3-: Symptom Chart 3

3-: Introduction

3-1 PRELIMINARY CHECKS

Note: Refer to Section 4C , Diagnostic Subroutines, Performance Diagnostic Procedures or the 11 x 17-inch Diagnostics Guide for the following preliminary checks.

- Perform the following preliminary checks:
  - Check engine oil level
  - Check for sufficient clean fuel
  - Check for an intake restriction

Are all checks OK?

Yes	No
GO to 3-2 .	SERVICE as necessary. VERIFY a symptom no longer exists.

3-2 CHECK HIGH PRESSURE PUMP OIL LEVEL

- Check engine oil level in high pressure pump reservoir.

Is oil level within 25.4 mm (1 inch) of inspection plug?

Yes	No
GO to 3-4 .	GO to 3-3 .

3-3 ATTEMPT TO START ENGINE

- Refill high pressure pump reservoir.
- Attempt to start engine.

Does engine start and then stall after about 15 seconds?

Yes	No
Reservoir is not supplying enough oil to the high-pressure oil pump. GO to Symptom Chart 17 .	GO to 3-4 . If no other faults are indicated, GO to Symptom Chart 17 .

3-4 PERFORM KOEO ON-DEMAND SELF TEST

Note: Confirm batteries are fully charged.

- Go to Section 4C , Diagnostic Subroutines, Performance Diagnostic Procedures. Perform KOEO On-Demand Self Test.

Is a fault indicated?

Yes	No
GO to appropriate pinpoint test.	GO to 3-5 .

3-5 CHECK SCAN TOOL COMMUNICATIONS

Did the scan tool lose communication during KOEO On-Demand Self Test?

Yes	No
GO to Pinpoint Test AF .	GO to 3-6 .

3-6 PERFORM KOEO INJECTOR ELECTRICAL SELF TEST

Note: Ignore DTC 0380.

- Disconnect glow plug control connector on side of glow plug relay to prevent battery draindown.
- Go to Section 4C , Diagnostic Subroutines, Performance Diagnostic Procedures. Perform KOEO Injector Electrical Self Test.

Is a fault indicated?

Yes	No
GO to appropriate pinpoint test.	GO to 3-7 .

3-7 VERIFY KOEO INJECTOR ELECTRICAL SELF TEST

Did the KOEO Injector Electrical Self Test run?

Yes	No
GO to 3-9 .	GO to 3-8 .

3-8 REPEAT KOEO INJECTOR ELECTRICAL SELF TEST

- Repeat KOEO Injector Electrical Self Test for each injector connector with one connector disconnected at a time.

Does the KOEO Injector Electrical Self Test run?

Yes	No
REMOVE valve cover and INSPECT the disconnected valve cover wiring harness for a pinched or grounded injector wire.	GO to Pinpoint Test W to check IDM power and ground. GO to Pinpoint Test AB29 to locate short to ground at IDM or in injector circuits.

3-9 CHECK PARAMETER IDENTIFICATIONS (PIDS)

- Disconnect IDM relay.

- Go to Section 2C , Diagnostic Methods, Parameter Identification (PID), Selecting Parameter Identification (PID).
- Select PIDs ICP, RPM and FUELPW.
- Crank engine and record PID values.

Did the scan tool lose communication during crank?

Yes	No
Battery voltage is dropping below 9.5 volts during crank. ATTACH battery charger and RETEST.	GO to 3-10 .

3-10 CMP CIRCUIT CHECK

Referring to Step 3-9, did the scan tool display PIDs RPM and FUEL PW = 0 while cranking?

Yes	No
CMP circuit fault. REINSTALL IDM relay. GO to Section 4C , Diagnostic Subroutines, Performance Diagnostic Procedures. PERFORM Retrieve/Clear Continuous DTCs for supporting data. GO to Pinpoint Test G .	GO to 3-11 .

3-11 ICP SENSOR CHECK

Referring to Step 3-9, did the scan tool display PID ICP of 3.5 Mpa (500 psi) or greater while cranking?

Yes	No
GO to 3-13 .	GO to 3-12 .

3-12 CHECK PRESSURE BALANCE

- Confirm engine oil level in high pressure pump reservoir is within 25.4 mm (1 inch) of inspection plug.
- Plug off high-pressure hose for right head with D94T-6600-A.
- Check PID IPR at crank, and record value.
- Reattach high-pressure hose for right head, plug off high-pressure hose for left head with D94T-6000-A, and record value.

