Form No. 3358–368 Rev. A

Grooming Reel Kit
Greensmaster® Flex 21
Part No. 107–8100

Installation Instructions

Setup Instructions

Loose Parts

Description	Qty.
Plow bolt	2
Shim	1
Sideplate adapter	2
Oil seal	1
Groomer drive assembly (R.H.)	1
Lock nut	2
Drive pulley	1
Driven pulley	1
Flange lock nut	2
Bushing	2
Height of cut arm assembly (R.H.)	1
Capscrew–M6	2
Spring washer	2
Locknut	2
Locknut	2
Groomer housing assembly (L.H.)	1
Bearing	2
Cap plug	1
Shift lever spring	1
Height of cut arm assembly (L.H.)	1
Belt	1
Cover	1
Installation Instructions	1
Parts catalog	1

Important Read these instructions thoroughly before setting up or operating the groomer. Failure to follow setup or operating instructions in this manual may result in damage to the machine and/or the groomer or the turf.

Note: Determine the left and right sides of the machine from the normal operating position.

1. Separate the cutting unit from the traction unit. Refer to Operator's Manual for procedure.
2. Loosen the screws securing each end of the front roller to the height-of-cut arms (Fig. 1).
3. Remove the carriage bolts, washers and locknuts securing the height-of-cut arms to the cutting unit side plates (Fig. 1). Remove the height-of-cut arms and roller assembly.

Note: Retain all parts for use if groomer is ever removed.

4. Remove the height-of-cut adjusting screws from the height-of-cut arms (Fig. 1).

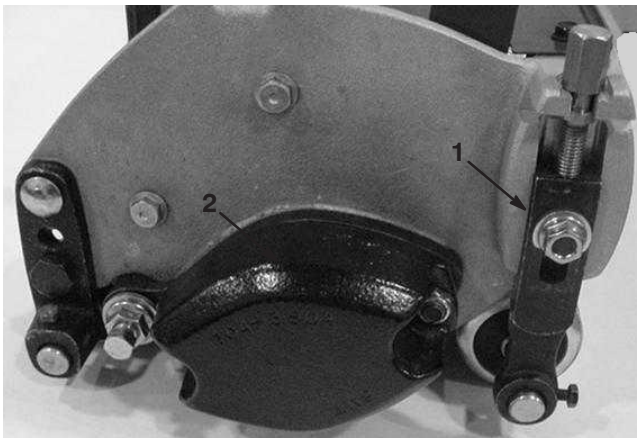


Figure 1

1. Height of cut arm
2. Reel weight

5. Remove the front bolt securing the bearing housing to the sideplate (Fig. 2). Replace with new shorter plow bolt (Fig. 3).

Note: On cutting units with serial numbers prior to 219999999, enlarge the front sideplate hole to .413". This will ease the installation of the new larger plow bolt.

Note: Replace one bolt at a time to retain the position of the reel bearing housing.

6. Remove the rear bolt securing the bearing housing to the sideplate (Fig. 2). Replace with new shorter plow bolt (Fig. 3).

Note: To simplify the removal of the rear bolt, cut off the bolt head.

© 2007 by The Toro Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196

All Rights Reserved
Printed in the USA

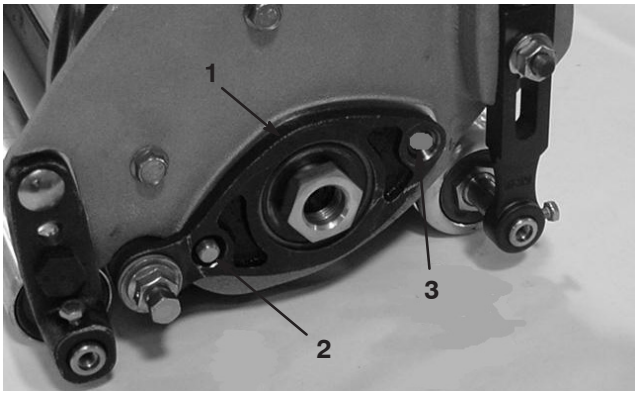


Figure 2

1. Bearing housing
2. Rear plow bolt
3. Front plow bolt

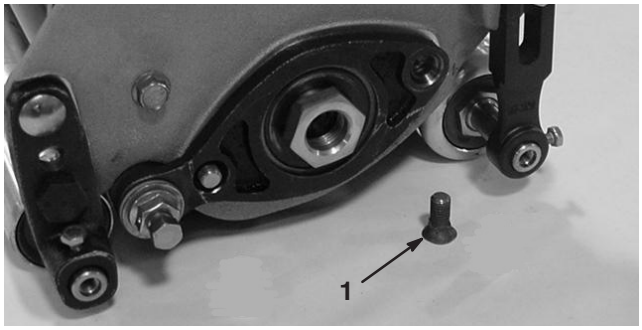


Figure 3

1. Bearing housing bolt (2)

7. Apply Loctite to the threads of each plow bolt. Thread a sideplate adapter onto each bolt (Fig. 4).

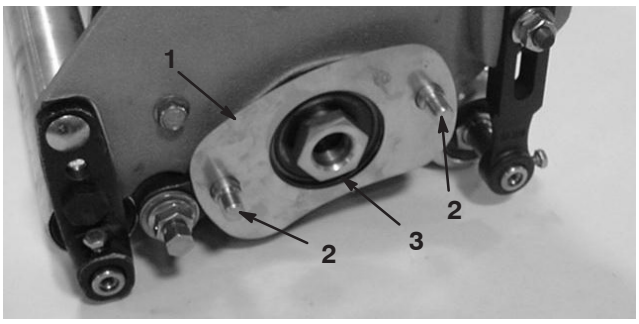


Figure 4

1. Shim
2. Sideplate adapter
3. Reel bearing locknut

8. Insert the shim onto the sideplate adapters positioning as shown in figure 4.

9. Remove the reel bearing locknut from the reel shaft (Fig. 4).

Note: The nut has left-hand threads.

Note: When removing the nut, secure the reel from turning by using a wood block.

10. On cutting units with serial numbers prior to 239999999, remove the oil seal from the bearing housing and replace with a new larger I.D. seal (Fig. 5). Seal to be flush with the bottom of the counter bore.

