Idle Air Control (IAC) System Diagnosis

Circuit Description

The vehicle control module (VCM) controls idle RPM with the idle air control (IAC) valve. To increase idle RPM, the VCM retracts the IAC pintle from the seat, allowing more air to bypass the throttle plate. To decrease RPM, it extends the IAC pintle valve in towards the seat, reducing air flow through the IAC valve port in the throttle body. A scan tool will read the VCM commands to the IAC valve in counts. The higher the counts, the more air allowed, or the higher the idle. The lower the counts, the less air allowed, or the lower the idle.

IAC Valve Reset Procedure

1. Turn ON the ignition for 20 seconds.
2. Turn OFF the ignition for 10 seconds.
3. Start the engine.
4. Check for the proper idle speed.

Diagnostic Aids

A slow, unstable, or fast idle may be caused by a non-IAC system problem that cannot be overcome by the IAC valve. The following checks should be made to repair a non-IAC system problem.

Important

If for some reason the air intake to the engine is restricted, the VCM will attempt to compensate by backing out the IAC pintle to maintain desired idle. If the engine has another source of air to the intake, the VCM will compensate by extending the IAC pintle. Scan IAC counts may reach zero as the VCM tries to maintain desired idle.

- Vacuum leak (high idle) -- If idle is too high, stop the engine. Fully extend (low) IAC with tester. Start the engine. If idle speed is above 800 RPM, locate and correct the vacuum leak including the crankcase ventilation system. Also, check for binding of the throttle blade or linkage.
- Sticking throttle cable or throttle plate shaft
- System lean (high air/fuel ratio) -- Idle speed may be too high or too low. Engine speed may vary up and down, disconnecting the IAC does not help. This may set DTC P0171. The scan tool will read heated oxygen sensor (HO2S) output less than 300 mV (0.3 volt). Check for low regulated fuel pressure or water in the fuel.
- System rich (low air/fuel ratio) - Idle speed too low. Scan IAC counts are usually above 80. System obviously rich and may exhibit black smoke exhaust. May set DTC P0172. The scan tool will read heated oxygen sensor (HO2S) signal fixed above 800 mV (0.8 volt). Check for high fuel pressure or a leaking or sticking injector. Silicone contaminated HO2S scan voltage will be slow to respond.
- Throttle body -- Remove the IAC valve and inspect the bore for foreign material.
- IAC valve electrical connections -- IAC valve connections should be carefully checked for proper contact.
- Crankcase ventilation valve -- An incorrect or faulty crankcase ventilation valve may result in an incorrect idle speed. Refer to Rough, Unstable, or Incorrect Idle and Stalling.
- A/C compressor -- Refer to Air Conditioning (A/C) Compressor Control Circuit Diagnosis if the circuit is shorted to ground. If the relay is faulty, an idle problem may exist. Refer to Rough, Unstable, or Incorrect Idle and Stalling.
- If intermittent poor driveability or idle symptoms are resolved by disconnecting the IAC, carefully recheck connections, valve terminal resistance, or replace the IAC.

An intermittent may be caused by any of the following conditions:

- A poor connection
- Rubbed through wire insulation
- A broken wire inside the insulation

Thoroughly inspect any circuitry that is suspected of causing the intermittent complaint. Refer to Testing for Intermittent and Poor Connections in Wiring Systems.

If a repair is necessary, refer to Wiring Repairs or Connector Repairs in Wiring Systems.

**Test Description**

The numbers below refer to the step numbers on the diagnostic table.

2. This test determines if the VCM is capable of closing the IAC valve.
3. This test determines if the VCM is capable of opening the IAC valve.
4. All engine mechanical related conditions should be checked and repaired before testing the IAC system.

**Idle Air Control (IAC) System Check**

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Value(s)</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Did you perform the Powertrain On-Board Diagnostic (OBD) System Check?</td>
<td>--</td>
<td>Go to Step 2</td>
<td>Go to the Powertrain On Board Diagnostic (OBD) System Check</td>
</tr>
</tbody>
</table>
| 2    | 1. Set the parking brake and block the drive wheels.  
2. Turn OFF the A/C.  
3. Start the engine and allow it idle in Park on an automatic transmission or Neutral on a manual transmission.  
4. Install a scan tool and go to Special Functions.  
5. Using RPM control in the IAC system test, command the engine speed to the first specified value.  
Is the actual engine speed within the second specified value of the commanded RPM? | 500 RPM  
100 RPM | Go to Step 3 | Go to Step 4 |
<table>
<thead>
<tr>
<th>Step</th>
<th>Activity</th>
<th>Engine Speed</th>
<th>Action</th>
<th>Next Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Using the RPM control in the IAC system test, command the engine speed to the first specified value. Is the actual engine speed within the second specified value of the commanded RPM?</td>
<td>1,200 RPM</td>
<td>100 RPM</td>
<td>Go to Diagnostic Aids</td>
</tr>
</tbody>
</table>
| 4    | 1. Check for the following:  
   - Vacuum leaks  
   - Throttle plates not closing properly  
   - Damaged positive crankcase ventilation (PCV) valve  
   - Restricted air induction system  
   2. Refer to Diagnostic Aids. | -- | -- | Go to Step 20 |
| 5    | Check for obstructions or excessive carbon deposits in the throttle body IAC passages. | -- | -- | Go to Step 21 |
| 6    | 1. Turn OFF the ignition.  
   2. Disconnect the IAC valve harness connector.  
   3. Check for a poor connection at the IAC valve. Refer to Diagnostic Aids. | -- | -- | Go to Step 19 |
| 7    | 1. Connect the **J 37027-A** IAC motor driver to the IAC valve.  
   2. Turn OFF the A/C.  
   3. Set the parking brake and block the drive wheels.  
   4. Start the engine and allow it to idle in Park on an automatic transmission or Neutral on a manual transmission.  
   5. Install a scan tool and monitor engine RPM.  
   6. Extend and retract the IAC valve using the IAC driver.  
   Does the engine RPM decrease and increase as the IAC valve is cycled? | -- | -- | Go to Step 8 |
| 8    | Does the RPM change smoothly with each flash of the IAC driver lamp? | -- | -- | Go to Step 9 |
| 9    | 1. Install the appropriate IAC node lamp onto the IAC valve harness connector.  
   2. Cycle the IAC motor driver and observe the lamps.  
   3. Both lamps should cycle green to red but never OFF as the RPM is changed over its range.  
   Are the lamps flashing red to green but never OFF? | -- | -- | Go to Step 10 |
| 10   | 1. Remove the **J 37027-A** IAC motor driver.  
   2. Measure the resistance between the IAC motor terminals A and B with a DMM.  
   3. Measure the resistance between the IAC motor terminals C and D with a DMM.  
   Are the readings within the specified value? | 40-80 ohms | -- | Go to Step 11 |
<p>|      | 1. Measure the resistance between the IAC motor | | | |</p>
<table>
<thead>
<tr>
<th>Step</th>
<th>Task Description</th>
<th>Condition</th>
<th>Next Step</th>
</tr>
</thead>
</table>
| 11   | terminals B and C with a DMM.  
2. Measure the resistance between the IAC motor terminals A and D with a DMM. | infinity | Go to Diagnostic Aids |
|      | Are the readings within the specified value? | | Go to Step 22 |
| 12   | 1. Turn OFF the ignition.  
2. Disconnect the VCM C2 connector.  
3. Check for a poor connection at the VCM. Refer to Diagnostic Aids. | -- | Go to Step 22 |
|      | Did you find a problem? | | Go to Step 19 Go to Step 13 |
| 13   | 1. Remove the IAC node lamp.  
2. Check for an open in the IAC driver circuits between the IAC valve harness connector and the VCM C2 connector. | -- | Go to Step 22 |
|      | Did you find a problem? | | Go to Step 19 Go to Step 14 |
| 14   | Probe the IAC valve harness connector terminals with a test lamp connected to B+. | -- | Go to Step 22 |
|      | Is the test lamp ON at any of the terminals? | | Go to Step 17 Go to Step 15 |
| 15   | 1. Turn ON the ignition, leaving the engine OFF.  
2. Probe the IAC valve harness connector terminals with a test lamp connected to a ground. | -- | Go to Step 22 |
|      | Is the test lamp ON at any of the terminals? | | Go to Step 18 Go to Step 16 |
| 16   | Check for a short between the IAC valve circuits. | -- | Go to Step 22 |
|      | Did you find a problem? | | Go to Step 19 Go to Step 23 |
| 17   | Repair the short to ground in the IAC circuit. Refer to Wiring Repairs in Wiring Systems. | -- | Go to Step 22 |
|      | Is the action complete? | | Go to Step 24 -- |
| 18   | Repair the short to voltage in the IAC circuit. Refer to Wiring Repairs in Wiring Systems. | -- | Go to Step 22 |
|      | Is the action complete? | | Go to Step 24 -- |
| 19   | Repair the circuit as necessary. Refer to Wiring Repairs in Wiring Systems. | -- | Go to Step 22 |
|      | Is the action complete? | | Go to Step 24 -- |
| 20   | Repair the condition as necessary. | -- | Go to Step 22 |
|      | Is the action complete? | | Go to Step 24 -- |
| 21   | Clean the IAC passages. | -- | Go to Step 22 |
|      | Is the action complete? | | Go to Step 24 -- |
| 22   | Replace the IAC valve. Refer to Idle Air Control (IAC) Valve Replacement. | -- | Go to Step 22 |
|      | Is the action complete? | | Go to Step 24 -- |
| 23 | 1. Replace the VCM.  
2. Program the new VCM. Refer to [VCM Replacement/Programming](#).  
3. Perform the Passlock Reprogramming procedure. Refer to [PASSLOCK Reprogramming Auto Learn](#) in Theft Deterrent.  
4. Perform the CKP System Variation Learn Procedure. Refer to [CKP System Variation Learn Procedure](#).  
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the action complete?</td>
<td>--</td>
<td>Go to Step 24</td>
</tr>
</tbody>
</table>

| 24 | 1. Install the scan tool.  
2. Start the engine and allow the engine to idle.  
3. Turn OFF all of the accessories.  
4. Command the engine speed up to the first specified value and then down to the second specified value two consecutive times with the scan tool.  
| --- | --- | --- |
| Does the actual RPM closely follow the commanded RPM? | 1,200 RPM  
500 RPM | System OK | Go to Step 2 |