

AF: Glow Plug System

[Introduction](#)

AF1 PRELIMINARY DIAGNOSIS

- **Note:** If DTCs P0670 and P0683 are present, carry out DTC P0670 diagnosis before diagnosing DTC P0683.
- Ignition OFF.
- Carry out a visual inspection.
- Ignition ON, engine OFF.
- Record the freeze frame data.
- Clear the DTCs.
- GPCM-Black connector disconnected.
- GPCM-Green connector disconnected.
- Visually inspect for:
 - pushed out pins
 - corrosion
- Apply dielectric compound.
- GPCM-Black connector connected.
- GPCM-Green connector connected.
- Verify all glow plug electrical connectors are connected.
- Carry out the KOER Glow Plug Monitor self-test.

Is DTC P0670, P0671, P0672, P0673, P0674, P0675, P0676, P0677, P0678, or P0683 present?

Yes	No
<p>For DTCs P0671, P0672, P0673, P0674, P0675, P0676, P0677 or P0678, GO to AF2 .</p> <p>For DTC P0670, GO to AF8 .</p> <p>For DTC P0683, GO to AF13 .</p>	<p>If no symptoms are present, RETURN the vehicle to the customer. The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector. If a symptom is present, REFER to Section 3, No DTCs Present Symptom Chart Index, if a driveability concern exists.</p>

AF2 DIAGNOSTIC TROUBLE CODES (DTCS) P0671, P0672, P0673, P0674, P0675, P0676, P0677, OR P0678

- **Note:** Refer to the component connector information at the beginning of this pinpoint test.
- **Note:** Glow plugs are numbered front to rear with even numbers on the left side of the engine.
- Ignition OFF.
- Glow Plug Bus Bar connector disconnected.
- Check for loose, damaged, or backed out terminals.
- Measure the resistance between:
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<ul style="list-style-type: none"> • (+) Glow Plug Bus Bar Connector, Component Side 	<ul style="list-style-type: none"> • (-)
<ul style="list-style-type: none"> • Suspect Glow Plug 	<ul style="list-style-type: none"> • Ground

Is the resistance between 0.5 - 2 ohms?

Yes	No
GO to AF4 .	GO to AF3 .

AF3 CHECK THE GLOW PLUG CIRCUIT BETWEEN THE BUS BAR CONNECTOR AND THE GLOW PLUG

- Disconnect the bus bar harness from the glow plugs.
- Measure the resistance between:
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<ul style="list-style-type: none"> • (+) Glow Plug Bus Bar Connector, Harness Side 	<ul style="list-style-type: none"> • (-) Glow Plug Connector, Harness Side
<ul style="list-style-type: none"> • Suspect Glow Plug 	<ul style="list-style-type: none"> • Suspect Glow Plug

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Is the resistance less than 5 ohms?

Yes	No
INSTALL a new glow plug. REFER to the Workshop Manual Section 303-07, Glow Plug System. CLEAR the DTCs. REPEAT the self-test.	INSTALL a new bus bar. CLEAR the DTCs. REPEAT the self-test.

AF4 CHECK THE GLOW PLUG VOLTAGE

- Disconnect the suspect GPCM connector.
- Ignition ON, engine OFF.
- Measure the voltage between:
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<ul style="list-style-type: none"> • (+) Suspect GPCM Connector, Harness Side 	<ul style="list-style-type: none"> • (-)
<ul style="list-style-type: none"> • VBAT 	<ul style="list-style-type: none"> • Ground

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Is the voltage greater than 10.5 V?

Yes	No
GO to AF5 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

AF5 CHECK THE GLOW PLUG CIRCUIT FOR AN OPEN

- Ignition OFF.
- Measure the resistance between:
-
-

<ul style="list-style-type: none"> • (+) Suspect GPCM Connector, Harness Side 	<ul style="list-style-type: none"> • (-) Glow Plug Bus Bar Connector, Harness Side
<ul style="list-style-type: none"> • Suspect GPCM 	<ul style="list-style-type: none"> • Suspect Glow Plug

Is the resistance less than 5 ohms?

Yes	No
GO to AF6 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

AF6 CHECK THE GLOW PLUG CIRCUIT FOR A SHORT TO GROUND

- Measure the resistance between:
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<ul style="list-style-type: none"> • (+) Suspect GPCM Connector, Harness Side 	<ul style="list-style-type: none"> • (-)
<ul style="list-style-type: none"> • Suspect GPCM 	<ul style="list-style-type: none"> • Ground

Is the resistance greater than 10K ohms?

Yes	No
GO to AF7 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

AF7 CHECK THE GLOW PLUG CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- Measure the voltage between:
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-

<ul style="list-style-type: none"> • (+) Suspect GPCM Connector, Harness Side 	<ul style="list-style-type: none"> • (-)
<ul style="list-style-type: none"> • Suspect GPCM 	<ul style="list-style-type: none"> • Ground

Is any voltage present?

Yes	No
REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.	INSTALL a new glow plug control module. REFER to the Workshop Manual Section 303-07, Glow Plug System. CLEAR the DTCs. REPEAT the self-test.

AF8 DIAGNOSTIC TROUBLE CODE (DTC) P0670

- Ignition OFF.
- PCM connector disconnected.
- GPCM-Green connector disconnected.
- Measure the resistance between:
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<ul style="list-style-type: none"> • (+) GPCM-Green Connector, Harness Side 	<ul style="list-style-type: none"> • (-) PCM Connector, Harness Side
<ul style="list-style-type: none"> • GPE - Pin 8 	<ul style="list-style-type: none"> • GPE - Pin E3

Is the resistance less than 5 ohms?

