Form No. 21256SL Rev B



# **Service Manual**

## **Bullseye**

FieldSweep 660 (Model No. 46412) FieldMagnet 600 (Model No. 46411) FieldCombo 770 (Model No. 46420) FieldFill 530 (Model No. 46423) FieldClean 580 (Model No. 46425) QuickGroom 550 (Model No. 46400) QuickGroom 700, Standard (Model No. 46402AA) QuickGroom 700, Soft (Model No. 46402BA) QuickGroom 710, Standard (Model No. 46405AA) QuickGroom 710, Soft (Model No. 46405BA) RotaQuake 630 (Model No. 46454) AccuraSeed 620 (Model No. 46430) RapidSeed 430 (Model No. 46435) RapidSeed 590 (Model No. 46440) NuSurface 470 (Model No. 46450) NuSurface 790 (Model No. 46452)

# **Revision History**

Revision	Date	Description
А	06/2021	Initial issue.
В	09/2021	Updated FieldFill 660.

### **Reader Comments**

The Toro Company Technical Assistance Center maintains a continuous effort to improve the quality and usefulness of its publications. To do this effectively, we encourage user feedback. Please comment on the completeness, accuracy, organization, usability, and readability of this manual by an e-mail to servicemanuals@toro.com

or Mail to:

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# NOTES

### Preface

The purpose of this publication is to provide the service technician with information for troubleshooting, testing and repair of major systems and components on the Bullseye machines.

Refer to the *Operator's Manuals* for installing, operating, maintenance, and adjustment instructions. Keep a copy of the *Operator's Manuals* and *Parts Catalogs* for your machine and its accessories with this *Service Manual* for reference. Additional copies of the *Operator's Manuals* and *Parts Catalogs* are available at www.toro.com.

The Toro Company reserves the right to change the product specifications or this publication without notice.

A DANGER	A
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This safety symbol means danger. When you see this symbol, carefully read the instructions that follow. Failure to obey the instructions could kill or cause serious permanent injury or disability.

WARNING

This safety symbol means warning. When you see this symbol, carefully read the instructions that follow. Failure to obey the instructions can result in serious injury.

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#### CAUTION

This safety symbol means caution. When you see this symbol, carefully read the instructions that follow. Failure to obey the instructions can result in minor to moderate injury.

IMPORTANT

The *Important* notice will give the important instructions which you must follow to prevent damage to the systems or components on the machine.

**Note:** A **Note** will give the general information about the correct operation, maintenance, service, testing, or repair of the machine.

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### **Service Procedure Icons**

The following icons appear throughout this Service Manual to bring attention to specific important details of a service procedure.



#### **Critical Process**

This icon is used to highlight:

- installing safety equipment (shields, guards, seat belts, brakes and R.O.P.S. components) that may have been removed.
- dimensions or settings that must be maintained for proper machine operation.
- a specific fastener tightening sequence.
- component orientation that may not be obvious.



#### **Critical Torque**

This icon is used to highlight an assembly torque requirement that is different than what is recommended in the Standard Torque Tables; refer to Standard Torque for Dry, Zinc Plated, and Steel Fasteners (Inch Series) (page 2–6) or Standard Torque for Dry, Zinc Plated, and Steel Fasteners (Metric Fasteners) (page 2–7).



#### Fluid Specifications

This icon is used to highlight fluid specifications and capacities that are less common, and may not appear on the machine service decal or in the machine *Operator's Manual*.

**Note:** Refer to the service decal on the machine and the machine *Operator's Manual* for commonly used fluid specifications and capacities.

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## Chapter 1

# Safety

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### **Safety Instructions**

The Bullseye machines are tested and certified by Toro for compliance with existing safety standards and specifications. Although hazard control and accident prevention partially are dependent upon the design and configuration of the machine, these factors are also dependent upon the awareness, concern and proper training of the personnel involved in the operation, transport, maintenance and storage of the machine. Improper use or maintenance of the machine can result in injury or death.



To reduce the potential of injury or death, comply with the following safety instructions as well as information found in the *Operator's Manuals* and the *Operator and Safety Training Videos* found on www.toro.com.

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### **Before Operating the Machine**

- Review and understand the contents of the Operator's Manual and all of the operating and safety decals on the machine before operation. Familiarize yourself with the controls, and know how to stop the machine quickly. Additional copies of the Operator's Manual are available at www.toro.com.
- Never allow children to operate the machine. Never allow adults to operate the machine without proper training.
- Become familiar with the controls. Know how to raise and disengage the cutting units and stop the tow vehicle quickly.
- Keep all shields, safety devices, and decals in place. If a shield, safety device, or decal is illegible or damaged, repair or replace it before operating the machine.
- Always wear substantial shoes. Do not operate machine while wearing sandals, tennis shoes, or sneakers. Do not wear loose fitting clothing which has the potential to get caught in moving parts and cause injury.
- Wearing safety glasses, safety shoes, long pants and a hard hat is advisable and may be required by local safety and insurance regulations.
- Make sure that operator is familiar with safe tow vehicle operation.
- Tighten any loose nuts, bolts, or screws to ensure that the machine is in safe operating condition.
- Make sure that the machine is properly attached to the tow vehicle; refer to the Tow Vehicle Operator's Manual.
- Make sure the entire work area is clear of objects which might be picked up and thrown by the machine.
- Do not carry passengers on the machine. Keep everyone, especially children and pets, away from the area of operation.

### While Operating the Machine

- Watch for holes or other hidden hazards.
- Do not drive close to sand traps, ditches, creeks, or other hazards.
- Reduce speed when making sharp turns. Avoid sudden stops and starts.
- Before backing up, look to the rear to ensure no one is behind the machine.
- Watch out for traffic when near or crossing roads. Always yield the right-of-way.
- Keep hands, feet, and clothing away from moving parts and the cutting unit discharge area.
- Raise the cutting units completely, and ensure they are locked in position when driving from one work area to another.
- Before starting the engine on the tow vehicle:
  - Apply the parking brake.
  - Make sure that the traction lever or transmission is in neutral and the PTO is disengaged.
  - Refer to the tow vehicle Operator's Manual for safe starting procedures.
- Do not run the tow vehicle engine in a confined area without an adequate ventilation. Exhaust fumes are hazardous and could be deadly.
- If any abnormal vibration is detected, disengage the PTO and stop the tow vehicle immediately. Determine the source of the vibration and correct any problem(s) before resuming the use of the machine.
- While operating, the combination of the tow vehicle and the machine may exceed noise levels of 85dB. Hearing protection is recommended for prolonged exposure.
- If a machine strikes a solid object or vibrates abnormally, stop immediately, and turn the engine off. Wait for all motion to stop before inspecting for damage. A damaged machine must be repaired or replaced before operation can resume.
- Traverse slopes carefully. Do not start or stop suddenly when traveling uphill or downhill.
- DON'T RISK INJURY! When a person or pet appears unexpectedly in or near the area while operating an the mower, STOP. Careless operation, combined with terrain angles, ricochets or improperly positioned guards can lead to thrown object injuries. Do not resume operation until the area is cleared.
- Before leaving the operator's position of the tow vehicle:
  - Disengage PTO power to the machine, and lower the unit to the ground.
  - Apply the parking brake on the tow vehicle. Stop the engine and remove key from the ignition switch.
  - Wait for all moving parts to stop before leaving the tow vehicle.

### **Maintenance and Service**

Refer to machine *Operator's Manual* when performing the regular equipment maintenance. Several maintenance procedures have break-in intervals identified in the *Operator's Manual*.

- Before servicing or making adjustments to the machine, disengage the tow vehicle PTO, position the machine on a level surface to the ground. Apply tow vehicle parking brake, stop engine and remove key from the key switch.
- Make sure that the machine is in safe operating condition by keeping all the nuts, bolts, and screws tight.
- Ensure that all of the hydraulic line connectors are tight and that all the hydraulic hoses and lines are in good condition before applying pressure to the hydraulic system.
- Use eye protection when working on the hydraulic system and its components.
- Keep your body and hands away from pin-hole leaks in the hydraulic lines that eject hydraulic fluid under high pressure. Use cardboard or paper to find hydraulic leaks. The hydraulic fluid escaping under pressure can penetrate the skin and cause injury. If hydraulic fluid is accidentally injected into the skin, you must have it surgically removed within a few hours by a doctor familiar with this type of injury. Otherwise, gangrene may result.
- Before disconnecting or performing any work on the hydraulic system, release all the pressure in the system by parking the machine on a level surface, lowering the machine completely, and then shutting off the engine.
- Never step over the PTO shaft to reach other side of the machine. Walk around the machine instead.
- Use care when checking or servicing the sharp objects. Always wear gloves, and use caution when servicing the sharp objects.
- When removing the machine components, tires, or performing other service, use the correct blocks, hoists, and jacks to raise and support the machine. Ensure that the machine is parked on a solid, level surface, such as a concrete floor. Always block the wheels with chocks. Use appropriate jack stands to support the raised machine. Failing to properly support the machine with appropriate jack stands can cause the machine to move or fall and can result in personal injury.
- If major repairs are necessary, contact your Authorized Toro Distributor.
- At the time of manufacture, the machine conformed to all of the applicable safety standards. To ensure the optimum performance and continued safe use of the machine, use only genuine Toro replacement parts and accessories. Use of non-Toro replacement parts and accessories can result in non-conformance with safety standards and can potentially void the warranty.

# **Safety and Instructional Decals**

Numerous safety and instruction decals are affixed to the traction unit and cutting units of your Bullseye. If any decal becomes illegible or damaged, install a new decal. Decal part numbers are listed in your *Parts Catalog*. Order replacement decals from Authorized Toro Distributor.

### Chapter 2

# **Specifications and Maintenance**

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# **Specifications**

The operators manuals provides information regarding the operation, general maintenance, specifications and maintenance intervals for your machine. Refer to the *Operator's Manual* for additional information when servicing the machine.

## **Torque Specifications**

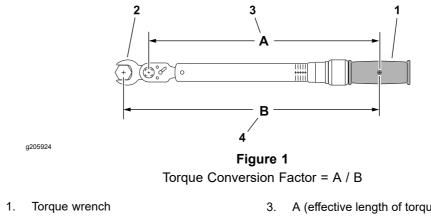
The recommended fastener torque values are listed in the following tables. For critical applications, as determined by Toro, either the recommended torque or a torque that is unique to the application is clearly identified and specified in this *Service Manual*.

These torque specifications for the installation and tightening of the fasteners will apply to all the fasteners which do not have a specific requirement identified in this *Service Manual*. The following factors must be considered when applying the torque: cleanliness of the fastener, use of a thread sealant (e.g., Loctite), degree of lubrication on the fastener, presence of a prevailing torque feature (e.g., Nylocknut), hardness of the surface underneath the head of the fastener, or similar condition which affects the installation.

As noted in the following tables, the torque values should be reduced by 25% for the lubricated fasteners to achieve the similar stress as a dry fastener. The torque values must be reduced when the fastener is threaded into the aluminum or brass. The specific torque value should be determined based on the aluminum or brass material strength, fastener size, length of thread engagement, etc.

The standard method of checking the torque can be performed by marking a line on the fastener (head or nut) and mating part, then back off the fastener 1/4 of a turn. Measure the torque necessary to tighten the fastener until the lines match up.

### Calculating the Torque Values When Using a Drive-Adapter Wrench



2. Drive-adapter wrench (crowsfoot)

- A (effective length of torque wrench)
- B (effective length of torque wrench and 4 drive-adapter wrench)

Using a drive-adapter wrench (e.g., crowfoot wrench) in any position other than 90° and 270° to the frame of the torque wrench will affect the torque value measured by the torque wrench because of the effective length (lever) of the torque wrench changes. When using a torque wrench with a drive-adapter wrench, multiply the listed torque recommendation by the calculated torque conversion factor (Figure 1) to determine proper tightening torque. When using a torque wrench with a drive-adapter wrench, the calculated torque will be lower than the listed torque recommendation.

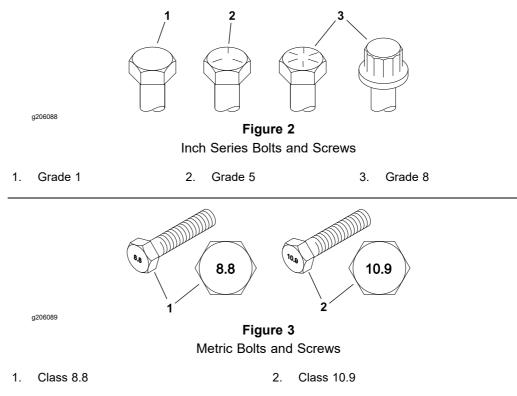
**Example:** The measured effective length of the torque wrench (distance from the center of the handle to the center of the square drive) is 457 mm (18 inches).

The measured effective length of the torgue wrench with the drive-adapter wrench installed (distance from the center of the handle to the center of the drive-adapter wrench) is 483 mm (19 inches).

The calculated torque conversion factor for this torque wrench with this drive-adapter wrench would be 18/19 = 0.947.

If the listed torque recommendation for a fastener is 103 to 127 N·m (76 to 94 ft-lbs), the proper torque when using this torque wrench with a drive-adapter wrench would be 98 to 121 N·m (72 to 89 ft-lbs).

### **Identifying the Fastener**



#### Fasteners with a Locking Feature

#### IMPORTANT

If a fastener with a locking feature or previously applied thread locking compound is reused, clean the fastener threads and apply new thread locker to the fastener during installation.

Locking features are designed to create friction and prevent a fastener from loosening. Locking features can be found on externally or internally threaded fasteners. Common examples are plastic inserts incorporated into the fastener and pre-applied "dry" thread locking compound. Keep in mind, a fastener with a locking feature usually means there will be friction during initial installation and during removal.

Toro recommends replacing fasteners with a locking feature once they have been removed because the effectiveness of the locking feature diminishes with each reuse. If it is necessary to reuse a fastener with a locking feature; apply a thread locking compound (Loctite for example) to the fastener during installation. Use the appropriate strength and type of thread locking compound based on application, fastener size or information found in the product *Operators Manual*, *Service Manual* or *Installation Instructions*.

# Standard Torque for Dry, Zinc Plated, and Steel Fasteners (Inch Series)

Thread Size	Grade 1, 5 and 8 with Thin Height Nuts	Studs, and Regular H (SAE J995	Bolts, Screws, Sems with eight Nuts Grade 2 or er Nuts)	SAE Grade 5 Bolts, Screws, Studs, and Sems with Regular Height Nuts (SAE J995 Grade 2 or Stronger Nuts)		SAE Grade 8 Bolts, Screws, Studs, and Sems with Regular Height Nuts (SAE J995 Grade 2 or Stronger Nuts)	
	in-lbs	in-lbs	N⋅cm	in-lbs	N·cm	in-lbs	N·cm
# 6 - 32 UNC	10 + 2	12 + 2	147 ± 23	15 ± 2	169 ± 23	23 ± 3	262 ± 34
# 6 - 40 UNF	10 ± 2	13 ± 2	147 ± 23	17 ± 2	192 ± 23	25 ± 3	282 ± 34
# 8 - 32 UNC	13 ± 2	25 ± 5	282 ± 56	29 ± 3	328 ± 34	41± 5	463 ± 56
# 8 - 36 UNF	13 ± 2	20 ± 5	202 ± 30	31 ± 4	350 ± 45	43 ± 5	486 ± 56
# 10 - 24 UNC	18 ± 2	30 ± 5	339 ± 56	42 ± 5	475 ± 56	60 ± 6	678 ± 68
# 10 - 32 UNF	10 ± 2	30 ± 3	339 ± 30	48 ± 5	542 ± 56	68 ± 7	768 ± 79
1/4 - 20 UNC	48 ± 7	53 ± 7	599 ± 79	100 ± 10	1130 ± 113	140 ± 15	1582 ± 169
1/4 - 28 UNF	53 ± 7	65 ± 10	734 ± 113	115 ± 12	1299 ± 136	160 ± 17	1808 ± 192
5/16 - 18 UNC	115 ± 15	105 ± 15	1186 ± 169	200 ± 25	2260 ± 282	300 ± 30	3390 ± 339
5/16 - 24 UNF	138 ± 17	128 ± 17	1146 ± 192	225 ± 25	2542 ± 282	325 ± 33	3672 ± 373
	ft-lbs	ft-lbs	N∙m	ft-lbs	N∙m	ft-lbs	N∙m
3/8 - 16 UNC	16 ± 2	16 ± 2	22 ± 3	30 ± 3	41 ± 4	43 ± 5	58 ± 7
3/8 - 24 UNF	17 ± 2	18 ± 2	24 ± 3	35 ± 4	47 ± 5	50 ± 6	68 ± 8
7/16 - 14 UNC	27 ± 3	27 ± 3	37 ± 4	50 ± 5	68 ± 7	70 ± 7	95 ± 9
7/16 - 20 UNF	29 ± 3	29 ± 3	39 ± 4	55 ± 6	75 ± 8	77 ± 8	104 ± 11
1/2 - 13 UNC	30 ± 3	48 ± 7	65 ± 9	75 ± 8	102 ± 11	105 ± 11	142 ± 15
1/2 - 13 UNC 1/2 - 20 UNF	30 ± 3 32 ± 4	48 ± 7 53 ± 7	65 ± 9 72 ± 9	75 ± 8 85 ± 9	102 ± 11 115 ± 12	105 ± 11 120 ± 12	142 ± 15 163 ± 16
1/2 - 20 UNF	32 ± 4	53 ± 7	72 ± 9	85 ± 9	115 ± 12	120 ± 12	163 ± 16
1/2 - 20 UNF 5/8 - 11 UNC	32 ± 4 65 ± 10	53 ± 7 88 ± 12	72 ± 9 119 ± 16	85 ± 9 150 ± 15	115 ± 12 203 ± 20	120 ± 12 210 ± 21	163 ± 16 285 ± 28
1/2 - 20 UNF 5/8 - 11 UNC 5/8 - 18 UNF	32 ± 4 65 ± 10 75 ± 10	53 ± 7 88 ± 12 95 ± 15	72 ± 9 119 ± 16 129 ± 20	85 ± 9 150 ± 15 170 ± 18	115 ± 12 203 ± 20 230 ± 24	120 ± 12 210 ± 21 240 ± 24	163 ± 16 285 ± 28 325 ± 33
1/2 - 20 UNF 5/8 - 11 UNC 5/8 - 18 UNF 3/4 - 10 UNC	32 ± 4 65 ± 10 75 ± 10 93 ± 12	53 ± 7 88 ± 12 95 ± 15 140 ± 20	72 ± 9 119 ± 16 129 ± 20 190 ± 27	85 ± 9 150 ± 15 170 ± 18 265 ± 27	115 ± 12 203 ± 20 230 ± 24 359 ± 37	120 ± 12 210 ± 21 240 ± 24 375 ± 38	163 ± 16 285 ± 28 325 ± 33 508 ± 52

**Note:** Reduce the torque values listed in the table above by 25% for lubricated fasteners. Lubricated fasteners are defined as threads coated with a lubricant, such as engine oil, or a thread sealant, such as Loctite.

