

INTERNATIONAL®

MECHANICAL DIAGNOSTICS

DT 466E  
International 530E

Date \_\_\_\_\_ Miles \_\_\_\_\_ Hours \_\_\_\_\_ Technician \_\_\_\_\_  
Eng. SN \_\_\_\_\_ VIN \_\_\_\_\_ Unit No. \_\_\_\_\_  
Eng. HP \_\_\_\_\_ Ambient Temp. \_\_\_\_\_ Coolant Temp. \_\_\_\_\_

Injector Part No. \_\_\_\_\_ Turbocharger No. \_\_\_\_\_  
Engine Family Rating Code \_\_\_\_\_  
Complaint \_\_\_\_\_

HARD START / NO START DIAGNOSTICS

Do shaded Tests 8,10, 11, and 12 if EST is not available.

See Electronic Control System Diagnostics in manual EGES-175-1 for Diagnostic Trouble Codes (DTC's).

1. Fuel Check

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

2. Engine Systems Check

- ☐ Leaks
- ☐ Loose connections

Fuel	Oil	Coolant	Electrical	Air

3. Engine Oil Check

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

4. Intake/Exhaust Restriction Test

- ☐ Hoses and piping
- ☐ Filter minder (See Figure A on back of form).
- ☐ Intake/exhaust restriction

5. EST Diagnostic Trouble Codes (DTC's)

- ☐ Install Electronic Service Tool (EST). (See Figure B on back of form).
- ☐ Do **Test 8** if EST is not available.

Active DTC's
Inactive DTC's

6. EST Key ON Engine OFF Standard Test

- ☐ Select **Key ON Engine OFF Standard Test** from menu.

DTC's found

Correct problem causing active DTC's before continuing.

7. EST Key On Engine OFF Injector Test

- ☐ Do **Test 6** before doing the **Key ON Engine OFF Injector Test**.
- ☐ Select **Key ON Engine OFF Injector Test** from menu.

DTC's found

8. STI Button - Flash Codes

- See Figure C on back of form.
- Depress and hold Engine Diagnostics Switch and turn ignition switch ON.

DTC's found

9. EST Data List

Do **Tests 10, 11, and 12** if EST is not available.

- ☐ Enter data in the **Actual** column below.
- ☐ Monitor DATA for 20 seconds or more while cranking engine.

PID	Spec	Actual
Battery voltage	7 volts min	
Engine rpm	130 rpm min	
ICP pressure	500 psi min	

- If voltage is low, see ECM diagnostics
- If no rpm is noted check DTC's.
- If ICP pressure is low do **Test 13**.

10. ECM Voltage Test

Use a DMM to measure ICP voltage while cranking engine [min 130 rpm (26 Hz)] for 20 seconds: Do procedure 1 or 2 below.

- Connect breakout tee **ZTSE4484** between IPR valve and IPR harness connector. Check voltage between connector pin **A** and **ground**. See Figure **D** on back of form.
- Connect breakout box to vehicle harness connector on ECM. Check voltage at breakout box pins (21+ & 1-) (22+ & 2-) (41 + & 23-). See Figure **E** on back of form.

Instrument	Spec	Actual
<b>DMM</b>	7 Volts (min each pin)	

If voltage is low see ECM diagnostics.

11. Engine Cranking Test

Use a DMM to measure engine cranking speed for 20 seconds: Do procedure 1 or 2 below.

- Connect breakout tee **ZTSE4486** between CMP sensor and CMP harness connector. Check rpm or Hz between connector pin **C** and ground. See Figure **F** on back of form.
- Connect breakout box to engine harness connector on ECM. Check voltage at breakout box pins (51+ & 19-). See Figure **E** on back of form.

Instrument	Spec	Actual
<b>DMM</b>	130 rpm (26 Hz) min	
51+ & 19 -		

If rpm is not shown, recheck DTC's and do CMP diagnostics.

12. Injection Control Pressure Test

Use a DMM to measure ICP voltage while cranking engine [min 130 rpm (26 Hz)] for 20 seconds: Do procedure 1 or 2 below.

- Connect breakout tee **ZTSE4347** between ICP sensor and ICP harness connector. Check voltage between connector pin **C** and ground. See Figure **G** on back of form.
- Connect breakout box to engine harness connector on ECM. Check voltage at breakout box pins (16+ & 19-). See Figure **E** on back of form.

Instrument	Spec	Actual
<b>DMM</b>	1 Volt min	
16+ & 19 -		

If ICP pressure is low do **Test 13**.

