

WARNING

Serious personal-injury to the operator or bystanders, as well as damage to equipment or property, can occur, if all safety and assembly instructions, provided with this product, are not followed.

You **MUST** read, understand, and comply with all of the safety, assembly, and operating instructions in this manual, **BEFORE** you attempt to operate your chipper-shredder-vac.

Maintenance Instructions

Chipper-Knife Removal And Installation

Your Patriot Electric Chipper-Shredder-Vac (CSV) has one (1) chipper-knife, that spins past the end of the chipper-cone, to chip up rigid materials, such as branches.

Patriot's chipper-knives are made of high-quality tool-grade steel, selected for its toughness, and are heat-treated for wear-resistance. However, the process of chipping rigid materials will dull the knife, requiring it to be removed for sharpening or replacement.

The design of your Patriot Electric Chipper-Shredder-Vac (CSV) allows for easy access to the chipper-knife, **without** completely disassembling the machine. The process is very easy and straight-forward, and can be completed by the average person.

*Note: Patriot recommends that you sharpen the chipper knife every six (6) to eight (8) hours of **actual chipping time**. This time may need to be reduced for harder materials or extended for softer materials. Sharpening the knife when it is just losing its edge makes it easier to sharpen and removes less material from the knife which ultimately makes your knife last longer.*

Tools – Required

The following tools are required to properly complete the chipper-knife removal process:

- [] 1/2" combination-wrench
- [] Pick (or similar tool), to clean-out the head of the knife screws
- [] 3/16" long-arm Allen-wrench (provided with unit & knife kit)

Always use the proper hand-tools for assembly. Personal-injury can result through the use of the improper type-or-size of tool, as well as while using a worn-or-damaged tool, that may slip off of hardware being tightened.

In addition, improper tools may damage hardware, making it difficult or impossible to properly tighten the hardware. Finally, damaged hardware will discourage timely-and-proper maintenance, which could lead to serious personal-injury or property-damage.

Common examples of improper assembly tools are: adjustable open-end wrenches and toothed gripping-pliers.

Maintenance Instructions (continued)

Chipper-Knife Removal And Installation (continued)

Tools – Recommended

The following tools are recommended to properly complete the chipper-knife removal process:

- [] Work-gloves
- [] Torque-wrench (5 – 30 ft-lb range)
- [] 1/2" socket for torque-wrench
- [] 3/16" hex (Allen) bit socket for torque-wrench
- [] 7/8" combination-wrench
- [] Anti-seize compound

Removal Procedure

1. Identify a ground-level work-area, where the chipper-shredder can be handled comfortably. The area should have a hard level-surface.

2. Using a 1/2" wrench, remove all three (3) of the 5/16" serrated flange-nuts that hold the chipper-cone assembly onto the chipper, as shown.

3. Remove the chipper-cone assembly, to expose the oval-shaped opening in the chipper-shredder's fan-housing, as shown.

Note: The chipper-knife may or may not be visible in the opening, once the chipper-cone assembly is removed. Either situation is perfectly acceptable, because safely getting the chipper-knife into the opening will be addressed in the next step.

WARNING

MOVING PARTS HAZARD

Serious personal-injury can occur, if you come into contact with the chipper-shredder's moving parts.

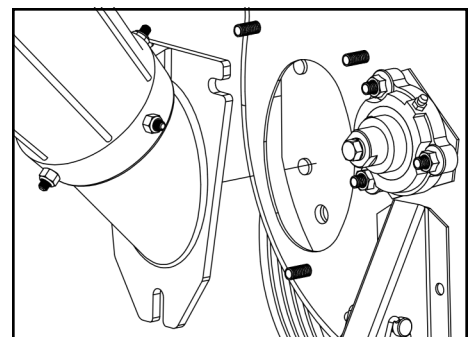
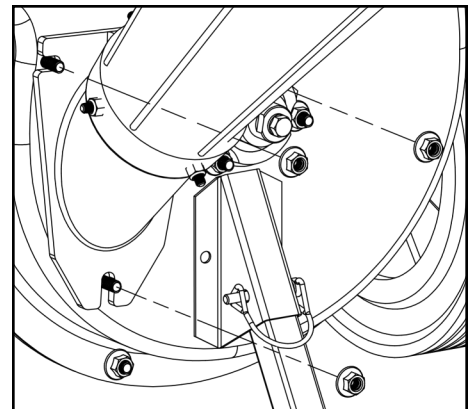
Turn off the motor, disconnect the electrical-cord, and wait for the rotor to come to a complete stop, before attempting to service the chipper-shredder.

CAUTION

LACERATION HAZARD

The chipper-knife is sharp.

Do not reach into the oval-shaped opening, next to the bearing, except to physically remove the chipper-knife. Do not touch the long sharpened-edge of the knife, even if you think it's dull.

