

# Charging System: Testing and Inspection

## Pinpoint Tests

### Test Note

#### CAUTION:

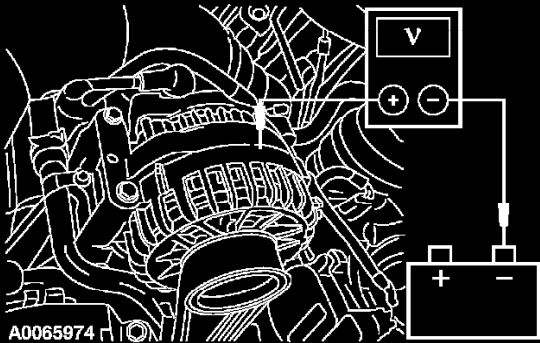
- Do not make jumper connections except as directed. Incorrect connections may damage the voltage regulator test terminals, fuses, or fuse links.
- Do not allow any metal object to come in contact with the generator housing and internal diode cooling fins.

#### NOTE:

- while carrying out any pinpoint test, disregard any DTCs set while following any specific pinpoint test. After the completion of any test, be sure to clear all codes in the PCM.
- All voltage measurements are referenced to the negative (-) battery post unless otherwise specified.
- When the battery has been disconnected and reconnected, some abnormal drive symptoms may occur while the powertrain control module (PCM) relearns its fuel trim. The vehicle may need to be driven to relearn the strategy.

### Test A

#### PINPOINT TEST A: THE BATTERY IS DISCHARGED OR BATTERY VOLTAGE IS LOW

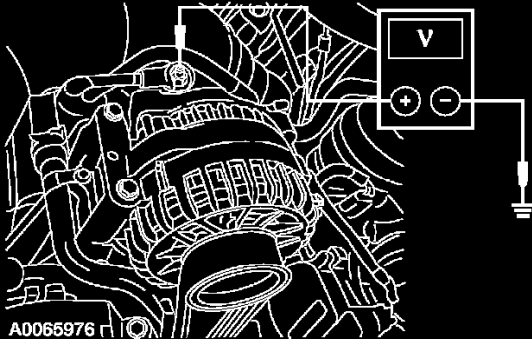
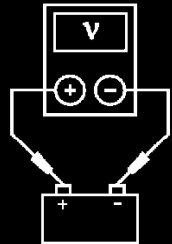
PINPOINT TEST A: THE BATTERY IS DISCHARGED OR BATTERY VOLTAGE IS LOW		
Test Step		Result / Action to Take
<b>A1</b>	<b>CHECK BATTERY CONDITION</b>	
	<ul style="list-style-type: none"> <li>• Carry out the Battery — Condition Test to determine if the battery can hold a charge and is OK for use.</li> <li>• <b>Is the battery OK?</b></li> </ul>	<p><b>Yes</b> GO to <b>A2</b>.</p> <p><b>No</b> INSTALL a new battery. TEST the system for normal operation.</p>
<b>A2</b>	<b>CHECK THE GENERATOR OUTPUT</b>	
	<ul style="list-style-type: none"> <li>• Carry out the Generator On-Vehicle Test—Load Test and No-Load Test. Refer to Component Tests.</li> <li>• <b>Is the generator OK?</b></li> </ul>	<p><b>Yes</b> GO to <b>A3</b>.</p> <p><b>No</b> GO to Pinpoint Test B.</p>
<b>A3</b>	<b>CHECK FOR CURRENT DRAINS</b>	
	<ul style="list-style-type: none"> <li>• Carry out the Battery — Drain Testing. Refer to Component Tests.</li> <li>• <b>Are there any excessive current drains?</b></li> </ul>	<p><b>Yes</b> REPAIR as necessary. TEST the system for normal operation.</p> <p><b>No</b> GO to <b>A4</b>.</p>
<b>A4</b>	<b>CHECK VEHICLE GROUNDS</b>	
	<ul style="list-style-type: none"> <li>• Key in START position.</li> <li>• Measure the voltage drop between the generator housing and the negative battery terminal.</li> </ul>  <p>A0065974</p> <ul style="list-style-type: none"> <li>• <b>Is the voltage drop less than 0.1 volt?</b></li> </ul>	<p><b>Yes</b> Verify any operating component(s) or if there is an intermittent excessive battery draw. TEST the system for normal operation.</p> <p><b>No</b> CHECK the engine ground/generator ground and the battery for corrosion. REPAIR as necessary. TEST the system for normal operation.</p>

