

D. 6.5L Diesel Engine Glow Plug System (Figure 8-3 Thru 8-5)

The glow plug is basically an electric heater that is energized by the operator through the ignition switch. Once energized, electric current flows through the glow plug to cause it to glow or become red hot 1550°F to 1650°F (829° to 884°C). After a given time period when the starter motor is engaged, the ambient air that flows into the engine will be rapidly increased in temperature through the use of the hot glow plug within the combustion chamber.

Each cylinder in the 6.5L engine employs a glow plug that is actually a 12-volt unit operated from the 24-volt battery system when the ignition key is turned to the run position prior to engaging the starter motor. They remain pulsing for a short time after starting, then automatically turn off.

Within the instrument panel of the vehicle is a "glow plugs" light that will turn on immediately when the engine is cold and the ignition switch is turned to the run position.

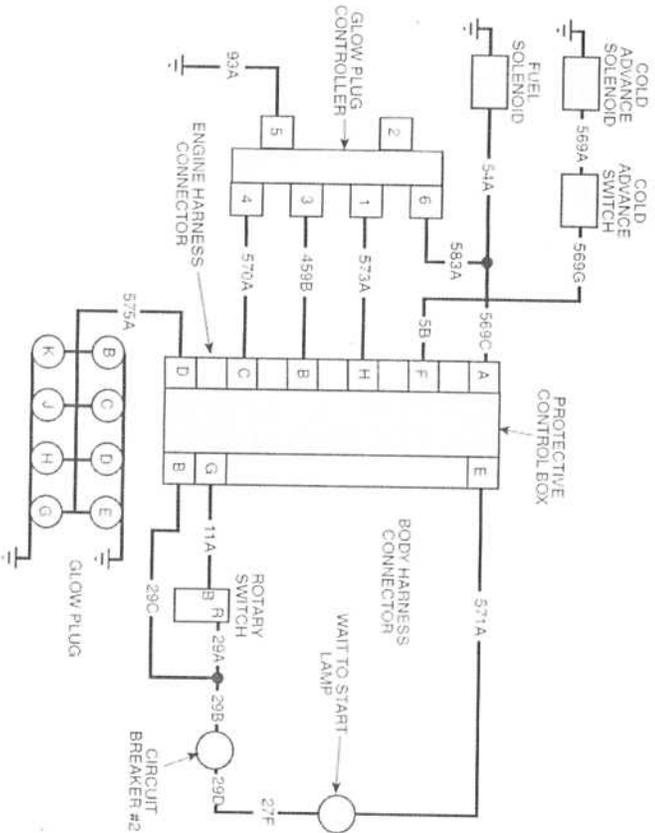


Figure 8-3. Glow Plug System Testing.

1. If the Wait to Start Light flickers on and off when ignition switch is turned to the on position and engine is cold, this is normally an indication of a defective glow plug controller or glow plugs.
2. If the Wait to Start Light comes on and stays on when ignition switch is turned to the on position and glow plugs do not cycle, (engine cold), this is normally an indication of a defective protective control box.
3. If glow plugs continue to cycle after engine has warmed up, replace glow plug controller and check system again.
4. If the glow plug system still continues to cycle after engine is warmed up, check for a 24-28 volt signal at alternator lead 2A. If no voltage is present or voltage is not within limits, replace the alternator. If 24-28 volts DC is present, replace protective control box.

NOTE

Allow engine to cool for 30 minutes before performing glow plug resistance checks.

Remove engine wiring harness connectors from glow plugs.

Connect one test lead of multimeter to terminal (1) and other test lead to threaded area (2). Glow plug internal resistance should be 1.5-2.5 ohms. If resistance is not 1.5-2.5 ohms, replace glow plug.

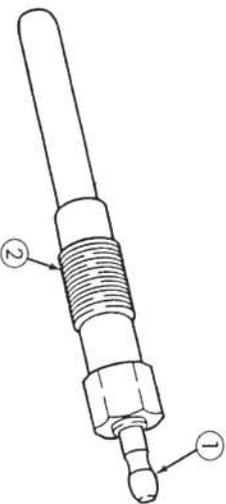


Figure 8-4. Glow Plug Resistance Testing.