Note: To ease assembly, lubricate the inside diameter of the oil seal with oil or grease.

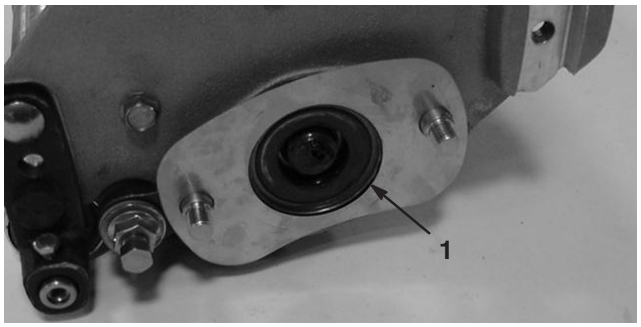


Figure 5

1. Oil seal

11. Position the right-hand groomer drive assembly onto the bearing housing and sideplate adapters (Fig. 6).

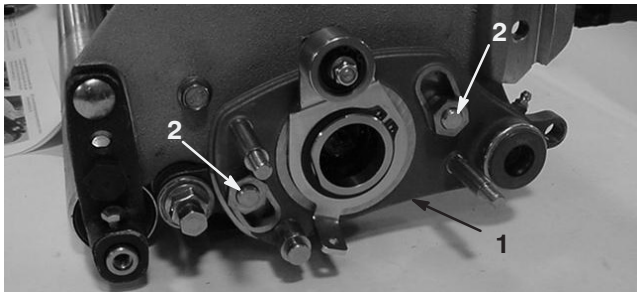


Figure 6

1. Right hand groomer drive assembly
2. Locknuts

12. Secure groomer drive assembly to the side plate adapters with (2) lock nuts (Fig. 6). Tighten the locknuts until the plate no longer can rotate. Hold the sideplate adapters with a Allen wrench and back–off the nuts 1/4 turn.

Note: If the locknuts have been removed and installed several times, the nut locking adhesive may wear out. If this occurs, apply Loctite before installing the nuts.

13. Lubricate the outside of the groomer drive pulley with oil or grease. Do not put oil or grease on the area where the belt will ride.

14. Install the groomer drive pulley onto the reel shaft (Fig. 7).

Note: The pulley has left-hand threads.

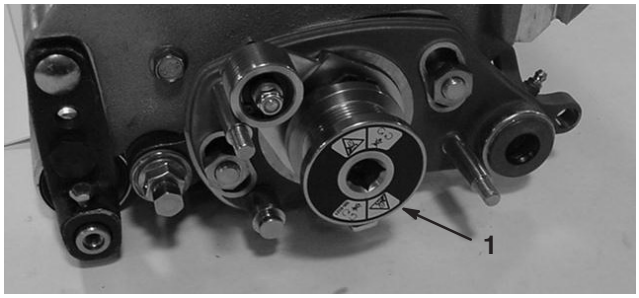
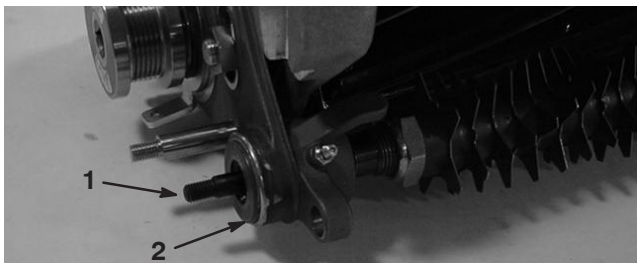


Figure 7

1. Groomer drive pulley

15. Apply grease to seal in drive assembly bearing support and to end of groomer shaft (Fig. 8).

16. Slide one end of the grooming reel shaft into the bearing support in the groomer housing assembly (Fig. 8). Support the shaft to reduce misalignment through the bearings.



Figure

1. Grooming reel shaft
2. Bearing support

17. Loosely mount the driven pulley to the end of the groomer shaft with a flange lock nut (Fig. 9).

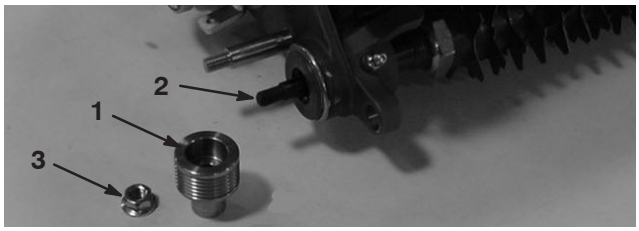


Figure 9

1. Groomer driven pulley
2. Grooming reel shaft
3. Flange lock nut

18. Insert a bushing into the hole in the groomer drive assembly (Fig. 10).

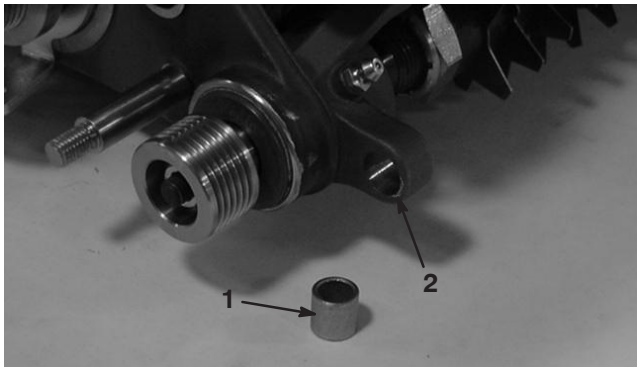


Figure 10

1. Bushing
2. Hole in groomer drive

19. Loosely install the right-hand height-of-cut arm assembly onto the side plate using the existing carriage bolt, nut, and washer (Fig. 11). Make sure that the rod end height-of-cut arm assembly slides into the bushing in the hole in the groomer drive assembly (Fig. 12).