13. Low ICP Pressure Test

- Do **this test** if ICP was low during **Test 9** or **12**.
- ☐ Remove EOT sensor, check for oil in reservoir (oil should pour out), and reinstall EOT sensor. See Figure **H** on back of form.
- ☐ Remove high pressure hose from oil manifold.
- ☐ Attach adapter **ZTSE4359** and ICP sensor to hose.
- ☐ Monitor pressure while cranking engine.

Instrument	Spec	Actual
<b>EST</b>	500 psi min	
<b>DMM</b>	1 Volt min	

- If ICP meets specs, check for high pressure oil leakage. See EGES-175-1 Section 2.
- If ICP is low check for pump rotation.
- If ICP is low replace IPR and retest.

14. Fuel Pump Presssure Test

- See Figure **J** on back of form.
- ☐ Measure pressure at bleeder valve on filter header.
- ☐ Minimum 130 rpm cranking speed for 20 seconds

Instrument	Spec	Actual
0-160 psi gauge	35 psi	

- If fuel pressure is low replace fuel filter, clean strainer, and retest.
- If fuel pressure is still low, do **Performance Diagnostics Test 3**.

PERFORMANCE DIAGNOSTICS

Do shaded test 7, if EST is not available.

- Run **Tests 1-17** with engine at operating temperature.
- See Electronic Control System Diagnostics in manual EGES-175-1 for Diagnostic Trouble Codes (DTC's).

1. Engine Oil Check

- ☐ Oil level and leaks
- ☐ Contaminated oil (fuel or coolant)
- ☐ Oil grade and viscosity
- ☐ Oil pressure

2. Fuel Pressure Test

- ☐ See Figure **J** on back of form.
- ☐ Fuel sample from tank
- ☐ Fuel contamination
- ☐ Measure fuel pressure at fuel filter bleeder.
- ☐ Measure fuel pressure at high idle.

Instrument	Spec	Actual
0-160 psi gauge	45 psi	

- If fuel pressure is low replace fuel filter, clean strainer, and retest.
- If fuel pressure is still low, do **Performance Diagnostics Test 3** below.

3. Transfer Pump Restriction Test

- Do **this test** only if fuel pressure is low. See Figure **K** on back of form.
- ☐ Measure restriction at fuel filter inlet at high idle.

Instrument	Spec	Actual
0-30 in Hg Vacuum gauge	< 8 in Hg	

- If restriction is more than 8 in Hg , check for blockage between fuel pump and tank.
- If restriction is less than 8 in Hg, see EGES-175-1 Section 2.

4. EST Diagnostic Trouble Codes (DTCs)

- ☐ Install Electronic Service Tool (EST).
- ☐ See Figure **B** on back of form.

Active DTC's
Inactive DTC's

5. EST Key ON Engine OFF Standard Test

- ☐ Select **Key ON Engine OFF Standard Test** from menu.

DTC's found

Correct problem causing active DTCs before continuing.

6. EST Key ON Engine OFF Injector Test

- ☐ **Test 5** must be done before doing this test. Select **Key ON Engine OFF InjectorTest** from menu.

DTC's found

7. STI Button - Flash Codes

See Figure C on back of form.

- Depress and hold Engine Diagnostics Switch and turn ignition switch ON.

DTC's found

8. Intake Restriction Test

See Figure **L** on back of form.

- ☐ Measure restriction at high idle and no load.

Instrument	Spec	Actual
Manometer or Magnehelic gauge	12.5 in H <sub>2</sub> O	

9. EST Key ON Engine Running Standard Test

Note: Engine must be above 160 °F.

- ☐ Select **Key ON Engine Running Standard Test** from menu.

DTC's found

10. EST Key On Engine Running Injector Test

Note: Engine must be above 160 °F.

- ☐ **Test 9** must be done before doing this test.

**NOTE:** Engine will run rough during this test.

DTCs found

11. Fuel Pressure Test (Full Load)

See Figure J on back of form.

- ☐ Measure fuel pressure at fuel filter bleeder.
- ☐ Check fuel pressure at full load, rated speed, and peak torque.

Instrument	Spec	Actual
0-160 psi gauge	45 psi	

- If fuel pressure is low, replace fuel filter, clean fuel strainer, and retest.
- If pressure is still low do **Test 3**.

12. ICP Pressure Test

- ☐ Monitor ICP and engine rpm. Use EST data list or breakout tee and DMM. See figure **G** on back of form.
- ☐ See EGES-175-1 for specifications.

PID	Spec	Actual
Low idle	psi/volts	
High idle	psi/volts	
Full load	psi/volts	

- If ICP is low or unstable, disconnect ICP sensor and retest.
- If problem is solved see ICP diagnostics.
- If still slow or unstable replace IPR and retest.

