

Idle Air Control (IAC) System Diagnosis

[Circuit Description](#)

The idle air control (IAC) valve is located in the throttle body of both the TBI and the MFI systems. The valve consists of a movable pintle, driven by a gear attached to an electric motor called a stepper motor. The IAC valve motor is a 2 phase bi-polar permanent magnet stepper motor that is capable of highly accurate rotation, or movement, every time the polarity of a winding is changed. This change in polarity can be seen when observing a test lamp connected between ground or B+ and an IAC valve circuit while the powertrain control module (PCM) is attempting to change the engine RPM. The test lamp will flash ON or OFF each time the polarity is changed. The PCM does not use a physical sensor in order to determine the IAC pintle position, but uses a predicted number of counts. One count represents one change in polarity, which equals one step of the stepper motor. The PCM counts the steps it has commanded in order to determine the IAC pintle position. The PCM uses the IAC valve in order to control the engine idle speed. The PCM does this by changing the pintle position in the idle air passage of the throttle body. This condition varies the air flow around the throttle plate when the throttle is closed. In order to determine the desired position of the IAC pintle at idle or during deceleration, the PCM refers to the following inputs:

- The engine RPM
- The battery voltage
- The air temperature
- The engine coolant temperature (ECT)
- The throttle position (TP) sensor angle
- The engine load
- The vehicle speed

When the ignition key is turned OFF, after an ignition cycle, the PCM will first seat the IAC pintle in the air bypass bore and then retract it a predetermined amount of counts to allow the proper amount of air to bypass the throttle plate for engine start-up. This procedure is known as an IAC reset.

[Diagnostic Aids](#)

Inspect for the following conditions:

- A skewed high TP sensor
- A restricted air intake system
- Objects blocking the IAC passage or throttle bore
- A correct and properly-installed PCV valve, and proper operation of the PCV valve
- Proper operation and installation of all air intake components
- Proper installation and operation of the mass air flow sensor, if the vehicle has this equipment.
- A tampered with or damaged throttle stop screw
- A tampered with or damaged throttle plate, throttle shaft, throttle linkage, or cruise control linkage, if the vehicle has this equipment
- Excessive deposits in the IAC passage or on the IAC pintle
- Excessive deposits in the throttle bore or on the throttle plate
- Vacuum leaks
- Excessive load on the engine, caused by the transmission, the power steering, the alternator, or by other equipment
- A high or unstable idle condition can be caused by a non-IAC system problem that cannot be overcome by the IAC valve. Refer to [Rough, Unstable, or Incorrect Idle and Stalling](#) .
- A low or unstable idle condition can be caused by a non-IAC system problem that cannot be overcome by the

IAC valve. Refer to [Rough, Unstable, or Incorrect Idle and Stalling](#) .

- If the problem is intermittent, refer to [Intermittent Conditions](#) .

Test Description

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

- This test will determine the ability of the PCM and the IAC valve circuits to control the IAC valve.
- This test will determine the ability of the PCM to provide the IAC valve circuits with a ground. On a normally-operating system, the test lamp should not flash while the IAC counts are incrementing.

Idle Air Control (IAC) System Diagnosis

Step	Action	Yes	No
<i>Schematic Reference: AIR Bypass Valve Solenoid, AIR Pump and MAF Sen</i>			
1	Did you perform the Diagnostic System Check-Engine Controls?	Go to Step 2	Go to Diagnostic System Check - Engine Controls
2	<p>Important</p> <p>Ensure engine speed stabilizes with each commanded RPM change to determine if the engine speed stays within 75 RPM of the commanded RPM.</p> <ol style="list-style-type: none"> Set the parking brake, and block the drive wheels. Install a scan tool. Start the engine. Turn OFF all accessories. With the scan tool RPM control function, slowly increment engine speed to 1,800 RPM, then to 600 RPM, then to 1,800 RPM. Exit the RPM control function. <p>Did the engine speed stabilize within 75 RPM of the commanded RPM during the above test?</p>	Go to Diagnostic Aids	Go to Step 3
3	<ol style="list-style-type: none"> Turn OFF the ignition. Disconnect the IAC valve. Connect a J 37027-A IAC System Motor Analyzer to the IAC valve. Start the engine. With the IAC motor driver, command the IAC valve in until near 600 RPM is reached. With the IAC motor driver, command the IAC valve out until near 1,800 RPM is reached. Return engine speed to desired idle, as indicated on the scan tool data list. <p>Did the engine speed steadily decrease to near 600 RPM and steadily increase to near 1,800 RPM when the IAC valve was commanded in and out?</p>	Go to Step 5	Go to Step 4
4	Did you observe an excessively high idle condition that could not be controlled with the IAC motor driver during the last test?	Go to Step 10	Go to Step 11
	1. With a test lamp connected to ground, probe one of the IAC valve		