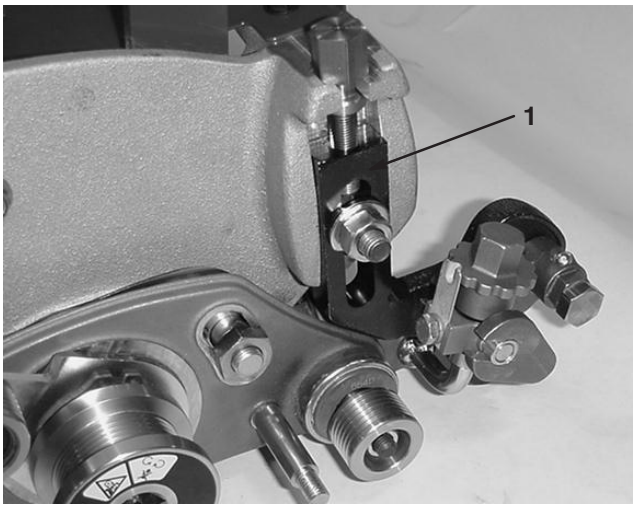


Figure 11

1. Height of cut arm assembly

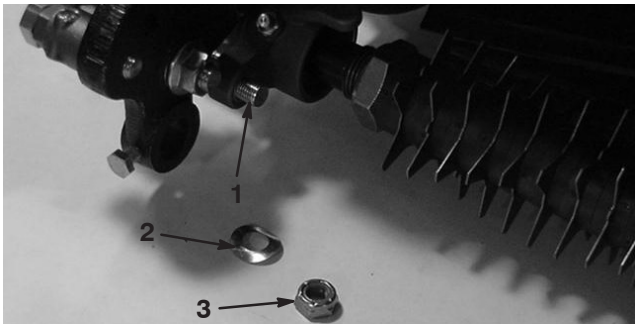


Figure 12

1. Rod end of height of cut assembly
2. Locknut
3. Spring washer

20. Secure the height-of-cut arm assembly rod end to the groomer drive assembly with a spring washer and locknut (Fig. 12). Do not overtighten locknut. Washer should be compressed but the arm must be free to pivot.

21. Insert the roller shaft into the height-of-cut arm and loosely secure with a M6 capscrew (Fig. 13). Do not install belt and cover at this time.

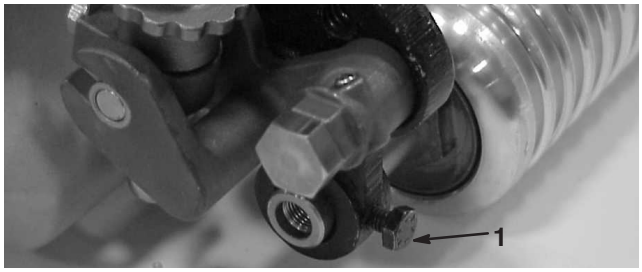


Figure 13

1. Roller shaft mounting capscrew

22. On the left end of the cutting unit, remove the belt cover (Fig. 14).

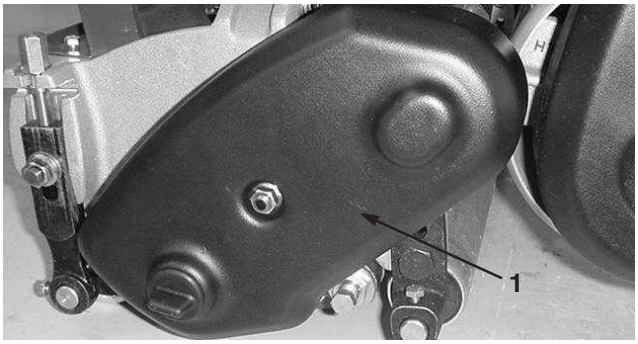


Figure 14

1. Belt cover

23. Loosen the (2) bearing housing mounting nuts to relieve belt tension (Fig. 15).

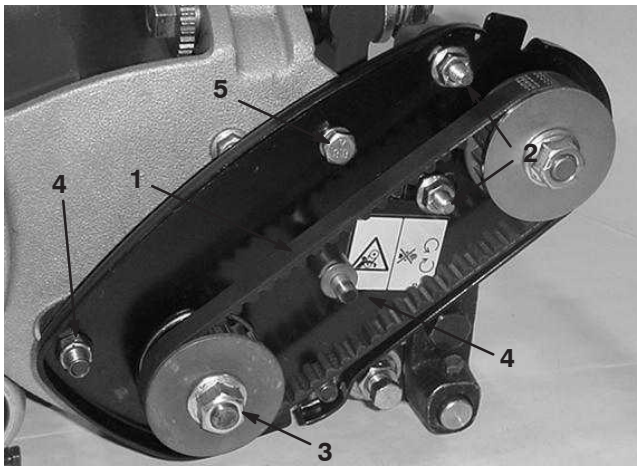


Figure 15

1. Reel drive belt
2. Bearing housing mounting nuts
3. Reel drive pulley nut
4. Mounting nuts
5. Mounting bolt

24. Remove the belt from the pulleys (Fig. 15).

25. Remove the nut securing the drive pulley to the reel shaft. Remove the pulley from the shaft. Retain the key for re–installation (Fig. 15).

Note: To prevent reel from turning when removing nut, block reel with a piece of wood.

26. Remove the (2) nuts and the bolt securing the reel drive plate to the side plate (Fig. 15). Remove the drive plate assembly.

Note: Do not remove the ring spacer from the bearing housing.

27. Slide the groomer housing assembly onto the ring spacer and groomer shaft (Fig. 16).

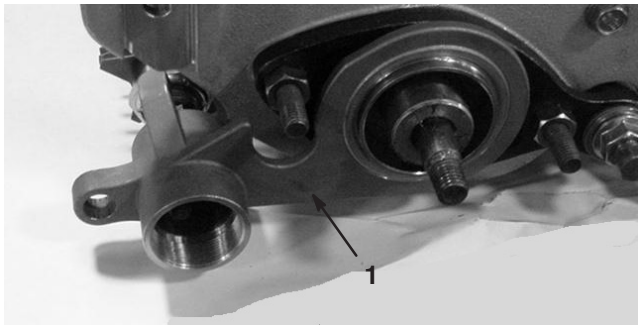


Figure 16

1. Groomer housing assembly

28. Insert the bearings onto the groomer shaft in groomer housing (Fig. 17). The extended bearing races should contact each other when installed to create a 1/4" gap between the bearings. Support the shaft to reduce misalignment through the bearings.