**Note:** The torque values must be reduced when installing the fasteners into threaded aluminum or brass. The specified torque value should be determined based on the aluminum or base material strength, fastener size, length of thread engagement, etc.

**Note:** The nominal torque values listed above for Grade 5 and 8 fasteners are based on 75% of the minimum proof load specified in SAE J429. The tolerance is approximately  $\pm$  10% of the nominal torque value. The thin height nuts include jam nuts.

# Standard Torque for Dry, Zinc Plated, and Steel Fasteners (Metric Fasteners)

Thread Size	Class 8.8 Bolts, Screws, and Studs with Regular Height Nuts (Class 8 or Stronger Nuts)		Studs with Reg	ts, Screws, and ular Height Nuts Stronger Nuts)
M5 X 0.8	57 ± 6 in-lbs	644 ± 68 N·cm	78 ± 8 in-lbs	881 ± 90 N·cm
M6 X 1.0	96 ± 10 in-lbs	1085 ± 113 N·cm	133 ± 14 in-lbs	1503 ± 158 N·cm
M8 X 1.25	19 ± 2 ft-lbs	26 ± 3 N·m	28 ± 3 ft-lbs	38 ± 4 N∙m
M10 X 1.5	38 ± 4 ft-lbs	52 ± 5 N·m	54 ± 6 ft-lbs	73 ± 8 N∙m
M12 X 1.75	66 ± 7 ft-lbs	90 ± 10 N·m	93 ± 10 ft-lbs	126 ± 14 N·m
M16 X 2.0	166 ± 17 ft-lbs	225 ± 23 N·m	229 ± 23 ft-lbs	310 ± 31 N·m
M20 X 2.5	325 ± 33 ft-lbs	440 ± 45 N·m	450 ± 46 ft-lbs	610 ± 62 N·m

**Note:** Reduce the torque values listed in the table above by 25% for lubricated fasteners. Lubricated fasteners are defined as threads coated with a lubricant, such as engine oil, or a thread sealant, such as Loctite.

**Note:** The torque values must be reduced when installing the fasteners into threaded aluminum or brass. The specified torque value should be determined based on the aluminum or base material strength, fastener size, length of thread engagement, etc.

**Note:** The nominal torque values listed above are based on 75% of the minimum proof load specified in SAE J1199. The tolerance is approximately  $\pm$  10% of the nominal torque value.

### **Other Torque Specifications**

Thread Size	Recommended Torque			
Thread Size	Square Head	Hex Socket		
1/4 - 20 UNC	140 ± 20 in-lbs	73 ± 12 in-lbs		
5/16 - 18 UNC	215 ± 35 in-lbs	145 ± 20 in-lbs		
3/8 - 16 UNC	35 ± 10 ft-lbs	18 ± 3 ft-lbs		
1/2 - 13 UNC	75 ± 15 ft-lbs	50 ± 10 ft-lbs		

SAE Grade 8 Steel Set Screws

#### Thread Cutting Screws (Zinc Plated Steel)

Type 1, Type 23 or Type F			
Thread Size	Baseline Torque**		
No. 6 - 32 UNC	20 ± 5 in-lbs		
No. 8 - 32 UNC	30 ± 5 in-lbs		
No. 10 - 24 UNC	38 ± 7 in-lbs		
1/4 - 20 UNC	85 ± 15 in-lbs		
5/16 - 18 UNC	110 ± 20 in-lbs		
3/8 - 16 UNC	200 ± 100 in-lbs		

#### Wheel Bolts and Lug Nuts

Thread Size Recommended Torque*					
7/16 - 20 UNF Grade 5	65 ± 10 ft-lbs	88 ± 14 N·m			
1/2 - 20 UNF Grade 5	80 ± 10 ft-lbs	108 ± 14 N·m			
M12 X 1.25 Class 8.8	80 ± 10 ft-lbs	108 ± 14 N·m			
M12 X 1.5 Class 8.8	80 ± 10 ft-lbs	108 ± 14 N·m			

\* For steel wheels and non-lubricated fasteners

### Thread Cutting Screws (Zinc Plated Steel)

Thread Size	Threads	Papalina Tarqua**	
	Туре А	Туре В	Baseline Torque**
No. 6	18	20	20 ± 5 in-lbs
No. 8	15	18	30 ± 5 in-lbs
No. 10	12	16	38 ± 7 in-lbs
No. 12	11	14	85 ± 15 in-lbs

\*\* The hole size, material strength, material thickness, and material finish must be considered when determining the specified torque values. All the torque values are based on the non-lubricated fasteners.

### **Conversion Factors**

in-lbs X 11.2985 = N·cm

ft-lbs X 1.3558 = N $\cdot$ m

 $N \cdot cm \times 0.08851 = in-lbs$  $N \cdot m \times 0.7376 = ft-lbs$ 

# **Shop Supplies**

The procedures found in this *Service Manual* may recommend the use of commonly used shop supplies (lubricants, sealants and adhesives). A symbol denoting the use of a shop supply may appear in figures that support a procedure. Always refer to the written procedure for specific information regarding the type and the application of a shop supply.

#### IMPORTANT

# Always follow manufacturers instructions when using or storing shop supplies.

Used to prevent corrosion, galling and seizure between metal parts. Most often applied to shafts and bores during assembly. Unless otherwise specified, high viscosity regular grade lithium-graphite based anti-seize lubricant should be used.	
GREASE	
Can be used to pre-fill (pack) bearings, boots and seals prior to assembly, ease installation of components during assembly, or fill cavities between moving parts through grease fittings after assembly. Unless otherwise noted, refer to the machine <i>Operator's Manual</i> or <i>Installation Instructions</i> for grease specifications.	
THREAD LOCKING COMPOUND (Thread Locker)	
Used to lock threaded fasteners in position. Available in low, medium and high strength for various size fasteners and applications. Most thread locking compounds are applied immediately prior to fastener installation. Some thread locking compounds use a "Wicking" feature, and can be applied after fastener installation. Most thread locking compounds allow the fastener to be removed with standard tools once cured. High strength thread locking compounds may require applying heat to the fastener and the surrounding area to allow fastener removal.	
<b>Note:</b> Some fasteners have a dry thread locking compound pre-applied (Patch-Loc) so no additional thread locking compound is necessary when installing a "new" fastener. These fasteners are designed to be removed and re-installed only once before applying additional thread locking compound is necessary.	
RETAINING COMPOUND (bearings and sleeves)	
An adhesive used to secure bearings, bushings and cylindrical parts into housings or onto shafts. When cured, bearing and sleeve retaining compound fills the gap between mating parts with a hard resin that increases load distribution and protects against corrosion.	
ADHESIVE	
Used to secure a variety of components immediately prior to assembly. May be recommended for installing new components or when reusing a component that had a pre-applied adhesive such as hood seals, mouldings and weather-stripping.	
THREAD SEALANT	
Used to seal threaded fittings and sensors from air, fuel and oil pressure leaks and prevent galling and seizure between threaded parts. A thread sealant in paste firm is preferred over sealant tape. The sealant should remain semi-pliable to allow for component removal with standard tools. Some thread sealants may require the use of a cleaner or primer prior to use.	

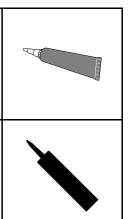
#### GASKET COMPOUND

Used to create a seal between mating parts. Gasket compounds may be used with or without the presence of a pre-formed gasket. Gasket compounds may be solvent or silicone based, and cure when exposed to air or designed to cure in an air-less environment (anaerobic). Most gasket compounds are designed to be applied to clean surfaces free of oil, chemical residue and previously used gaskets or gasket compounds.

#### SILICONE SEALANT

Designed for a broad variety of sealing and bonding requirements, silicone sealants are usually room temperature vulcanizing (RTV) which form a flexible silicone rubber that bonds to a wide variety of smooth or porous materials when cured. Standard silicone sealants are designed to perform in temperatures from -51F to 232C (-60F to 400F), while high temperature variants can preform in temperatures up to 343C (650F).

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## **Special Tools**

You can order these special tools from your Toro Distributor. Some tools may also be available from a local tool supplier.

#### Hydraulic O-Ring Kit

#### Toro Part No. 117-2727

This kit includes O-rings in a variety of sizes for the face seal and port seal hydraulic connections. To help prevent a hydraulic leak, replace the O-rings when you open the hydraulic connection.



# **General Information**

### **Hydraulic Hoses**

The hydraulic hoses are subject to extreme conditions such as pressure differentials during operation and exposure to weather, sun, chemicals, very warm storage conditions, in addition to mishandling during operation and maintenance. These conditions can cause damage to the hose or deterioration to the hose material. Some hoses are more susceptible to these conditions than others. Examine all of the hydraulic hoses of the machine frequently and repair or replace them as necessary. Hoses that move during normal machine operation should be replaced every 2 years. Check hydraulic hoses for the following signs of deterioration or damage:

- Hydraulic hoses should not be hard, cracked, cut, abraded, charred, leaking, or otherwise damaged.
- Hydraulic hoses should not be kinked, crushed, flattened, or twisted.
- Hydraulic hose covers should not be blistered, soft, degraded, or loose.
- Hydraulic hose fittings should not be cracked, damaged, or badly corroded.

#### A

#### WARNING

Release all pressure in the hydraulic system before performing any work on the hydraulic system:

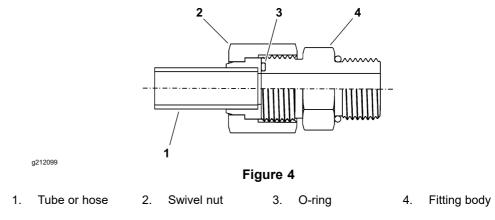
- Keep your body and hands away from pin-hole leaks or nozzles that eject hydraulic fluid under high pressure.
- Do not use your hands to search for leaks; use a piece of paper or cardboard.
- Hydraulic fluid escaping under pressure can have sufficient force to penetrate the skin and cause serious injury.
- If hydraulic fluid is injected into your skin, the fluid damage to your body must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

When you replace a hydraulic hose, ensure that the hose is straight (not twisted) before you tighten the fittings. Observe the imprint (layline) on the hose to do this. Using two wrenches, hold the hose straight with one wrench and tighten the hose swivel nut onto the fitting with the other wrench; refer to Installing Hydraulic Hoses and Tubes (O-Ring Face Seal) (page 2–13).

**Note:** If the hose has an elbsow at one end, tighten the swivel nut on the elbsow end before you tighten the nut on the straight end of the hose.

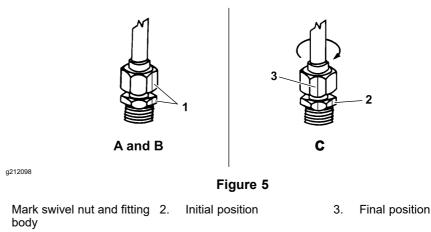
For more hydraulic hose information, refer to the Toro Basics Series Training Book *Hydraulic Hose Servicing* (Part No. 94813SL).

### Installing Hydraulic Hoses and Tubes (O-Ring Face Seal)



- 1. Ensure that all the threads, the sealing surfaces of the hose/tube, and the fitting are free of burrs, nicks, scratches, or unwanted material.
- 2. To help prevent a hydraulic leak, replace the face seal O-ring when you open the connection. Ensure that the O-ring is installed and correctly seated in the groove of the fitting. Lightly lubricate the O-ring with clean hydraulic fluid.
- 3. Align the hose/tube against the body of the fitting so that the flat face of the hose/tube sleeve fully touches the O-ring in the fitting (Figure 4).
- 4. Use your hand to thread the swivel nut onto the fitting. While you hold the hose/tube in alignment with a wrench, use a torque wrench to tighten the swivel nut to the recommended torque value within the specified range of torque values; refer to the Torque Specifications (page 2–3). This procedure to tighten the swivel nut requires a drive-adapter wrench (e.g., crowfoot wrench).

**Note:** It may be necessary to use a drive-adapter wrench (e.g., crowfoot wrench) to install a hydraulic fitting; refer to Installing the Hydraulic Fittings (SAE Straight Thread O-Ring Fittings) (page 2–15).



1.

# Installing Hydraulic Hoses and Tubes (O-Ring Face Seal) (continued)

Fitting Dash Size	Hose/Tube Side Thread Size (inch)—threads per inch)	Installation Torque
4	9/16—18	25 to 29 N·m (18 to 22 ft-lbs)
6	11/16—16	37 to 44 N·m (27 to 33 ft-lbs)
8	13/16—16	51 to 63 N·m (37 to 47 ft-lbs)
10	1—14	82 to 100 N·m (60 to 74 ft-lbs)
12	1–3/16—12	116 to 142 N⋅m (85 to 105 ft-lbs)
16	1–7/16—12	150 to 184 N·m (110 to 136 ft-lbs)
20	1–11/16—12	190 to 233 N·m (140 to 172 ft-lbs)

#### Hose/Tube Installation Torque Table

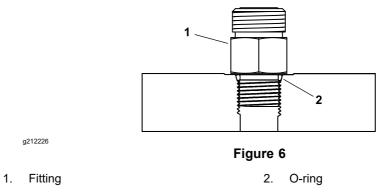
#### Flats From Wrench Resistance Table

Size	FFWR
4 (1/4 inch nominal hose or tubing)	1/2 to 3/4
6 (3/8 inch)	1/2 to 3/4
8 (1/2 inch)	1/2 to 3/4
10 (5/8 inch)	1/2 to 3/4
12 (3/4 inch)	1/3 to 1/2
16 (1 inch)	1/3 to 1/2

- 5. If a torque wrench is not available or if space at the swivel nut prevents the use of a torque wrench, use the alternative procedure Flats From Wrench Resistance (FFWR) given below.
  - A. Use a wrench to tighten the swivel nut onto the fitting until you feel light resistance with the wrench—approximately **3.39 N·m** (**30 in-lbs**).
  - B. Put a mark on the swivel nut and body of the fitting (item 1 in Figure 5). If connecting a hose, hold the hose in alignment with a wrench to prevent the hose from turning.
  - C. Use a wrench to tighten the nut to the correct Flats From Wrench Resistance (compare items 2 and 3 in Figure 5).

# Installing the Hydraulic Fittings (SAE Straight Thread O-Ring Fittings)

#### Installing a Non-Adjustable Fitting



- 1. Ensure that all the threads, the sealing surfaces of fitting, and the component port are free of burrs, nicks, scratches, or unwanted material.
- 2. To help prevent a hydraulic leak, replace the O-ring when you open the connection.
- 3. Lightly lubricate the O-ring with clean hydraulic fluid. Ensure that the threads of the fitting are clean with no lubricant applied.

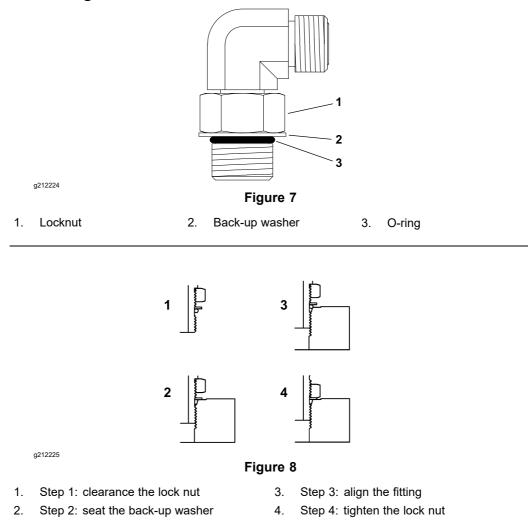
#### IMPORTANT

Before tightening the fitting, determine the material used for the port the fitting is being installed in. Installing a fitting into an aluminum port requires reducing the installation torque.

4. Install the fitting into the port, then use a torque wrench and socket to tighten the fitting to the recommended torque value within the specified range of torque values; refer to the Fitting Installation Torque Table (page 2–17).

**Note:** It may be necessary to use a drive-adapter wrench (e.g., crowfoot wrench) to install a hydraulic fitting; refer to Calculating the Torque Values When Using a Drive-Adapter Wrench (page 2–4).

- 5. If a torque wrench is not available or if space at the port prevents the use of a torque wrench, use the Flats From Finger Tight (FFFT) procedure given below:
  - A. Install the fitting into the port and tighten the fitting down full length until finger-tight.
  - B. If the port material is steel, tighten the fitting to the listed value; refer to the Flats From Finger Tight (FFFT) Table (page 2–17).
  - C. If the port material is aluminum, tighten the fitting to 60% of the listed value; refer to the Flats From Finger Tight (FFFT) Table (page 2–17).



- 1. Ensure that all the threads, the sealing surfaces of fitting, and the component port are free of burrs, nicks, scratches, or unwanted material.
- 2. To help prevent a hydraulic leak, replace the O-ring when you open the connection.
- 3. Lightly lubricate the O-ring with clean hydraulic fluid. Ensure that the threads of the fitting are clean with no lubricant applied.
- 4. Turn back the lock nut as far as possible. Ensure that the back-up washer is not loose and it is pushed up as far as possible (Step 1 in Figure 8).
- 5. Install the adjustable fitting into the port by hand until the washer contacts the face of the port (Step 2 in Figure 8).
- 6. If the adjustable fitting needs to align with another component, rotate the fitting counterclockwise until it is aligned to the desired position (Step 3 in Figure 8). Do not rotate the adjustable fitting more than 1 turn counterclockwise.

#### IMPORTANT

Before tightening the fitting, determine the material used for the port the fitting is being installed in. Installing a fitting into an aluminum port requires reducing the installation torque.

#### Installing an Adjustable Fitting (continued)

- 7. Tighten the fitting lock nut (Step 4 in Figure 8):
  - A. Hold the fitting in the correct alignment with a wrench and use a torque wrench and tighten the lock nut to the recommended torque value within the specified range of torque values; refer to the Fitting Installation Torque Table (page 2–17). This tightening procedure requires a drive-adapter wrench (e.g., crowfoot wrench); refer to Calculating the Torque Values When Using a Drive-Adapter Wrench (page 2–4).
  - B. If a torque wrench is not available or if space at the port prevents the use of a torque wrench, hold the fitting in the correct alignment with a wrench and tighten the lock nut with a second wrench.
  - C. If the port material is steel, tighten the fitting to the listed Flats From Finger Tight (FFFT) value; refer to the Flats From Finger Tight (FFFT) Table (page 2–17).
  - D. If the port material is aluminum, tighten the fitting to 60% of the listed FFFT value; refer to the Flats From Finger Tight (FFFT) Table (page 2–17).