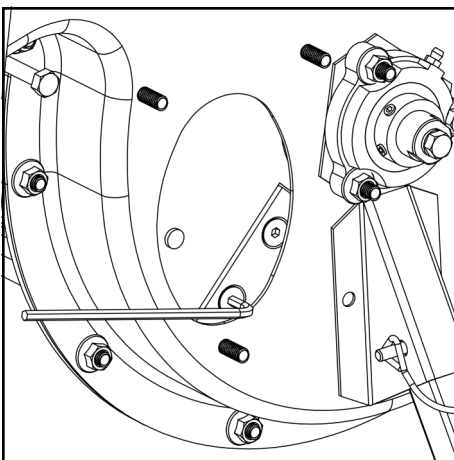
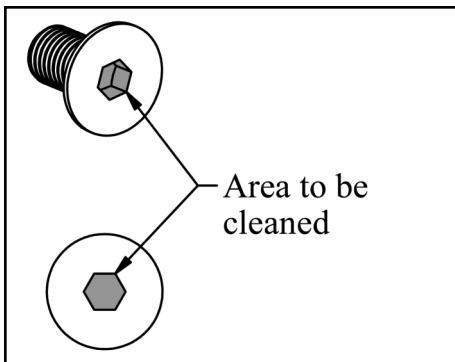
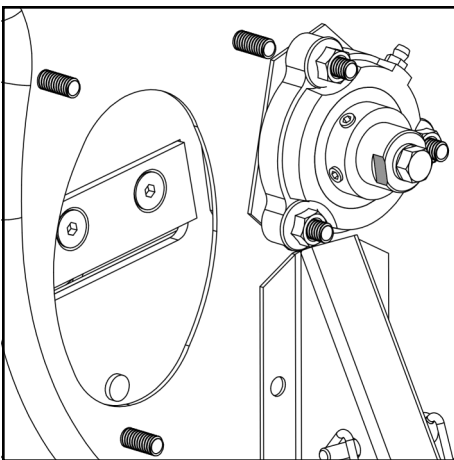


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Maintenance Instructions (continued)

Chipper-Knife Removal And Installation (continued)

Removal Procedure (continued)

4. Two flat-surfaces have been machined into the end of the rotor-shaft, which comes through the bearing; see grayed surface in the illustration for location. We recommend using a 7/8" wrench to slowly rotate this shaft, in a clockwise direction, until the chipper-knife is visible in the oval-shaped opening, as shown.

Note: The rotor-shaft of the electric chipper-shredder can typically be turned with your fingers, the use of a wrench simply provides additional leverage and safety. While the rotor can be turned in either direction, we recommend rotating in the clockwise direction, so that the dull-edge of the knife enters the opening first, to reduce the risk of injury.

5. Use a pick (or similar tool) to thoroughly clean-out the center, see the grayed surface in the illustration for location, of both of the knife screws.

We cannot emphasize enough that, this is the most important step in ensuring successful removal and reinstallation of the chipper-knife.

Failure to thoroughly clean-out the center of the knife screws could result in damage to either screw's head; which may require extreme-measures to remove the damaged screw.

6. Fully insert the short leg of the 3/16" long-arm Allen-wrench into the head of the outermost screw, as shown.

Note: The torque applied to the Allen-wrench, to loosen the screw, will rotate the rotor. The wrench will likely contact the edge of the oval-shaped opening, as shown. There is no need to try to prevent this.

Loosen, but **do not** remove, the outermost screw.

Maintenance Instructions (continued)

Chipper-Knife Removal And Installation (continued)

Removal Procedure (continued)

7. Fully insert the short leg of the 3/16" long-arm Allen-wrench into the head of the innermost screw, as shown.

Loosen, but **do not** remove, the innermost screw.

8. Fully insert the long leg of the 3/16" long-arm Allen-wrench into the head of the outermost screw. Slowly remove the screw, being careful not to let it fall into the chipper-shredder.