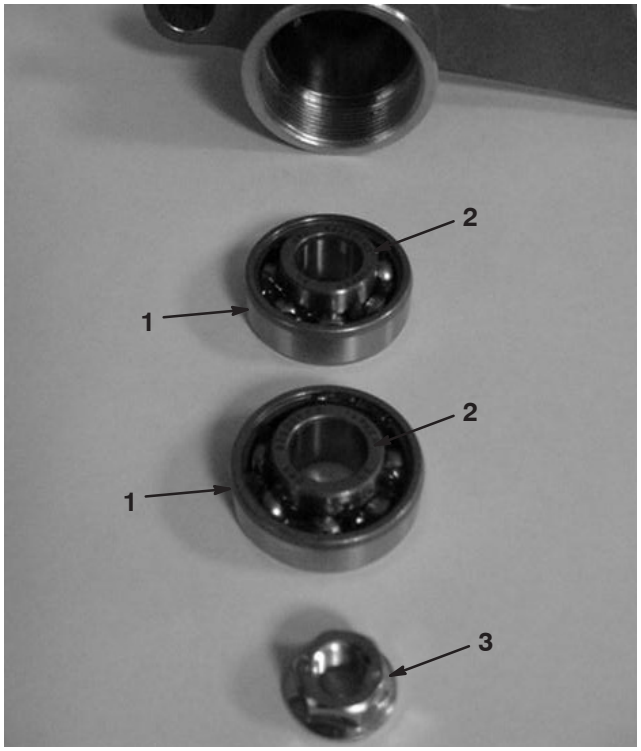


Figure 17

1. Bearing
2. Bearing race
3. Flange lock nut

29. Secure groomer shaft to the groomer housing assembly with a flange lock nut (Fig. 17). While holding the nut on the other end of the groomer shaft, torque the nuts to 17–21 ft.-lb. (23–28 N·m). Do not overtighten the nuts.

30. Apply Loctite to the threads on the cap plug (Fig. 18). Thread the cap plug into the groomer housing. Torque the cap plug to 60–80 ft–lbs.

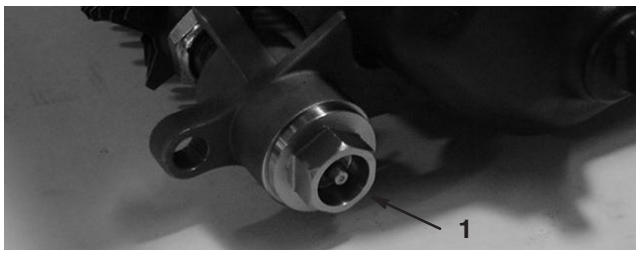


Figure 18

1. Cap plug

31. Reinstall the reel drive plate to the side plate with the (2) nuts and bolt previously removed (Fig. 19).

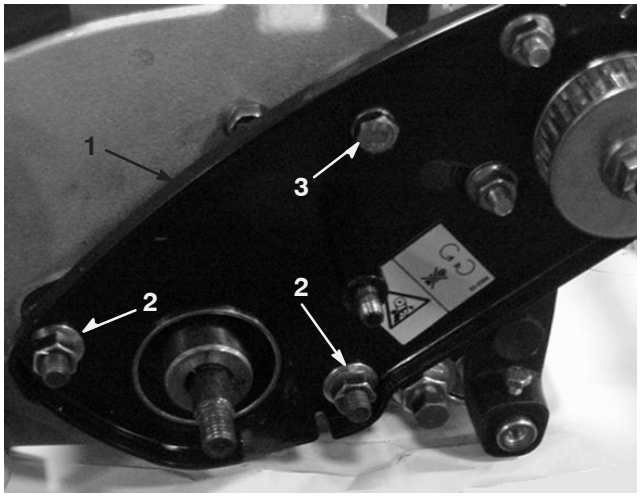


Figure 19

1. Reel drive plate
2. Mounting nuts
3. Mounting bolt

32. Reinstall the drive pulley w/key to the shaft with the nut previously removed (Fig. 20).

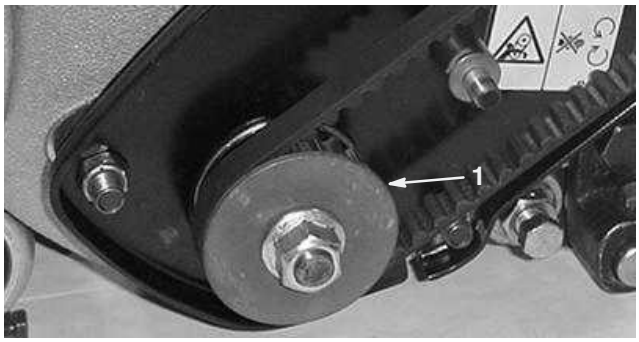


Figure 20

1. Drive pulley

33. Install the belt and tension per the procedure in the Operator's Manual.

34. Install the left belt cover.

35. Loosely install the left-hand height-of-cut arm assembly onto the side plate using the existing carriage bolt, nut, and washer (Fig. 11). Make sure that the rod end height-of-cut arm assembly slides into the bushing in the hole in the groomer drive assembly (Fig. 12).

36. Secure the height-of-cut arm assembly rod end to the groomer drive assembly with a spring washer and locknut (Fig. 12). Do not overtighten locknut. Washer should be compressed but the arm must be free to pivot.

37. Insert the roller shaft into the height-of-cut arm and loosely secure with a M6 capscrew (Fig. 21).

38. Center the roller between the arms and tighten both mounting capscrews (Fig. 21).

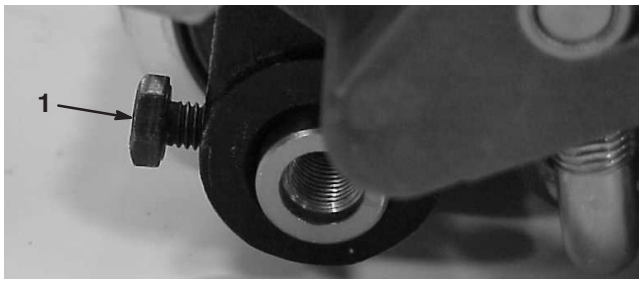


Figure 21

1. Roller shaft mounting capscrew

39. Rotate the idler pulley until shift lever spring can be hooked into the hole in the pulley bracket and onto the stud as shown in figure 22.

