

ROTOR REMOVAL – GAS CSV

These Instructions Applicable to All Gas Engine Powered Chipper-Shredder-Vacs

Depending on the materials you process through your chipper, their moisture content, the climate you live in, and many other factors you may have difficulty removing the rotor from the engine shaft. The following procedure is a simple, relatively inexpensive, and effective way for the average homeowner to remedy the situation.

Required Tools:

7/16” wrench to remove shredder hopper hardware

1/2” wrench to remove chipper cone and fan housing

9/16” wrench to remove rotor bolt (CSV-3090H requires 5/8” wrench)

3/4” wrench

3/8” variable speed drill

*15/32” drill bit (make sure bit has stepped down shaft for 3/8” drill)

*1/2”-20NF plug style hand tap

*Adjustable tap wrench (does not need to be fancy or expensive)

Motor oil, cutting fluid, 3-in-1 oil or some other lubricant to use with drill bits

1/8” allen wrench to remove bearing lock collar

5/32” allen wrench to remove shredder hopper hardware

*3/8” split ring lock washer for reinstallation of rotor bolt (CSV-3090H requires 7/16” split ring lock washer)

*1/4”-20 nylon insert lock nuts (2 required for replacement of shredder hopper hardware)

*1/2”-20 x 1 1/2” hex head cap screw, grade 8

*5/16”-24 x 4 1/2” hex head cap screw, grade 8

Hacksaw or other tool to cut head off of 5/16” cap screw

*1 oz. tube of anti-seize compound

Magnetized screwdriver (preferably Phillips head with 6” long shaft)

Safety goggles or glasses (**WEAR AS APPROPRIATE THROUGHOUT PROCEDURE**)

** The asterisk identifies items that we anticipate you'll need to purchase. All items are readily available in most hardware stores or home improvement centers.*

Procedure:

1. Remove the spark plug wire from the spark plug and position the unit so that it is in a stable position for you to work on the rotor. This procedure assumes that you have the instruction manual that was originally provided with the equipment to explain basic disassembly of the unit.



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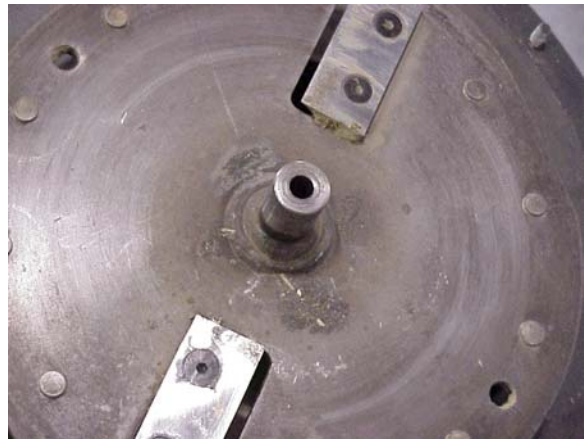
2. You may have already completed the next few steps in determining that this procedure is required. Remove chipper cone, discharge deflector, bearing lock collar, bearing, front hopper hardware, and fan housing to expose rotor.



3. Place an object, such as the 2" x 2" board shown, down through the opening at the bottom of the shredder hopper. Wedge the object between the rotor's hub and one of the y-hammer shafts. This will help prevent the rotor from spinning during the rest of this procedure.



4. Remove the rotor bolt by turning it counterclockwise. The bolt was tightened to 45 ft-lbs (67 ft-lbs for the CSV-3090H) at the factory so do not be alarmed by the amount of torque required to loosen the bolt. Remove the bolt and split ring lock washer. Discard the split ring lock washer. Fill the hole that passes down the center of the rotor shaft, shown at right, with motor oil, cutting fluid, 3-in-1 oil or some other lubricant.