Yes	No
GO to AF9 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

AF9 CHECK THE CONTROL CIRCUIT FOR A SHORT TO GROUND

- Measure the resistance between:
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-

<ul style="list-style-type: none">• (+) GPCM-Green Connector, Harness Side	<ul style="list-style-type: none">• (-)
<ul style="list-style-type: none">• GPE - Pin 8	<ul style="list-style-type: none">• Ground

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Is the resistance greater than 10K ohms?

Yes	No
GO to AF10 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

AF10 CHECK THE CONTROL CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- Measure the voltage between:
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-

<ul style="list-style-type: none">• (+) GPCM-Green Connector, Harness Side	<ul style="list-style-type: none">• (-)
<ul style="list-style-type: none">• GPE - Pin 8	<ul style="list-style-type: none">• Ground

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Is any voltage present?

Yes	No
REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.	GO to AF11 .

AF11 CHECK THE GLOW PLUG CONTROL MODULE FOR VOLTAGE

- Ignition OFF.
- GPCM-Black connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:
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-

• (+) GPCM-Black Connector, Harness Side	• (-)
• VPWR - Pin 9	• Ground

Is the voltage greater than 10.5 V?

Yes	No
GO to AF12 .	REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.

AF12 CHECK THE GLOW PLUG CONTROL MODULE CONTROL CIRCUIT

- **Note:** With the ignition ON, engine OFF the PCM provides a path to ground for the glow plug enable (GPE) circuit.
- Ignition OFF.
- GPCM-Black connector connected.
- PCM connector connected.
- Ignition ON, engine OFF.
- Measure the voltage between:

<ul style="list-style-type: none"> • (+) Vehicle Battery 	<ul style="list-style-type: none"> • (-) GPCM-Green Connector, Harness Side
<ul style="list-style-type: none"> • Positive terminal 	<ul style="list-style-type: none"> • GPE - Pin 8

Is the voltage greater than 10.5 V?

Yes	No
<p>INSTALL a new glow plug control module. REFER to the Workshop Manual Section 303-07, Glow Plug System.</p> <p>CLEAR the DTCs. REPEAT the self-test.</p>	<p>GO to AF17 .</p>

AF13 DIAGNOSTIC TROUBLE CODE (DTC) P0683

- Ignition OFF.
- PCM connector disconnected.
- GPCM-Green connector disconnected.
- Measure the resistance between:

<ul style="list-style-type: none"> • (+) GPCM-Green Connector, Harness Side 	<ul style="list-style-type: none"> • (-) PCM Connector, Harness Side
<ul style="list-style-type: none"> • Diagnostic Communication - Pin 9 	<ul style="list-style-type: none"> • GPD - Pin E17

Is the resistance less than 5 ohms?

Yes	No
<p>GO to AF14 .</p>	<p>REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.</p>

AF14 CHECK THE DIAGNOSTIC CIRCUIT FOR A SHORT TO GROUND

- Measure the resistance between:

<ul style="list-style-type: none"> • (+) GPCM-Green Connector, Harness Side 	<ul style="list-style-type: none"> • (-)
<ul style="list-style-type: none"> • Diagnostic Communication - Pin 9 	<ul style="list-style-type: none"> • Ground

Is the resistance greater than 10K ohms?

Yes	No
GO to AF15 .	REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

AF15 CHECK THE DIAGNOSTIC CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition ON, engine OFF.
- Measure the voltage between:
-
-

<ul style="list-style-type: none"> • (+) GPCM-Green Connector, Harness Side 	<ul style="list-style-type: none"> • (-)
<ul style="list-style-type: none"> • Diagnostic Communication - Pin 9 	<ul style="list-style-type: none"> • Ground

Is any voltage present?

Yes	No
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REPAIR the short circuit. CLEAR the DTCs. REPEAT the self-test.

GO to [AF16](#) .

AF16 CHECK THE GLOW PLUG CONTROL MODULE FOR VOLTAGE

- Ignition OFF.
- GPCM-Black connector disconnected.
- Ignition ON, engine OFF.
- Measure the voltage between:
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-

<ul style="list-style-type: none"> • (+) GPCM-Black Connector, Harness Side 	<ul style="list-style-type: none"> • (-)
<ul style="list-style-type: none"> • VPWR - Pin 9 	<ul style="list-style-type: none"> • Ground

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Is the voltage greater than 10.5 V?

Yes	No
<p>INSTALL a new glow plug control module. REFER to the Workshop Manual Section 303-07, Glow Plug System.</p> <p>CLEAR the DTCs. REPEAT the self-test.</p>	<p>REPAIR the open circuit. CLEAR the DTCs. REPEAT the self-test.</p>

AF17 CHECK FOR CORRECT PCM OPERATION

- Disconnect all the PCM connectors.
- Visually inspect for:
 - pushed out pins
 - corrosion
- Connect all the PCM connectors and make sure they seat correctly.
- Carry out the PCM self-test and verify the concern is still present.

Is the concern still present?

Yes	No
<p>INSTALL a new PCM. REFER to Section 2, Flash Electrically Erasable Programmable Read Only Memory (EEPROM), Programming the VID Block for a Replacement PCM.</p>	<p>The system is operating correctly at this time. The concern may have been caused by a loose or corroded connector.</p>