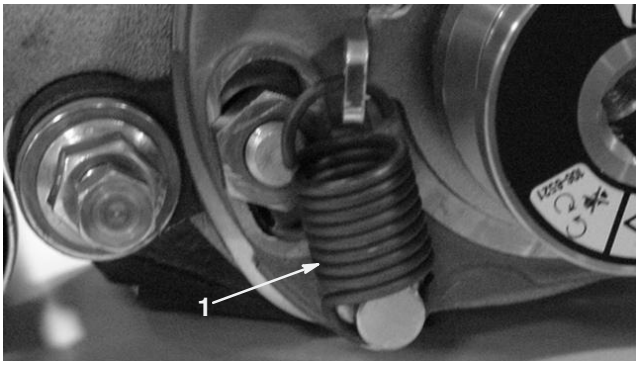


Figure 22

1. Shift lever spring

40. Insert the belt onto the driver pulley, idler pulley and driven pulley routing as shown in figure 23.

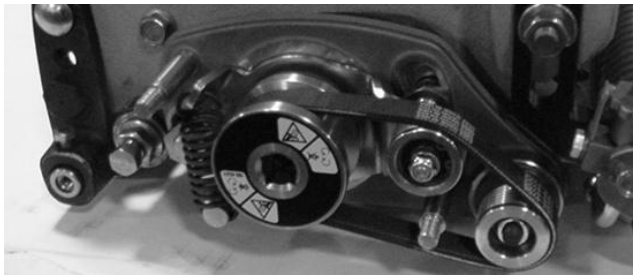


Figure 23

Important Make sure the belt is centered on the pulleys and in the grooves (Fig. 24).

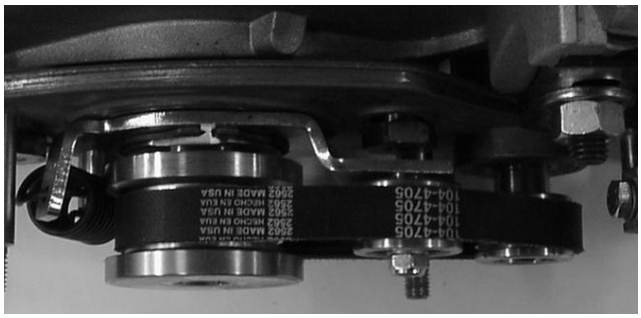


Figure 24

41. Mount cover to groomer housing assembly with (2) lock nuts (Fig. 25).

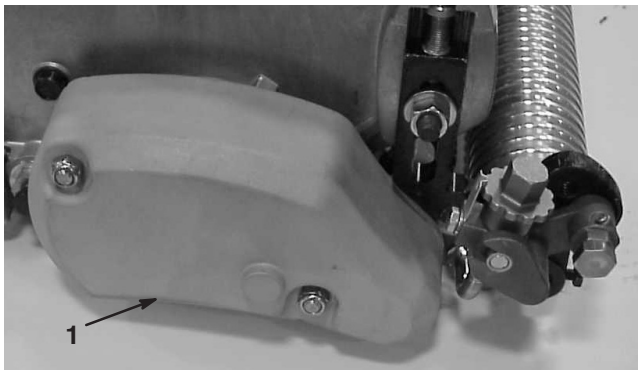


Figure 25

1. Belt cover

42. Lubricate the groomer bearings (Fig. 26 & 27). Pump grease into fittings until grease is purged onto groomer shaft. Wipe excess grease from seals and shaft.

Note: Operate groomer for 30 seconds after greasing. Disengage cutting unit and wipe excess grease from seals and shaft.

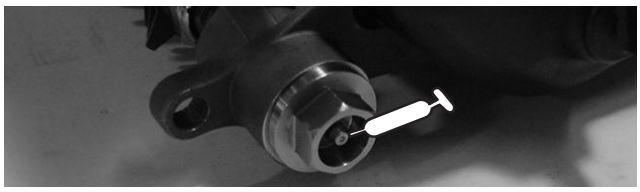


Figure 26

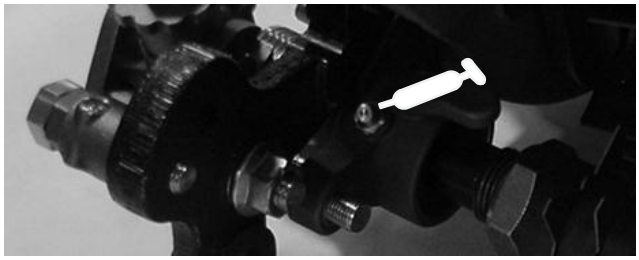


Figure 27

Operation

Introduction

Grooming is performed in the turf canopy above the soil level. Grooming promotes vertical growth of grass plants, reduces grain and severs stolons producing a denser turf. Grooming produces a more uniform and tighter playing surface for faster and truer action of the golf ball.

Verticutting is a more aggressive cultivation technique designed to remove thatch by cutting through the turf canopy and into the thatch/mat layer. Grooming should not be considered a replacement for verticutting. Verticutting is generally a more rigorous and periodic treatment that can temporarily damage the playing surface, while grooming is a routine and gentler treatment designed to manicure the turf.

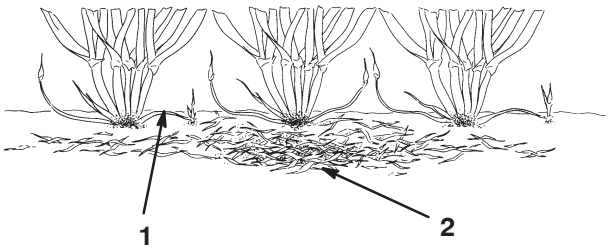


Figure 28

1. Grass runners
2. Thatch

Grooming brushes are a more recent development which are designed to be less intrusive than conventional grooming blades when adjusted to lightly contact the turf canopy. Brushing may be more benefical for the ultra-dwarf cultivars, since these grass types have more of a upright growth pattern and do not fill in that well through horizontal growth. Brushes, however, can injure leaf tissue if they are set to penetrate too deeply into the canopy.