Test A1-A4

### Test B

#### PINPOINT TEST B: THE CHARGING SYSTEM WARNING INDICATOR IS ON WITH THE ENGINE RUNNING (THE CHARGING SYSTEM VOLTAGE DOES NOT INCREASE)

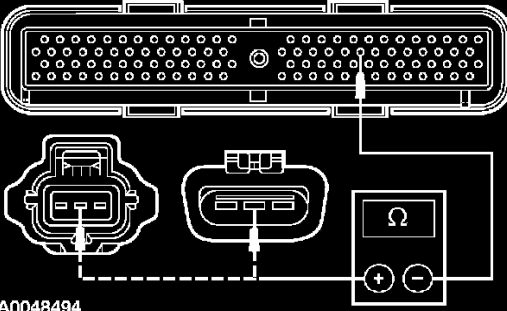
**DIAGNOSIS AND TESTING (Continued)****PINPOINT TEST B: THE CHARGING SYSTEM WARNING INDICATOR IS ON WITH THE ENGINE RUNNING (THE CHARGING SYSTEM VOLTAGE DOES NOT INCREASE)**

Test Step		Result / Action to Take
<b>B1</b>	<b>CHECK THE FAULT CODES IN THE PCM</b>	<p><b>Yes</b> REFER to PCM Diagnostic Trouble Code (DTC) Index.</p> <p><b>No</b> GO to B2.</p>
	<ul style="list-style-type: none"> <li>Connect the diagnostic tool.</li> <li>Key in ON position.</li> </ul> <p>Use the recorded PCM DTCs from the continuous and on-demand self-test.</p> <ul style="list-style-type: none"> <li><b>Are any DTCs recorded?</b></li> </ul>	
<b>B2</b>	<b>CHECK THE GENERATOR B+ CIRCUIT 38 (BK/OG)</b>	
	<ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Disconnect the diagnostic tool.</li> <li>Measure the voltage between the generator C102b, circuit 38 (BK/OG), harness side and ground.</li> </ul>  <p>A0065976</p> <ul style="list-style-type: none"> <li><b>Is the voltage equal to battery positive voltage?</b></li> </ul>	
<b>B3</b>	<b>CHECK THE GENERATOR INTEGRITY</b>	<p><b>Yes</b> GO to B3.</p> <p><b>No</b> REPAIR the circuit. TEST the system for normal operation.</p>
	<ul style="list-style-type: none"> <li>Disconnect: Generator C102a (4G), C102c (6G).</li> <li>Key in START position.</li> <li><b>NOTE:</b> If the generator communication lines are disconnected, the generator will self-excite if it is operated at approximately 2,000 engine rpm for a momentary period of time. It will then operate in a default mode at 13.5 volts until the engine is turned off.</li> </ul> <p>With the engine running at approximately 2,000 rpm, measure the battery voltage.</p>  <p>AJ0210-A</p> <ul style="list-style-type: none"> <li><b>Is the battery voltage approximately 13.5 volts?</b></li> </ul>	
<b>B4</b>	<b>CHECK CIRCUIT 904 (LG/RD) FOR AN OPEN</b>	
	<ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Disconnect: PCM C175.</li> </ul>	

(Continued)

Test B1-B4

**DIAGNOSIS AND TESTING (Continued)****PINPOINT TEST B: THE CHARGING SYSTEM WARNING INDICATOR IS ON WITH THE ENGINE RUNNING (THE CHARGING SYSTEM VOLTAGE DOES NOT INCREASE) (Continued)**

