INTERNATIONAL®

Hard Start and No Start Diagnostics

International® VT 365

Technician _____ Miles _____ Transmission:
Date _____ Hours _____ Man____ Auto____
Unit No. _____ VIN _____ Truck build _____

Ambient temp. _____ Engine SN _____
Coolant temp. _____ Engine HP _____
Complaint _____ Engine Family Rating Code _____

ECM calibration _____
IDM calibration _____
Injector No. _____
Turbochager No. _____

WARNING

Read safety instructions in Engine Diagnostics Manual EGES-240, before doing any diagnostic procedure on this form.

Notes

Fill out the heading on this form.

For starting concerns with ECT temperatures below 60 degrees F, do Test 15A (Glow Plug System) and service as required. If a problem was found and corrected, **it is not necessary to complete the rest of the form** unless a starting concern remains.

Do all checks in sequence unless otherwise stated. Doing a check or test out of sequence could cause incorrect results. If a problem was found and corrected, **it is not necessary to complete the rest of the form** unless a starting concern remains.

Reference figures for procedures are on the back of this form.

See Appendix A in Engine Diagnostics Manual EGES-240, for engine specifications.

See Appendix B in EGES-240, or Form CGE 310 for DiagnosticTrouble Codes (DTCs).

1. Fuel

(Figures A and B)

- ☐ Fuel level
- ☐ Free of water, icing, and clouding
- ☐ Free of contaminants
- ☐ Correct fuel grade

Note: If unit was run out of fuel, make sure the fuel system is primed.

Comments

2. Engine Systems

- ☐ Leaks
- ☐ Loose connections

Fuel Oil Coolant Electrical Air

3. Engine Oil

- ☐ Leaks
- ☐ Contaminated oil (fuel or coolant)
- ☐ Oil grade, viscosity, and level
- ☐ Miles/hours on oil

Comments

4. Intake and Exhaust Restriction

- ☐ Hoses and piping
- ☐ Filter minder (Figure C and D)
- ☐ Intake/exhaust restriction

Comments

5. Initial Key On (Do not start.)

- ☐ Listen for injector precycle BUZZ (Length is temperature dependent).
- ☐ Check for WAIT TO START with key ON.
- ☐ Check Water In Fuel (WIF) lamp (optional).

Comments

6. Engine Cranking

- ☐ Does engine crank?
- ☐ Check cranking RPM. (Dash)
- ☐ Check oil pressure (Dash)
- ☐ Check smoke color.

Check	Spec	Actual
RPM		
Oil pressure		
Smoke color	—	

7. Diagnostic Trouble Codes

- ☐ Install Electronic Service Tool (EST). (Figure E)
- ☐ Do **Test 10** if an EST is not available.

Active DTCs

Inactive DTCs

Correct problem causing active DTCs before continuing.

8. Key On Engine Off Standard Test

Use EST to run Key On Engine Off Standard Test.

DTCs found

Correct problem causing active DTCs before continuing.

9. Key On Engine Off Injector Test

- ☐ Do **Test 8** before doing the Key On Engine Off Injector Test.
- ☐ Use EST to run Key On Engine Off Injector Test.

DTCs found

Correct problem causing active DTCs before continuing.

10. Diagnostic Trouble Code Access

(Figure F)

(Required only if EST is not available)

- ☐ Set parking brake and turn ignition key ON.
- ☐ Press and release CRUISE ON and RESUME / ACCEL switches at the same time, twice within 3 seconds of key ON.

Active DTCs

Inactive DTCs

Correct problem causing active DTCs before continuing.

11. EST Data list

- ☐ Enter data in the Spec column below.
- ☐ Crank engine for 20 seconds and monitor DATA.
- ☐ Enter data in the Actual column below.

PID	Spec	Actual
VBAT		
RPM		
ICP		
EOP		
EGRP		

- If voltage is below spec, see ECM diagnostics.
- If no rpm is noted, check DTCs.
- If ICP pressure is below spec, do **Test 16.**
- If EOP is below spec, see Section 4, Engine symptoms.
- If EGRP is out of range, see Section 6 in EGES-240.

12. Main Power Relay Voltage to ECM

- ☐ Connect breakout harness between ECM power relay and distribution box.
- ☐ Crank engine and use a DMM to measure voltage to ECM. (min 100 rpm for 20 seconds) (Figure G)
- ☐ Check voltage between connector pin **87** and **ground**.