Grooming is similar to verticutting in its runner cutting action. Grooming blades however, should never penetrate the soil like verticutting or dethatching. Groomer blades are spaced closer together and are used more often than verticutters so that they are more effective in cutting runners and removing thatch.

Because grooming injures leaf tissue to some degree it should be avoided during periods of high stress. Cool season species such as creeping bent grass and annual blue grass should not be groomed during high temperature (and high humidity) periods in midsummer.

It is difficult to make precise recommendations on use of grooming reels because so many variables affect the performance of grooming, including:

- The time of the year (i.e., the growing season) and weather pattern
- The general condition of each green
- The frequency of grooming/cutting—both how many cuttings per week and how many passes per cutting
- The height-of-cut setting on the main reel
- The height/depth setting on the grooming reel
- How long the grooming reel has been in use on this green
- The type of grass on the green
- The overall greens management program (i.e. irrigation, fertilizing, spraying, coring, over seeding, etc.)
- Traffic
- Stress periods (i.e., high temperatures, high humidity, unusually high traffic)

These factors can vary from golf course to golf course and from green to green. It is important, therefore, to inspect the greens frequently and vary the grooming practice in accordance with the need.

The groomer is set at the factory with 1/2 in. (13 mm) blade spacing. The 1/2 in. setting allows you to groom slightly deeper to cut stolons without thinning out the turf excessively. By removing spacers and adding blades or adding spacers and removing blades the groomer can be changed to 1/4 in. (6 mm) or 3/4 in. (19 mm) spacing.

Grooming with 1/4 in. (6 mm) blade spacing is recommended for fast growth periods (spring through early summer) mainly to thin out the top layer of the canopy. Grooming with 3/4 in. (19 mm) blade spacing is recommended for slower growth periods (late summer through fall and winter). During high stress periods it may be desirable to not use the grooming reel.

Note: Grooming with 1/4 in. (6 mm) blade spacing will tend to remove more grass blades and thatch and cut more runners than grooming with 1/2 in. (13 mm) or 3/4 in. (19 mm) blade spacing. If you are grooming with 1/4 in.

(6 mm) blade spacing, one or two groomings per week will probably be sufficient except during maximum growth periods.

Note: The practice of changing the direction of cut each time the green is cut should be continued when a groomer is used. This rotation will enhance the effects of the grooming.

Raising and Lowering Groomer

To raise or lower the grooming reel:

- Loosen the bolts on the right and left groomer arms (Fig. 29).

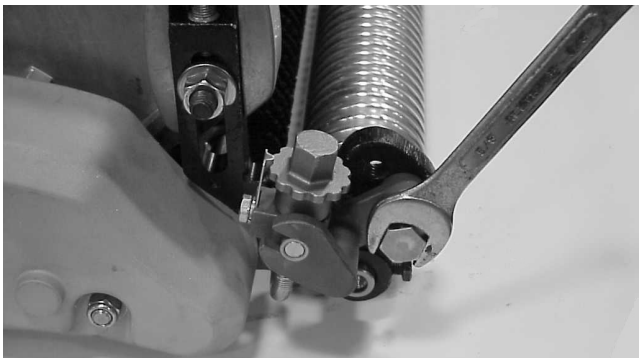


Figure 29

- Rotate the arms up or down (Fig. 30).

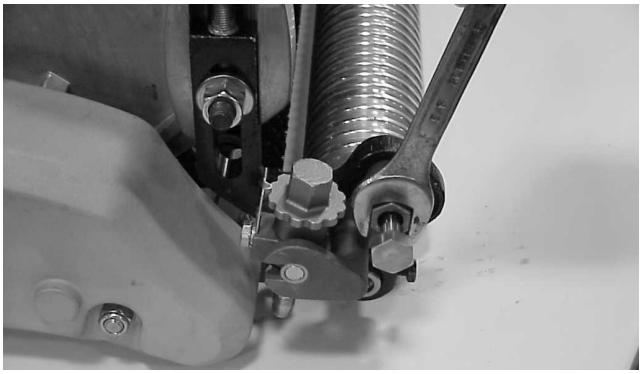


Figure 30

1. Raised position (Transport)

- Tighten the bolts securing the adjustment.

Height/Depth of Groomer Setting

The groomer blade height/depth of grooming can be set using the following procedure:

1. Make sure the rollers are clean and main reel is set to desired height of cut. Position machine on a flat, level work surface.
2. Lower the grooming reel into the grooming position. Refer to Raising and Lowering groomer, page 8.
3. On one end of groomer shaft, measure the distance from the lowest tip of a groomer blade to work surface. Turn the groomer height adjusting knob (Fig. 31) to raise or lower blade tip to the desired grooming height. Each notch on the adjusting knob is approximately equal to .003 inch of groomer depth.



Figure 31

1. Groomer height adjusting knob

4. Repeat procedure on opposite end of groomer, then recheck setting on first side. Readjust as required.
5. If grooming mode is not going to be used, raise the grooming reel into the transport position. Refer to Raising and Lowering groomer, page 8.

Note: At higher grooming heights, the grooming reel may have to be set in the raised (transport) position, thus making the raise/lower feature unavailable.

Testing Groomer Performance

Important Improper or over-aggressive use of the grooming reel (i.e., too deep or too frequent grooming) may cause unnecessary stress on the turf leading to severe greens damage. Use the groomer cautiously.

It is important to determine the performance of the groomer before putting it into regular use on greens. We strongly suggests that a formal test procedure be used. The following is a practical way of determining the proper height/depth setting:

1. Set the cutting reel to the height of cut that would normally be used without the grooming reel. Use a Wiehle roller and scraper for the front roller.
2. Set the groomer reel 1/2 the height of cut setting above the roller level. (e.g. for 1/8” (.125) H.O.C setting , set the groomer at 1/16” (.063) above roller).
3. Make a pass over the test green, then lower the groomer flush with the roller level and make another pass over the test green.