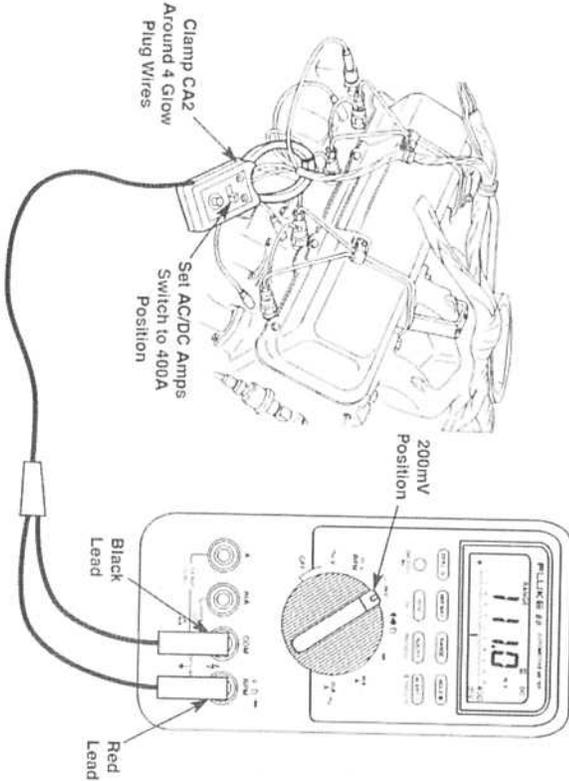
Glow Plug System Operation

When the engine is below 120°F (48°C) and the rotary switch is turned to the "RUN" position, the "Wait-To-Start" light goes on for up to fifteen seconds, depending on engine temperature, then goes off. The engine can then be started. After engine is started, the glow plugs will continue to cycle (for up to 5 minutes), then stop cycling.

The glow plug system is cycling normal when there is an on pulse for approximately 5 seconds and an off pulse for approximately 15 seconds.

To detect glow plug system cycling, watch the voltmeter on the instrument panel. The gauge needle will move to the left when glow plugs are on, then return to normal position when glow plugs are off. A relay click should be heard from the protective control box as the system switches on and off. A Multi meter may be used on any glow plug wire to visually watch operation of glow plug system.

If engine temperature is above 120°F (48°C), glow plugs are not required to start the engine.



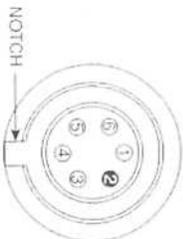
Each glow plug draws approximately 15 amperes. To test the system connect current probe around the 4 glow plug wires on each engine bank. With glow plugs cycling, there should be approximately 60 ampere draw for each bank or 120 ampere draw for all eight glow plugs. Each defective glow plug will lower amperage draw approximately 15 amperes. (Example) With one defective glow plug, the total reading will be approximately 105 amperes. With two defective glow plugs, the total reading will be approximately 90 amperes etc. Each defective glow plug will reduce the amperage draw on each bank by 15 amps; 60, 45, 30, 15 amperes etc.

NOTE

No test is available for the glow plug controller. Replace it suspected of being faulty. If symptoms still exist, continue testing.

E. Glow Plug Wiring Testing (Figure 8-5)

1. Disconnect engine wiring harness connector from the glow plug controller. Check the controller connector for dirt or moisture contamination, clean if required. Replace if suspected of being faulty. If symptoms still exist, continue with system testing.
 2. With ignition switch on, check for 24 volts at wire # 583A. Repair or replace wiring harness if no voltage is indicated.
 3. Using a multimeter, check for continuity between terminal 5 (wire 93A) at glow plug controller connector (lead 93A) and ground. Repair engine wiring harness if continuity is not present.
 4. Disconnect negative battery cable and disconnect engine wiring harness connector at protective control box. Inspect the control box and harness connector for dirt, or moisture contamination, clean if required. Using a multimeter, check for continuity between terminal "D" in protective control box engine wiring harness connector and eight glow plug connectors (leads 575). Repair engine harness, if any glow plug lead does not have continuity.
 5. Using a multimeter, check for continuity between terminal "G" in engine wiring harness connector at protective control box and lead 2A at alternator. Repair engine wiring harness, if continuity is not present.
 6. Using a multimeter, the following continuity checks must be made from engine wiring harness connector at protective control box to engine wiring harness connector at glow plug controller.
 - a. Terminal "C" at protective control box connector to terminal 4 (wire 570A) at glow plug controller connector.
 - b. Terminal "B" at protective control box connector to terminal 3 (wire 459B) at glow plug controller connector, c. Terminal "H" at protective control box connector to terminal 1 (wire 573A) at glow plug controller connector.
 - d. Terminal "A" at protective control box connector (lead 54B) to terminal 6 (wire 583A) at glow plug controller connector.
- If any leads did not have continuity, repair engine wiring harness.
7. If no problem is found in glow plugs, glow plug controller or engine wiring harness, replace protective control box and check system for proper operation.



Glow Plug Controller Wiring Harness Testing