position sensor signal failure (no engine revolution signal)</td>
<td>Even through cam position recognition is normal, no crankshaft position signal recognition</td>
<td>Monitoring the actual rpm through or scan tool</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inspection the ECM pin 100, 99 about short circuit with bad contact</td>
</tr>
<tr>
<td>18</td>
<td>Crankshaft position sensor signal failure (rpm &gt; max. value)</td>
<td>When more than applicable revolution values or implausible to 60-2 teeth.</td>
<td>Inspection the CKP sensor</td>
</tr>
<tr>
<td>20</td>
<td>Crankshaft position sensor signal failure (gap recognition failure)</td>
<td>When implausible recognition of cam and crank angle signal or intermittent sensing the signal or error count of undetected gap.</td>
<td>Inspection the air gap between sensor and drive plate</td>
</tr>
<tr>
<td>67</td>
<td>Crankshaft position sensor adaptation failure</td>
<td>When faulty crank angle sensor adaption</td>
<td>Inspection the drive plate (teeth condition)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inspection the ECM</td>
</tr>
</tbody>
</table>

Notice: Measure the insulator resistance of the CKP sensor if out of the specified value.
Crankshaft Position Sensor Output Wave Inspection

1. Measure the output wave between the ECM terminals No. 99 and No. 100 using the scan tool or the oscilloscope while engine cranking (start motor activated).

   **Notice:** Check the segment or crankshaft position sensor and air gap if cannot get the output wave as shown in the figure.

![Crankshaft Position Sensor Output Wave](YAD1F130)

   a  Voltage
   b  Identifying the No. 1-2 Missing Teeth

Crankshaft Position Sensor Insulator Resistance Inspection

1. Disconnect the coupling from ECM while the ignition switch is in "OFF" position.
2. Measure the resistance between the coupling terminal pin No. 100 and No. 69 using a multimeter.

| Specified Value | >20 kΩ |

**Notice:** Measure the check and ground terminal of the CKP sensor if out of the specified value.
The Camshaft Position (CMP) sensor sends a CMP signal to the Engine Control Module (ECM). The ECM uses this signal as a “synchronized pulse” to trigger the injectors in the proper sequence. The ECM uses the CMP signal to indicate the position of the #1 piston during its power stroke. This allows the ECM to calculate true sequential fuel injection mode of operation.
Circuit Description

The CMP sensor sends a cam position signal to the ECM. If the cam position signal is lost while the engine is running, the fuel injection system shifts to a calculated sequential fuel injection mode based on the last fuel injection pulse, and the engine continues to run.

Camshaft Position Sensor Signal Voltage Inspection

1. Measure the voltage between the ECM terminal No. 11 and No. 106 while the engine speed is at idle.

<table>
<thead>
<tr>
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<th>Description</th>
<th>Trouble Area</th>
<th>Maintenance Hint</th>
</tr>
</thead>
</table>
| 19           | Camshaft position sensor signal : No. 1 cylinder recognition failure | When no cam recognition signal during TN 24 counts more. (maintain the constant low or high level) | • Inspection the source voltage of CMP sensor  
• Inspection the ECM pin 106, 104 about short circuit or open with bad contact  
• Inspection the CMP sensor  
• Inspection the damage of sensor or sprocket  
• Inspection the ECM |
| 58           | Camshaft position sensor signal : No. 1 cylinder synchronization failure | When synchronization fault of cylinder 1 (TDC recognition)                      |                                                                                  |
Camshaft Position Sensor Output Wave Inspection
1. Measure the output wave between the ECM terminals No. 104 and No. 106 using the scan tool or the oscilloscope while engine speed is at idle.

Notice: Replace the CAM sensor if cannot get the output wave as shown in the figure.

Camshaft Position Sensor Power Supply Inspection
1. Disconnect the CMP sensor Connector.
2. Measure the resistance between the No. 1 and No. 3 pin of the CMP sensor connector while the ignition switch is in “ON” position.

| Specified Value | 11 ~ 14 v |

Notice: If the measured value is not within the specified value, check the cable.