4. Compare the results. The first groomed area when the setting was 1/2 the height of cut setting above the roller level will have removed significantly less grass and thatch than the second setting.

Check the test green 2 or 3 days after the first grooming for general condition/damage. If the groomed areas are turning yellow/brown, and the non-groomed areas are green, then the grooming was too aggressive.

Note: The color of the grass will change when the grooming reel is used. This can be observed with the first grooming and will continue over time. Experience will allow the greens superintendent to judge by color of the turf (along with close examination) if the current grooming practice is appropriate for the particular green. Because the grooming reel stands up more grass and removes thatch, the quality of the cut will not be the same as without the groomer. This effect is most noticeable the first few times a groomer is used on a green.

Note: On multiple passes (i.e., double and triple cutting), the groomer will continue to penetrate deeper on each successive pass. Multiple passes are not recommended.

5. After testing the performance of the groomer on a test green and satisfactory results are obtained, grooming on the playing greens can begin. It is important to realize, however, that each green may respond differently to grooming. In addition, growing conditions are constantly changing. Inspect the groomed greens frequently and make adjustments to the grooming procedure as often as necessary.

Transport Mode

Important When transporting the machine, be sure to disengage the cutting unit and raise the grooming reel into its transport (raised) position.

Maintenance

Cleaning

Hose off the grooming reel after use. Do not permit the grooming reel to stand in water so that the components rust.

Greasing

Lubricate the groomer bearings (Fig. 32 & 33) weekly or after every 10 operating hours, before extended periods of non use **and immediately after every washing.** Pump grease into fittings until grease is purged onto groomer shaft. Wipe excess grease from seals and shaft.

Note: Operate groomer for 30 seconds after greasing. Disengage cutting unit and wipe excess grease from seals and shaft.

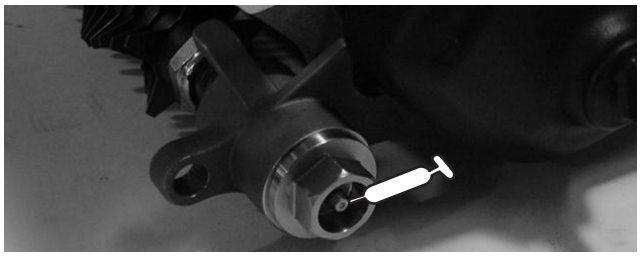


Figure 32

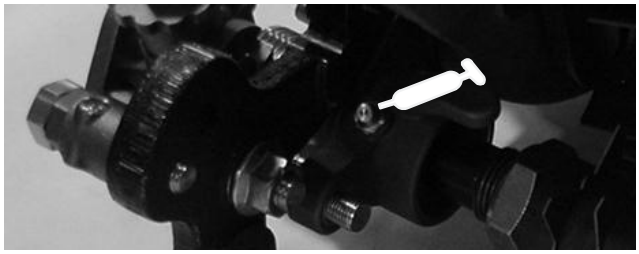


Figure 33

Lubricate bearings on each end of groomer before extended periods of non use.

Blade Inspection

Inspect the grooming reel blades frequently for damage and wear. Bent blades may be straightened with a pliers. Worn blades can be replaced or the grooming reel shaft reversed to put the sharpest edge of the blade forward. When inspecting the blades, check to see that the right and left blade shaft end nuts are tight.

Note: Because the groomer may introduce more debris (i.e., dirt and sand) into the cutting unit than what the reel would normally be exposed to, the bedknife and main reel should be checked for wear more frequently. This is especially important in sandy soil and/or when the groomer is set for penetration.

Grooming Reel Replacement

The grooming reel can be removed to replace individual blades, the entire shaft, or to reverse the shaft so that the sharpest edge of the blades are forward. Remove and replace the grooming reel shaft using the following procedure:

1. On right end of cutting unit, remove belt cover from groomer housing (Fig. 34).



Figure 34

1. Belt cover

2. Remove the belt from driver pulley, idler pulley and driven pulley (Fig. 35).

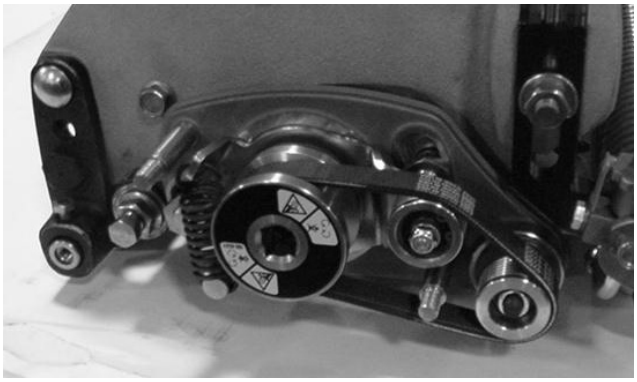


Figure 35

3. Loosen the bolt securing the roller shaft to the height-of-cut arm (Fig. 36).



Figure 36

1. Roller shaft bolt

4. Remove the locknut and spring washer securing the height-of-cut arm assembly rod end to the groomer drive assembly (Fig. 37).