13. Boost Pressure Test (Full Load)

- ☐ Monitor boost pressure and engine rpm with EST in data list. See Figure **M** on back of form.
- ☐ Use dash tach, 0-30 psi gauge, breakout tee, and DMM if EST is not available.
- ☐ See EGES-175-1 for performance specifications.

Test	Spec psi @ rpm	Actual
Peak HP		
Peak Torque		

14. Crankcase Pressure Test

- ☐ Measure pressure at road draft tube with restriction tool **ZTSE4039**. See Figure **N** on back of form.
- ☐ Measure at high idle, **NO LOAD**.

Instrument	Spec	Actual
Manometer or Magnehelic gauge	< 6 in H <sub>2</sub> O	

STOP

If **Tests 1-14** meet specifications, engine operation is good: **Tests 15-17** are not necessary.

15. Wastegate Actuator Test

- ☐ Apply regulated air to actuator.
- ☐ Check for leakage and actuator travel.

Instrument	Spec	Actual
0 to 60 psi	28 ± 2 psi	

16. Exhaust Restriction Test

- ☐ Inspect exhaust system.
- ☐ Check restriction (3-6 in) after turbocharger.
- ☐ Measure restriction at full load and rated speed.

Instrument	Spec	Actual
Manometer or Magnehelic gauge	0-33 in H <sub>2</sub> O	

17. Valve Clearance Test

- ☐ Test with Engine OFF: Hot or cold.