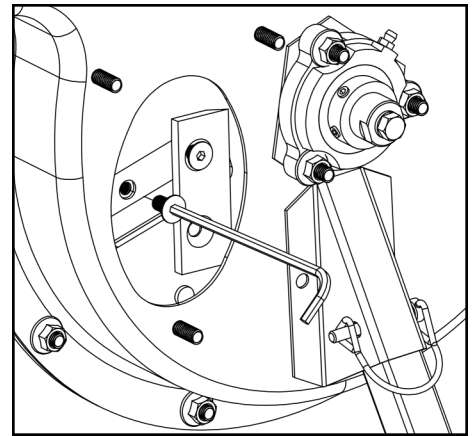
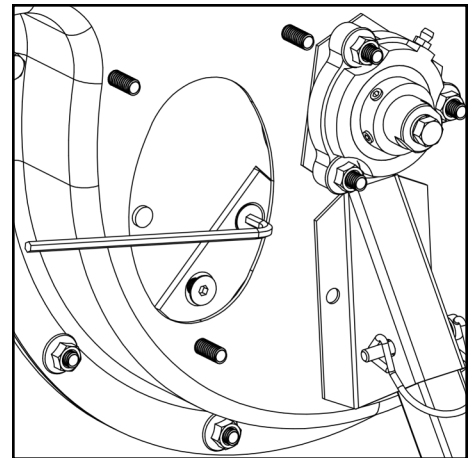
Note: The weight of the knife will cause the outer end of the knife to swing down, once the outermost screw is removed. There is no need to try to prevent this. The knife may not move as much as shown, depending on how much you loosened the innermost screw and how much buildup is on the face of the rotor.

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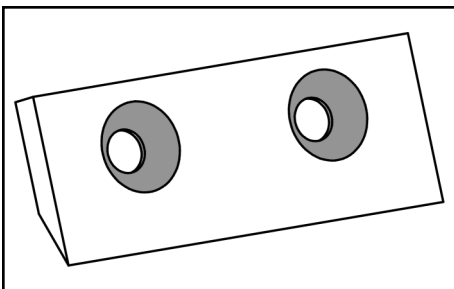
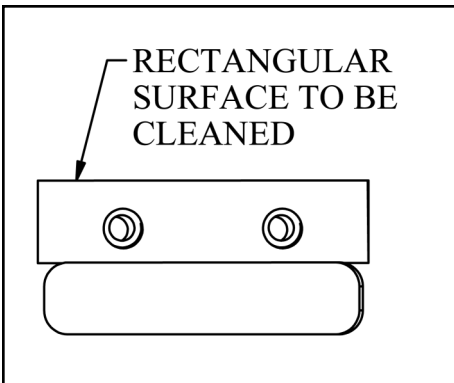
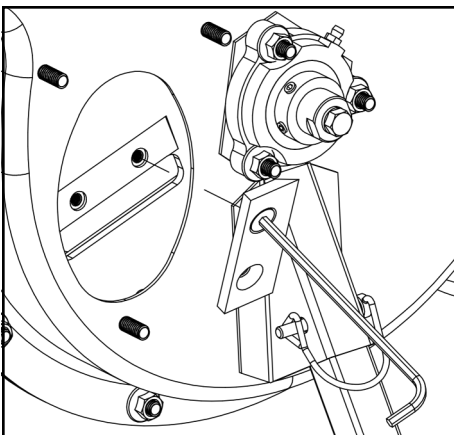


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Maintenance Instructions (continued)

Chipper-Knife Removal And Installation (continued)

Removal Procedure (continued)

9. Fully insert the long leg of the 3/16" long-arm Allen-wrench into the head of the innermost screw. As you slowly remove the screw, **lightly** push the screw, back against the rotor. Once you feel that the screw is no longer attached to the rotor, slightly twist the outer-end of the Allen-wrench downward, so that you can carefully remove the chipper-knife, screw, and wrench **together**, as shown.

Installation Procedure

1. Make sure the surface of the rotor, where the knife is attached, is clean. Debris caught between the knife and the rotor, when the knife screws are tightened, can cause stress in the knife, even when the chipper is not being used.
2. Before you install the chipper-knife, apply a thin coating of anti-seize compound to the two (2) screw holes, see the grayed surfaces in the illustration for location. The anti-seize compound will make it easier to remove the chipper-knife screws in the future.

Maintenance Instructions (continued)

Chipper-Knife Removal And Installation (continued)

Installation Procedure (continued)

3. Attaching the knife to the rotor is a very similar process, primarily in the way that the Allen-wrench was used, to that of removing the innermost screw and chipper-knife. Place one of the chipper-knife screws onto the long leg of the 3/16" long-arm Allen-wrench and then insert the screw into the innermost hole in the chipper-knife, as shown. Slowly move the chipper-knife, screw, and wrench **together**, into the oval-shaped opening; **loosely** tighten the screw to the corresponding mounting hole in the rotor, as shown.
4. Place one (1) of the chipper-knife screws onto the long leg of the 3/16" long-arm Allen-wrench and then carefully insert the screw into the outermost hole, in the chipper-knife, as shown. Once the screw is in the hole, slowly use the Allen-wrench to rotate both the screw and chipper-knife, aligning both with the corresponding mounting-hole in the rotor; loosely tighten the screw.
5. Fully insert the short leg of the 3/16" long-arm Allen-wrench into the head of the outermost screw, as shown.

