

A EN 201 - Agricultural Power Units

Small Engine Reassembly

Objectives:

The Student Will Be Able To:

1. Describe considerations of small gas engine assembly;
2. Reassemble the small gas engine;
3. Demonstrate the ability to correctly reset all air gaps, torque specifications, and other measurements;
4. Justify the need for any repairs or adjustments made; and
5. Start and Run their engine after re-assembly.

Required Reading For Quiz:

1. This laboratory chapter

I. Introduction:

Reassembling your small gas engine will basically be a reverse process of disassembly. However, there are a few extra considerations. These considerations include repairs, air gap measurements, torque measurements, and completing the job correctly. As stated in Chapter 8, speed is not to be the prime directive during this lab. Good workmanship should be the goal. Good workmanship includes; careful accurate work, not having left-over parts, and engine operation when the job is finished.

II. Reassembly Procedure: (*Add pre-service lubricating grease to all internal parts.)

1. Install the Crankshaft

Reminder: Tapered end to the front of the engine.

2. Reassemble the Piston Rings and Connecting Rod, (See Figure, 5.1-5.4).

Reminder: The rings must be replaced correctly. Review your sketch of connecting rod and piston ring orientation.

3. Install the Piston and Connecting Rod in the Cylinder, (See Figure, 5.5-5.7).

Reminder: Use piston ring compressor. Clean and coat cylinder wall with lube. Use the handle of a mallet to gently tap the piston into the cylinder. Be sure not to force the connecting rod against the crankshaft. Install the piston & rod in the correct orientation.

4. Replace Connecting Rod Cap, (See Figure, 5.7 and 5.8).

Reminder: Lubricate interior of rod cap and connecting rod. Replace cap and rod in the correct direction. Replace oil splash and rod cap lock. Torque screws properly.

5. Replace Tappets

6. Replace Cam Gear (See Figure, 5.9)

Reminder: Make sure journal is secure. Line up timing marks.

7. Install Crankcase Cover (See Figure, 5.10)

Reminder: Use correct gasket. Tighten bolts in correct sequence. Replace oil seal if needed. Adjust end play if needed.

8. Measure Tappet Clearance

NOTE: Measure tappet clearance as explained in Laboratory IV and return to the Chapter 9 measurement sheets to record your measurements. If adjustments need to be made, make them and continue on. *Check with the lab instructor if adjustments are required.

9. Install the Valve Springs and Retainers

Reminder: Use valve spring compressor tool. The heavier gauge or taller spring goes to the exhaust valve.

10. Replace Valve Cover Plate

Reminder: The plate has a gasket.

11. Install the Armature and Governor Blade

Reminder: Don't forget to connect the kill wire to carburetor. 5hp models do not have a vane governor. Carburetor & governor linkage will be installed in step number 22.

***Note: If engine is equipped with Magnatron® Ignition System, disregard steps 12-14. If not, refer back to your disassembly sketch.**

12. Replace Plunger, (See Figure, 5.11).

Reminder: Notch side up.

13. Install Breaker Points and Condenser, then set air gap

Reminder: Set air gap with points fully open.

14. Replace Breaker Point and Condenser Cover

15. Install Flywheel and Flywheel Key

Reminder: Remove any oxidation from the key, key way, and/or flywheel magnets.

16. Replace Washer, Starter Clutch, & Flywheel Screen -OR- Flywheel Screen, Bell Housing, & Crankshaft Nut

Reminder: Washer convex side up. Torque properly. Add a few drops of oil to the oil port on starter clutch, if ease of movement is poor. Some models are not equipped with a washer.

17. Adjust Armature Air Gap, (See Figure, 5.12).

Reminder: Check specifications or use a business card as a short cut.

18. Check for "Spark"

19. Replace Cylinder Head, Head Gasket, and Corresponding Parts, (See Figure, 5.13).

Reminder: Return head bolts to their proper holes and tighten in the correct sequence. Torque properly. Don't forget shield.

