



OBSOLETE PERFORMANCE ASSEMBLY SOLUTIONS

Work Instruction
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Operation Number: 50 Description: Top End Assembly Instructions	Prepared By: Quality Approved by: Manufacturing
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Title: Cylinders, Cylinder Heads and Piston Assembly	

CYLINDER, CYLINDER HEAD AND PISTON ASSEMBLY

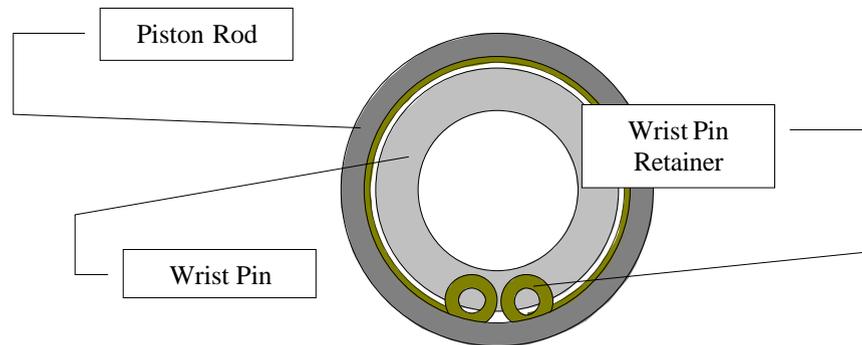
PRIOR TO ASSEMBLY, inspect cylinders and heads for bent and damaged fins, porosity and voids on fins and inside heads' combustion chambers, missing paint, etc.

1. Install two small hollow dowels (PN01-063) into the dowel holes.
2. Ensure that the router reflects adequate cure time for the thread lock. (Six Hours Minimum.)
3. Install the Cylinder Base Gasket(s), Part #(s) 01-268/Front and 01-269/Rear, over the cylinder studs and the dowel pins.
4. Remove two (2) Piston Assemblies (PN01-110) from their boxes and inspect for damage such as broken rings, scratches etc.
5. Oil the wrist pins and connecting rods bearing surfaces and piston assembly, including the rings, skirts, etc., with 20w50 motor oil.
6. Install the piston with the *notched skirt facing the middle of the engine*. Some pistons will have an arrow noting the direction they should be installed. **DOUBLE CHECK!** The wrist pin should slide through the connecting rod with little or no resistance.
7. Insert Wrist Pin Keeper (PIA PN01-110) into the piston wrist pin retainer groove using snap ring pliers. (Refer to Figure 1 for subinstructions regarding this procedure.)



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8. Make certain that both of the wrist pin retainers are secured in the grooves, with the chamfered side in and the eyelets clocked at either noon or six o'clock plus or minus 30°. Update the assembly paperwork.
 9. Clean cylinders (PN01-125 Front and PN01-126 Rear) with citrus oil based parts cleaner thoroughly with a cloth. Use a clean cloth for each cylinder.
 10. Lubricate the inside surface of each cylinder.
 11. Compress the piston rings using the hand ring compressor.
 12. Holding the sprocket shaft socket, secure the crankshaft during the cylinder installation.
- “This step requires some technique.”*
13. Carefully push the cylinder over the studs and piston. With a quick, deliberate movement, push the cylinder completely over the piston and its' rings. Be sure not to damage the rings during this process.
 14. Remove the ring compressor.
 15. Push the cylinder all the way down onto the cylinder deck, ensuring that it seals against the cylinder base gasket.
 16. Repeat steps 12, and 13-18 for the opposite cylinder.
 17. Holding the tops of the cylinders down so they cannot travel, rotate the crankshaft to ensure there is no interference, and that the rings have been seated



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properly. There will be a visible witness mark in the cylinder wall—this is normal.

18. Rotate the crankshaft until the pistons both reach their lowest point. Wipe the cylinders clean and free of any debris that may have been lifted up during rotation.
19. Select a front and a rear cylinder head (PN01-01-143 Front and PN01-146 Rear). They are differentiated by a physical marking. “F” for front and “R” for rear.
20. Place four (4) hollow dowel pins (PN01-061), two (2) in the top of each cylinder.
21. Install one (1) cylinder gasket (PN01-268 Front and PN01-269 Rear) on each of the two cylinders, making certain that the “fire ring” is facing up.
22. Ensure Cylinder Heads were leak tested and place the cylinder heads on the cylinders; check to see that the gasket surfaces are sealed and the cylinders are seated properly. Fill out appropriate portions of the Assembly paperwork.
23. Apply a small drop of oil to each of the head bolts internally threaded ends and the bolt seat surfaces of each.
24. Install two (2) each of the long (PN01-170) and two each of the short (PN01-171) head bolts on each of the two cylinder heads. Short bolts go in the low side of the head. Long in the high side.
25. Torque to 5 ft lbs., then 14 ft lbs and 90° in the order shown in Figure 2 below.
26. Repeat steps 22 thru 25 for the remaining cylinder head.
27. Break all cylinder head bolts loose so that there is no torque applied. (Zero Torque)
28. Repeat step 25 for each cylinder head following the cross-pattern illustrated below.



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29. Complete all relative portions of the Assembly Traveler.

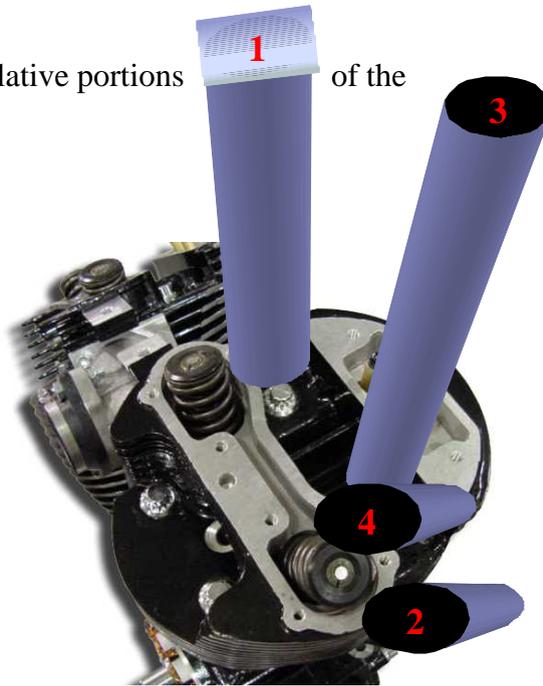


Figure 2