MAXXFORCE
INTERNATIONAL DIESEL POWER™

Performance Diagnostics

International® MaxxForce® DT, 9, and 10
2007 through 2009 Model Years

Technician _____ Miles _____ Transmission:
Date _____ Hours _____ Manual ____ Auto ____
Unit No. _____ EFRC _____ Build date _____

Ambient temperature _____ Engine SN _____ ECM Calibration _____
Coolant temperature _____ Engine HP _____ Turbocharger _____
Complaint _____ VIN _____

⚠ WARNING

To prevent personal injury or death, read all safety instructions in the "Safety Information" section of International MaxxForce DT, 9, and 10 *Engine Diagnostics Manual* EGES-370-1 before doing procedures on this form.

Header Information and Specifications

1. If instrument panel warning lamp is illuminated, do DTCs and ECM Calibration test. Record any active DTCs related to complaint. Return to Visual Inspection. Continue with remaining tests, noting DTCs.
2. Look up the VIN on ISIS for build date, engine hp, engine serial number, ECM calibration, and transmission.
3. See Performance Specifications for EFRC, injector number, and turbocharger number.
4. Use Performance Specifications to fill in the specifications needed for some tests.
5. See "Performance Diagnostics" in EGES-370-1. Use figures and additional information to do each test or procedure.
6. Do all tests in sequence unless directed otherwise. It is not necessary to complete the rest of the form after the problem has been found and corrected.

1. Visual Inspection

☐ Check all fluid levels.
☐ Inspect electrical harness and connections.
☐ Inspect air filter minder.
☐ Inspect for obvious exhaust damage.

Fuel	Oil	Coolant	Electrical	Air

Note: Engine will not start if the IPR valve, CMP, or CKP sensor is disconnected.

2.1 Fuel Quality

☐ Take a fuel sample from filter housing drain port.

Comments

- If fuel is contaminated with water, icing, gasoline, kerosene, etc., clean fuel system as necessary to remove all contaminates.
- If fuel is clean, do Fuel Pressure and Aeration test.

Note: If engine was run out of fuel, ensure the system is primed.

2.2 Fuel Pressure and Aeration

☐ Connect fuel gauge to fuel pressure test port on intake manifold.
☐ Start engine, measure fuel pressure with shut-off valve closed, open shut-off valve to check for aeration.

Pressure	Spec	Low idle	High idle
0-160 psi gauge			
Is fuel aerated?			

- If pressure is high and pulsating, see Combustion Leaks to Fuel in Section 4 of EGES-370-1.
- If fuel is aerated, check for leaks in suction side to the pump.
- If pressure is below specification and not aerated, replace filter and test again.
- If pressure is still below specification after changing filter, do Fuel Inlet Restriction test.

2.3 Fuel Inlet Restriction

Note: Test is only valid if engine starts and achieves high idle.
☐ Connect 0-30 in-Hg vacuum gauge and fuel inlet restriction adaptor to fuel strainer housing.
☐ Start engine and accelerate to high idle.

Restriction	Specification	Actual
0-30 in Hg vac gauge		

- If restriction is above specification, check lines between tank and pump for blockage.
- If fuel pressure is low and not restricted, inspect and clean regulator valve. Test again.
- If fuel pressure is still low after cleaning regulator, replace fuel pump.

3. Sensor Compare

☐ Open Vin plus session with EST.
☐ Verify pressure sensors are within specification.
☐ Verify EOT and ECT are within 8 °C (15 °F) of each other.
☐ Verify accelerator pedal travels from 0% to 100%.

Sensor	Spec.	actual	Sensor	Spec	actual
ECT			EBP		
EOT			EOP		
MAT			EGDP		
ICP			EGT1		
BAP			EGT2		
MAP			EGT3		

If any results are out of specification, see EGES 370-1 Section 7.

4. DTCs and ECM Calibration

☐ Open VIN session with EST. (Verify ECM software matches vehicle.)

Active DTCs	InActive DTCs

- If ECM software does not match, reprogram the ECM.
- If any DTCs are set, correct fault before continuing.

5. KOEO Standard Test

☐ Use EST to run KOEO Standard Test.

DTCs

If any DTCs are set, correct fault code before continuing.

6. EGR Valve and ITV Operation

☐ Turn the ignition switch to ON. (Do not start engine)
☐ Run KOEO Output State Low and High tests.

PID	Specification	Actual
EGR (close position)	0 to 5 %	
EGR (open position)	95 to 100 %	
ITV (close position)	0 to 5 %	
ITV (open position)	45 to 55 %	

If out of specification, see ITV or EGR in Section 7 of EGES-370-1.

7. KOEO Injector Test

☐ Use EST to run KOEO Injector Test.

DTCs

If any DTCs are set, correct fault before continuing.

8. KOER Standard Test

☐ Use EST to run KOER Standard Test.

Active DTCs

If any DTCs are set, correct fault before continuing.

9.1 Air Management Test

☐ Use EST to run Air Management Test.