20. Replace Spark Plug

Reminder: Set air gap

21. Replace Muffler

Reminder: Use proper gasket, if applicable. Steps 21 & 22 may be interchangeable.

22. Replace Carburetor, Gas Tank, and Linkage

Reminder: Refer to your drawing. Don't forget gasket.

23. Replace Blower Housing

24. Replace Serviced Air Cleaner

25. Fill Crankcase with fresh Oil

26. Fill Tank 1/3 Full of Gas

27. Start and Run Engine

Reminder: Only while instructor is present. Use engine stand and vice.

28. Adjust Carburetor, if necessary

Reminder: Ask for assistance.

29. Empty Gas Tank

30. Empty Oil Into Original Oil Container

31. Return the Engine to Storage and Clean your Area, Tools, & Tub.

32. Check Your Toolbox Inventory with the Instructor for a Grade and Overall Grading.

Reassembly Specifications & Illustrations:

Torque:

Connecting Rod Cap: 100 inlbs.

Crankcase Cover : 85 inlbs.

Starter Clutch: 55 ftlbs.

Head Bolts: 140 inlbs.

Air Gaps:

Tappet:

Intake: .005"-.007"

Exhaust: .009"-.011"

Breaker Points: .020"

Armature Gap: .006"-.010"

Spark Plug: .030"

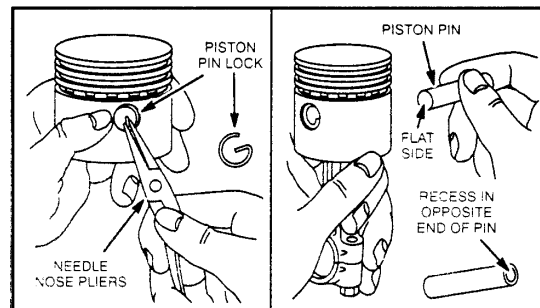


Fig. 5.1, Reassembling the Piston Pin
Courtesy of Briggs & Stratton Corp.

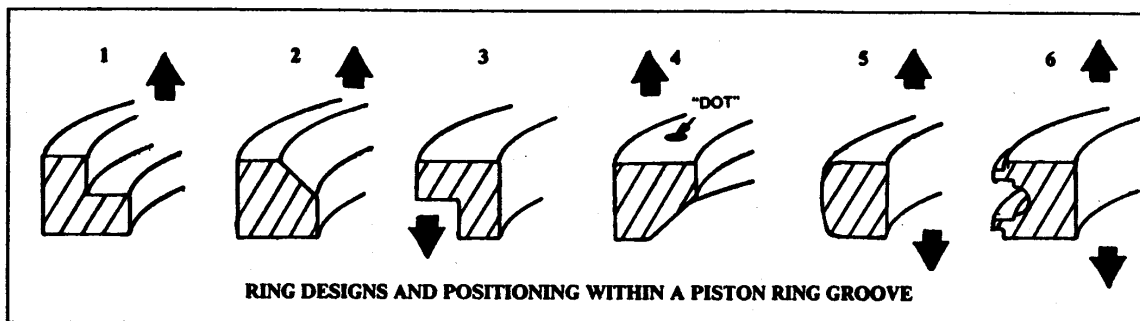


Fig. 5.2, Piston Ring Positions

Piston rings are different by physical appearance. The design of each ring may vary according to the ring's function or the design used by the ring's manufacturer. To correctly install the rings, use the above illustration as a guide. Those rings which have an inside bevel or step (rings 1 and 2) are installed with the inside bevel or step toward the top of the piston. Those rings that have an outside step (ring 3) are installed with the step down. Piston rings with an embossed "dot" (ring 4) are installed with the dot toward the top of the piston. All oil rings without a step or inside bevel (rings 5 and 6) can be installed in either direction.