Is difference in IPR duty cycle greater than 2%?

Yes	No
SERVICE leaks in cylinder head with the lower readings according to Service Manual direction.	REPLACE IPR according to Service Manual direction.

3-13 CHECK GLOW PLUGS

Note: Run these checks if starting difficulty is in cold temperatures and/or if excessive white smoke is generated after starting in warmer temperatures.

Note: Refer to Pinpoint Test S for circuit diagrams.

- Disconnect all glow plug/injector connectors on both valve cover gaskets.

- Check resistance between ground and each glow plug connector using a digital multimeter and Tool 014-00935.

Is resistance between 0.1 and 2.0 ohms?

Yes	No
GO to 3-14 .	REMOVE valve cover and INSPECT harness for opens and shorts. If harness is OK, REPLACE indicated glow plug.

3-14 CHECK GLOW PLUG CONNECTORS

- Check resistance between each glow plug contact in the engine harness and the two brown wires on the glow plug relay.

Is resistance between 0 and 2.0 ohms?

Yes	No
GO to 3-15 .	REPLACE engine wiring harness.

3-15 CHECK GLOW PLUG RELAY CIRCUIT

- Check voltage between glow plug relay Circuit 38 (BK/O) and chassis ground.

Is battery voltage present?

Yes	No
GO to 3-16 .	**CAUTION: Confirm resistance to ground is above 10,000 ohms before attaching to starter relay.** REPLACE relay feeder wire fusible links 299 (DB).

3-16 CHECK GLOW PLUG RELAY

- Connect all glow plug connectors.
- Connect glow plug control connector on side of relay.
- Disconnect EOT.
- Connect voltmeter between relay terminal with two brown wires and chassis ground.
- Measure voltage with key off and key on while wiggling wires connected to relay (relay will remain closed for two minutes with key on).

Does voltage change from 0 to battery voltage and stay at battery voltage for approximately 2 minutes?

Yes	No
GO to 3-17 .	REPLACE glow plug relay according to Service Manual direction. CONFIRM that voltage drop between relay studs is less than 100 m ohms on new relay.

3-17 CHECK TANDEM FUEL PUMP PRESSURE

- Connect EOT.
- Remove IDM relay.
- Go to Section 4C , Diagnostic Subroutines, Hard Start/No Start Diagnostic Procedures. Perform Tandem Fuel Pump Pressure test.

Is fuel pressure less than 138 kPa (20 psi) at crank rpm (100 rpm or greater)?

Yes	No
GO to 3-18 .	GO to 3-22 .

3-18 CHECK REGULATOR VALVE

- Check regulator valve on fuel side for sticking or debris.

Is regulator valve faulty?

Yes	No
REPLACE regulator valve according to Service Manual direction.	GO to 3-19 .

3-19 RECHECK TANDEM FUEL PUMP PRESSURE

- Remove filter cover and filter.
- Disconnect fuel pressure regulator from filter housing.
- Check for clogged fuel screen.
- Change fuel filter and recheck tandem fuel pump pressure, referring to Step 3-17.

Is fuel pressure still less than 138 kPa (20 psi) at crank rpm (100 rpm or greater)?

Yes	No
GO to 3-20 .	GO to 3-22 .

3-20 CHECK TANDEM FUEL PUMP INLET RESTRICTION

- Go to Section 4C , Diagnostic Subroutines, Performance Diagnostic Procedures. Perform Tandem Fuel Pump Inlet Restriction test.

Is vacuum greater than 20 kPa (6 in-Hg)?

Yes	No
INSPECT inlet lines between tank(s) and fuel line fitting for blockage.	GO to 3-21 .

3-21 CHECK FUEL INLET LINE

- Check for fuel inlet line blockage between quick connect fitting and fuel pump.

Is there blockage?

Yes	No
REPLACE fuel inlet line according to Service Manual direction.	REPLACE tandem fuel pump according to Service Manual direction.

3-22 CHECK ENGINE CRANKING

- Install IDM relay.
- Crank engine.

Does engine try to start but cannot maintain idle speed?

Yes	No
IDM is not providing full voltage. REPLACE IDM according to Service Manual direction.	GO to Pinpoint Test A .