

AJ: Symptom Chart 9[← AJ: Introduction](#)**AJ1 PRELIMINARY CHECKS**

- Perform preliminary checks. Refer to Diagnostic Performance Procedures 1-4 in [Section 4A](#) or [Section 4B](#) .

Are all checks OK?

Yes	No
GO to AJ2 .	REPAIR as required. VERIFY a symptom no longer exists.

AJ2 ATMOSPHERIC PRESSURE RATIONALITY CHECK

- Go to [Section 2](#) , Diagnostic Methods, Parameter Identification (PID), Selecting Parameter Identification (PID).
- Select PIDs EBP, MAP and BARO (EBP is not used on F-Series 650/750).
- Key on, engine off.

Does any PID deviate from atmospheric pressure in your locale by more than 10 kPa (1.5 psi)?

Yes	No
GO to the appropriate pinpoint test for the sensor with the largest difference.	GO to AJ3 .

AJ3 CHECK COLOR OF EXHAUST SMOKE

Note: White tailpipe exhaust smoke is a normal condition at start-up with temperatures below 10°C (50°F) or with an extended idle in a cool climate.

- Start engine.

Is there excessive exhaust smoke?

Yes	No
If exhaust smoke is white, GO to AJ4 . If exhaust smoke is black, GO to AJ5 .	RETURN to Symptom Chart Index.

AJ4 CHECK WHITE TAILPIPE EXHAUST SMOKE

Note: White tailpipe exhaust smoke is a normal condition at start-up with temperatures below 10°C (50°F) or with an extended idle in a cool climate.

- Go to [Section 4A](#) or [Section 4B](#) , Diagnostic Subroutines, Hard Start/No Start Diagnostic Procedures. Perform Glow Plug System Operation check.

Is a fault indicated?

Yes	No
FOLLOW Diagnostic Procedures direction.	GO to AJ5 .

AJ5 CHECK CHARGE AIR COOLER FOR RESTRICTIONS

- Check for any conditions that may restrict air flow through the charge air cooler.
- Disconnect ducts at CAC and check for restriction.
- Check inside of CAC for restrictions.

Are there any restrictions?

Yes	No
CLEAN as required. VERIFY repair.	GO to AJ6 .

AJ6 CONFIRM FUEL QUALITY

- Drain fuel tank.
- Add known high quality diesel fuel to fuel tank.

Is amount of smoke decreased?

Yes	No
ADVISE operator on need for higher quality fuel.	GO to AJ7 .

AJ7 CHECK FOR OUT-OF-RANGE SENSOR

- Allow engine to sit overnight.
- Do not start engine.
- Check operation of:
 - Intake air temperature (IAT) sensor
 - Manifold air temperature (MAT) sensor
 - Engine oil temperature (EOT) sensor

Do sensor temperature readings agree within 6 degrees?

Yes	No
GO to AJ8 .	REFER to applicable Pinpoint Test in Section 5 .

AJ8 CHECK FOR COOLANT LEAK

- Go to the Workshop Manual to check cooling system for leaks.

Does coolant leak internally?

Yes	No
REPAIR as necessary. REFER to the Workshop	

Manual.	GO to AJ9 .
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AJ9 CHECK INTAKE AIR HEATER OPERATION

Note: Intake air heater is not used on F-Series 650/750.

- KOER — Verify control relay closes.

Are there intake air heater DTCs in memory?

Yes	No
GO to Pinpoint Test KL .	GO to AJ10 .

AJ10 CHECK THERMOSTAT OPERATION

- Go to the Workshop Manual to check thermostat operation.

Is thermostat operating properly?

Yes	No
GO to AJ11 .	REPAIR as necessary.

AJ11 ISOLATE ENGINE CYLINDERS GENERATING SMOKE

Note: When the vehicle is assembled, gaskets are not installed between the cylinder head and the exhaust manifold. If the exhaust manifold is separated from the cylinder head, gaskets must be installed.

- Remove the exhaust manifold attaching bolts.
- Pry the manifolds away from the cylinder head.
- Start the engine.

Are all cylinders generating smoke?

Yes	No
GO to AJ12 .	GO to AJ13 .

AJ12 CHECK FOR ENGINE WEAR

- Go to [Section 4A](#) or [Section 4B](#) , Diagnostic Subroutines, Performance Diagnostic Procedures. Perform Crankcase Pressure Test.

Is crankcase pressure higher than 4 inches of H₂O?

Yes	No
REPAIR engine for rings or valves as required according to Workshop Manual direction.	GO to AJ13 .

AJ13 TEST GLOW PLUG

- Remove glow plug from smoking cylinder.
- Ground body of glow plug and install jumper wire from B+ source to glow plug terminal.

Does glow plug tip become hot?

Yes	No
GO to AJ14 .	REPLACE glow plug. VERIFY repair.

AJ14 SWITCH FUEL INJECTORS

- Switch injector(s) between a smoking and non-smoking cylinder(s).

Does smoke move with injector?

Yes	No
REPLACE injector(s). VERIFY repair.	REPAIR base engine. REFER to the Workshop Manual.