DTCs

If any DTCs are set, correct fault before continuing.

9.2 VGT Test

☐ Use EST to toggle turbocharger operation and monitor EBP and MAP.

Did EBP and MAP change for transition?	Yes	No
Low to medium		
Medium to high		
High to low		
Low to high		

- If no change was monitored during transition, then go to VGT Actuator Linkage Test.
- If change was seen during transition, then go to Torque Converter Stall test.

9.3 VGT Actuator Linkage Test

☐ Turn ignition switch to ON.
☐ Monitor VGT linkage movement.
Note: Linkage should have full range of upward and downward movement. A short pause should be noticed before completing full upward motion.
- If no problems are detected, continue on.
- If a problem is detected, correct problem and retest.

☐ Turn ignition switch to OFF.
☐ Manually move the VGT linkage through a full range of movement.
- If no problems are detected, continue to next test.
- If a problem is detected, correct problem and retest.

10. Torque Converter Stall (Automatic only)

☐ Set parking brake and apply service brake.
☐ Put transmission in drive.
☐ Push accelerator to the floor, no longer then 5 seconds. Monitor the time it takes to get to maximum rpm.
☐ Record rpm and time.

Condition	Specification	Actual
Stall rpm		
Time (Idle to stall in seconds)		

- If minimum rpm is reached within specified time for a launch concern, **do not continue with Performance Diagnostics tests**.
- If rpm is low or was not reached within specified time, continue

11. Road Test (Full load, rated speed)

☐ Connect fuel gauge to fuel filter housing test port.
☐ Open Performance session using EST.
☐ Verify coolant temperature is above 70 °C (158 °F).
☐ Run engine at full load, rated speed.
☐ Record snapshot during road test. Playback snapshot and record data taken at 100% load at rated speed.

Measurement	Specification	Actual
Engine load	100%	
RPM		
MAP		
EBP		
ICP		
Fuel pressure		

- If MAP and EBP are above specification, a biased BARO sensor or failed turbocharger are suspect.
- If EBP is above specification and MAP is below specification, check for exhaust restriction.
- If ICP can not achieve minimum, check ICP system.
- If fuel pressure falls below specification, replace fuel filter and clean strainer. Test again.

12. Injector Disable

☐ Use EST to run injector disable diagnostics to identify suspect cylinders.

Selected Cylinder	EOT	Average Fuel Rate	Deviation	Average Engine Load	Deviation
Baseline					
1					
2					
3					
4					
5					
6					
Cut-off values:		Fuel rate		Engine load	

If any cylinder is suspect, do Relative Compression test.

13. Relative Compression

☐ Turn ignition switch to ON.
☐ Use EST to run Relative Compression Test.
☐ Crank engine following EST instructions.

Relative Compression Test	Value
Cylinder 1 Relative Compression	
Cylinder 2 Relative Compression	
Cylinder 3 Relative Compression	
Cylinder 4 Relative Compression	
Cylinder 5 Relative Compression	
Cylinder 6 Relative Compression	

- If a Relative Compression Test and Injector Disable Test identify a suspect cylinder, check for a mechanical problem.
- If a Relative Compression Test does not identify a suspect cylinder, but the Injector Disable Test does, replace suspect injector.

14. Crankcase Pressure

Note: Engine coolant temperature must be above 70 °C (158 °F).
☐ Measure at left valve cover with crankcase pressure test adapter.
☐ Measure at high idle and no load.

Restrictor Tool	Specification	Actual
0-30 in Hg vac gauge		

(Continue to Side 2)

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15. Intake Restriction

☐ Check hoses and piping for damage or incorrect fit.
☐ Measure restriction at high idle, no load.

Restriction	Specification	Actual
0-30 in Hg vac gauge	12.5 in H_20	

16. Exhaust Restriction

☐ Inspect exhaust system.
☐ Disconnect EGR valve.
☐ Use EST to monitor EBP at high idle and no load.

Pressure	Specification	Actual
EBP PID		

- If pressure is above specification, remove turbo outlet exhaust pipe and test again.
- If pressure is good with pipe removed, correct problem from turbocharger to tail pipe.
- If EBP is still high with turbo outlet exhaust pipe removed, repair or replace turbocharger.

17. Injection Control Pressure

☐ Use EST to monitor ICP and engine speed.

Condition	Specification	Actual
KOEO		
Low idle		
High idle (initial)		
High idle (after 2 min.)		
Is oil aerated after 2 minutes?		

- If ICP is high or unstable, hold at high idle for 2 minutes. Return to low idle, take oil sample, check for foam, and correct condition if oil is aerated.
- If oil is not aerated, disconnect ICP sensor and check for engine stability.
- If problem is corrected, see ICP Sensor - Operational Diagnostics in EGES 370-1 Section 7 for voltages.
- If ICP is still high or unstable, replace IPR and test again.

18. Valve Lash and Engine Brake Lash

☐ Valve lash and engine brake actuator lash
Engine OFF: Cold

Instrument	Specification	Actual
Feeler gauge	0.019 in	