Test Step		Result / Action to Take
<b>B4</b>	<b>CHECK CIRCUIT 904 (LG/RD) FOR AN OPEN (Continued)</b>	
	<ul style="list-style-type: none"> <li>Measure the resistance between the generator C102a (4G), C102c (6G) pin 2, circuit 904 (LG/RD), harness side and the PCM C175 pin 45, circuit 904 (LG/RD), harness side and between the generator C102a (4G), C102c (6G) pin 2, circuit 904 (LG/RD) harness side and ground.</li> </ul>  <p>A0048494</p> <ul style="list-style-type: none"> <li>Is the resistance less than 5 ohms between the generator and the PCM and greater than 10,000 ohms between the generator and ground?</li> </ul>	<p><b>Yes</b> GO to B5.</p> <p><b>No</b> REPAIR the circuit. TEST the system for normal operation.</p>
<b>B5</b>	<b>CHECK FOR CORRECT PCM OPERATION</b>	
	<ul style="list-style-type: none"> <li>Check for: <ul style="list-style-type: none"> <li>corrosion</li> <li>pushed-out pins</li> </ul> </li> <li>Connect any disconnected connectors.</li> <li>Make sure all other system connectors are fully seated.</li> <li>Operate the system and verify the concern is still present.</li> <li>Is the concern still present?</li> </ul>	<p><b>Yes</b> INSTALL a new PCM. REPEAT the PCM self-test.</p> <p><b>No</b> The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.</p>

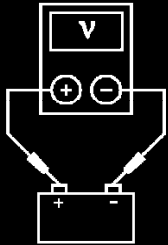
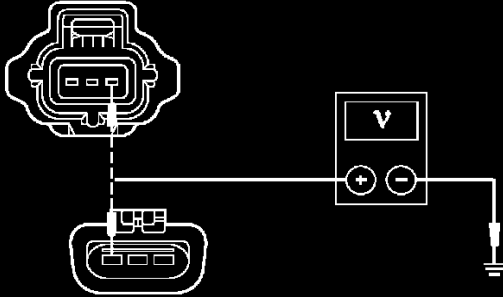
**Test B4-B5****Test C****PINPOINT TEST C: THE CHARGING SYSTEM OVERCHARGES (BATTERY VOLTAGE IS GREATER THAN 15.5 VOLTS)****PINPOINT TEST C: THE CHARGING SYSTEM OVERCHARGES (BATTERY VOLTAGE IS GREATER THAN 15.5 VOLTS)**

Test Step		Result / Action to Take
<b>C1</b>	<b>CHECK THE FAULT CODES IN THE PCM</b>	
	<ul style="list-style-type: none"> <li>Connect the diagnostic tool.</li> <li>Key in ON position.</li> <li>Use the recorded PCM DTCs from the continuous and on-demand self-test.</li> <li>Are any DTCs recorded?</li> </ul>	<p><b>Yes</b> REFER to PCM Diagnostic Trouble Code (DTC) Index.</p> <p><b>No</b> GO to C2.</p>
<b>C2</b>	<b>CHECK THE BATTERY VOLTAGE</b>	
	<ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Disconnect the diagnostic tool.</li> <li>Key in START position.</li> </ul>	

(Continued)

**Test C1-C2**

**DIAGNOSIS AND TESTING (Continued)****PINPOINT TEST C: THE CHARGING SYSTEM OVERCHARGES (BATTERY VOLTAGE IS GREATER THAN 15.5 VOLTS) (Continued)**