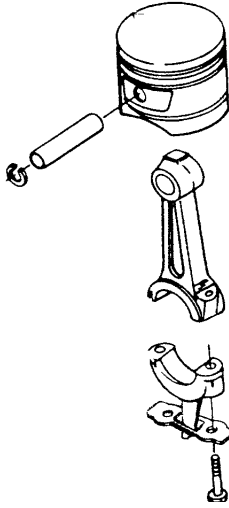


Fig. 5.3, Piston Assembly

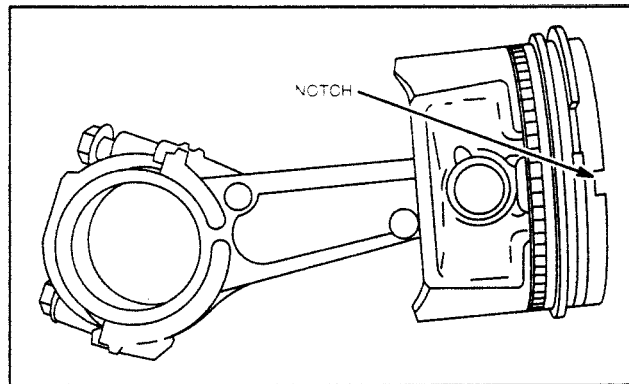


Fig. 5.4, Correctly Assembled Piston
Courtesy of Briggs & Stratton Corp.

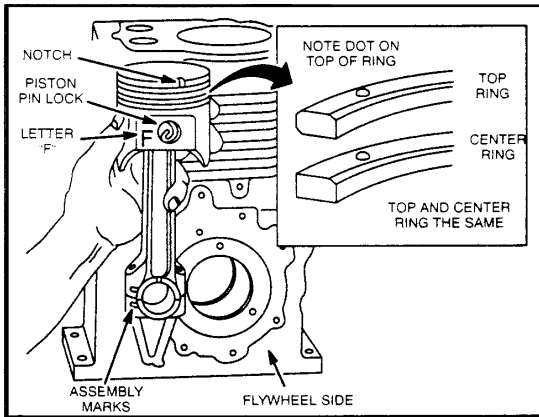


Fig. 5.5, Installing the Piston Correctly
Courtesy of Briggs & Stratton Corp.

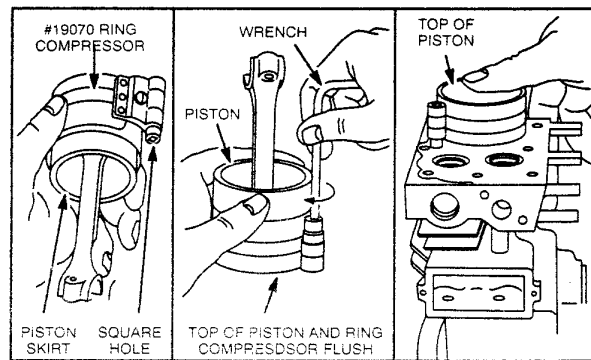


Fig. 5.6, Using the Piston Ring Compressor
Courtesy of Briggs & Stratton Corp.

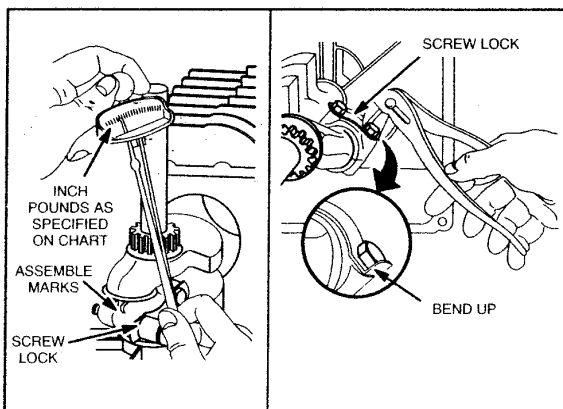


Fig. 5.7, Attaching the Connecting Rod to the Crankshaft
Courtesy of Briggs & Stratton Corp.

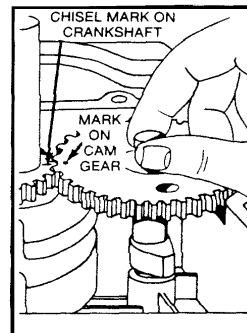


Fig. 5.9, Aligning Timing Marks
Courtesy of Briggs & Stratton Corp.

