

APTB 05/14

SUBJECT: High–Pressure Oil System Leak Test

October 7, 2014

The majority of Alliant Power **AP63661** Remanufactured High–Pressure Oil Pumps (HPOP) returned for warranty consideration are found to be in good working condition with no faults detected. Properly troubleshooting injection control pressure (ICP) related issues and diagnosing the high–pressure oil system is very critical. Never replace the HPOP until all high–pressure oil system leaks have been repaired and the high–pressure oil system is retested. Listed below are the tools required and recommended procedure for properly testing Ford 6.0 L, Navistar VT275, and Navistar VT365 engine high–pressure oil systems.

Tools Required:

- Ford IDS, equivalent scan tool, or **AP0068** IPR 2 Wire Pigtail
- High–Pressure Pump Test Adapter found in **AP0037** Pressure Test Kit
- Shop air supply with 100 psi minimum
- Open Tube Stethoscope (to aid in hearing small air leaks)

Recommended Procedure:

- Verify correct engine oil level and base engine oil pressure.
- If engine will start, warm engine until engine oil temperature (EOT) is greater than 176° F (80° C).

Note: *Higher engine oil temperatures are more effective for diagnosing high–pressure oil system leaks.*

- On most applications, remove the ICP sensor and install test adaptor fitting from **AP0037** kit. On some other applications (Ford E Series) it is easier to remove the test port plug on the top of the high–pressure oil pump and install adaptor fitting at this location.
- Pressurize the high–pressure oil system with at least 100 psi of shop air pressure.
- Allow oil to drain through the injection pressure regulating (IPR) valve for at least two minutes. An air leak should be heard at the IPR drain location.
- An air leak at the IPR drain of the HPOP with the IPR duty cycle at 0% or no voltage applied is normal. See image at right of HPOP for drain location.
- If using Ford IDS or equivalent scan tool, close the IPR valve by increasing the IPR duty cycle to 85%. Listen for air noise change.
- If using **AP0068** IPR 2 Wire Pigtail, apply 12 volts and ground directly to IPR valve to close it. Listen for air noise change.
- If no air noise change is heard the IPR valve may not be functioning as commanded. Carry out IPR valve diagnostics. If air noise change is heard continue testing.
- Remove oil filler cap from passenger side valve cover and crankcase ventilation tube from driver side valve cover and listen for air leaks. Remove valve cover from side of engine that a leak can be heard.



- Cycle IPR off and on to help isolate the location of the leak. Use an open tube stethoscope if needed to aid in hearing small air leaks.
- Air leaks heard from underneath valve cover could be present at injector oil inlet seals (Figure 1), oil rail outlet fitting seals (Figure 2), oil rail front port plug seals (Figure 3), or stand pipe seals (Figure 4).

Note: Some slight air leakage around injector oil exhaust ports is normal.

- If an air noise change is heard at the back of the engine a leak at the branch tube assembly Snap-To-Connect (STC) fitting is suspect. See image below of the old and new STC fitting. Old fitting has a high rate of failure.



- It is possible to have the HPOP leak high pressure into the low pressure side internally within the pump. To verify this leak remove oil filter cap and filter then listen for air leak/gurgle with air pressure applied. If a leak from the high-pressure system to the low-pressure system is found, the HPOP must be replaced.
- After completing all repairs verify correct ICP sensor readings and IPR duty cycle while cranking the engine.
- If still needed, verify the high-pressure oil system integrity by repressurizing the system and listening again for any remaining leaks when cycling the IPR valve.

Note: The replacement parts may leak if all the surfaces are not oil saturated under system pressure and the seals are not correctly seated during installation.

Refer to Alliant Power Diagnostic Guide link for further diagnostic and testing information at:

<http://alliantpower.com/dealers-only/diagnostic-guides/disclaimer>

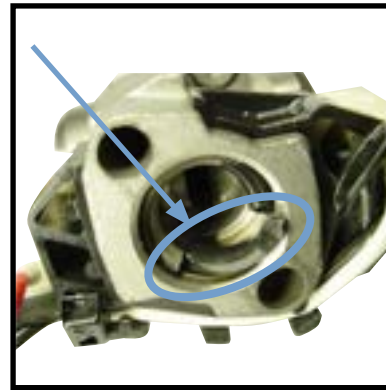


Figure 1

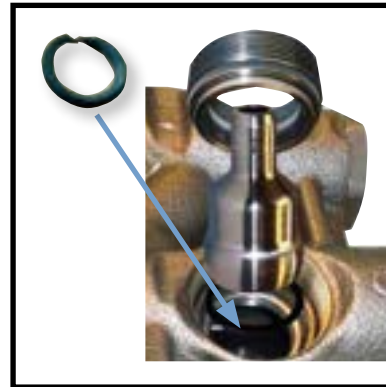


Figure 2



Figure 3

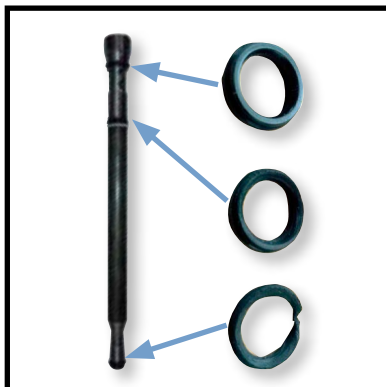


Figure 4