Instrument	Spec	Actual
DMM	7 Volts (min)	

13. Main Power Relay Voltage to IDM

- ☐ Connect breakout harness between IDM power relay and distribution box. (Figure H)
- ☐ Crank engine and use DMM to measure voltage to IDM. (min 100 rpm for 20 seconds)
- ☐ Check voltage between connector pin **87** and **ground**.

Instrument	Spec	Actual
DMM	7 Volts (min)	

14. Fuel Pressure

(Figures J and K)

Note: If unit was run out of fuel, make sure the fuel system is primed.

- ☐ Minimum cranking speed 100 RPM for 20 seconds
- ☐ Measure (filtered) pressure at fuel filter housing.

Instrument	Spec	Actual
0-160 PSI Gauge		

- If fuel pressure is below spec, replace fuel filter, clean strainer, and retest.
- If fuel pressure is still below spec, see (Fuel Inlet Restriction) in **Test 14** of EGES-240.

15A. Glow Plug System

1. Install Current Clamp around the feed wire loom for glow plugs in the right side. (Figure L)
2. Turn ignition key ON. (Do not start the engine.)
3. Use EST to do Output State Test for glow plugs. (After 40 seconds record the amperage reading.)
4. Move clamp to left side and record amperage reading (Figure M)

Side	Spec	Reading
Right	34-52 Amps	
Left	34-52 Amps	

- If reading is below or above the amperage spec, do **Test 15B** for each glow plug in the failed side.
- If the reading is 0 Amps, do **Test 8** on this form. For DTC 251, see Glow Plug Control Circuit in Section 7 of EGES-240.

15B. Glow Plug System (Components)

1. Select the feed wiring loom for the glow plug side that failed.
2. Remove wires from the loom convolute.
3. Install Current Clamp around one of the four wires and do the Output State Test (Figure N). After 40 seconds, measure amperage. Move clamp to remaining wires one at a time, measuring amperage each time.

Note: If any glow plug failed, use a DMM to do steps 4 and 5.

4. Check resistance in wire between glow plug relay and glow plug. (Figure P)
5. Check glow plug resistance to ground. (Figure R)

Glow Plug No.	**Record for Step 3** Glow plug amperage (8.5 - 16 amps)	**Record for Step 4** Glow plug relay to glow plug (0 -1 Ohm)	**Record for Step 5** Glow plug to ground (.1 - 6 Ohms)
1			
2			
3			
4			
5			
6			
7			
8			

16. Low ICP System Pressure

- ☐ Do only the following low ICP tests if ICP was low during **TEST 11**. (See Section 5 in EGES-240 for test procedures.)
- ☐ If the test result for System Function is Yes, **do not continue with the following tests for Low ICP**.

Low ICP Tests

Test	Question	Result
16.1 System function	Greater than 500 PSI (0.82v) ?	☐ Yes ☐ No
16.2 IPR isolation	Audible air leak ?	Left ☐ Yes ☐ No Right ☐ Yes ☐ No
16.3 IPR function	Audible air leak ?	Unplugged ☐ Yes ☐ No B+ applied ☐ Yes ☐ No
16.4 Cylinder head isolation	Air leaks in cylinder head components ?	Left ☐ Yes ☐ No Right ☐ Yes ☐ No
16.5 Discharge, rear branch, and connection tubes	Audible air leak ?	Discharge ☐ Yes ☐ No Rear branch ☐ Yes ☐ No Connection tubes ☐ Yes ☐ No
16.6 High pressure pump	Greater than 500 PSI (0.82v) ?	☐ Yes ☐ No