Test Step		Result / Action to Take
<b>C2</b>	<b>CHECK THE BATTERY VOLTAGE (Continued)</b>	
<ul style="list-style-type: none"> <li>With the engine running and all accessories turned off, measure the voltage at the battery while varying the engine rpm.</li> </ul>  <p style="text-align: center;">AJ0210-A</p> <ul style="list-style-type: none"> <li>Is the voltage greater than 15.5 volts?</li> </ul>		<p><b>Yes</b> GO to C3.</p> <p><b>No</b> GO to C4.</p>
<b>C3</b>	<b>CHECK FOR VOLTAGE DROP IN CIRCUIT 36 (YE/WH)</b>	
<ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Disconnect: Generator C102a (4G), C102c (6G).</li> <li>Measure the voltage between the generator C102a-3 (4G) or C102c (6G), circuit 36 (YE/WH), harness side and ground.</li> </ul>  <p style="text-align: center;">A0042653</p> <ul style="list-style-type: none"> <li>Is the voltage within 0.5 volt from battery voltage?</li> </ul>		<p><b>Yes</b> RECONNECT the generator C102a (4G) or C102c (6G). GO to C4.</p> <p><b>No</b> REPAIR the circuit for high resistance. TEST the system for normal operation.</p>
<b>C4</b>	<b>CHECK THE GENERATOR PIDS</b>	
<ul style="list-style-type: none"> <li>Connect the diagnostic tool.</li> <li>Key in START position.</li> <li>Enter the following diagnostic mode on the diagnostic tool: With the engine running, monitor the generator output fault PID in the PCM.</li> <li>Does the PID read YES?</li> </ul>		<p><b>Yes</b> GO to C5.</p> <p><b>No</b> GO to C6.</p>
<b>C5</b>	<b>CHECK THE GENERATOR INTEGRITY</b>	
<ul style="list-style-type: none"> <li>Key in OFF position.</li> <li>Disconnect: Generator C102a.</li> <li>Key in START position.</li> <li><b>NOTE:</b> If the generator communication lines are disconnected, the generator will self-excite if it is operated at approximately 2000 rpm for a momentary period of time. It will then operate in a default mode at 13.5 volts until the engine is turned off.</li> <li>With the engine running at approximately 2000 rpm, measure the battery voltage.</li> <li>Is the battery voltage approximately 13.5 volts?</li> </ul>		<p><b>Yes</b> GO to C6.</p> <p><b>No</b> INSTALL a new generator. TEST for normal operation.</p>

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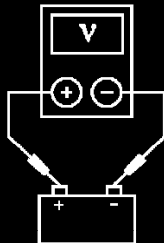
Test C2-C5

**DIAGNOSIS AND TESTING (Continued)****PINPOINT TEST C: THE CHARGING SYSTEM OVERCHARGES (BATTERY VOLTAGE IS GREATER THAN 15.5 VOLTS) (Continued)**

Test Step		Result / Action to Take
<b>C6</b>	<b>CHECK FOR CORRECT PCM OPERATION</b>	
	<ul style="list-style-type: none"> <li>• Disconnect all PCM connectors.</li> <li>• Check for:               <ul style="list-style-type: none"> <li>• corrosion</li> <li>• pushed-out pins</li> </ul> </li> <li>• Connect all PCM connectors and make sure they seat correctly.</li> <li>• Operate the system and verify the concern is still present.</li> <li>• <b>Is the concern still present?</b></li> </ul>	<p><b>Yes</b> INSTALL a new PCM. CLEAR the DTCs. REPEAT the self-test.</p> <p><b>No</b> The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.</p>

## Test C6

**Test D****PINPOINT TEST D: THE CHARGING SYSTEM WARNING INDICATOR IS ON WITH THE ENGINE RUNNING AND THE BATTERY INCREASES VOLTAGE****PINPOINT TEST D: THE CHARGING SYSTEM WARNING INDICATOR IS ON WITH THE ENGINE RUNNING AND THE BATTERY INCREASES VOLTAGE**

Test Step		Result / Action to Take
<b>D1</b>	<b>CHECK THE FAULT CODES IN THE PCM</b>	
	<ul style="list-style-type: none"> <li>• Connect the diagnostic tool.</li> <li>• Key in ON position.</li> <li>Use the recorded PCM DTCs from the continuous and on-demand self-test.</li> <li>• <b>Are any DTCs recorded?</b></li> </ul>	<p><b>Yes</b> REFER to PCM Diagnostic Trouble Code (DTC) Index.</p> <p><b>No</b> GO to D2.</p>
<b>D2</b>	<b>CHECK THE SYSTEM FOR OVERCHARGING</b>	
	<ul style="list-style-type: none"> <li>• Key in START position.</li> <li>• With the engine running and all accessories off, measure the voltage at the battery terminals while varying the engine rpm.</li> </ul> <div style="text-align: center;">  <p>AJ0210-A</p> </div> <ul style="list-style-type: none"> <li>• <b>Is the voltage greater than 15.5 volts?</b></li> </ul>	<p><b>Yes</b> GO to Pinpoint Test C.</p> <p><b>No</b> GO to D3.</p>
<b>D3</b>	<b>CHECK THE CHARGING SYSTEM WARNING INDICATOR OPERATION</b>	
	<ul style="list-style-type: none"> <li>• With the engine running, monitor the generator output fault PID in the PCM.</li> <li>• <b>Does the PID read YES?</b></li> </ul>	<p><b>Yes</b> GO to D4.</p> <p><b>No</b> REFER to Instrument Panel, Gauges and Warning Indicators for the correct diagnostic direction.</p>
<b>D4</b>	<b>CHECK THE GENERATOR OUTPUT</b>	
	<ul style="list-style-type: none"> <li>• Verify the generator output. Refer to Component Tests.</li> <li>• <b>Did the generator pass the component tests?</b></li> </ul>	<p><b>Yes</b> GO to D5.</p> <p><b>No</b> INSTALL a new generator. TEST the system for normal operation.</p>

(Continued)

## Test D1-D4

**DIAGNOSIS AND TESTING (Continued)****PINPOINT TEST D: THE CHARGING SYSTEM WARNING INDICATOR IS ON WITH THE ENGINE RUNNING AND THE BATTERY INCREASES VOLTAGE (Continued)**

Test Step		Result / Action to Take
<b>D5</b>	<b>CHECK FOR CORRECT PCM OPERATION</b>	
	<ul style="list-style-type: none"> <li>• Check for:               <ul style="list-style-type: none"> <li>• corrosion</li> <li>• pushed-out pins</li> </ul> </li> <li>• Connect any disconnected connectors.</li> <li>• Make sure all other system connectors are fully seated.</li> <li>• Operate the system and verify the concern is still present.</li> <li>• <b>Is the concern still present?</b></li> </ul>	<p><b>Yes</b> INSTALL a new PCM. REPEAT the PCM self-test. TEST the system for normal operation.</p> <p><b>No</b> The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.</p>

**Test D5****Test E****PINPOINT TEST E: THE CHARGING SYSTEM WARNING INDICATOR IS OFF WITH THE IGNITION SWITCH IN THE RUN POSITION AND THE ENGINE OFF****PINPOINT TEST E: THE CHARGING SYSTEM WARNING INDICATOR IS OFF WITH THE IGNITION SWITCH IN THE RUN POSITION AND THE ENGINE OFF**

Test Step		Result / Action to Take
<b>E1</b>	<b>CHECK THE CHARGING SYSTEM WARNING INDICATOR OPERATION</b>	
	<ul style="list-style-type: none"> <li>• Key in OFF position.</li> <li>• Connect the diagnostic tool.</li> <li>• Key in ON position.</li> <li>• Turn on the charging system warning indicator using Active Commands.</li> <li>• <b>Is the charging system warning indicator on?</b></li> </ul>	<p><b>Yes</b> GO to E2.</p> <p><b>No</b> REFER to Instrument Panel, Gauges and Warning Indicators for the correct diagnostic direction.</p>
<b>E2</b>	<b>CHECK FOR CORRECT PCM OPERATION</b>	
	<ul style="list-style-type: none"> <li>• Check for:               <ul style="list-style-type: none"> <li>• corrosion</li> <li>• pushed-out pins</li> </ul> </li> <li>• Connect any disconnected connectors.</li> <li>• Make sure all other system connectors are fully seated.</li> <li>• Operate the system and verify the concern is still present.</li> <li>• <b>Is the concern still present?</b></li> </ul>	<p><b>Yes</b> INSTALL a new PCM. TEST the system for normal operation.</p> <p><b>No</b> The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. CLEAR the DTCs. REPEAT the self-test.</p>