Fitting Dash Size	Fitting Port Side Thread Size (inch)—threads per inch)	Installation Torque Into Steel Port	Installation Torque Into Aluminum Port
4	7/16—20	21 to 25 N·m (15 to 19 ft-lbs)	13 to 15 N·m (9 to 11 ft-lbs)
5	1/2—20	25 to 29 N·m (18 to 22 ft-lbs)	15 to 20 N⋅m (11 to 15 ft-lbs)
6	9/16—18	47 to 56 N·m (34 to 42 ft-lbs)	28 to 35 N·m (20 to 26 ft-lbs)
8	3/4—16	79 to 97 N·m (58 to 72 ft-lbs)	48 to 58 N⋅m (35 to 43 ft-lbs)
10	7/8—14	135 to 164 N·m (99 to 121 ft-lbs)	82 to 100 N·m (60 to 74 ft-lbs)
12	1–1/16—12	182 to 222 N·m (134 to 164 ft-lbs)	110 to 134 N·m (81 to 99 ft-lbs)
14	1–3/16—12	217 to 265 N·m (160 to 196 ft-lbs)	131 to 160 N⋅m (96 to 118 ft-lbs)
16	1–5/16—12	274 to 336 N·m (202 to 248 ft-lbs)	165 to 202 N·m (121 to 149 ft-lbs)
20	1–5/8—12	335 to 410 N·m (247 to 303 ft-lbs)	202 to 248 N·m (149 to 183 ft-lbs)

#### Fitting Installation Torque Table

#### Flats From Finger Tight (FFFT) Table

Size	FFFT
4 (1/4 inch nominal hose or tubing)	1.00 ± 0.25
6 (3/8 inch)	1.50 ± 0.25
8 (1/2 inch)	1.50 ± 0.25
10 (5/8 inch)	1.50 ± 0.25
12 (3/4 inch)	1.50 ± 0.25
16 (1 inch)	1.50 ± 0.25

### General Precautions for Removing and Installing Hydraulic System Components

#### Before Repair or Replacement of Hydraulic Components

- 1. Before removing any parts from the hydraulic system, park the machine on a level surface, engage parking brake, lower the attachments and stop engine. Remove key from the key switch.
- 2. Clean machine before disconnecting, removing or disassembling any hydraulic components. Make sure that the hydraulic components, hoses connections and fittings are cleaned thoroughly. Always keep in mind the need for cleanliness when working on hydraulic equipment.
- 3. Put caps or plugs on any hydraulic lines, hydraulic fittings and components left open or exposed to prevent system contamination.
- 4. Put labels on disconnected hydraulic lines and hoses for proper installation after repairs are completed.
- 5. Note the position of hydraulic fittings (especially elbsow fittings) on hydraulic components before removal. Mark parts if necessary to make sure they will be aligned properly when installing hydraulic hoses and tubes.

#### After Repair or Replacement of Hydraulic Components

- 1. Lubricate O-rings and seals with clean hydraulic oil before installing hydraulic components.
- 2. Make sure that the caps or plugs are removed from the hydraulic tubes, hydraulic fittings and components before reconnecting.
- Use proper tightening methods when installing hydraulic hoses and fittings (see Installing the Hydraulic Fittings (SAE Straight Thread O-Ring Fittings) (page 2–15)).
- 4. After repairs, check control linkages or cables for proper adjustment, binding or broken parts.
- 5. After disconnecting or replacing any hydraulic components, operate machine functions slowly until air is out of system.
- 6. Check for hydraulic oil leaks. Shut off engine and correct leaks if necessary. Check oil level in hydraulic reservoir and add correct oil if necessary.

### **Chapter 3**

# Troubleshooting

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Evaluate Potential Causes	
Assess Performance	3–2
Repair	3–2
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# GEARS – The Systematic Approach to Defining, Diagnosing and Solving Problems

### **Gather Information**

- Information reported by the customer
- Information observed by you
- Establish the what, where and when of the issue

### **Evaluate Potential Causes**

- · Consider possible causes of the problem to develop a hypothesis
- Narrow down the focus of the problem

### **Assess Performance**

- Ensure you have all the necessary tools for testing
- Test all potential causes of the failure
- Reevaluate and create a new hypothesis if necessary

### Repair

• Return the unit to service by repairing, rebuilding or replacing

### **Solution Confirmation**

- Did the issue go away
- Was the root cause of the issue correctly repaired
- Are there any other new symptoms

### Chapter 4

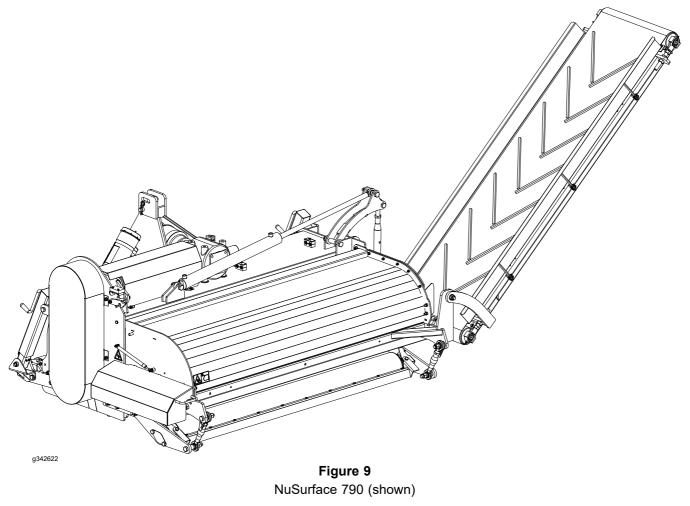
# NuSurface 790 (Model No. 46452)

# **Table of Contents**

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Rotor Assembly	
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# **General Information**

The operators manual provides information regarding the operation, general maintenance, and maintenance intervals for your NuSurface 790 (Model Number 46452). Refer to the *Operator's Manual* for additional information when servicing the machine.



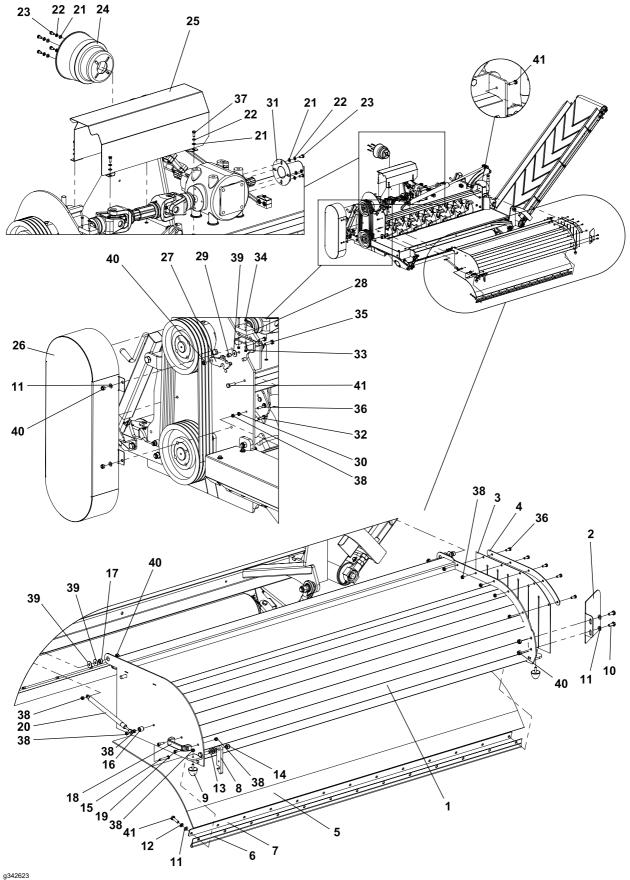
# **Technical Data**

### NuSurface 790

ltem	Description
Working width	2.0 meters (79 in)
Working depth	Up to 50 mm (2 in)
Working speed	The working speed depends on the conditions and the required result. It is maximum 3 km/h (1.8 mph).
Weight	1319 kg (2908 lbs)
Three-point connection	Cat. 2
Gearbox oil to be used	SAE 140
Bearing grease to be used	EP2
Recommended tractor HP	40 - 50 HP
Minimum lift capacity of the tractor 610 mm (24 in) behind the link arms	1650 kg ( 3640 lbs)
Hydraulic connections of the tractor	2x double-acting valves
PTO rpm	540
Standard items	PTO Frase knives
Optional	Scarify knives

# **Service and Repairs**

# Covers



#### Figure 10 (continued)

1.	Rear cover	15.	Bolt	29.	Distance bush
2.	Material divider	16.	Bush	30.	Distance bush
3.	Gate rubber	17.	Pivot bush (2 each)	31.	PTO shaft cover
4.	Clamp strip	18.	Handle	32.	Bolt (4 each)
5.	Guide plate	19.	Bolt (2 each)	33.	Self-locking nut (2 each)
6.	Close rubber	20.	Gas strut	34.	Bolt (2 each)
7.	Clamp strip	21.	Washer (12 each)	35.	Bolt
8.	Safety hook	22.	Spring washer (12 each)	36.	Bolt
9.	Rubber stop (2 each)	23.	Bolt (8 each)	37.	Bolt (9 each)
10.	Bolt (2 each)	24.	PTO Cover	38.	Self-locking nut (13 each)
11.	Washer (19 each)	25.	Safety cover	39.	Large washer (5 each)
12.	Spring washer (13 each)	26.	Safety cover	40.	Self-locking nut (9 each)
13.	Washer (3 each)	27.	Safety hook	41.	Bolt (15 each)
14.	Self-locking nut	28.	Rubber stop		

### **Removing the Covers**

A



Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the roller to prevent it from moving.
- 4. To remove the PTO cover (item 24 in Figure 10):
  - A. Remove the four bolts (23), spring washers (22) and washers (21) that secures the PTO cover (24) to the gearbox.
  - B. Remove the PTO cover (24) from the gearbox.
- 5. To remove the driveshaft cover (25):
  - A. Remove the four bolts (37), spring washers (22) and washers (21) that secures the driveshaft cover (25) to the main frame.
  - B. Remove the driveshaft cover (25) from the main frame.
- 6. To remove the pulley drive cover (26):
  - A. Remove the four self-locking nuts (40), washers (11) and bolts (32) that secures the pulley drive cover (26) to the main frame.
  - B. Remove the pulley drive cover (26) from the main frame.

A

### CAUTION

To prevent personal injury, make sure that rear cover assembly is supported as it is removed from the machine. The rear cover assembly weighs approximately 60 kg (132 lbs).

- 7. To remove the rear cover assembly:
  - A. Remove the two self-locking nuts (38) that secures the gas strut (20) to the main frame and the rear cover.
  - B. Remove the gas strut (20) from the machine.
  - C. Remove the two self-locking nuts (40), washers (39), and bolts (41) that secures the rear cover assembly to the main frame.
  - D. Remove the rear cover assembly from the machine.
  - E. If necessary, disassemble the rear cover assembly by using the Figure 10 as a guide.

### Installing the Covers

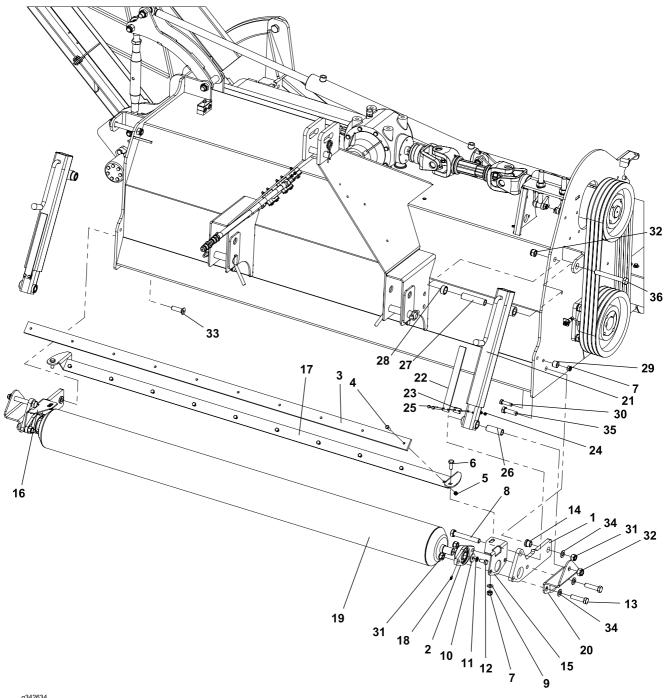


To prevent personal injury, make sure that rear cover assembly is supported as it is installed to the machine. The rear cover assembly weighs approximately 60 kg (132 lbs).

- 1. If removed, assemble the rear cover assembly by using the Figure 10 as a guide.
- 2. To install the rear cover assembly:
  - A. Position the rear cover assembly onto the machine.
  - B. Secure the rear cover assembly to the main frame with two bolts (41), washers (39) and self-locking nuts (40).
  - C. Position the gas strut (20) onto the machine.
  - D. Secure the gas strut (20) to the main frame and rear cover assembly with two self-locking nuts (38).
- 3. Install the pulley drive cover (26):
  - A. Position the pulley drive cover (26) onto the main frame.
  - B. Secure the pulley drive cover (26) to the main frame with four bolts (32), washers (11) and self-locking nuts (40).
- 4. To install the driveshaft cover (25):
  - A. Position the driveshaft cover (25) onto the main frame.
  - B. Secure the driveshaft cover to main frame with four washers (21), spring washers (22) and bolts (37).
- 5. To install the PTO cover (24):
  - A. Position the PTO cover (24) onto the gearbox.
  - B. Secure the PTO cover (24) to the gearbox with four washers (21), spring washers (22) and bolts (23).
- 6. Lubricate the grease fittings; refer to Operator's Manual.
- 7. Check the operation of the machine.

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# **Front Roller Assembly**



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#### Figure 11 (continued)

1.	Front roller strip (2 each)	13.	Bolt (4 each)	25.	Bolt (4 each)
2.	Bearing (2 each)	14.	Pivot bush (2 each)	26.	Distance bush (2 each)
3.	Scraper strip	15.	Scraper back left	27.	Distance bush (2 each)
4.	Bolt (10 each)	16.	Scraper back right	28.	Distance bush (2 each)
5.	Self-locking nut (10 each)	17.	Scraper	29.	Bush (2 each)
6.	Bolt (2 each)	18.	Grease nipple (2 each)	30.	Bolt (2 each)
7.	Self-locking nut (4 each)	19.	Roller	31.	Self-locking nut (6 each)
8.	Bolt (2 each)	20.	Support bracket (2 each)	32.	Self-locking nut (4 each)
9.	Washer (2 each)	21.	Jack (2 each)	33.	Socket head bolt
10.	Large washer (2 each)	22.	Height indicator strip (2 each)	34.	Washer (6 each)
11.	Spring Washer (2 each)	23.	Distance block (2 each)	35.	Bolt
12.	Bolt (2 each)	24.	Self-locking nut (4 each)	36.	Bolt (2 each)

### **Removing the Front Roller Assembly**

### A

#### CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the rear roller to prevent it from moving.

### 

### CAUTION

To prevent personal injury, make sure that the roller assembly is supported as it is removed from the machine. Roller weighs approximately 36 kg (80 lbs).

- 4. Remove the two nuts (item 32 in Figure 11) and bolts (8) that secures the front roller assembly to the jacks (21).
- 5. Remove the two nuts (31), washers (34), socket head bolt (33) and bolt (35) that secures the front roller strips (1) to the main frame.
- 6. Remove the front roller assembly from the machine.
- 7. If necessary, disassemble the front roller assembly by using the Figure 11 as a guide.

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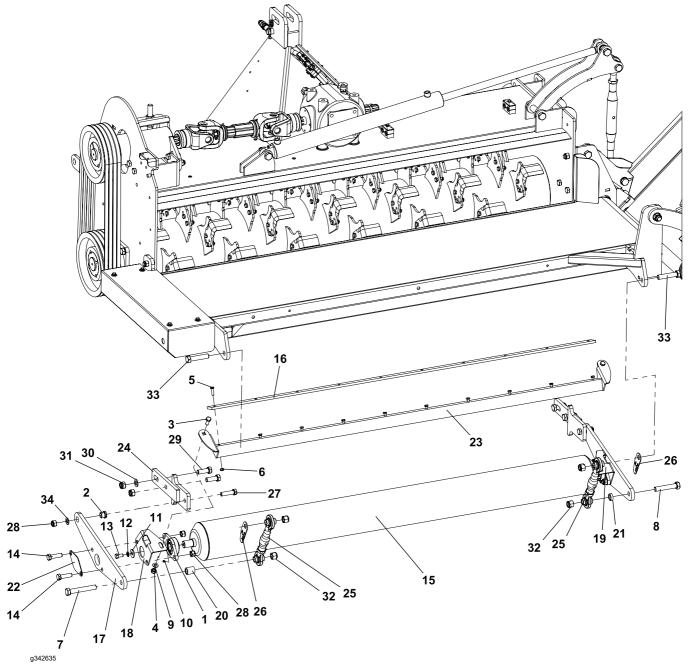
## CAUTION

To prevent personal injury, make sure that the roller assembly is supported as it is installed to the machine. Roller weighs approximately 36 kg (80 lbs).

- 1. If removed, assemble the front roller assembly using the Figure 11 as a guide.
- 2. Position the front roller assembly onto the machine. Make sure that the pivot bushings (14) are placed into the front roller strip (1).
- 3. Secure the front roller strip to the main frame with the bolt (35) (left side of the roller), socket head bolt (33) (right side of the of the roller), washers (34) and nuts (31).
- 4. Make sure that the distance bushes (26) are positioned inside the jacks (21).
- 5. Secure the front roller assembly to the jacks (21) with the two bolts (8) and nuts (32).
- 6. Check that the roller is free to rotate and no binding exists.
- 7. Adjust the position of the front roller; refer to Operator's Manual.
- 8. Lubricate the grease fittings; refer to Operator's Manual.
- 9. Check the operation of the machine.

A

# **Rear Roller Assembly**





#### Figure 12 (continued)

- 1. Bearing (2 each)
- 2. Pivot bush (2 each)
- 3. Bolt (2 each)
- 4. Self-locking nut (2 each)
- 5. Bolt (10 each)
- 6. Self-locking nut 10 each)
- 7. Hex bolt
- 8. Hex bolt
- 9. Washer (2 each)
- 10. Grease nipple (2 each)
- 11. Large washer (2 each)
- 12. Spring washer (2 each)

- 13. Bolt (2 each)
- 14. Bolt (4 each)
- 15. Roller
- 16. Scraper strip
- 17. Rear roller strip (2 each)
- 18. Scraper back left
- 19. Scraper back right
- 20. Distance bush
- 21. Distance bush
- 22. Cover plate (2 each)
- 23. Scraper
- 24. Pivot support (2 each)

- 25. Toplink (2 each)
- 26. Depth adjustment gauge (2 each)
- 27. Bolt (2 each)
- 28. Self-locking nut (6 each)
- 29. Bolt (4 each)
- 30. Washer (2 each)
- 31. Self-locking nut (4 each)
- 32. Self-locking nut (4 each)
- 33. Hex bolt (2 each)
- 34. Washer (2 each)

### **Removing the Rear Roller Assembly**

A

CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.

### A

### CAUTION

To prevent personal injury, make sure that the roller assembly is supported as it is removed from the machine. Roller weighs approximately 36 kg (80 lbs).

- 4. Remove the nut (item 32 in Figure 12), distance bush (20) and bolt (7) that secures the left side of the rear roller assembly to the toplink (25).
- 5. Remove the nut (32), distance bush (21) and bolt (8) that secures the right side of the rear roller assembly to the toplink (26).
- 6. Remove the two self-locking nuts (28), washers (34) and bolts (27) that secures the rear roller strips (17) to the pivot support (24).
- 7. Remove the rear roller assembly from the machine.
- 8. If necessary, disassemble the rear roller assembly by using the Figure 12 as a guide.

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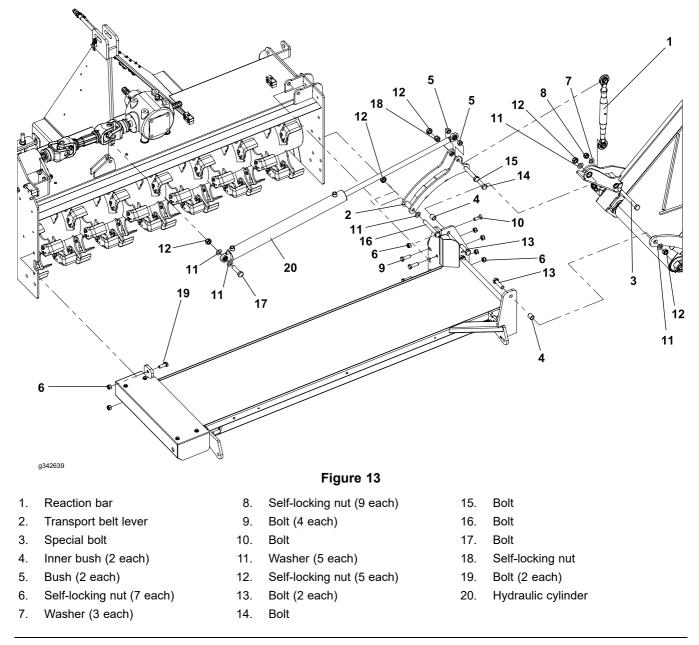
### CAUTION

To prevent personal injury, make sure that the roller assembly is supported as it is installed to the machine. Roller weighs approximately 36 kg (80 lbs).

- 1. If removed, assemble the rear roller assembly using the Figure 12 as a guide.
- 2. Position the rear roller assembly onto the machine. Make sure that the pivot bushings (2) are placed into the rear roller strip (17).
- 3. Secure the rear roller strip (17) to the pivot support (24) with the two bolts (27), washers (34) and self-locking nuts (29).
- 4. Secure the rear roller assembly to the right side of the toplink (26) with the distance bush (24), bolt (8) and nut (32).
- 5. Secure the rear roller assembly to the left side of the toplink (26) with the distance bush (20), bolt (7) and nut (32).
- 6. Check that the roller is free to rotate and that no binding exists.
- 7. Adjust the position of the rear rollers; refer to Operator's Manual
- 8. Lubricate the grease fittings; refer to Operator's Manual.
- 9. Connect the machine to the traction unit and check the operation of the machine.

A

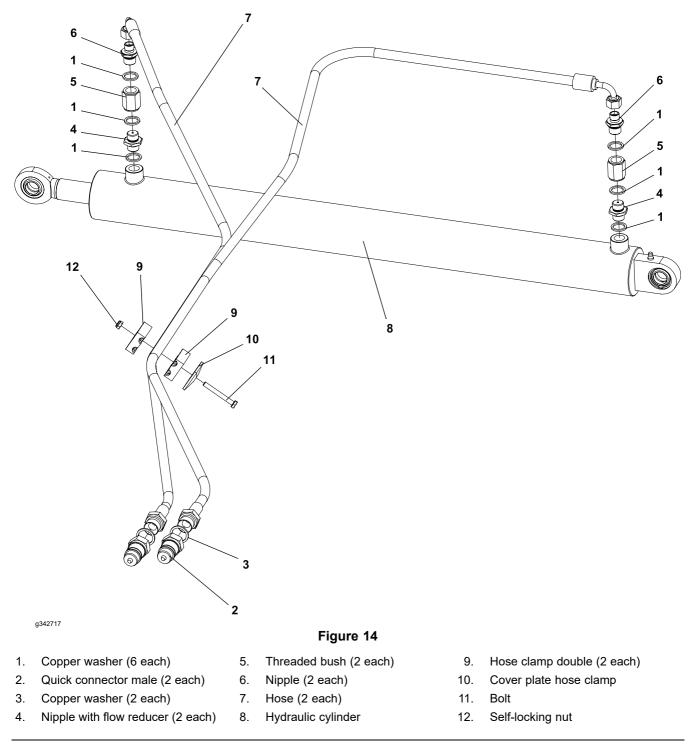
# Hydraulic Cylinder

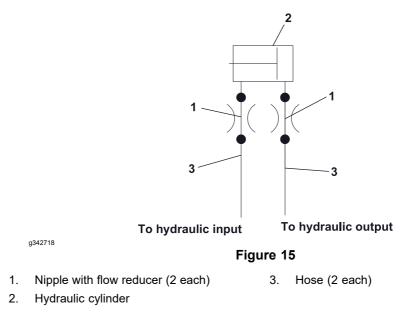


### **Removing the Hydraulic Cylinder**

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Lower the upper conveyor and make sure that the hydraulic cylinder is not under load.
- 5. To prevent contamination of hydraulic system during removal, thoroughly clean the exterior hydraulic fittings.
- 6. Read the General Precautions for Removing and Installing Hydraulic System Components (page 2–18).

### Removing the Hydraulic Cylinder (continued)





7. Label the hydraulic hose positions for assembly purposes.

8. Disconnect the hydraulic hoses from the hydraulic cylinder and put caps or plugs on open hydraulic lines and fittings; refer to Figure 14 and Figure 15.

# To prevent personal injury, make sure that the hydraulic cylinder is supported as it is removed from the machine.

- 9. Remove the self-locking nut (item 12 in Figure 13), bolt (15) and bushes (5) that secures the hydraulic cylinder (20) to the transport belt lever (2).
- 10. Remove the self-locking nut (12), washers (11) and bolt (17) that secures the hydraulic cylinder (20) to the main frame.
- 11. If necessary, remove the fittings and O-rings from the hydraulic cylinder; refer to Figure 14.
- 12. Discard the O-rings.

### Installing the Hydraulic Cylinder

1. If removed, install the hydraulic fittings with new O-rings into the hydraulic cylinder ports; refer to Figure 14 and Installing the Hydraulic Fittings (SAE Straight Thread O-Ring Fittings) (page 2–15).

A

### CAUTION

A

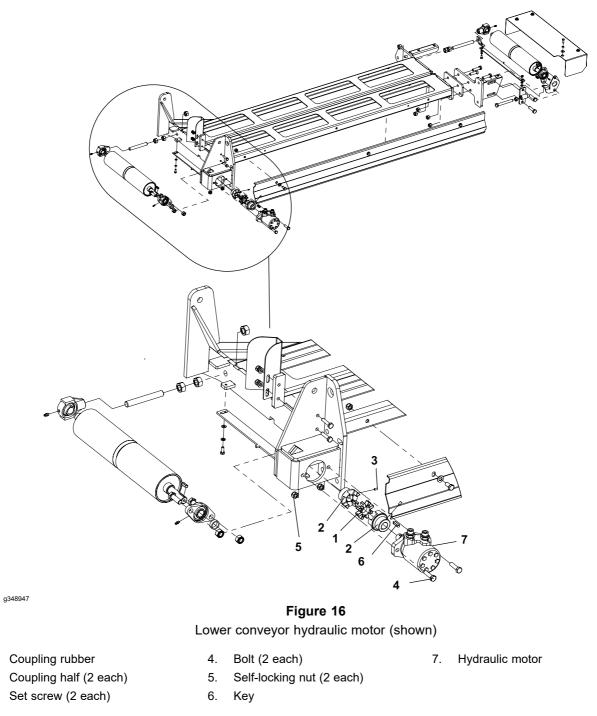
To prevent personal injury, make sure that the hydraulic cylinder is supported as it is installed to the machine.

- 2. Position the hydraulic cylinder (20) onto the machine mounting points; refer to Figure 13.
- 3. Secure the hydraulic cylinder (20) to the main frame with the bolt (17), washers (11) and self-locking nut (12).

### Installing the Hydraulic Cylinder (continued)

- 4. Secure the hydraulic cylinder (20) to the transport belt lever (2) with the bolt (15), bushes (5) and self-locking nut (12).
- 5. Remove the caps and plugs from the hydraulic hoses and fittings that are installed during the removal procedure.
- 6. Install the hydraulic hoses using marks made during the removal process to properly orientate the parts. Refer to Installing Hydraulic Hoses and Tubes (O-Ring Face Seal) (page 2–13), Figure 14 and Figure 15.
- 7. Lubricate the grease fittings; refer to Operator's Manual.
- 8. Operate machine functions slowly until air is out of hydraulic system.

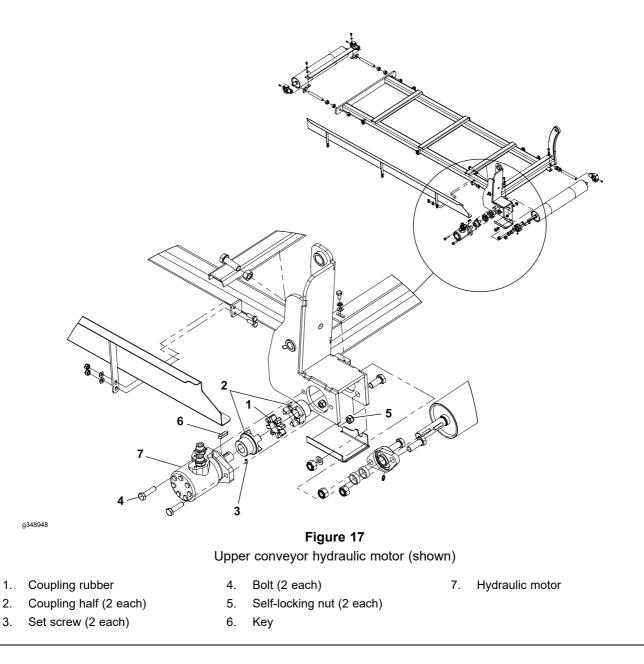
# **Hydraulic Motors**



1.

2.

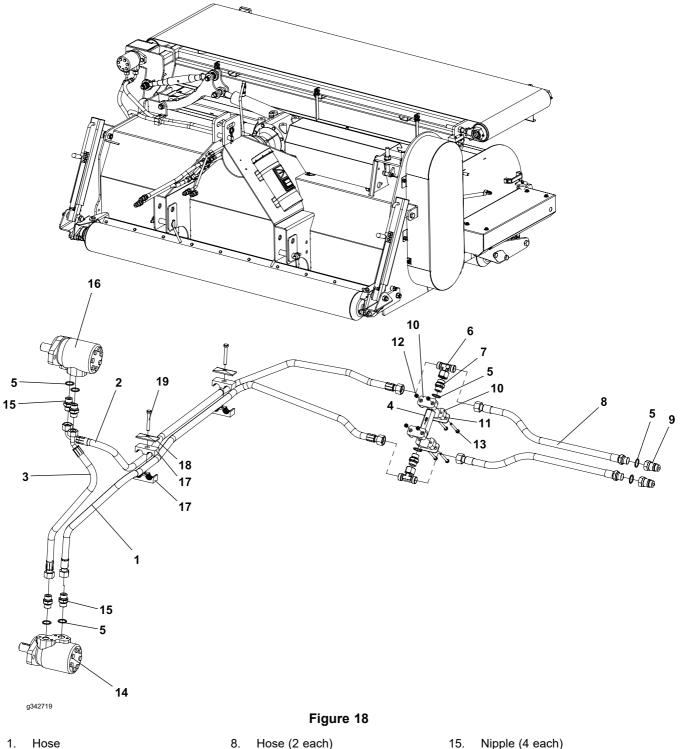
3.



### **Removing the Hydraulic Motors**

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Lower the upper conveyor and make sure that the hydraulic cylinder is not under load.
- 5. To prevent contamination of hydraulic system during removal, thoroughly clean the exterior hydraulic fittings.
- 6. Read the General Precautions for Removing and Installing Hydraulic System Components (page 2–18).

### **Removing the Hydraulic Motors (continued)**

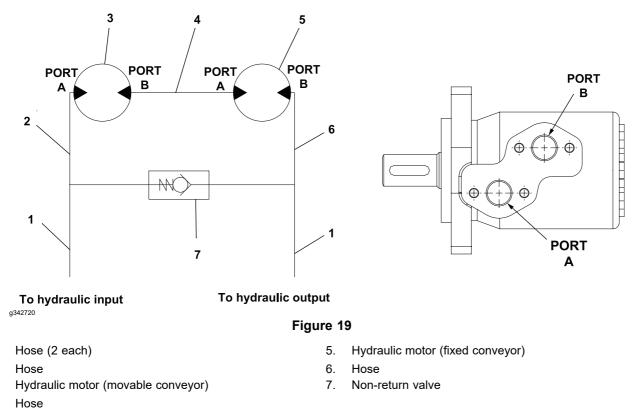


- 2. Hose
- 3. Hose
- SL Non-return valve 4.
- 5. Copper washer (8 each)
- 6. T-Connector (2 each)
- 7. Nipple (2 each)

- Hose (2 each)
- 9. Quick connector male (2 each)
- 10. Pipe clamp single (4 each)
- Deck plate (2 each) 11.
- 12. Self-locking nut (4 each)
- 13. Bolt (4 each)
- 14. Hydraulic motor

- 15. Nipple (4 each)
- Hydraulic motor 16.
- 17. Hose clamp double (4 each)
- Cover plate hose clamp (2 each) 18.
- 19. Bolt (2 each)

## **Removing the Hydraulic Motors (continued)**



7. Disconnect the hydraulic hoses from the hydraulic motors and put caps or plugs on open hydraulic lines and fittings. Label disconnected hydraulic lines for proper assembly; refer to Figure 18 and Figure 19.

# A

1.

2. 3.

4.

# CAUTION

To prevent personal injury, make sure that the hydraulic motor is supported as it is removed from the machine.

- 8. Remove the two nuts (item 5 in Figure 16) and bolts (4) that secures the hydraulic motor (7) to the lower conveyor frame.
- 9. If necessary, remove the parts from the hydraulic motor (7) using the Figure 16 as a guide.
- 10. Remove the two nuts (item 5 in Figure 17) and bolts (4) that secures the hydraulic motor (7) to the upper conveyor frame.
- 11. If necessary, remove the parts from the hydraulic motor (7) using the Figure 17 as a guide.
- 12. If necessary, remove the fittings and O-rings from the hydraulic motors; refer to Figure 18.
- 13. Discard the O-rings.

A

### Installing the Hydraulic Motors

A

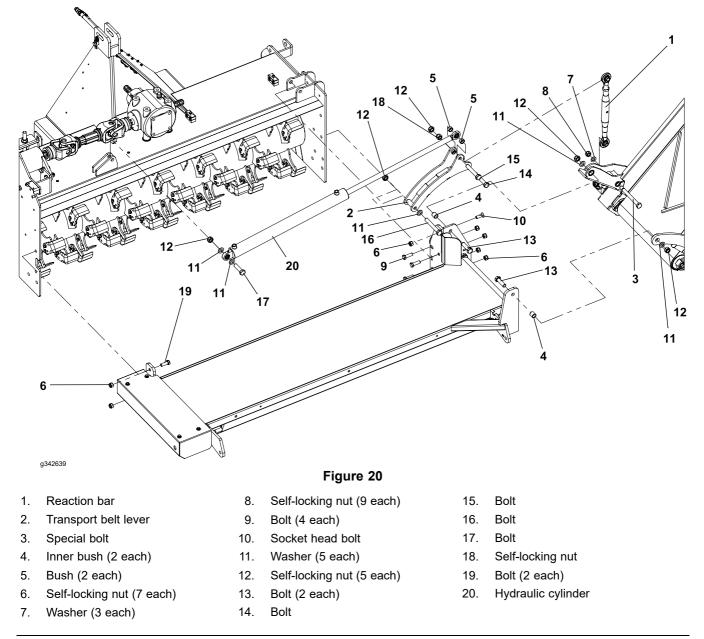
 If removed, install the hydraulic fittings with new O-rings into the hydraulic motor ports; refer to Figure 18 and Installing the Hydraulic Fittings (SAE Straight Thread O-Ring Fittings) (page 2–15).

#### 

To prevent personal injury, make sure that the hydraulic motor is supported as it is installed to the machine.

- 2. If removed, assemble the parts onto the hydraulic motor using the Figure 18 as a guide.
- 3. Position the hydraulic motor (7) onto the upper conveyor frame; refer to Figure 18.
- 4. Secure the hydraulic motor (7) with the two bolts (4) and nuts (5).
- 5. If removed, assemble the parts onto the hydraulic motor using the Figure 17 as a guide.
- 6. Position the hydraulic motor (7) onto the lower conveyor frame; refer to Figure 17.
- 7. Secure the hydraulic motor (7) with the two bolts (4) and nuts (5).
- 8. Remove the caps and plugs from the hydraulic hoses and fittings that are installed during removal procedure.
- Install the hydraulic hoses using marks made during the removal process to properly orientate the parts. Refer to Installing Hydraulic Hoses and Tubes (O-Ring Face Seal) (page 2–13), Figure 18 and Figure 19.
- 10. Lubricate the grease fittings; refer to Operator's Manual.
- 11. Operate machine functions slowly until air is out of hydraulic system.

# Conveyors



### **Removing the Conveyors**

#### A

### CAUTION

A

# Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Lower the upper conveyor and make sure that the hydraulic cylinder is not under load.

### **Removing the Conveyors (continued)**

A

### CAUTION

To prevent personal injury, make sure that the conveyor is supported as it is removed from the machine.

- 5. Remove the hydraulic motors from the upper and lower conveyors; refer to Removing the Hydraulic Motors (page 4–18).
- 6. To remove the upper conveyor from the machine:
  - A. Remove the self-locking nut (item 8 in Figure 20), washer (7) and special bolt (3) that secures the reaction bar (1) to the upper conveyor frame.
  - B. Remove the two self-locking nuts (12), washers (11) and bolts (13) that secures the upper conveyor frame to the lower conveyor frame.
  - C. Remove the upper conveyor from the machine. If necessary, remove the inner bush (4) from the upper conveyor frame.
  - D. Disassemble the upper conveyor; refer to Disassembling the Upper Conveyor (page 4–28).
- 7. To remove the lower conveyor from the machine:
  - A. Remove the toplinks (item 26 in Figure 12) from the lower conveyor using the Figure 12 as a guide.
  - B. Remove the two self-locking nuts (item 6 in Figure 20) and bolts (19) that secures the left side of the lower conveyor to the main frame.
  - C. Remove the five self-locking nuts (6), socket head bolt (10) and four bolts (9) that secures the right side of the lower conveyor to the main frame.
  - D. Remove the lower conveyor from the machine.
  - E. Disassemble the lower conveyor; refer to Disassembling the Lower Conveyor (page 4–26).

#### Installing the Conveyors

A

### CAUTION

A

A

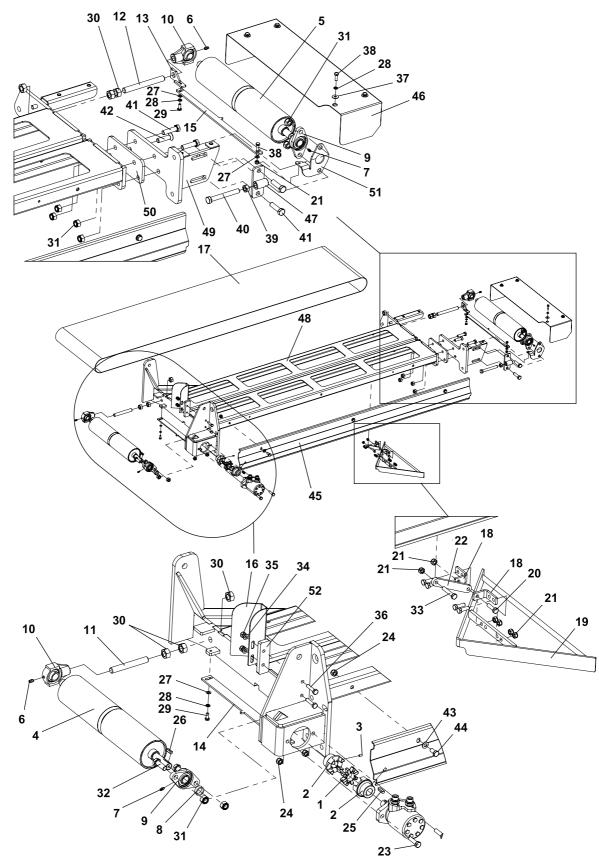
# To prevent personal injury, make sure that the conveyor is supported as it is installed onto the machine.

- 1. To install the lower conveyor onto the machine:
  - A. If disassembled, assemble the lower conveyor; refer to Assembling the Lower Conveyor (page 4–26).
  - B. Position the lower conveyor on the machine.
  - C. Secure the right side of the lower conveyor to the machine with four bolts (item 9 in Figure 20), socket head bolt (10) and five self-locking nuts (6).
  - D. Secure the left side of the lower conveyor to the machine with two bolts (19) and self-locking nuts (6).
  - E. Install the toplinks (item 26 in Figure 12) to the lower conveyor using the Figure 12 as a guide.
- 2. To install the upper conveyor onto the machine:
  - A. If disassembled, assemble the upper conveyor; refer to Assembling the Upper Conveyor (page 4–28).

### Installing the Conveyors (continued)

- B. Position the upper conveyor on the machine.
- C. If removed, insert the inner bushes (item 4 in Figure 20) into the upper conveyor frame.
- D. Secure the upper conveyor frame to the lower conveyor frame with two bolts (13), washers (11) and nuts (12).
- E. Secure the reaction bar (1) to the upper conveyor frame with a special bolt (3), washer (7) and self-locking nut (8).
- 3. Install the hydraulic motors onto the upper and lower conveyors; refer to Installing the Hydraulic Motors (page 4–21).
- 4. Check and adjust the conveyor belt alignment; refer to Operator's Manual.
- 5. Lubricate the grease fittings; refer to Operator's Manual.
- 6. Check the operation of the machine.

# Lower Conveyor



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#### Figure 21 (continued)

1.	Coupling Rubber	19.	Triangular scraper
2.	Coupling half (2 each)	20.	Bolt
3.	Set screw (2 each)	21.	Self-locking nut (7 each)
4.	Belt roller driven	22.	Strip
5.	Belt roller	23.	Bolt (2 each)
6.	Grease nipple (2 each)	24.	Self-locking nut (5 each)
7.	Grease nipple (2 each)	25.	Кеу
8.	Distance bush	26.	Кеу
9.	Bearing (2 each)	27.	Washer (4 each)
10.	Bearing (2 each)	28.	Spring washer (7 each)
11.	Threaded rod	29.	Bolt (3 each)
12.	Threaded rod	30.	Nut (6 each)
13.	Scraper bracket	31.	Self-locking nut (8 each)
14.	Roller scraper	32.	Bolt (2 each)
15.	Roller scraper	33.	Bolt
16.	Material divider	34.	Washer (2 each)
17.	Conveyor belt	35.	Self-locking nut (2 each)
18.	Bracket (2 each)	36.	Bolt (2 each)

- 37. Large washer (4 each)
- Bolt (5 each) 38.
- 39. Nut
- 40. Bolt
- 41. Bolt (4 each)
- 42. Bolt (2 each)
- Washer (3 each) 43.
- 44. Bolt (3 each)
- Deflection cover belt 45.
- Belt cover 46.
- 47. Spanner bracket
- 48. Fixed conveyor frame
- 49. Bearing bracket
- 50. Spacer plate
- 51. Scraper bracket
- 52. Spacer

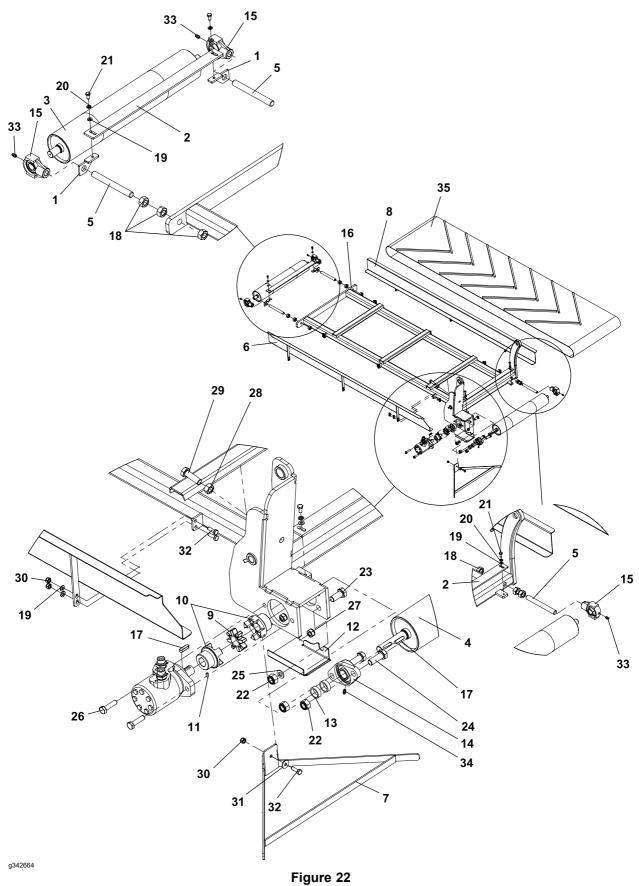
### Disassembling the Lower Conveyor

- 1. Remove the four bolts (item 38 in Figure 21), spring washers (28) and washers (37) that secures the belt cover (46) to the conveyor frame (48).
- 2. Remove the belt cover (46) from the conveyor frame (48).
- 3. On both sides of the conveyor, loosen the tension on conveyor belt (17) at belt roller (5):
  - A. Retain the bolt (40) with wrench to prevent it from turning.
  - B. Loosen the adjusting nut (39) to remove tension on the conveyor belt (17).
  - C. Repeat for other side of the conveyor belt.
- 4. Disassemble the lower conveyor by using the Figure 21 as a guide.

### Assembling the Lower Conveyor

- 1. Assemble the lower conveyor using the Figure 21 as a guide.
- 2. On both sides of the conveyor, apply the tension to conveyor belt (17) at belt roller (5):
  - A. Retain the bolt (40) with wrench to prevent it from turning.
  - B. Tighten the adjusting nut (39) to apply tension on the conveyor belt (17).
  - C. Repeat for other side of the conveyor belt.
- 3. Lubricate the grease fittings; refer to Operator's Manual.

# **Upper Conveyor**



#### Figure 22 (continued)

- 1. Scraper bracket (2 each)
- 2. Scraper strip (2 each)
- 3. Driven roller
- 4. Driver roller
- 5. Threaded rod (3 each)
- 6. Side panel conveyor left
- 7. Scraper
- 8. Side panel conveyor right
- 9. Coupling Rubber
- 10. Coupling half (2 each)
- 11. Set screw (2 each)
- 12. Protection cover

- 13. Distance bush (2 each)
- 14. Bearing
- 15. Bearing (3 each)
- 16. External conveyor frame
- 17. Key (2 each)
- 18. Nut (9 each)
- 19. Washer (16 each)
- 20. Spring washer (4 each)
- 21. Bolt (4 each)
- 22. Self-locking nut (3 each)
- 23. Bolt
- 24. Bolt (2 each)

- 25. Washer
- 26. Bolt (2 each)
- 27. Self-locking nut (2 each)
- 28. Nut
- 29. Bolt
- 30. Self-locking nut (13 each)
- 31. Large washer
- 32. Bolt (13 each)
- 33. Grease nipple straight (3 each)
- 34. Grease nipple
- 35. Conveyor belt

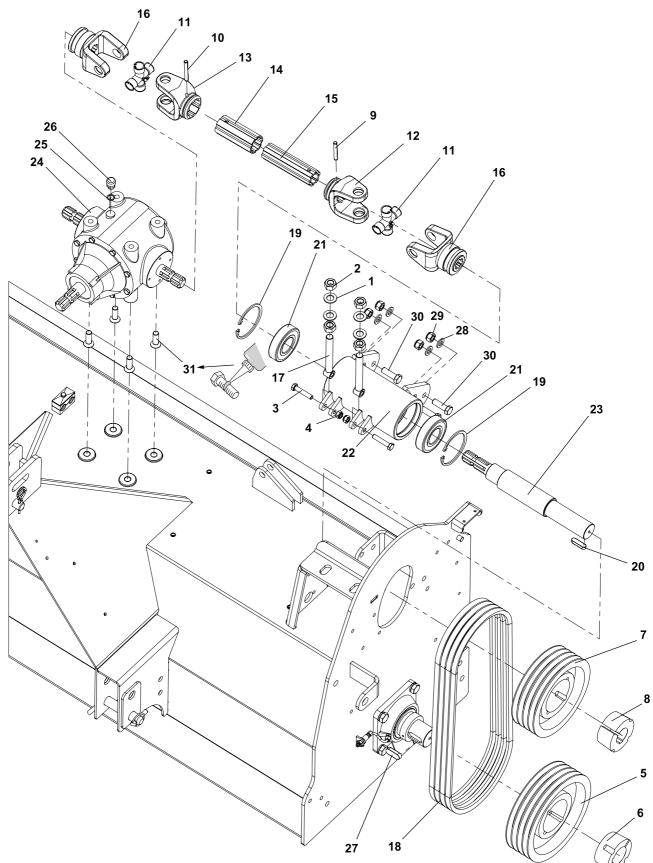
### **Disassembling the Upper Conveyor**

- 1. On both sides of the conveyor, loosen tension on the conveyor belt (item 35 in Figure 22) at driven roller (3):
  - A. Loosen the adjusting nuts (18) to remove tension on the conveyor belt (35).
  - B. Repeat for other side of the conveyor belt.
- 2. Disassemble the upper conveyor by using the Figure 22 as a guide.

### Assembling the Upper Conveyor

- 1. Assemble the upper conveyor using the Figure 22 as a guide.
- 2. On both sides of the conveyor. apply tension to conveyor belt (35) at driven roller (3):
  - A. Tighten the adjusting nut (18) to apply tension on the conveyor belt (35).
  - B. Repeat for other side of the conveyor belt.
- 3. Lubricate the grease fittings; refer to Operator's Manual.

Gearbox



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Figure 23

#### Figure 23 (continued)

- 1. Washer (4 each)
- Nut (4 each) 2.
- Bolt (2 each) 3.
- 4. Self-locking nut (2 each)
- Pulley 5.
- 6. Taper lock
- Pulley 7.
- 8. Taper lock
- 9. Inner roll pin
- 10. Outer roll pin
- Universal joint (2 each) 11.

- 12. Inner tube yoke
- 13. Outer tube yoke
- 14. Outer tube
- 15. Inner tube
- Complete collar yoke (2 each) 16.
- 17. Eye bolt spanner (2 each)
- V-Belt (4 each) 18.
- 19. Circlip (2 each)
- 20.
- Key
- 21. Bearing (2 each) 22. Bearing house driveshaft

- 23. Drive shaft
- 24. Gearbox
- 25. Copper washer
- 26. Breather
- 27. Key
- 28. Washer (4 each)
- 29. Self-locking nut (4 each)
- 30. Bolt (4 each)
- Socket head bolt (4 each) 31.

### **Removing the Gearbox**

# A

CAUTION

A

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Remove the PTO from the machine; refer to Operator's Manual.
- 5. Remove the gearbox cover and driveshaft cover from the machine; refer to Removing the Covers (page 4–5).
- 6. Slide and remove the collar yoke (item 16 in Figure 23) of the driveshaft from the gearbox shaft (24).



CAUTION

A

To prevent personal injury, make sure that the gearbox is supported as it is removed from the machine. Gearbox weighs approximately 35 kg (77 lbs).

- 7. Support gearbox to prevent it from shifting.
- 8. Remove the four socket head bolts (31) that secures the gearbox (24) to the machine frame.
- 9. Carefully remove gearbox (24) from the machine.

Â

# CAUTION

A

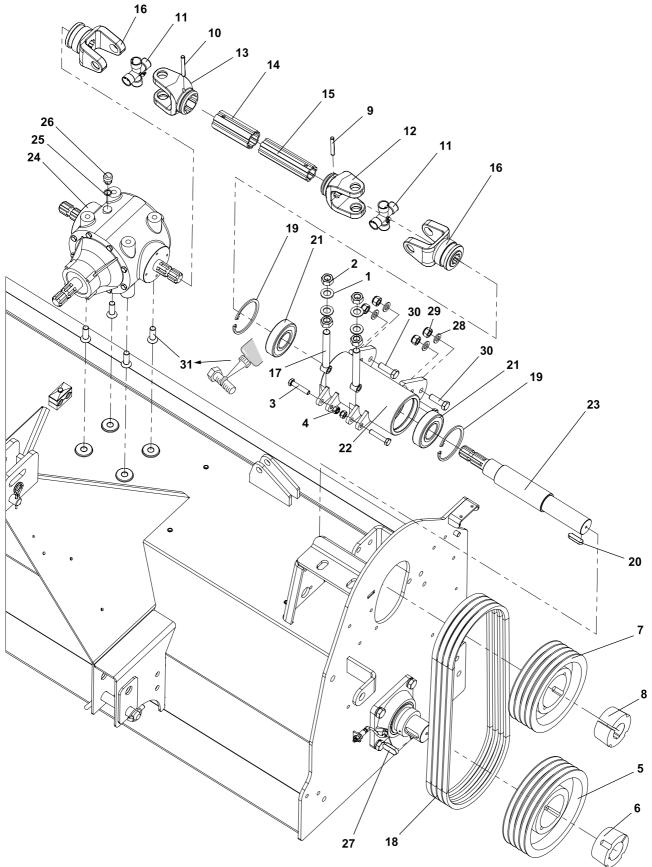
To prevent personal injury, make sure that the gearbox is supported as it is installed to the machine. Gearbox weighs approximately 35 kg (77 lbs).

- 1. Carefully position the gearbox (24) onto the machine.
- 2. Apply thread locking compound to the socket head bolts (31).
- 3. Secure the gearbox (24) to the machine frame with four socket head bolts (31).



- 4. Fill the gearbox (24) with 2.5 L (2.64 qt) of GL-5 80W-90 I oil.
- 5. Slide and install the driveshaft onto the gearbox.
- 6. Install the driveshaft cover and gearbox cover; refer to Installing the Covers (page 4–6).
- 7. Lubricate the grease fittings; refer to Operator's Manual.
- 8. Connect the machine to the traction unit and check the operation of the machine.

# **Driveshaft and Pulleys**



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#### Figure 24 (continued)

- 1. Washer (4 each)
- 2. Nut (4 each)
- 3. Bolt (2 each)
- 4. Self-locking nut (2 each)
- 5. Pulley
- 6. Taper lock
- 7. Pulley
- 8. Taper lock
- 9. Inner roll pin
- 10. Outer roll pin
- 11. Universal joint (2 each)

- 12. Inner tube yoke
- 13. Outer tube yoke
- 14. Outer tube
- 15. Inner tube
- 16. Complete collar yoke (2 each)
- 17. Eye bolt spanner (2 each)
- 18. V-Belt (4 each)
- 19. Circlip (2 each)
- 20. Key
- 21. Bearing (2 each)
- 22. Bearing house driveshaft

- 23. Driveshaft
- 24. Gearbox
- 25. Copper washer
- 26. Breather
- 27. Key
- 28. Washer (4 each)
- 29. Self-locking nut (4 each)
- 30. Bolt (4 each)
- 31. Socket head bolt (4 each)

### **Removing the Driveshaft and Pulleys**

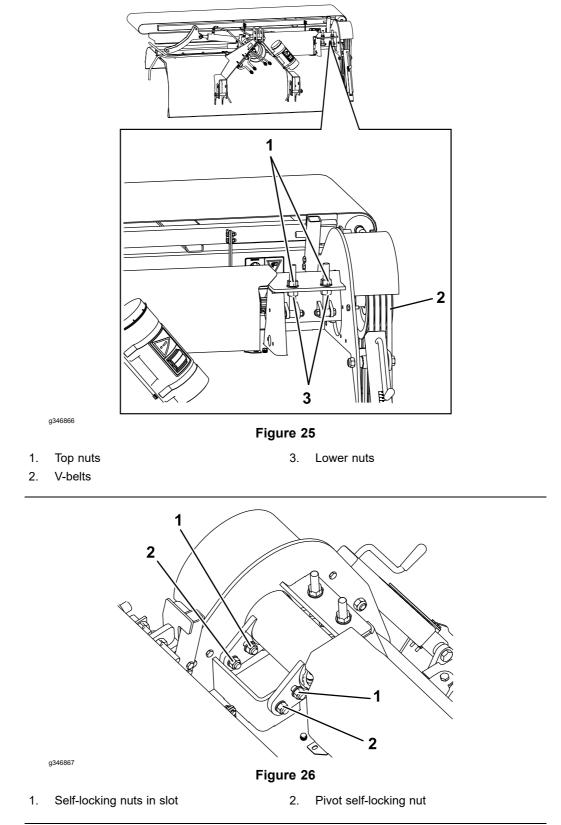
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CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Remove driveshaft cover and pulley drive cover from the machine; refer to Removing the Covers (page 4–5).
- 5. To remove the driveshaft from the machine:
  - A. Slide and remove the collar yoke (item 16 in Figure 24) of the driveshaft from the gearbox shaft (24).
  - B. Slide and remove the collar yoke (16) of the driveshaft from the bearing driveshaft (23).
  - C. Carefully remove the driveshaft from the machine.
  - D. For servicing the universal joint; refer to Servicing the Driveshaft Universal Joint and Bearing Assembly (page 4–40).
- 6. To remove the pulleys (5 and 7) from the machine:

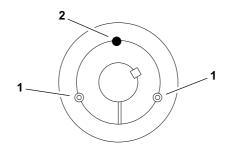
# Removing the Driveshaft and Pulleys (continued)



- A. Remove the tension on the V-belts (18) by loosening the four nuts (item 1 and 3 in Figure 25) and self-locking nuts (item 1 and 2 in Figure 26) on the bearing driveshaft assembly.
  - B. Remove the four V-belts (18) from the pulleys (5 and 7).

### **Removing the Driveshaft and Pulleys (continued)**

C. Remove the two set screw that secures the taper lock (8) to drive the pulley on the bearing drive shaft (23).

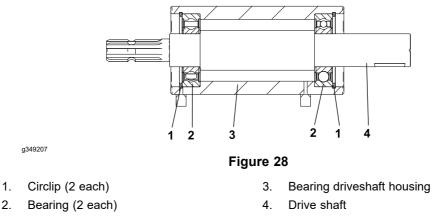


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Figure 27

1. Set screw installation position 2. Set screw removal position

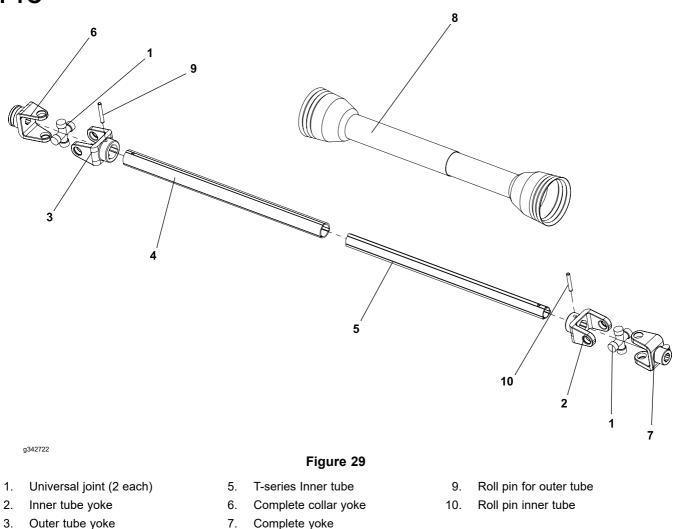
- D. Install one of the removed set screws into the threaded hole of the taper lock (8); refer to Figure 27. Tighten the set screw to loosen the taper lock (8) from the pulley (7).
- E. Repeat the steps C and D to remove the taper lock (6) from the pulley (5).
- F. Slide and remove the pulleys (5 and 7).
- G. Locate and retrieve the keys (20 and 27).
- 7. To remove the bearing driveshaft assembly from the machine:
  - A. Remove the four self-locking nuts (29), washers (28) and bolts (30) that secures the bearing driveshaft assembly to the machine frame.
  - B. Remove the nuts (2) and washers (1) that secures the eye bolt spanners (17) and bearing driveshaft assembly to the machine frame.
  - C. Remove the bearing drive shaft assembly from the machine.
  - D. Remove the two self-locking nuts (4) and bolts (3) that secures the eye bolt spanners (17) to the bearing driveshaft assembly.
- 8. To disassemble the bearing driveshaft assembly:
  - A. Remove the circlips (19) in the bearing driveshaft housing (22) that secures the bearings (21).
  - B. Use a press to remove the bearings (21) from the bearing driveshaft housing (22).
  - C. Discard the bearings (21).
  - D. Thoroughly clean and inspect the bearing driveshaft housing (22).



- 1. To assemble the bearing drive shaft assembly:
  - A. Apply a coat of grease to the new bearings (21).
  - B. Press one bearing (21) partially into the bearing driveshaft housing (22).
  - C. Carefully insert the drive shaft (23) into the bearing driveshaft housing (22) and the bearing (21); refer to Figure 24 for correct orientation of the bearing driveshaft (23).
  - D. Install another bearing (21) into the bearing drive shaft housing (22).
  - E. Check that the bearings (21) are properly seated inside the bearing drive shaft housing (22); refer to Figure 28.
  - F. Secure the bearings (21) with the two circlips (19); refer to Figure 28.
- 2. To install the bearing driveshaft assembly:
  - A. Position the two eye bolt spanners (17) onto the bearing drive shaft assembly.
  - B. Secure the two eye bolt spanners (17) with two bolts (3) and self-locking nuts (4).
  - C. Position the bearing driveshaft assembly and eye bolt spanners (17) onto the machine; refer to Figure 24 for correct orientation of the bearing driveshaft assembly.
  - D. Secure the eye bolt spanners to the machine frame with four washers (1) and nuts (2).
  - E. Secure the bearing driveshaft assembly to the machine frame with four bolts (30), washers (28) and self-locking nuts (29).
- 3. To install the pulleys (5 and 7) onto the machine:
  - A. Clean the bearing driveshaft output shaft, pulley ID (inner diameter) and taper lock (8).
  - B. Position the key (20), pulley (7), and then the taper lock (8) to the bearing driveshaft output shaft. Slide the taper lock to the shoulder on the shaft (23). Align the threaded holes of the pulley with the non-threaded holes of the taper lock.
  - C. Apply oil to the threads of the set screws and install the screws into the threads of the pulley (7). Alternately and evenly tighten the set screws.
  - D. Fill the allen recess in the set screws and taper lock threads with grease to prevent dirt from packing into the crevices.
  - E. Repeat the steps A and D to install the pulley (5) onto the rotor shaft.
  - F. Install the four V-belts (18) onto the pulleys (5 and 7).
  - G. Adjust the tension of the V-belts; refer to the Operator's Manual.

### Installing the Driveshaft and Pulleys (continued)

- 4. To install the driveshaft onto the machine:
  - A. Carefully position the driveshaft onto the machine.
  - B. The outer tube yoke (13) should be positioned towards the gearbox (24) and the inner tube yoke (12) should be positioned towards the bearing housing driveshaft (23).
  - C. Slide and secure the collar yoke (16) of the driveshaft to the bearing housing driveshaft (23).
  - D. Slide and secure the collar yoke (16) of the driveshaft to the gearbox shaft (24).
- 5. Install the pulley cover and driveshaft covers to the machine; refer to Installing the Covers (page 4–6).
- 6. Lubricate the grease fittings; refer to Operator's Manual.
- 7. Connect the machine to the traction unit and check the operation of the machine.



- T-series Outer tube 4.
- Complete yoke
- Complete shield 8.
- IMPORTANT

Never use the PTO over 30° angle.

Measure correct length of the PTO first.

Always deburr the parts when you cut to correct length.

# **Disassembling the PTO**

- 1. Park the machine on a level surface and disengage the PTO. Disconnect the machine from the tow vehicle; refer to the Operator's Manual.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.

### A

# CAUTION

A

To prevent personal injury, make sure that the PTO is supported as it is removed from the machine. PTO weighs approximately 28 kg (62 lbs).

### **Disassembling the PTO (continued)**

A

- 4. Slide and remove the complete yoke (item 7 in Figure 29) from the tow tractor.
- 5. Slide and remove the complete collar yoke (6) from the machine.
- 6. Remove the PTO from the machine.
- 7. Remove the complete shield (8) from the PTO.
- 8. Disassemble the PTO by using the Figure 29 as a guide.
- 9. For servicing the universal joint; refer to Servicing the Driveshaft Universal Joint and Bearing Assembly (page 4–40).

### **Assembling the PTO**

### CAUTION

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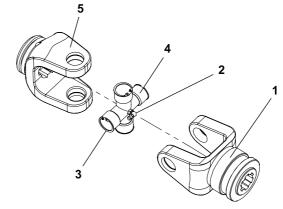
To prevent personal injury, make sure that the PTO is supported as it is installed to the machine. PTO weighs approximately 28 kg (62 lbs).

- 1. Assemble the PTO using the Figure 29 as a guide.
- 2. Install the complete shield (8) to the PTO.
- 3. Position the PTO onto the machine. The complete collar yoke (6) should be positioned towards the machine and complete yoke (7) should be positioned towards the tow tractor.
- 4. Slide and install the complete collar yoke (6) to the machine.



- 5. Torque tighten the complete collar yoke locking bolt to 80 N·m (700 in-lbs).
- 6. Slide and install the complete yoke (7) to the tow tractor.
- 7. Lubricate the grease fittings; refer to Operator's Manual.
- 8. Connect the machine to the traction unit and check the operation of the machine.

### Servicing the Driveshaft Universal Joint and Bearing Assembly



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Figure 30

1. End yoke

4. Universal joint and bearing assembly

2. Grease fitting

5. Shaft yoke

- 3. Circlip (4 each)
- 1. Remove the circlips (item 3 in Figure 30) that secure the bearings in the yokes.
  - IMPORTANT

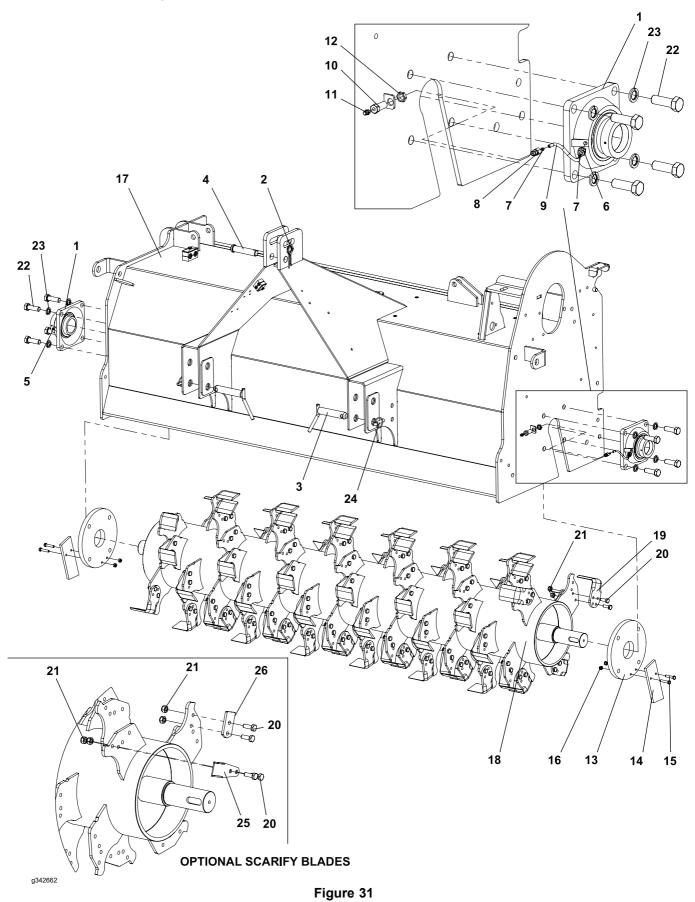
## Support the yokes when removing and installing the bearings to prevent damage.

- 2. Use a press to remove the cross and bearings from the yokes.
- 3. Thoroughly clean and inspect all components.
- 4. Install new cross and bearings as follows:
  - A. Apply a thick layer of grease to the bearing bores in the end yoke and shaft yoke.
  - B. Press one bearing partially into yoke.

### IMPORTANT

## Take care when installing cross into bearing to avoid damaging bearing seal.

- C. Insert the cross into the yoke and bearing.
- D. Hold the cross in alignment and press the bearing in until it hits the yoke.
- E. Install the snap ring into the yoke groove to secure the installed bearing.
- F. Place second bearing into the yoke bore and onto the cross shaft. Press the bearing into the yoke and secure with the snap ring.
- G. Repeat the procedure for the other yoke.
- H. Apply grease to the cross until it comes out of all the 4 bearing cups.
- 5. Ensure that the assembled joint moves without any binding. Lightly rap the yoke lugs with a soft-faced hammer to remove slight binding. If the binding continues, disassemble the joint to identify the source of binding.



#### Figure 31 (continued)

- 1. Roller support (2 each)
- R-clip round 2.
- Pin (2 each) 3.
- 4. Pin
- 5. Grease nipple
- Grease nipple connector 6.
- Connector (2 each) 7.
- 8. Grease nipple connector
- 9. Grease hose

### Removing the Rotor Assembly

#### 10. Bulkhead coupling

- 11. Grease nipple
- 12. Nut
- 13. Side cover bearing (2 each)
- Side strip cover bearing (2 each) 14.
- 15. Bolt (4 each)
- Self-locking nut (4 each) 16.
- 17. Main frame
- 18. Rotor

- 19. Frase blade 8 mm (76 each)
- 20. Bolt (152 each)
- Self-locking nut (152 each) 21.
- 22. Bolt (8 each)
- Spring washer (8 each) 23.
- 24. Linch pin (2 each)
- Scarify blade 3 mm (76 each) 25.
- 26. Balance strip (76 each)

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### CAUTION

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Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Park the machine on a level surface and disengage the PTO. Disconnect the machine from the tow vehicle; refer to the Operator's Manual.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Remove the pullev drive cover from the machine: refer to Removing the Covers (page 4-5).
- 5. Remove the pulleys; refer to Removing the Driveshaft and Pulleys (page 4-33).

#### A

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### CAUTION

To prevent personal injury, make sure that the rotor assembly is supported as it is removed from the machine. Rotor assembly weighs approximately 300 kg (662 lbs).

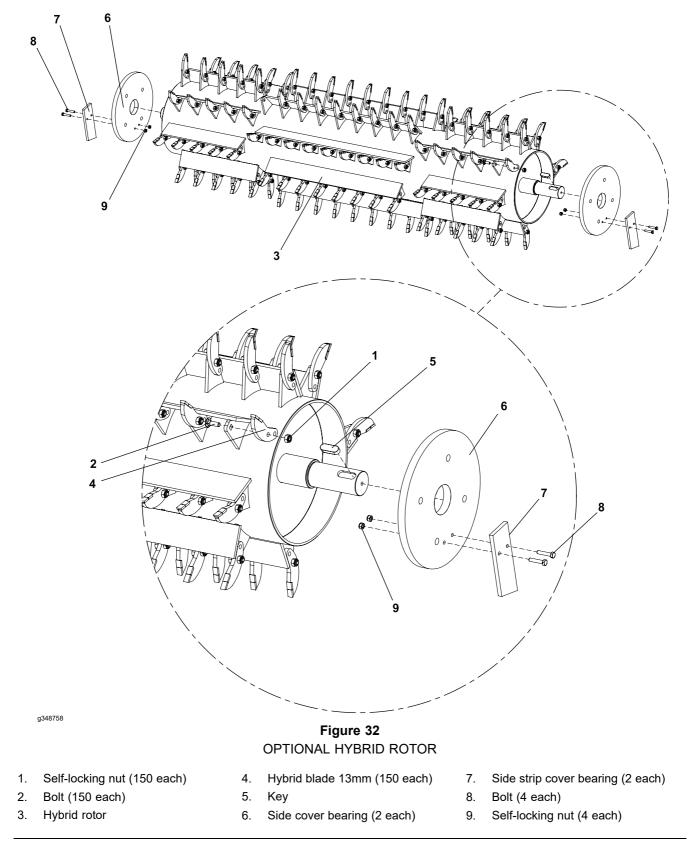
- 6. Loosen and disconnect the grease nipple connector (item 6 in Figure 31) from left side of the rotor support (1)
- 7. Remove four bolts (22) and spring washers (23) that secures the left side of the rotor support (1) to the machine frame (17).
- 8. Remove four bolts (22) and spring washers (23) that secures the right side of the rotor support (1) to the machine frame (17).

### CAUTION

To prevent personal injury, make sure that the machine frame is supported as it is removed from the rotor. The machine frame weighs approximately 1022 kg (2250 lbs).

- 9. Raise the machine frame while allowing the rotor assembly on the ground.
- 10. Disassemble the rotor assembly by using the Figure 31 as a guide.

### Removing the Rotor Assembly (continued)



### Installing the Rotor Assembly

- 1. Assemble the rotor assembly using the Figure 31 as a guide.
- 2. If removed, install the frase blades to the rotor; refer to Operator's Manual.

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- 4. Secure right side of the rotor support (1) to the machine frame (17) with four spring washers (23) and bolts (22).
- 5. Secure left side of the rotor support (1) to the machine frame (17) with four spring washers (23) and bolts (22).
- 6. Install the grease nipple connector (6) to the left side of the rotor support (1).
- 7. Install the pulleys and V-belts; refer to Driveshaft and Pulleys (page 4–32).
- 8. Install the pulley covers; refer to Installing the Covers (page 4-6).
- 9. Lubricate the grease fittings; refer to Operator's Manual.
- 10. Connect the machine to the traction unit and check the operation of the machine.

## **Chapter 5**

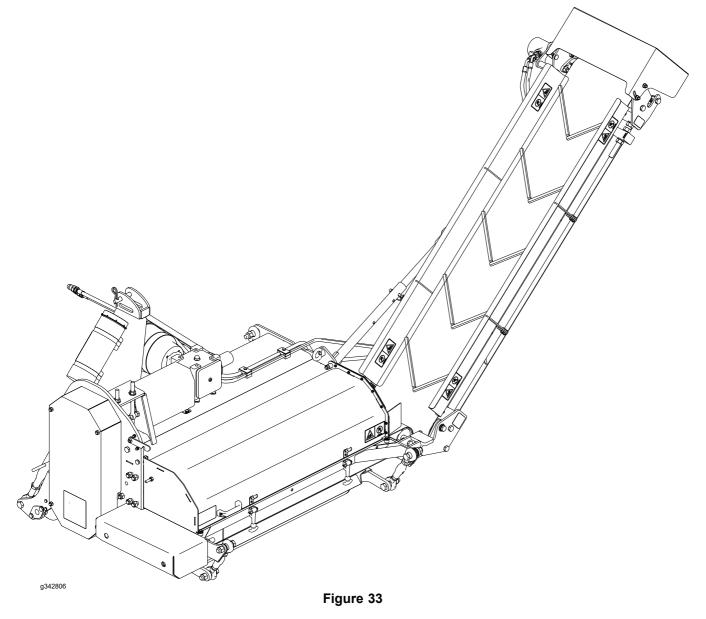
# NuSurface 470 (Model No. 46450)

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## **General Information**

The operators manuals provides information regarding the operation, general maintenance, and maintenance intervals for your NuSurface 470 (Model Number 46450). Refer to the *Operator's Manual* for additional information when servicing the machine.



### **Technical Data**

### NuSurface 470

ltem	Description
Working width	1.2 meter (47.2 in)
Working depth	Up to 50 mm (2 in)
Working speed	The working speed depends on the conditions and the required result. It is maximum 3 km/h (1.8 mph).
Weight	620 kg (1367 lbs)
Three-point connection	Cat. 1
Gearbox oil to be used	SAE 140
Bearing grease to be used	EP2
Recommended tractor HP	30-40 HP
Minimum lift capacity of the tractor 610 mm (24 in) behind the link arms	775 kg (1709 lbs)
Hydraulic connections of the tractor	1x double-acting valves
PTO rpm	540
Standard items	PTO Cutter knives
Optional	Scarify knives

## **Service and Repairs**

### Covers

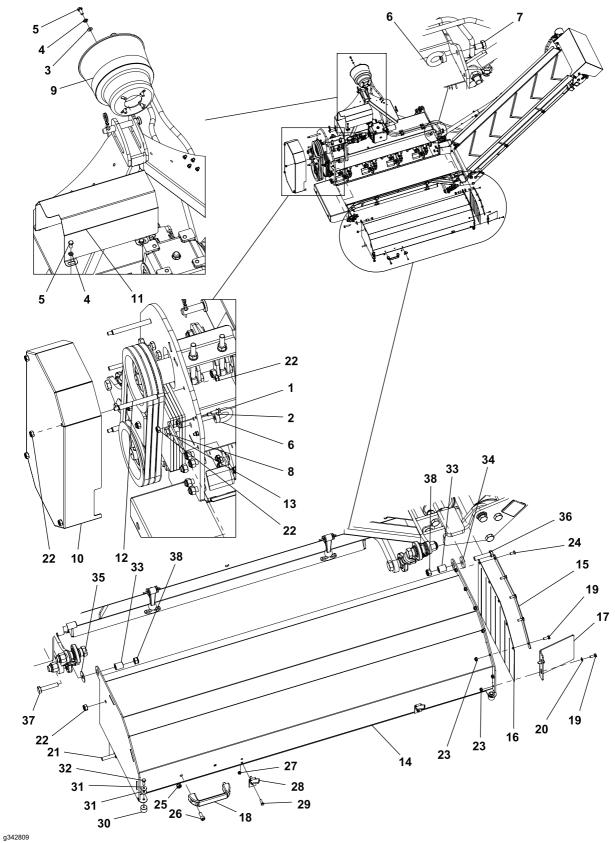


Figure 34

#### Figure 34 (continued)

1.	Bolt (2 each)	14.	Weld assy cover	27.	Self-locking nut (4 each)
2.	Bolt	15.	Contra strip	28.	Bracket for latch (2 each)
3.	Washer (4 each)	16.	Rubber gate	29.	Bolt (4 each)
4.	Spring washer (8 each)	17.	Guide support	30.	Stop (2 each)
5.	Bolt (8 each)	18.	Handle	31.	Large washer (4 each)
6.	Lifting eye nut (2 each)	19.	Bolt (6 each)	32.	Bolt (2 each)
7.	Bolt	20.	Washer (2 each)	33.	Distance bush (2 each)
8.	Bolt	21.	Bolt	34.	Distance washer
9.	PTO cover	22.	Self-locking nut (10 each)	35.	Distance washer
10.	Safety cover	23.	Self-locking nut (7 each)	36.	Bolt
11.	Driveshaft cover	24.	Bolt	37.	Bolt
12.	Stud (4 each)	25.	Self-locking nut (2 each)	38.	Self-locking nut (2 each)
13.	Lock strip	26.	Bolt (2 each)		

### **Removing the Covers**

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### CAUTION

# Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the roller to prevent it from moving.
- 4. To remove the PTO cover (item 9 in Figure 34):
  - A. Remove the four bolts (5), spring washers (4) and washers (3) that secures the PTO cover (9) to the gearbox.
  - B. Remove the PTO cover (9) from the gearbox.
- 5. To remove the driveshaft cover (11):
  - A. Remove the four bolts (5) and spring washers (4) that secures the driveshaft cover (11) to the main frame.
  - B. Remove the driveshaft cover (11) from the main frame.
- 6. To remove the pulley drive cover (10):
  - A. Remove the four self-locking nuts (22) that secures the pulley drive cover (10) to the main frame.
  - B. Remove the pulley drive cover (10) from the main frame.

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### CAUTION

To prevent personal injury, make sure that rear cover assembly is supported as it is removed from the machine. The rear cover assembly weighs approximately 18 kg (40 lbs).

- 7. To remove the rear cover assembly:
  - A. Remove the two self-locking nuts (38), distance bushes (33), washers (34 and 35) and bolts (36 and 37) that secures the rear cover assembly to the main frame.
  - B. Remove the rear cover assembly from the machine.
  - C. If necessary, disassemble the rear cover assembly by using the Figure 34 as a guide.

### Installing the Covers

### CAUTION

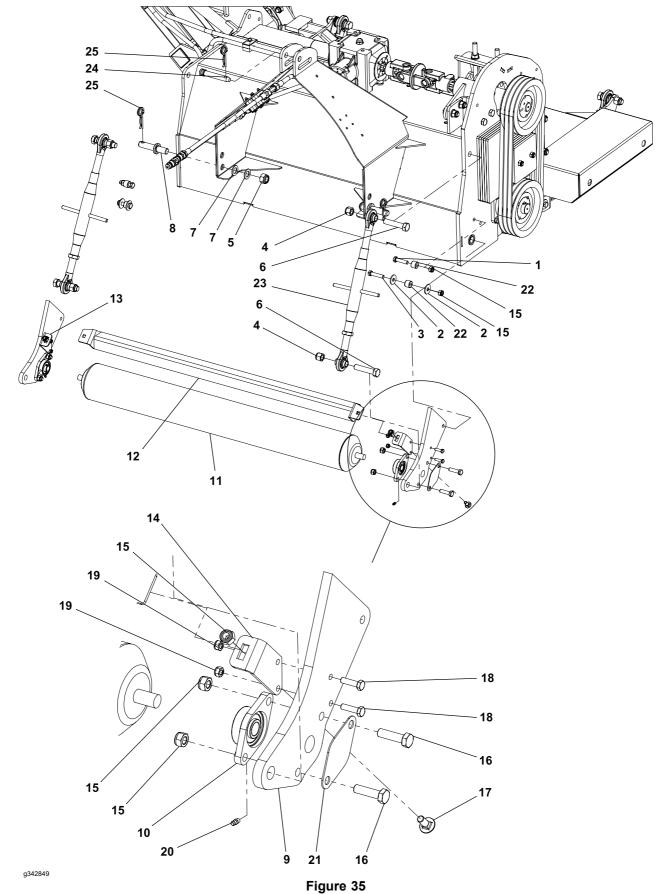
To prevent personal injury, make sure that rear cover assembly is supported as it is installed to the machine. The rear cover assembly weighs approximately 18 kg (40 lbs).

- 1. If removed, assemble the rear cover assembly by using the Figure 34 as a guide.
- 2. To install the rear cover assembly:
  - A. Position the rear cover assembly onto the machine.
  - B. Secure the rear cover assembly to the main frame with two bolts (36 and 37), washers (34 and 35), distance bushes (33) and self-locking nuts (38).
- 3. To install the pulley drive cover (10):
  - A. Position the pulley drive cover (10) onto the main frame.
  - B. Secure the pulley drive cover (10) to the main frame with four self-locking nuts (22).
- 4. To install the driveshaft cover (11):
  - A. Position the driveshaft cover (11) onto the main frame.
  - B. Secure the driveshaft cover to main frame with four spring washers (4) and bolts (5).
- 5. To install the PTO cover (9):
  - A. Position the PTO cover (9) onto the gearbox.
  - B. Secure the PTO cover (9) to the gearbox with four washers (3), spring washers (4) and bolts (5).
- 6. Lubricate the grease fittings; refer to Operator's Manual.
- 7. Check the operation of the machine.

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### **Front Roller**



#### Figure 35 (continued)

- 1. Bolt (2 each)
- 2. Large washer (4 each)
- 3. Bolt (2 each)
- 4. Self-locking nut (4 each)
- 5. Self-locking nut (2 each)
- 6. Hex bolt (4 each)
- 7. Washer (4 each)
- 8. Bottom 3-point pin (2 each)
- 9. Strip roller front (2 each)

### **Removing the Front Roller**

### 10. Bearing (2 each)

- 11. Roller
- 12. Scraper roller
- 13. Bracket scraper front
- 14. Bracket scraper front
- 15. Self-locking nut (10 each)
- 16. Bolt (4 each)
- 17. Bolt (2 each)
- 18. Bolt (4 each)

- 19. Self-locking nut (4 each)
- 20. Grease nipple (2 each)
- 21. Cover plate (2 each)
- 22. Bush (4 each)
- 23. Toplink (2 each)
- 24. Top link pin
- 25. R-clip round (3 each)

### CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the rear roller to prevent it from moving.

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CAUTION

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To prevent personal injury, make sure that the roller assembly is supported as it is removed from the machine. Roller weighs approximately 30 kg (66 lbs).

- 4. Remove the two self-locking nuts (item 4 in Figure 35) and bolts (6) that secures the front roller assembly to the toplinks (23).
- 5. Remove the two self-locking nuts (15), washers (2), bushes (22) and bolts (3) that secures the front roller strips (9) to the main frame.
- 6. Remove the front roller assembly from the machine.
- 7. If necessary, disassemble the front roller assembly by using the Figure 35 as a guide.

### Installing the Front Roller



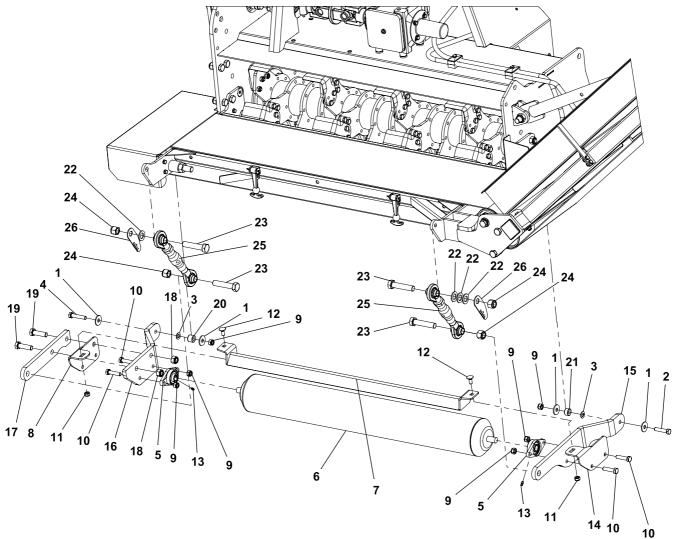
To prevent personal injury, make sure that the roller assembly is supported as it is installed to the machine. Roller weighs approximately 30 kg (66 lbs).

- 1. If removed, assemble the front roller assembly using the Figure 35 as a guide.
- 2. Position the front roller assembly onto the machine. Make sure that the bushes (22) are placed into the front roller strip (9).

### Installing the Front Roller (continued)

- 3. Secure the front roller strips to the main frame with the two bolts (3), washers (2) and self-locking nuts (15).
- 4. Secure the front roller assembly to the toplinks (23) with the two bolts (6) and self-locking nuts (4).
- 5. Check that the roller is free to rotate and no binding exists.
- 6. Adjust the position of the front roller; refer to Operator's Manual.
- 7. Lubricate the grease fittings; refer to Operator's Manual.
- 8. Check the operation of the machine.

### **Rear Roller**



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- 1. Large washer (4 each)
- 2. Bolt
- 3. Washer (2 each)
- 4. Bolt
- 5. Bearing (2 each)
- 6. Roller
- 7. Scraper roller
- 8. Bracket scraper
- 9. Self-locking nut (6 each)

#### Figure 36

- 10. Bolt (4 each)
- 11. Self-locking nut (2 each)
- 12. Bolt (2 each)
- 13. Grease nipple (2 each)
- 14. Bracket scraper
- 15. Adjustment strip
- 16. Adjustment strip
- 17. Adjustment strip
- 18. Self-locking nut (2 each)

- 19. Bolt (2 each)
- 20. Bush
- 21. Bush
- 22. Washer (4 each)
- 23. Bolt (4 each)
- 24. Self-locking nut (4 each)
- 25. Toplink CAT 1 (2 each)
- 26. Depth adjustment gauge (2 each)

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CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.

### CAUTION

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To prevent personal injury, make sure that the roller assembly is supported as it is removed from the machine. Roller weighs approximately 36 kg (80 lbs).

- 4. Remove the two self-locking nuts (item 24 in Figure 36) and bolts (23) that secures the rear roller assembly to the toplinks (25).
- 5. Remove the two self-locking nuts (9), washers (1) and bolts (2 and 4) that secures the rear roller strips (15 and 16) to the main frame.
- 6. Remove the rear roller assembly, washers (3) and bushes (20 and 21) from the machine.
- 7. If necessary, disassemble the rear roller assembly by using the Figure 36 as a guide.

### Installing the Rear Roller

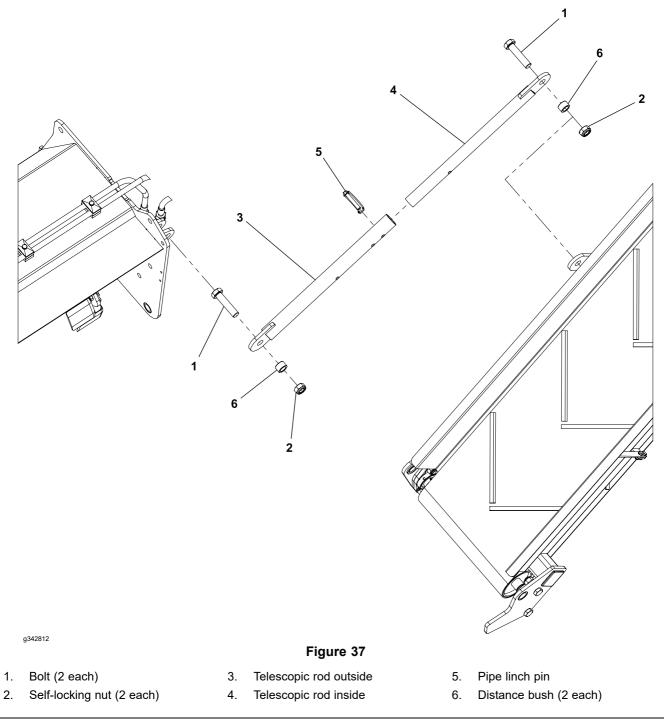
CAUTION

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To prevent personal injury, make sure that the roller assembly is supported as it is installed to the machine. Roller weighs approximately 36 kg (80 lbs).

- 1. If removed, assemble the rear roller assembly using the Figure 36 as a guide.
- 2. Position the rear roller assembly onto the machine. Make sure that the bushes (20 and 21) are placed into the main frame.
- 3. Secure the rear roller strips (15 and 16) to the main frame with the two bolts (2 and 4), washers (1 and 3) and self-locking nuts (9); refer to Figure 36.
- 4. Secure the rear roller assembly to the toplinks (25) with the two bolts (23) and self-locking nuts (24).
- 5. Check that the roller is free to rotate and that no binding exists.
- 6. Adjust the position of the rear rollers; refer to Operator's Manual.
- 7. Lubricate the grease fittings; refer to Operator's Manual.
- 8. Connect the machine to the traction unit and check the operation of the machine.

### **Telescopic Rod**



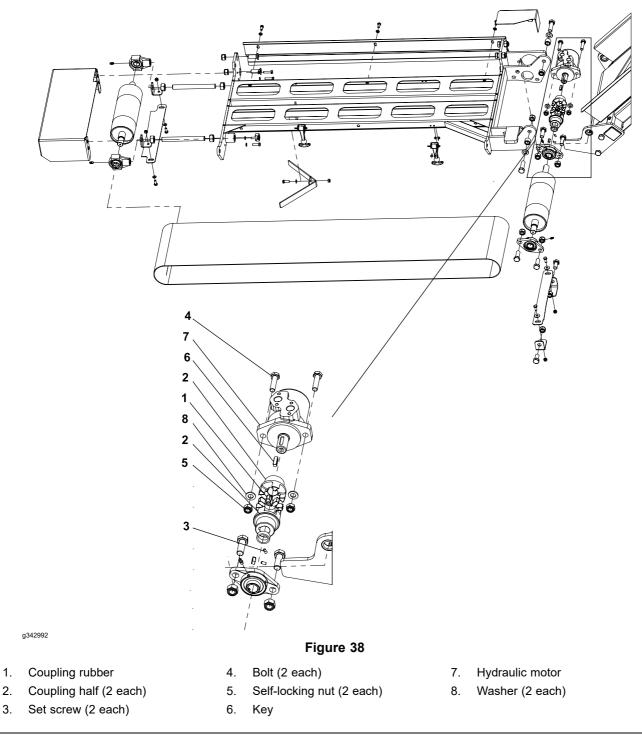
### **Removing the Telescopic Rod**

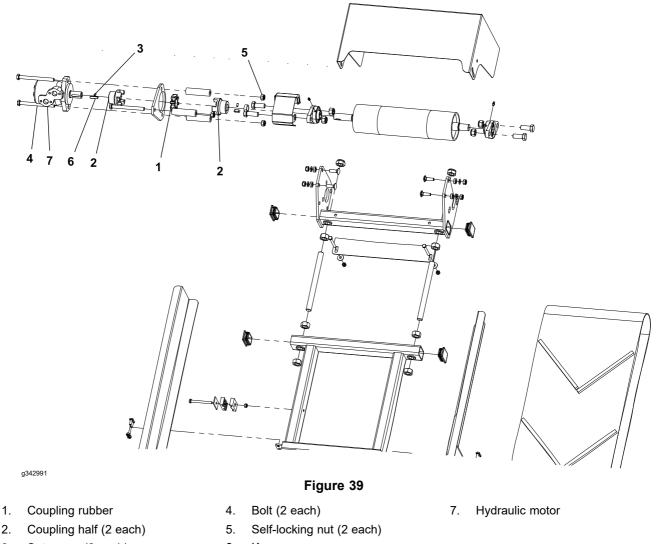
- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Lower the upper conveyor and make sure that the telescopic rods are not under load.
- 5. Remove the telescopic rod between upper and lower conveyors by using the Figure 37 as a guide.

### Installing the Telescopic Rod

- 1. Install the telescopic rod between upper and lower conveyors using the Figure 37 as a guide.
- 2. Lubricate the grease fittings; refer to Operator's Manual.
- 3. Connect the machine to the traction unit and check the operation of the machine.