© INTERNATIONAL TRUCK AND ENGINE CORPORATION

Figure A

Figure B

Figure C

Figure D

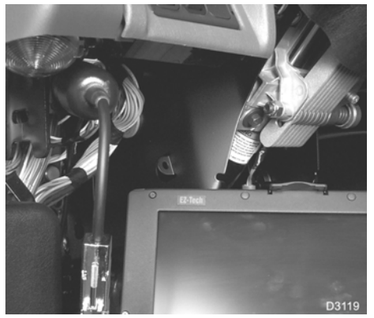

Figure E

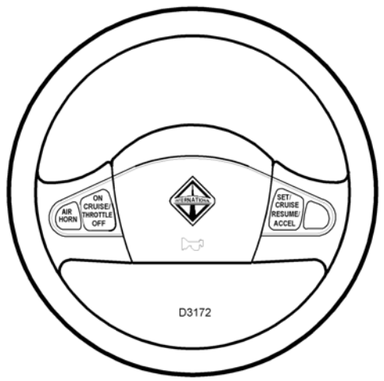

Figure F

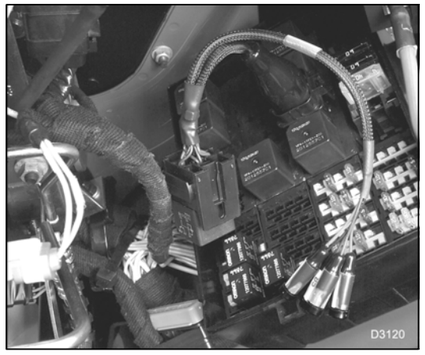

Figure G

Figure H

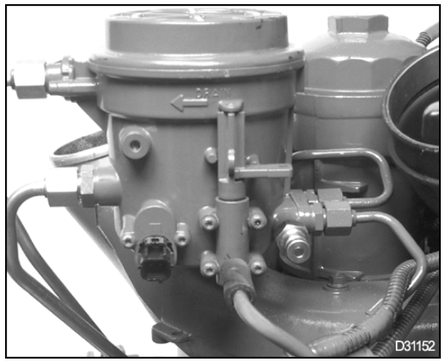

Figure J

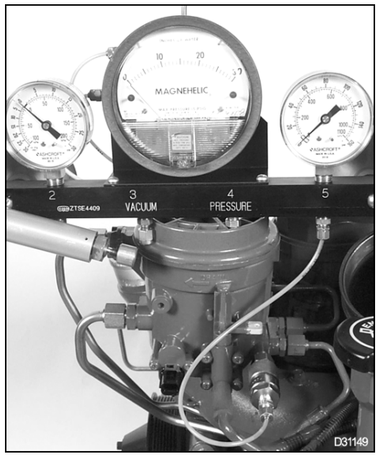

Figure K

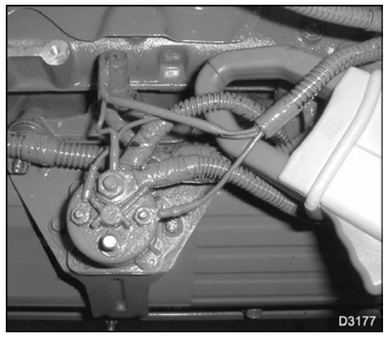

Figure L

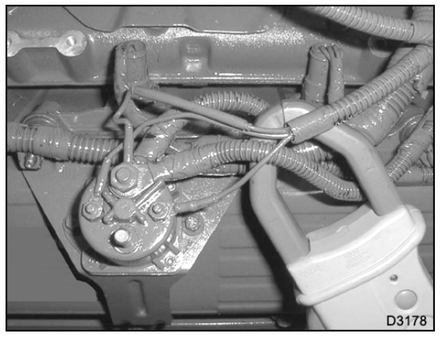

Figure M

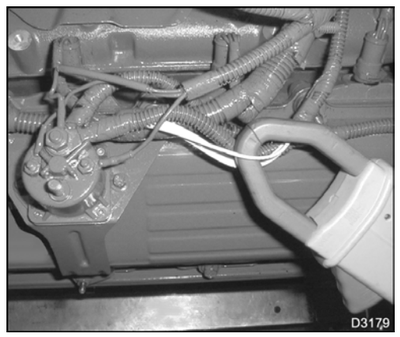

Figure N

Figure P

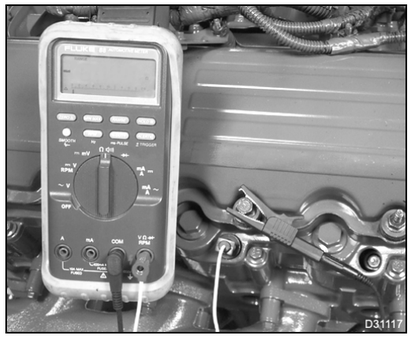

Figure R