Published: Jan 30, 2007

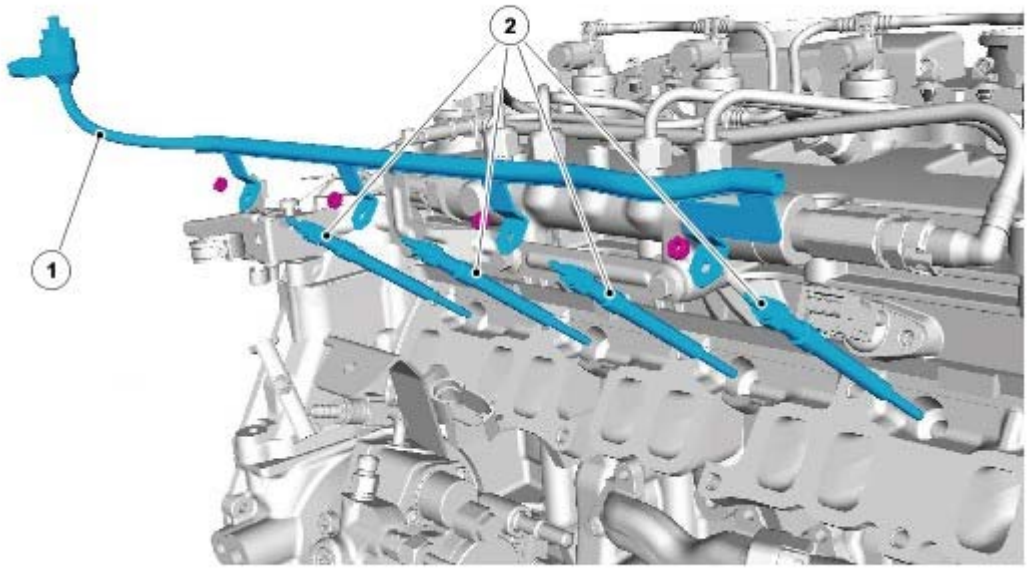
Specifications

Item	Nm	lb-ft
Glow plug wiring harness nuts	2	1
Glow plugs	13	10

Published: Nov 2, 2006

Glow Plug System

COMPONENT LOCATION



E85330

Item	Part Number	Description
1		Glow plug wire
2		Glow plug(s)

OVERVIEW

The glow plugs are located in the side of the cylinder head and aid engine starting and efficiency. The glow plugs and the glow plug indicator lamp are controlled by the Engine Control Module (ECM).

The glow plugs preheat the combustion chambers, which aids cold starting. During the preheat stage, the ECM receives an engine temperature signal from the cylinder head temperature (CHT) sensor and this determines the preheat time. The lower the temperature, the longer the preheat time. There is a maximum preheat time of 8 seconds at -20°C or lower. At temperatures above 80°C there is no preheat phase.

Once the engine has started, the glow plugs enter an after-glow phase. The after-glow phase helps to improve idling and reduce hydrocarbon emissions through more efficient combustion just after starting. The after-glow phase only operates at engine speeds below 2500 RPM, above that, the after-glow phase is interrupted to increase the durability of the glow plugs. There is a maximum after-glow time of 30 seconds at -20°C or lower. At temperatures above 50°C there is no after-glow phase.

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Glow Plug System

Overview

For information on description and operation:
Glow Plug System

Inspection and Verification

1 . Verify the customer concern.

2 . Visually inspect for obvious signs of mechanical or electrical damage.

Electrical
• Glow plug lamp • Fuses Link 1, fuse box under seat • Glow plug relay • Engine management relay • Wiring harness/connectors • Glow plugs • Engine control module (ECM)

3 . If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

4 . Use the approved diagnostic system or a scan tool to retrieve any diagnostic trouble codes (DTCs) before moving onto the symptom chart or DTC index.

Make sure that all DTCs are cleared following rectification.

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Symptom Chart

Symptom	Possible cause	Action
Poor starting (extreme weather conditions)	• Glow plugs inoperative/inefficient • Fuel temperature too low The fuel system recycles fuel until operating temperature is reached to reduce this possibility	Check the glow plug harnesses at the glow plugs and at the connections to the main harness. Refer to the electrical guides. Check for DTCs indicating a glow plug fault. Rectify as necessary. Clear the DTCs and check for normal operation.
High cold-engine emissions	• After-glow phase inoperative	Check the glow plug harnesses at the glow plugs and at the connections to the main harness. Refer to the electrical guides. Check for DTCs indicating a glow plug fault. Rectify as necessary. Clear the DTCs and check for normal operation. After-glow is designed to function at engine temperatures below 50°C (122°F), below 2,500 rpm and for a maximum of 30 seconds after engine starting.
High cold-engine noise, vibration or harshness	• After-glow phase inoperative	Check the glow plug harnesses at the glow plugs and at the connections to the main harness. Refer to the electrical guides. Check for DTCs indicating a glow plug fault. Rectify as necessary. Clear the DTCs and check for normal operation. After-glow is designed to function at engine temperatures below 50°C (122°F), below 2,500 rpm and for a maximum of 30 seconds after engine starting.