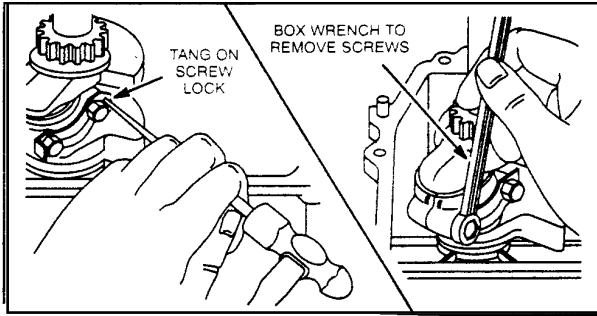


Fig. 5.8, Assembling the Connecting Rod Cap
 Courtesy of Briggs & Stratton Corp.

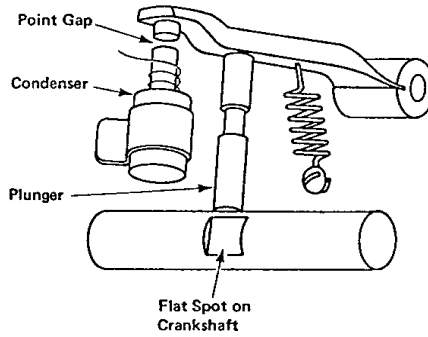


Fig. 5.11, Assembling Breaker Points and Condenser

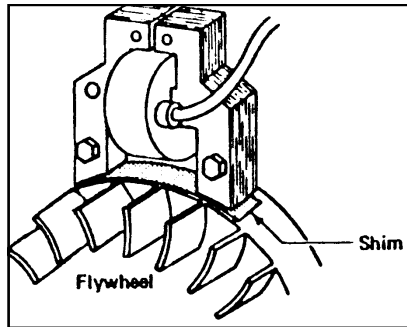


Fig. 5.12, Setting Armature Air Gap
 Courtesy of Briggs & Stratton Corp.

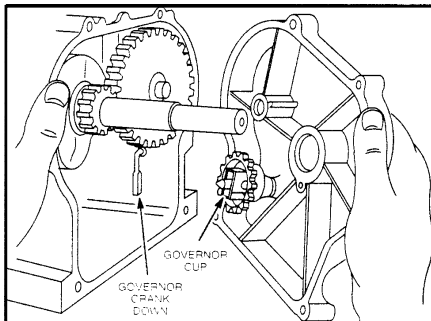


Fig. 5.10, Replacing Crankcase Cover
 Courtesy of Briggs & Stratton Corp.

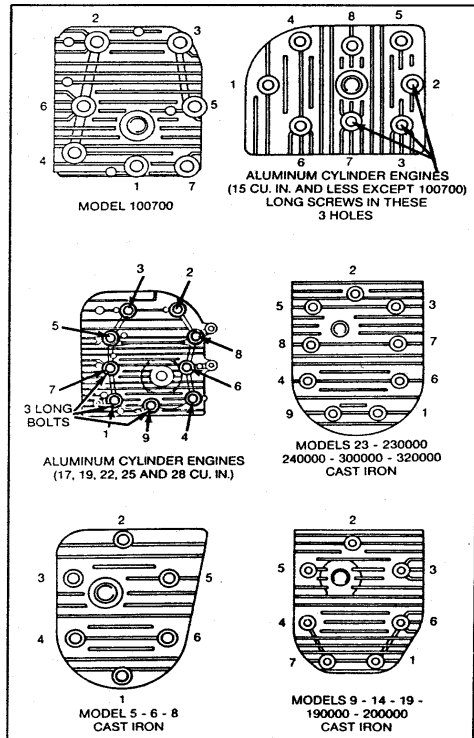


Fig. 5.13, Torque Patterns for Cylinder Head Bolts
 Courtesy of Briggs & Stratton Corp.



Notes:

