



Isolated Actuator Test

- ☐ Using Pressure Test Kit air regulator, connect regulated air directly to turbocharger wastegate actuator.
- ☐ Apply 21.5 psi of regulated air pressure and measure wastegate actuator rod movement.

Actuator Rod Movement	Specification 0.5 in.	Actual
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- If actuator rod moves and stops within specification, repair leaking supply line and/or leaking solenoid.
- If actuator rod does not move, proceed to next step.
- ☐ Remove actuator rod from turbocharger wastegate arm, following procedures in *Engine Service Manual*.
- ☐ Attempt to move wastegate valve by hand.
- If wastegate valve moves freely, replace turbocharger wastegate actuator.
- If wastegate valve does not move freely, replace turbocharger.

12. Crankcase Oil Breather Separator Test

- Note: Ensure engine temperature is above 70°C (158°F) and oil level is in specification.
- ☐ Start engine. Place the Ultrasonic Ear near Oil Separator housing.
  - ☐ Shut off engine and quickly monitor for centrifugal noise. Note: Centrifuge will continue spinning for about 15 seconds after engine is shut off.
  - If centrifuge noise is not heard, go to *Engine Service Manual* for removal and replacement procedures.

13. Crankcase Pressure Test

- Note: Ensure engine temperature is above 70°C (158°F) and oil level is in specification.
- ☐ Disconnect breather outlet tube at crankcase breather.
  - ☐ Block off breather outlet tube using standard shop bolt.
  - ☐ Connect Crankcase Pressure Test Tool to breather elbow.
  - ☐ Connect Manometer to Crankcase Pressure Test Adapter.
  - ☐ Start engine and press accelerator pedal fully to floor.
  - ☐ Record crankcase pressure.

Manometer	Specification	Actual
Crankcase Pressure	< 6 in. H <sub>2</sub> O	

- If pressure is above specification, go to the next step to pinpoint suspect cylinder.
- If pressure is within specification, repair or replace air compressor. See *Engine Service Manual* for removal and replacement procedures.

14. Relative Compression Test

- Note: Use a battery charger when performing this test. It is important that cranking rpm remains consistent throughout test.
- ☐ Turn ignition key ON, engine OFF.
  - ☐ Use ServiceMaxx™ software to run Relative Compression Test.
  - ☐ Follow on-screen instructions.

	Speed Difference
Cylinder 1	rpm
Cylinder 2	rpm
Cylinder 3	rpm
Cylinder 4	rpm
Cylinder 5	rpm
Cylinder 6	rpm

- If Speed Difference for one cylinder is significantly lower than others, that cylinder is suspect for compression loss.

15. Cylinder Cutout Test

- Note: Verify Fuel System pressure is not below specification, fuel is not aerated, and fuel grade meets specification, before running this test.
- ☐ Use ServiceMaxx™ software, to run Cylinder Cut Out Test.
  - ☐ Follow on-screen instructions.

	Fuel Rate 1	Fuel Rate 2	Fuel Rate 3	Fuel Rate Avg
Cyl 1	gal/hr			
Cyl 2	gal/hr			
Cyl 3	gal/hr			
Cyl 4	gal/hr			
Cyl 5	gal/hr			
Cyl 6	gal/hr			

- If Cylinder Cutout Test does not identify a suspect cylinder, no action is required.
- If Cylinder Cutout Test identifies a suspect cylinder and Relative Compression Test does not, replace failed Injector. See injector replacement in *Engine Service Manual*.

16. Road Test (Full load, rated speed)

- ☐ Connect Fuel Pressure Gauge to intake manifold test port and secure gauge in a safe visible location.
- ☐ Use ServiceMaxx™ software to load Performance session.
- ☐ Start engine. Find an open stretch of road. Start recording. When driving conditions are safe, select a suitable gear, press accelerator pedal fully to floor, and accelerate to rated speed at 100% load.
- ☐ When road test is complete, stop recording.
- ☐ Review recorded results at 100% engine load at rated speed.

Gauge	Engine @ rated speed and 100% load	Actual
Fuel Delivery Pressure	85 psi	
Injection Control Pressure	4500 psi	
Exhaust Back Pressure		
Intake Manifold Pressure		

- If FDP is below specification, see Fuel System in Hard Start and No Start Diagnostics.
- If engine does not accelerate smoothly or feels unbalanced, perform Fuel Aeration Check, Relative Compression Test, and Cylinder Cut Out Test.
- If ICP is below specification, go to ICP System Test in Performance Diagnostics section.
- If EBP is above specification, remove turbocharger intake tube and inspect for turbocharger damage.