DTC Index

NOTE:

If a control module or component is suspect and the vehicle remains under manufacturer warranty, refer to the

Warranty Policy and Procedures manual (section B1.2), or determine if any prior approval program is in operation, before the replacement of a component.

NOTE:

Generic scan tools may not read the codes listed, or may read only 5-digit codes. Match the 5 digits from the scan tool to the first 5 digits of the 7-digit code listed to identify the fault (the last 2 digits give extra information read by the manufacturer-approved diagnostic system).

NOTE:

When performing voltage or resistance tests, always use a digital multimeter (DMM) accurate to three decimal places, and with an up-to-date calibration certificate. When testing resistance always take the resistance of the DMM leads into account.

NOTE:

Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.

NOTE:

Inspect connectors for signs of water ingress, and pins for damage and/or corrosion.

NOTE:

If DTCs are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

NOTE:

For a full list of engine control module (ECM) DTCs:

Electronic Engine Controls

DTC	Description	Possible cause	Action
P037D29	Glow plug relay sensor circuit - signal invalid	• Glow plug short circuit to ground • Relay circuit to relay • Relay circuit from relay • Glow plug relay fault	Check the relay and circuits. Refer to the electrical guides. Activate the relay and check for an audible "click". Rectify as necessary. Clear the DTCs and test for normal operation.
P038011	Glow plug/heater circuit A - circuit short to ground	• Glow plug relay control circuit: short circuit to ground • Glow plug relay fault	Check the relay and circuits. Refer to the electrical guides. Activate the relay and check for an audible "click". Rectify as necessary. Clear the DTCs and test for normal operation.
P038015	Glow plug/heater circuit A - circuit short to battery or open	• Glow plug relay control circuit: short circuit to power • Glow plug relay control circuit: open circuit • Glow plug relay fault	

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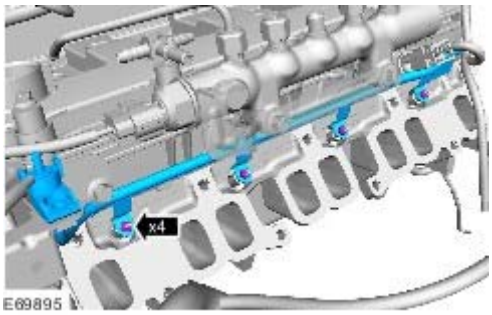
Glow Plug (19.60.41)

Removal

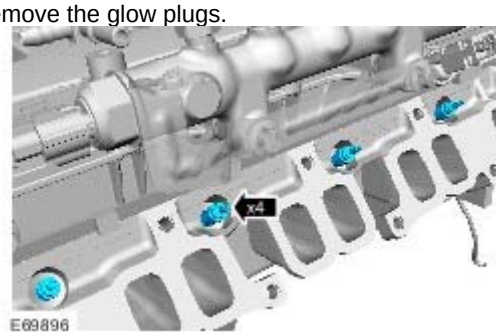
1 . Disconnect the battery ground cable.
For additional information, refer to Battery Disconnect and Connect

2 . Remove the intake manifold.
For additional information, refer to Intake Manifold (30.15.02)

3 . Release the glow plug wiring harness.
Remove the 4 nuts.



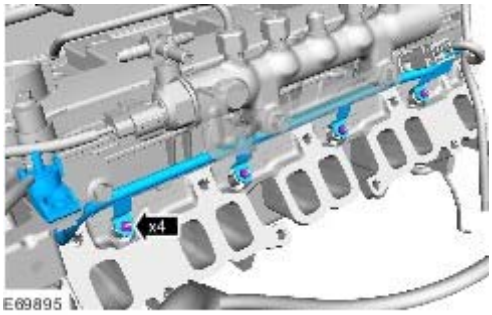
4 . Remove the glow plugs.



Installation

1 . To install, reverse the removal procedure.
Tighten to 13 Nm (10 lb.ft).

2 . Tighten to 2 Nm (1 lb.ft).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