Note: The torque, applied to the Allen-wrench to tighten the screw, will rotate the rotor. The wrench will likely contact the edge of the oval-shaped opening, as shown. There is no need to try to prevent this.

Securely tighten the outermost screw.

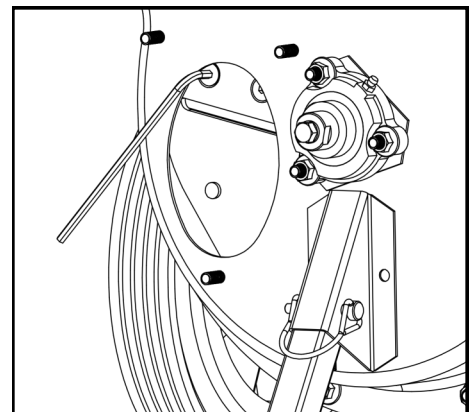
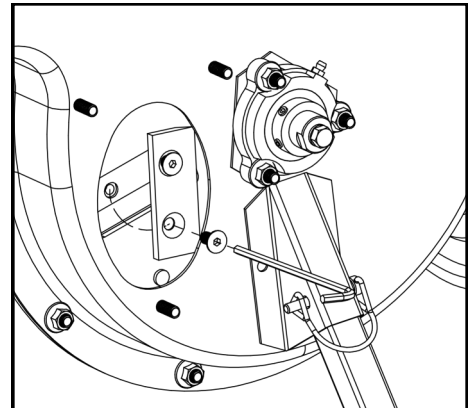
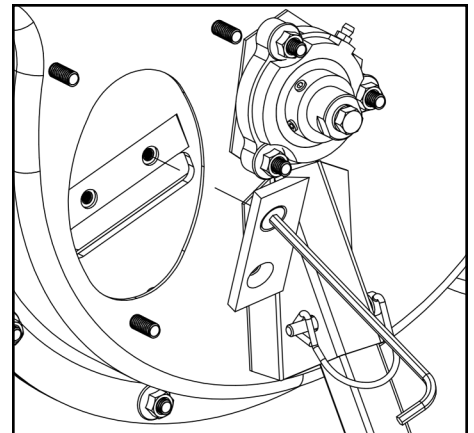
Recommended torque: 14 - 16 ft-lb

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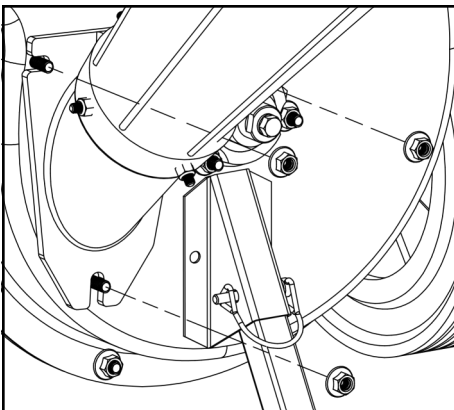
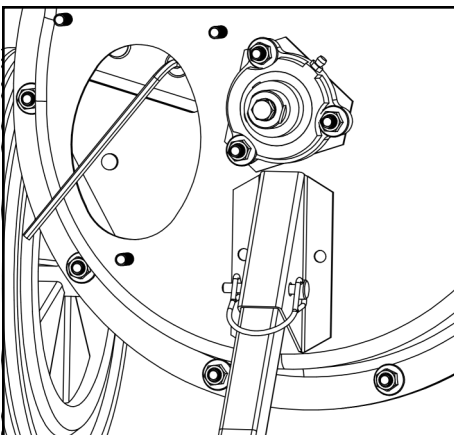


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Maintenance Instructions (continued)

Chipper-Knife Removal And Installation (continued)

Installation Procedure (continued)

6. Fully insert the short leg of the 3/16" long-arm Allen-wrench into the head of the innermost screw. Securely tighten the innermost screw.

Recommended torque: 14 - 16 ft-lb

7. Position the chipper-cone assembly in the oval-shaped opening, in the chipper-shredder's fan-housing, as shown. Place one (1) of the 5/16" serrated flange-nuts on each of the three (3) studs, projecting through the flange of the chipper-cone casting, and hand tighten.

*Note: It is important that you understand that cast parts, such as the chipper-cone casting, have slightly sloped faces to accommodate manufacturing. **DO NOT OVERTIGHTEN** the nuts trying to eliminate gaps between the casting and the fan-housing! Overtightening can distort the fan-housing or break the studs.*

Finish by securely tightening each of the three (3) nuts, with a 1/2" wrench.

Recommended torque: 14 - 16 ft-lb

Maintenance Instructions (continued)

Chipper-Knife Removal And Installation (continued)

Installation Procedure (continued)

8. **CONGRATULATIONS! You have completed the reassembly of your Patriot chipper-shredder.**