Instrument	Spec	Actual
Feeler gauge	0.025 in	



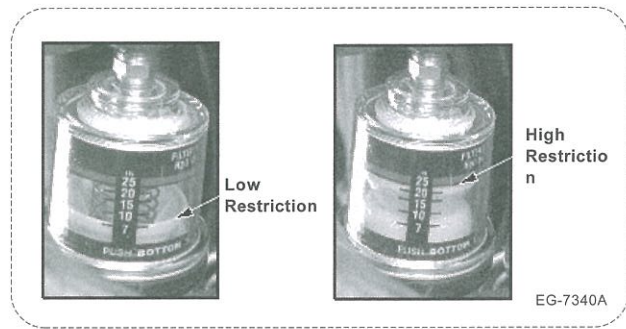


Figure A

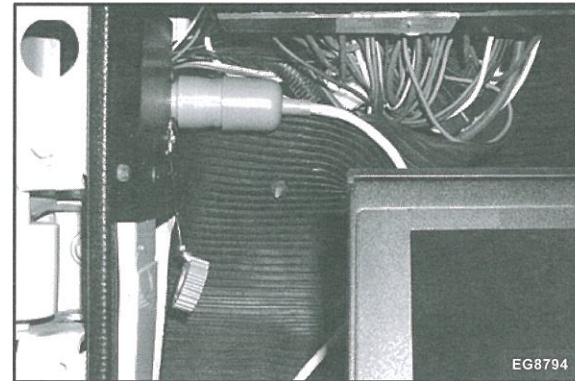


Figure B

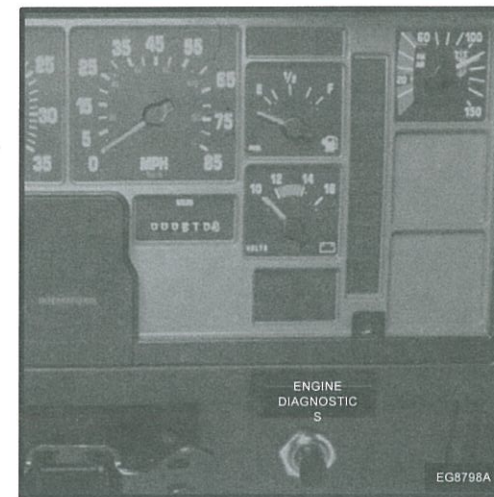


Figure C

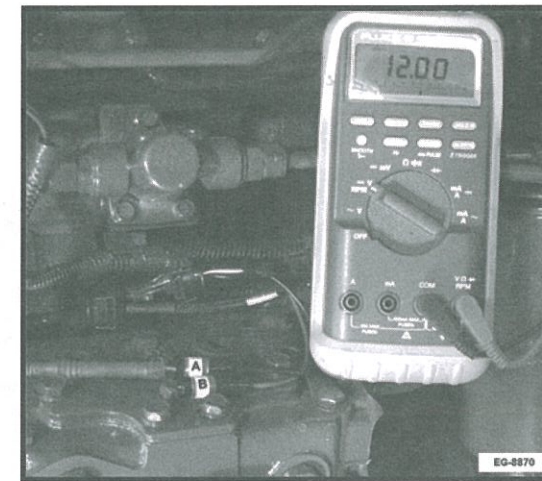


Figure D

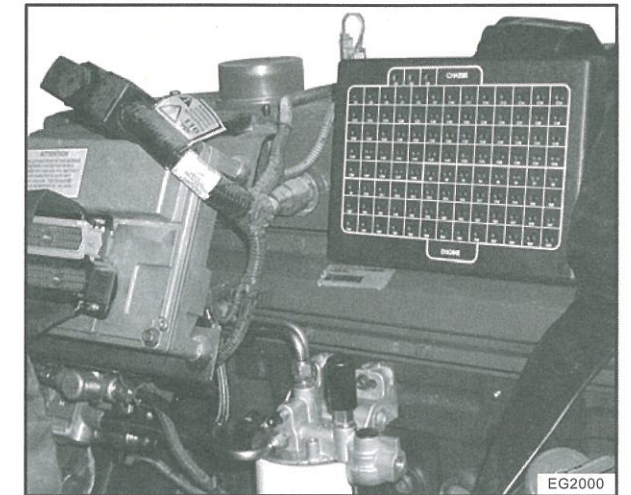


Figure E



Figure F

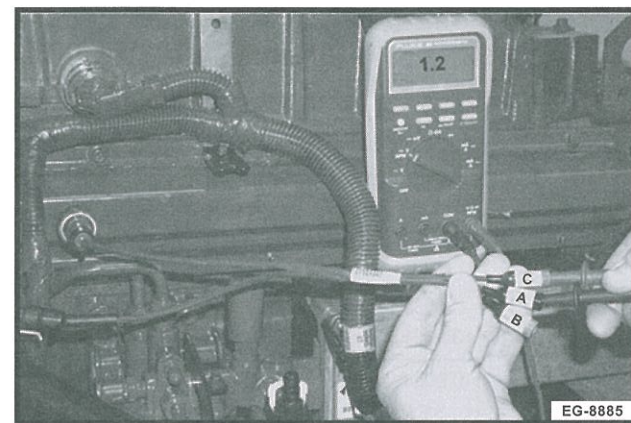


Figure G

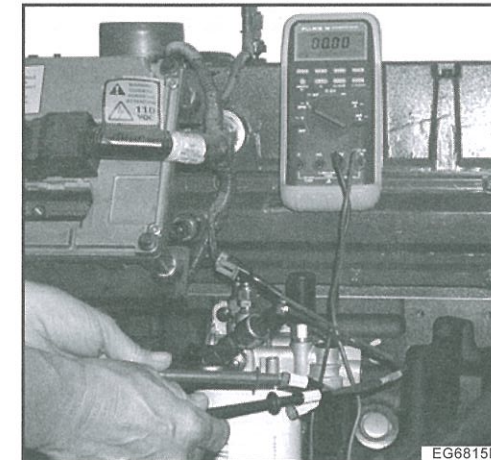
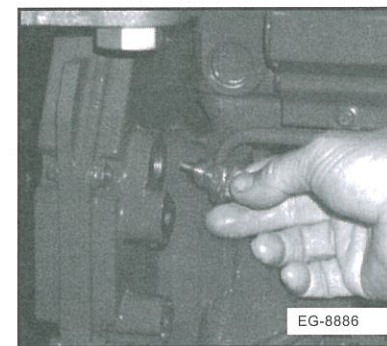