**Test E1-E2****Test F****PINPOINT TEST F: THE GENERATOR IS NOISY**

**PINPOINT TEST F: THE GENERATOR IS NOISY**

Test Step		Result / Action to Take
<b>F1</b>	<b>CHECK FOR ACCESSORY DRIVE NOISE</b>	<b>Yes</b> If equipped with a one-way clutch (OWC) pulley, GO to <b>F2</b> . If not equipped with a OWC pulley, GO to <b>F3</b> . <b>No</b> REPAIR as necessary. TEST the system for normal operation.
	<ul style="list-style-type: none"> <li>Check the accessory drive belt for damage and correct installation. Refer to Drive Belts, Mounts, Brackets and Accessories.</li> <li>Check the accessory mounting brackets and generator pulley for looseness or misalignment.</li> <li>Is the accessory drive OK?</li> </ul>	
<b>F2</b>	<b>CHECK ONE-WAY CLUTCH (OWC) PULLEY</b>	<b>Yes</b> GO to <b>F3</b> . <b>No</b> INSTALL a new generator assembly with OWC pulley. TEST the system for normal operation.
	<ul style="list-style-type: none"> <li>With the front-end accessory drive (FEAD) belt removed, spin the OWC pulley in a clockwise direction, then reverse the direction of the pulley by spinning it in a counterclockwise direction. If necessary, refer to (*) for belt removal.</li> <li>Does the OWC pulley engage with the rotor when spun in a clockwise direction and free-wheel when spun in a counterclockwise direction with minimal noise as compared to a known good vehicle?</li> </ul>	

\* Drive Belts, Mounts, Brackets and Accessories

(Continued)

**Test F1-F2****DIAGNOSIS AND TESTING (Continued)****PINPOINT TEST F: THE GENERATOR IS NOISY (Continued)**

Test Step		Result / Action to Take
<b>F3</b>	<b>CHECK GENERATOR MOUNTING</b>	<b>Yes</b> GO to <b>F4</b> . <b>No</b> REPAIR as necessary. TEST the system for normal operation.
	<ul style="list-style-type: none"> <li>Check the generator mounting for loose bolts or misalignment.</li> <li>Is the generator mounted correctly?</li> </ul>	
<b>F4</b>	<b>CHECK GENERATOR FOR EXCESSIVE ELECTRICAL NOISE</b>	<b>Yes</b> GO to <b>F5</b> . <b>No</b> INSTALL a new generator. TEST the system for normal operation.
	<ul style="list-style-type: none"> <li>Disconnect: Generator C102b.</li> <li>Key in START position.</li> <li>With the engine running, determine if the generator is still noisy.</li> <li>Is the noise still present?</li> </ul>	
<b>F5</b>	<b>CHECK GENERATOR FOR MECHANICAL NOISE</b>	<b>Yes</b> INSTALL a new generator. TEST the system for normal operation. <b>No</b> REFER to Engine to diagnose the source of the engine noise.
	<ul style="list-style-type: none"> <li>Turn all accessories OFF. With the engine running, use a stethoscope or equivalent listening device to probe the generator for unusual mechanical noise.</li> <li>Is the generator the noise source?</li> </ul>	

**Test F3-F5****Test G****PINPOINT TEST G: RADIO INTERFERENCE****PINPOINT TEST G: RADIO INTERFERENCE**

Test Step		Result / Action to Take
<b>G1</b>	<b>VERIFY GENERATOR IS SOURCE OF RADIO INTERFERENCE</b>	<b>Yes</b> REFER to Radio, Stereo, and Compact Disc for diagnosis and testing of the in-vehicle entertainment system. <b>No</b> INSTALL a new generator. TEST the system for normal operation.
	<p><b>NOTE:</b> If the original equipment manufactured (OEM) audio unit has been replaced with the aftermarket unit, the vehicle may not pass the following test. Return the vehicle to OEM condition before proceeding with this pinpoint test.</p> <ul style="list-style-type: none"> <li>Key in START position.</li> <li>Start and run the engine.</li> <li>Tune the radio to a station where the interference is present.</li> <li>Key in OFF position.</li> <li>Disconnect: Generator C102b.</li> <li>Key in START position.</li> <li>With the engine running, is the interference present with the generator disconnected?</li> </ul>	

**Test G1**