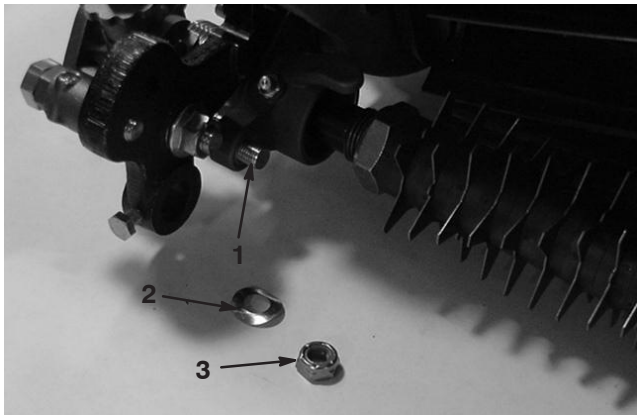


Figure 37

1. Rod end of height of cut assembly
2. Spring washer
3. Locknut

5. Remove carriage bolt, nut, and washer securing height-of-cut arm assembly to side plate (Fig. 38).

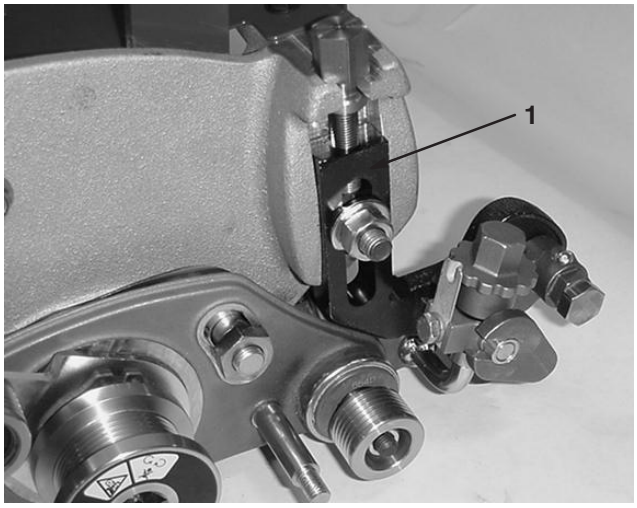


Figure 38

1. Height of cut arm assembly

6. Remove the flange lock nut securing the driven pulley to the end of the groomer shaft (Fig. 39). Remove the pulley.

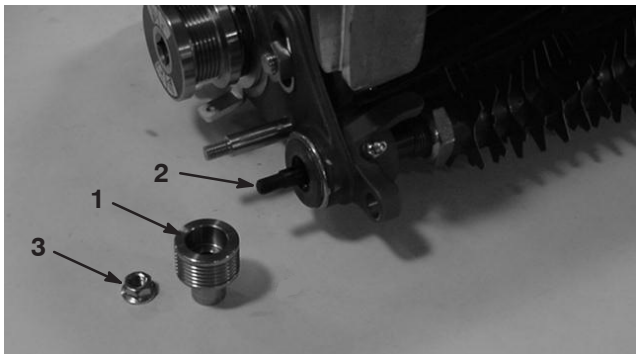


Figure 39

1. Groomer driven pulley
2. Grooming reel shaft
3. Flange lock nut

7. Remove the groomer drive pulley from the reel shaft (Fig. 40).

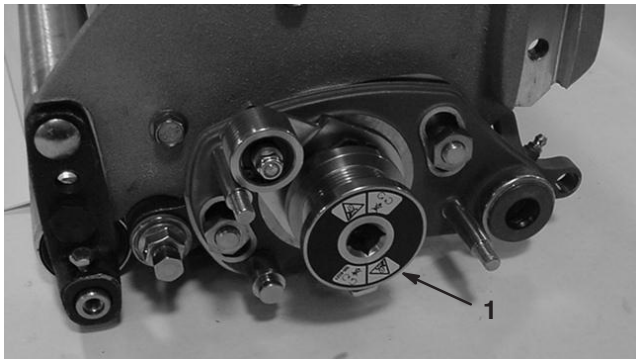


Figure 40

1. Groomer drive pulley

Note: The nut has left-hand threads.

8. Remove the (2) locknuts securing the groomer drive assembly to the side plate adapters (Fig. 41).

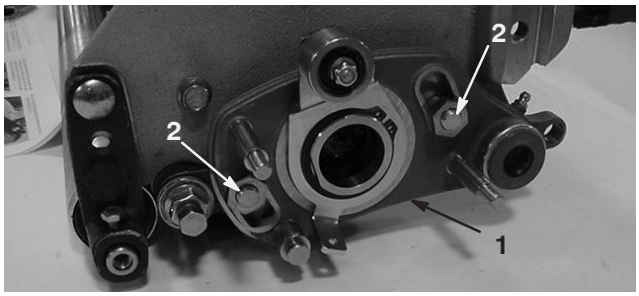


Figure 41

1. Right hand groomer drive assembly
2. Locknuts

9. Remove the groomer drive assembly from the side plate adapters.

10. On left end of cutting unit, remove the cap plug from the groomer housing (Fig. 42).

11. Remove the nut securing the groomer shaft to the groomer housing.

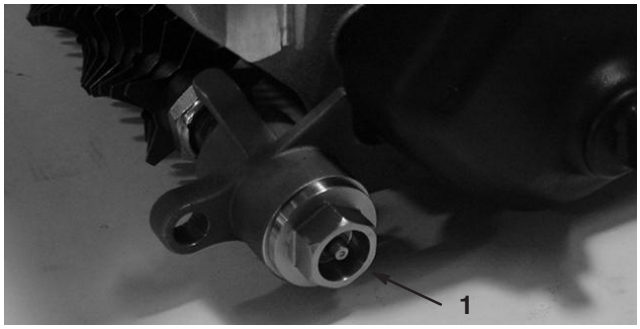


Figure 42

1. Cap plug

12. Remove the groomer shaft.

13. Assemble the shaft in reverse order. Using the location marks on each blade as a guide, assemble each blade so that the location mark is offset one flat on the hexagonal shaft.

Note: The location marks on each blade are offset so that they can be used to achieve proper grooming reel setup. Stack the blades and match the location marks before installing them on the grooming reel shaft.

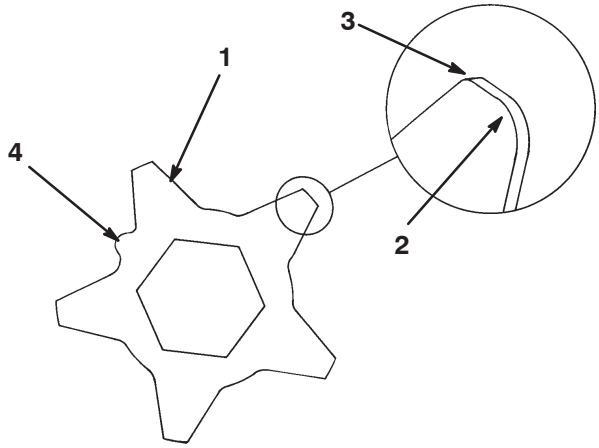


Figure 43

1. Grooming blade
2. Dull (rounded) edge
3. Sharp edge
4. Location mark

14. Torque the lock nuts to 200–250 in.–lb.

15. Check the grooming reel height/depth setting.


TORO®