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5. Place 15/32” drill bit in 3/8” variable speed drill. We fully realize that a 29/64” drill bit is the recommended size drill bit for a 1/2”-20NF tap. However, these instructions are intended to be practical and it is likely to be difficult and expensive to find a 29/64” bit that will fit a 3/8” variable speed drill. Carefully begin to drill down through the hole that passes through the center of the rotor shaft. Do your best to keep the drill bit aligned with the centerline of the hole. For best results, run the drill slowly at 400 to 600 rpm and lubricate the hole frequently. Do not force the bit down the hole or it will bind up and stop the drill. If this happens, simply reverse the drill momentarily to free the bit. Reverse the drill again so that the bit turns in a clockwise direction, get the drill bit up to speed and ease it back down into the hole. Patience and persistence is the key to successfully drilling this hole. Drill down 2” to 2 1/2” from the end of the rotor shaft. This is more than sufficient to thread the hole. If you drill down deeper, you run the risk of damaging the engine shaft.



6. Use a magnetized screwdriver to remove the metal shavings from the hole. A Phillips head screwdriver with 6” long shaft works well for this. This is a tedious task but is important to ensure that the engine shaft does not become damaged later in this procedure. Once the metal shavings are removed, refill the hole with motor oil, cutting fluid, 3-in-1 oil or some other lubricant.



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7. Insert the 1/2"-20NF plug style hand tap wrench and carefully start the tap in the hole. It is not difficult but it is critical that you take the time to get the tap started straight down the hole. If you start the tap in the hole significantly crooked you will ruin the end of the hole and possibly break the tap. Taps are made of hardened steel and are very difficult to remove. If you do break off the tap, it needs to be rotated counterclockwise to remove it from the rotor shaft.



8. If properly started and well lubricated, it will be quite easy to tap the hole. Continue turning the tap into the hole until the thread cutting portion of the tap is completely into the hole as shown in the picture. Remove the tap from the hole by turning it counterclockwise.



9. Once again, use a magnetized screwdriver to remove the metal shavings from the hole. A Phillips head screwdriver with 6" long shaft works well for this. This is a tedious task but is important to ensure that the engine shaft does not become damaged later in this procedure.



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10. Remove the head from the 5/16"-24 hex head cap screw, grade 8, so that the remaining shaft is 4 1/2" long as shown in the picture.



11. Insert the threaded end of the screw shaft from step 10 into the hole in the rotor shaft. Allow the shaft to drop to the bottom of the hole.



12. Use a screwdriver to gently press on the end of the screw shaft to make sure that it is seated completely at the bottom of the engine shaft. The top of the screw shaft should be approximately 1/2" below the end of the rotor shaft as shown in the picture. If necessary, remove the screw shaft and cut it slightly to obtain a minimum distance of 1/2" from the top of the screw shaft to the end of the rotor shaft.



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13. Apply a generous coating of anti-seize compound to the threads of the 1/2"-20 x 1 1/2" hex head cap screw, grade 8, and install the cap screw in the end of the rotor shaft. The anti-seize compound will make it easier to turn the cap screw and will also prevent it from becoming stuck in the rotor shaft. Begin turning the cap screw by hand until it contacts the screw shaft that you placed in the hole.



14. Carefully begin to turn the cap screw with a 3/4" wrench. If you have to apply 35 to 45 ft-lbs and cannot get the rotor to move, there is most likely some sort of interference. Always check to see if any of the y-hammers are or will catch on the centerplate as shown in the top picture. If a y-hammer is going to catch on the centerplate, stop turning the cap screw and rotate the y-hammer out of the way as depicted in the picture below. Once you are certain that the y-hammers are clear of the centerplate, continue to remove the rotor by turning the cap screw with the 3/4" wrench. After about an inch of travel, the head of the cap screw will be touching the top of the rotor shaft. The rotor should be freed up enough so that you can pull it off by hand. If this is not the case, make sure that you do not have a y-hammer caught on the centerplate or some other interference and contact Patriot at 1-800-798-2447 before proceeding.



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15. Once the rotor is removed, remove the 5/16" screw shaft from the engine shaft and clean out the grinder housing. Remove the 1/2" cap screw from the rotor shaft and keep both the 1/2" cap screw and the 5/16" screw shaft for future use.



16. Clean up the engine shaft and apply a generous coating of anti-seize compound to all surfaces prior to reinstalling the rotor.



17. Reassemble the unit per the instructions located in the instruction manual that was originally provided with the unit.

The split ring lock washer for the rotor bolt and the lock nuts for the front hopper hardware should be replaced with new components so that they function properly.

Replace the spark plug wire and the unit should be ready for use.