5	<p>circuits at the IAC valve harness connector using the J 35616-A .</p> <ol style="list-style-type: none"> 2. Start the engine. 3. With the IAC motor driver, command low RPM while observing a scan tool until the IAC Counts start to increment. 4. While the IAC Counts are incrementing, observe the test lamp. 5. Return engine speed to desired idle, as indicated on the scan tool data list. 6. Repeat the above procedure for the other 3 IAC valve circuits. <p>Did the test lamp remain ON, never flashing, while the IAC Counts were incrementing at any of the IAC valve circuits during the above test?</p>	Go to Step 9	Go to Step 6
6	<p>Did the test lamp remain OFF, never flashing, while the IAC Counts were incrementing at any of the IAC valve circuits during the above test?</p>	Go to Step 8	Go to Step 7
7	<ol style="list-style-type: none"> 1. Connect a test lamp between the IAC coil A low circuit and the IAC coil A high circuit at the IAC valve harness connector using the J 35616-A Connector Test Adaptor Kit. 2. With the IAC motor driver, command low RPM while observing a scan tool until the IAC counts start to increment. 3. While the IAC counts are incrementing observe the test lamp. 4. Return engine speed to desired idle as indicated on the scan tool data list. 5. Repeat the above procedure with the test lamp connected between the IAC coil B low circuit and the IAC coil B high circuit at the IAC valve harness connector. <p>Did the test lamp stay illuminated, never flashing, while the IAC counts were incrementing during the above test?</p>	Go to Diagnostic Aids	Go to Step 15
8	<ol style="list-style-type: none"> 1. Turn OFF the ignition. 2. Disconnect the PCM harness connectors. 3. With a DMM, test for an open or for a short to ground on the IAC valve circuit where the test lamp remained off. Refer to Circuit Testing , and Wiring Repairs in Wiring Systems. <p>Did you find and correct the condition?</p>	Go to Step 16	Go to Step 12
9	<ol style="list-style-type: none"> 1. Turn ON the ignition. 2. With a DMM, test for a short to voltage on the IAC valve circuit where the test lamp remained illuminated. Refer to Circuit Testing , and Wiring Repairs in Wiring Systems. <p>Did you find and correct the condition?</p>	Go to Step 16	Go to Step 12
10	<p>Inspect for the following conditions:</p> <ul style="list-style-type: none"> • Evidence of throttle body damage and tampering • A skewed TP sensor signal • Evidence of throttle lever screw tampering, if the vehicle has this equipment • Vacuum leaks • A faulty or incorrectly-installed PCV valve and hose, if the vehicle has this equipment • Throttle shaft binding • Throttle linkage or cruise control linkage binding, if the vehicle has this equipment 		

	<ul style="list-style-type: none"> Remove the IAC valve. Refer to Idle Air Control (IAC) Valve Replacement . Inspect for the following conditions: <ul style="list-style-type: none"> Debris in the IAC passage Excessive deposits on the throttle plate Excessive deposits in the throttle bore Excessive deposits on IAC Valve pintle <p>Repair any of the above conditions as necessary. Refer to the appropriate repair procedure.</p> <p>Did you find and correct the condition?</p>	Go to Step 16	Go to Step 13
11	<p>Inspect for the following conditions:</p> <ul style="list-style-type: none"> Throttle body damage and tampering, and throttle lever screw tampering, if the vehicle has this equipment A restricted air intake system-Inspect for a possible collapsed or clogged air intake duct before and after the air filter element, a restricted air filter element, or a restriction at the throttle body intake screen, if the vehicle has this equipment Excessive deposits on the throttle plate Excessive deposits in the throttle bore Remove the IAC valve, and inspect for excessive deposits on the IAC valve pintle and in the IAC valve passage. <p>Repair any of the above conditions as necessary. Refer to the appropriate repair procedure.</p> <p>Did you find and correct the condition?</p>	Go to Step 16	Go to Step 13
12	<p>Inspect for a poor connection at the PCM harness connectors. Refer to Testing for Intermittent and Poor Connections , and Connector Repairs in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	Go to Step 16	Go to Step 15
13	<p>Inspect for a poor connection at the IAC valve harness connector. Refer to Testing for Intermittent and Poor Connections in Wiring Systems.</p> <p>Did you find and correct the condition?</p>	Go to Step 16	Go to Step 14
14	<p>Replace the IAC valve. Refer to Idle Air Control (IAC) Valve Replacement .</p> <p>Did you complete the replacement?</p>	Go to Step 16	--
15	<p>Replace the PCM. Refer to Powertrain Control Module (PCM) Replacement .</p> <p>Did you complete the replacement?</p>	Go to Step 16	--
16	<ol style="list-style-type: none"> Use the scan tool in order to clear any DTCs that may have set. Turn OFF the ignition for 30 seconds. Operate the vehicle within the original conditions in order to verify the repair. <p>Did you verify the repair?</p>	Go to Step 17	Go to Step 2
17	<p>With a scan tool observe the Stored information, Capture info.</p>	Go to Diagnostic Trouble Code	

Does the scan tool display any DTCs that you have not diagnosed?

[\(DTC\) List](#)

System OK