Figure H

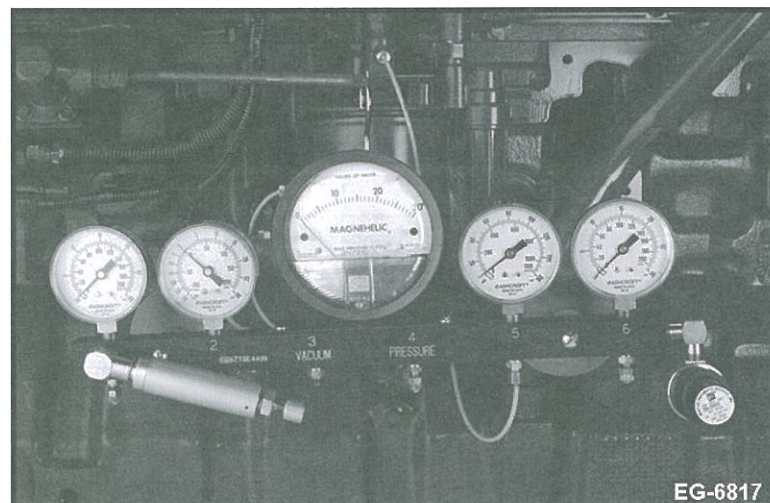
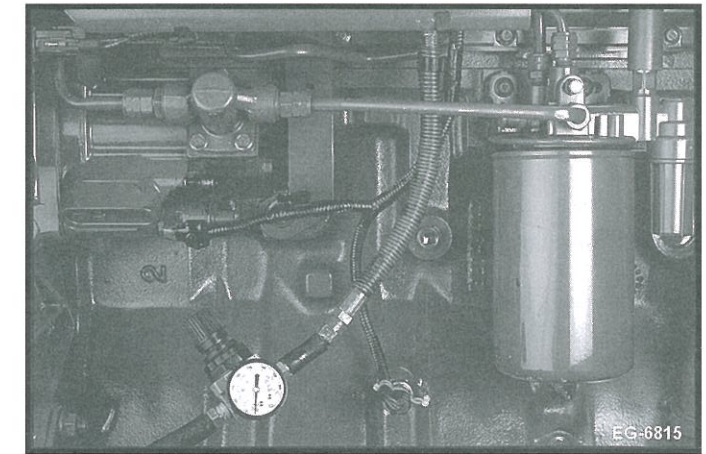


Figure J

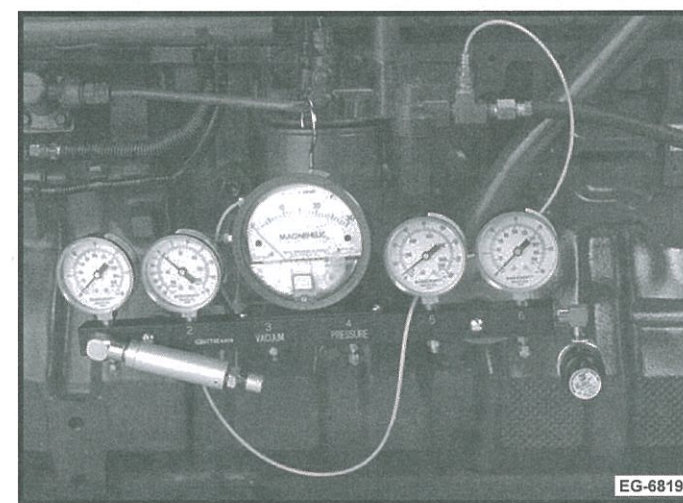


Figure K

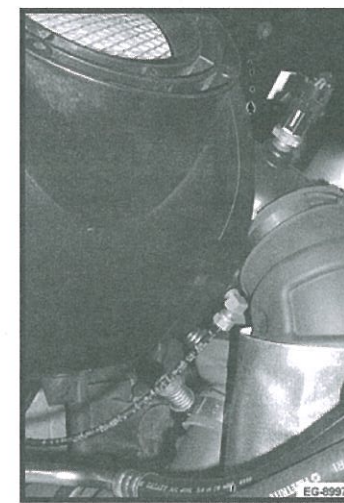


Figure L

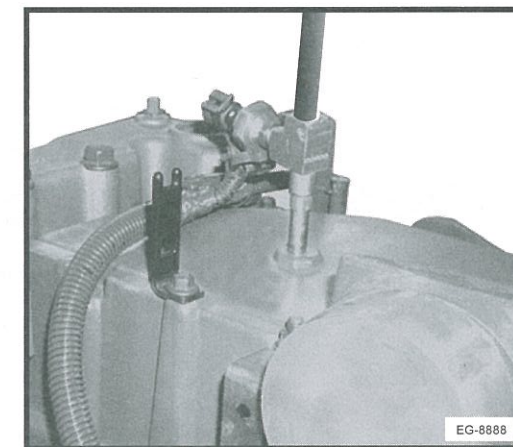


Figure M

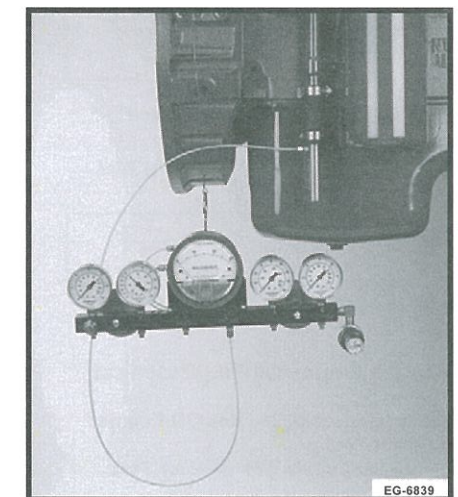


Figure N