### **Hydraulic Motors**



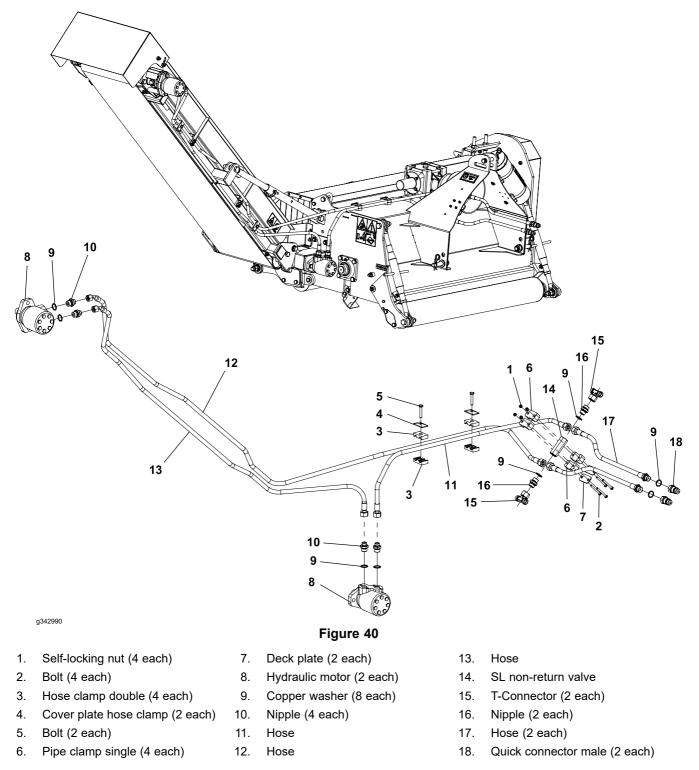


- Set screw (2 each) 3.
- 6. Key

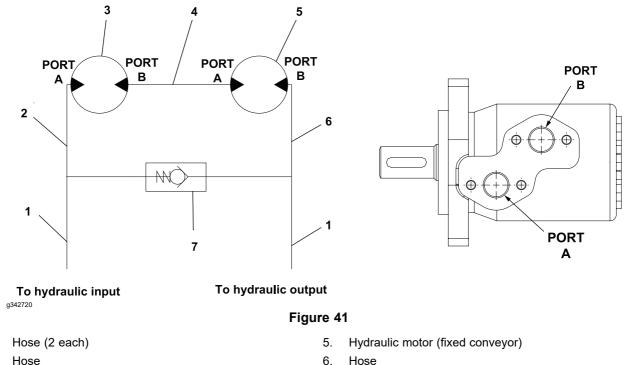
### **Removing the Hydraulic Motors**

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Lower the upper conveyor and make sure that the upper conveyor is secured properly.
- 5. To prevent contamination of hydraulic system during removal, thoroughly clean the exterior hydraulic fittings.
- 6. Read the General Precautions for Removing and Installing Hydraulic System Components (page 2–18).

Removing the Hydraulic Motors (continued)



### **Removing the Hydraulic Motors (continued)**



3. Hydraulic motor (movable conveyor)

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4. Hose

1.

2.

- 7 Non roturn valvo
- 7. Non-return valve
- 7. Disconnect the hydraulic hoses from the hydraulic motors and put caps or plugs on open hydraulic lines and fittings. Label disconnected hydraulic lines for proper assembly; refer to Figure Figure 40 and Figure 41.

### CAUTION

To prevent personal injury, make sure that the hydraulic motor is supported as it is removed from the machine.

- 8. Remove the two nuts (item 5 in Figure 38), washers (8) and bolts (4) that secures the hydraulic motor (7) to the lower conveyor frame.
- 9. If necessary, remove the parts from the hydraulic motor (7) using the Figure 38 as a guide.
- 10. Remove the two nuts (item 5 in Figure 39) and bolts (4) that secures the hydraulic motor (7) to the upper conveyor frame.
- 11. If necessary, remove the parts from the hydraulic motor (7) using the Figure 39 as a guide.
- 12. If necessary, remove the fittings and O-rings from the hydraulic motors; refer to Figure 40.
- 13. Discard the O-rings.

### Installing the Hydraulic Motors

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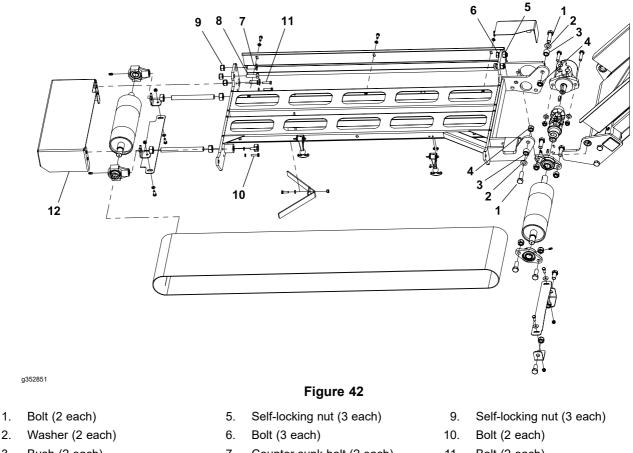
1. If removed, install the hydraulic fittings with new O-rings into the hydraulic motor ports; refer to Figure 40 and Installing the Hydraulic Fittings (SAE Straight Thread O-Ring Fittings) (page 2–15).

#### 

To prevent personal injury, make sure that the hydraulic motor is supported as it is installed to the machine.

- 2. If removed, assemble the parts onto the hydraulic motor using the Figure 39 as a guide.
- 3. Position the hydraulic motor (7) onto the upper conveyor frame; refer to Figure 39.
- 4. Secure the hydraulic motor (7) with the two bolts (4) and nuts (5).
- 5. If removed, assemble the parts onto the hydraulic motor using the Figure 38 as a guide.
- 6. Position the hydraulic motor (7) onto the lower conveyor frame; refer to Figure 38.
- 7. Secure the hydraulic motor (7) with the two bolts (4), washers (8) and nuts (5).
- 8. Remove the caps and plugs from the hydraulic hoses and fittings that are installed during removal procedure.
- Install the hydraulic hoses using marks made during the removal process to properly orientate the parts. Refer to Installing Hydraulic Hoses and Tubes (O-Ring Face Seal) (page 2–13), Figure 40 and Figure 41 as a guide.
- 10. Lubricate the grease fittings; refer to Operator's Manual.
- 11. Operate machine functions slowly until air is out of hydraulic system.

### Conveyors



3. Bush (2 each)

1.

- 4. Self-locking nut (2 each)
- Counter sunk bolt (2 each) 7.
- Bolt 8.

- 11. Bolt (2 each)
- 12. Cover

### **Removing the Conveyors**



Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Lower the upper conveyor and make sure that the telescopic rod is not under load.

### A

### CAUTION

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To prevent personal injury, make sure that the conveyor is supported as it is removed from the machine.

### **Removing the Conveyors (continued)**

- 5. Remove the hydraulic motors from the upper and lower conveyors; refer to Removing the Hydraulic Motors (page 5–15).
- 6. To remove the upper conveyor from the machine:
  - A. Remove the telescopic rod from the machine; refer to Removing the Telescopic Rod (page 5–12).
  - B. Remove the two self-locking nuts (item 4 in Figure 42), washers (2) and bolts (1) that secures the upper conveyor frame to the lower conveyor frame.
  - C. Remove the upper conveyor from the machine. If necessary, remove the bushes (3) from the upper conveyor frame.
  - D. If necessary, disassemble the upper conveyor; refer to Disassembling the Upper Conveyor (page 5–25).
- 7. To remove the lower conveyor from the machine:
  - A. Remove the toplinks (item 25 in Figure 36) from the lower conveyor using the Figure 36 as a guide.
  - B. Remove the four bolts (item 10 and 11 in Figure 42) that secures the cover (12) to the lower conveyor. Remove the cover from the lower conveyor.
  - C. Remove the three self-locking nuts (9), counter sunk bolts (7) and bolt (8) that secures the left side of the lower conveyor to the main frame.
  - D. Remove the three self-locking nuts (5) and bolts (6) that secures the right side of the lower conveyor to the main frame.
  - E. Remove the lower conveyor from the machine.
  - F. If necessary, disassemble the lower conveyor; refer to Disassembling the Lower Conveyor (page 5–23).

### Installing the Conveyors

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### CAUTION

To prevent personal injury, make sure that the conveyor is supported as it is installed onto the machine.

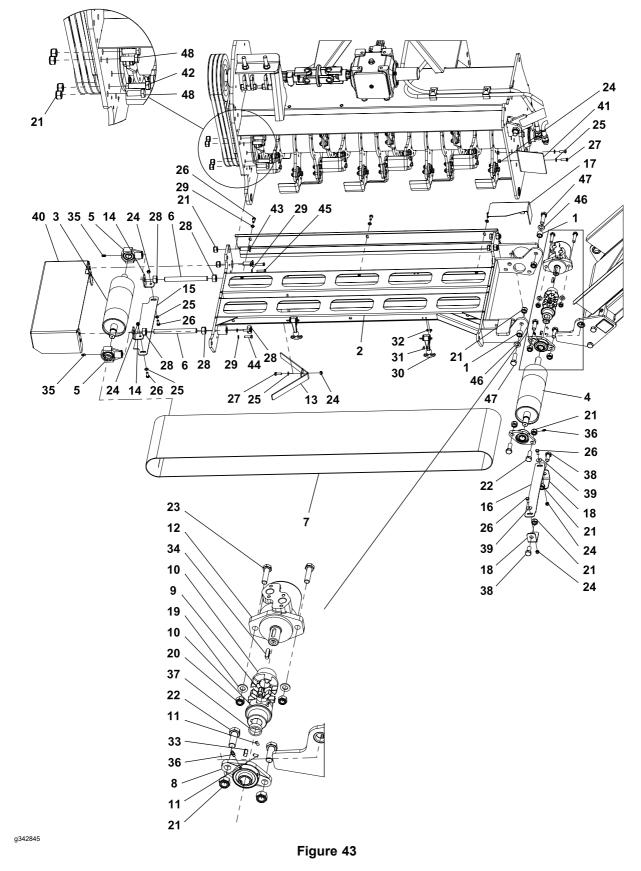
- 1. To install the lower conveyor onto the machine:
  - A. If disassembled, assemble the lower conveyor; refer to Assembling the Lower Conveyor (page 5–23).
  - B. Position the lower conveyor to the machine.
  - C. Secure the right side of the lower conveyor to the machine with three bolts (item 6 in Figure 42) and self-locking nuts (5).
  - D. Secure the left side of the lower conveyor to the machine with two counter sunk bolts (7), bolt (8) and self-locking nuts (9).
  - E. Install the cover (12) to the lower conveyor and secure with four bolts (10 and 11).
  - F. Install the toplinks (item 25 in Figure 36) to the lower conveyor using the Figure 36 as a guide.
- 2. To install the upper conveyor onto the machine:
  - A. If disassembled, assemble the upper conveyor; refer to Assembling the Upper Conveyor (page 5–25).
  - B. Position the upper conveyor to the machine.

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### Installing the Conveyors (continued)

- C. If removed, install the bushes (3) into the upper conveyor frame.
- D. Secure the upper conveyor frame to the lower conveyor frame with two bolts (1), washers (2) and self-locking nuts (4).
- E. Install the telescopic rod to the machine; refer to Installing the Telescopic Rod (page 5–13).
- 3. Install the hydraulic motors onto the upper and lower conveyors; refer to Installing the Hydraulic Motors (page 5–18).
- 4. Check and adjust the conveyor belt alignment; refer to Operator's Manual.
- 5. Lubricate the grease fittings; refer to Operator's Manual.
- 6. Check the operation of the machine.

### Lower Conveyor



#### Figure 43 (continued)

1.	Bush (2 each)	17.	Safety cover	33.	Кеу
2.	Fixed conveyor frame	18.	Scraper bracket (2 each)	34.	Key
3.	Driven roller	19.	Washer (2 each)	35.	Grease nipple (2 each)
4.	Driver roller	20.	Self-locking nut (2 each)	36.	Grease nipple (2 each)
5.	Bearing (2 each)	21.	Self-locking nut (14 each)	37.	Distance bush
6.	Threaded rod (2 each)	22.	Bolt (4 each)	38.	Bolt (2 each)
7.	Conveyor belt fixed	23.	Bolt (2 each)	39.	Large washer (2 each)
8.	Bearing (2 each)	24.	Self-locking nut (7 each)	40.	Cover fixed belt
9.	Coupling rubber	25.	Washer (5 each)	41.	Guide support long
10.	Coupling half (2 each)	26.	Bolt (7 each)	42.	Bolt
11.	Set screw (2 each)	27.	Bolt (3 each)	43.	Bolt (2 each)
12.	Hydraulic motor	28.	Nut (6 each)	44.	Bolt (2 each)
13.	Scraper	29.	Spring washer (7 each)	45.	Bolt (2 each)
14.	Bracket scraper (2 each)	30.	Rubber lock assy (2 each)	46.	Washer (2 each)
15.	Scraper	31.	Bolt (4 each)	47.	Bolt (2 each)
16.	Scraper compact	32.	Self-locking nut (4 each)	48.	Bolt (3 each)

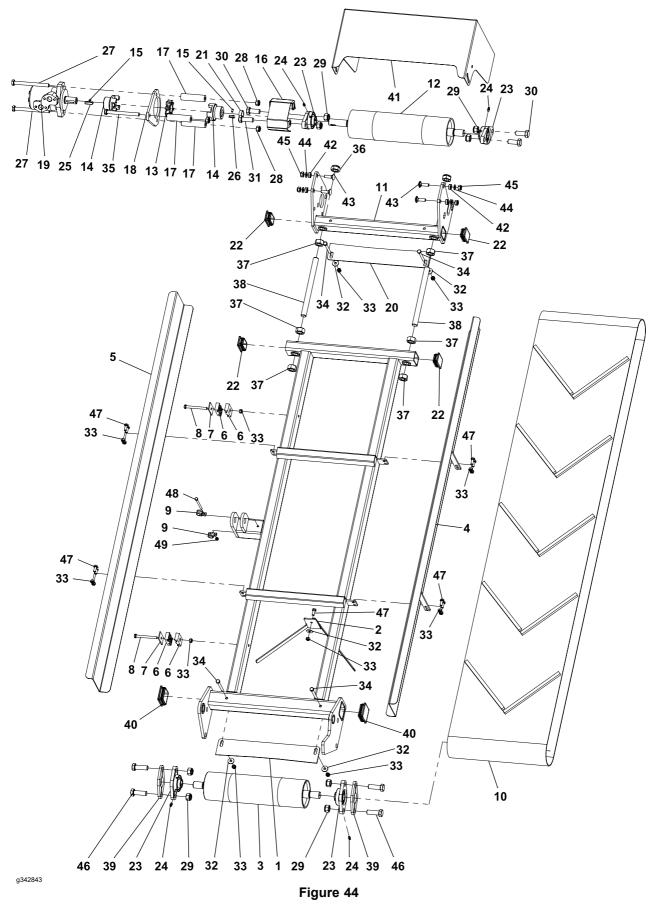
### **Disassembling the Lower Conveyor**

- 1. Remove the four bolts (item 44 and 45 in Figure 43) that secures the cover (40) to the lower conveyor frame.
- 2. Remove the cover (40) from the lower conveyor.
- 3. Remove the tension on conveyor belt by loosening the nuts (28) on left side of the conveyor.
- 4. Disassemble the lower conveyor by using the Figure 43 as a guide.

### Assembling the Lower Conveyor

- 1. Assemble the lower conveyor using the Figure 43 as a guide.
- 2. Adjust the tension on conveyor belt by tightening the nuts (28) on left side of the conveyor; refer to *Operator's Manual*.
- 3. Install the cover (40) to the lower conveyor and secure with four bolts (44 and 45).
- 4. Lubricate the grease fittings; refer to Operator's Manual.

### **Upper Conveyor**



#### Figure 44 (continued)

1.	Serener	10	Motor strip	35.	Bolt
1.	Scraper	18.	Motor strip	35.	Buit
2.	Scraper	19.	Hydraulic motor	36.	Self-locking nut (2 each)
3.	Driven roller	20.	Scraper	37.	Nut (6 each)
4.	Side panel conveyor right	21.	Distance bush	38.	Threaded rod (2 each)
5.	Side panel conveyor left	22.	Plastic stop (4 each)	39.	Bearing spacer (2 each)
6.	Hose clamp double (4 each)	23.	Bearing (4 each)	40.	Plastic stop (2 each)
7.	Cover plate hose clamp (2 each)	24.	Grease nipple (4 each)	41.	Flow cover
8.	Bolt (2 each)	25.	Кеу	42.	Distance bush (4 each)
9.	Hose clamp (2 each)	26.	Кеу	43.	Bolt (4 each)
10.	Conveyer belt	27.	Bolt (2 each)	44.	Washer (4 each)
11.	Transport belt spanner frame	28.	Self-locking nut (3 each)	45.	Self-locking nut (4 each)
12.	Driver roller	29.	Self-locking nut (8 each)	46.	Bolt (4 each)
13.	Coupling rubber	30.	Bolt (3 each)	47.	Bolt (9 each)
14.	Coupling half (2 each)	31.	Bolt	48.	Bolt
15.	Set screw (2 each)	32.	Large washer (5 each)	49.	Self-locking nut
16.	Cover motor	33.	Self-locking nut (15 each)		
17.	Distance bush (3 each)	34.	Bolt (4 each)		

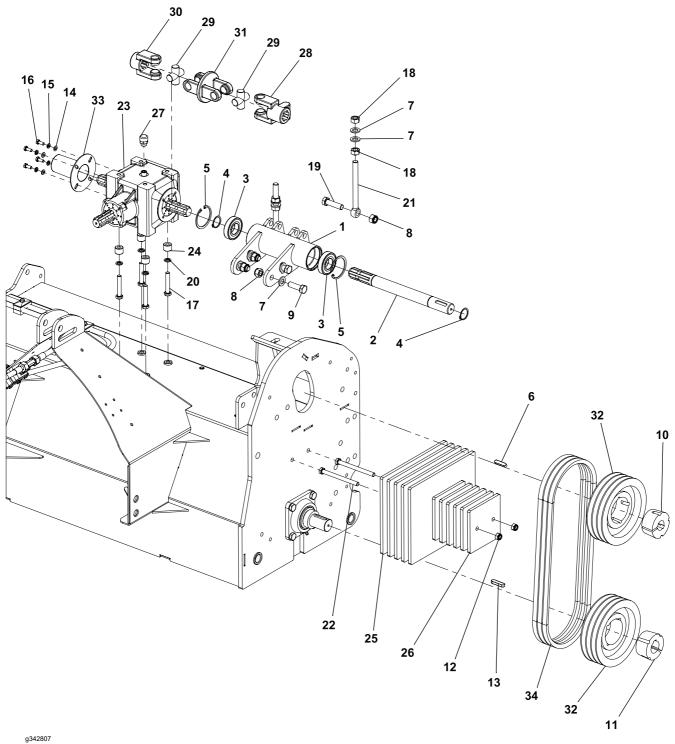
### **Disassembling the Upper Conveyor**

- 1. Remove the four self-locking nuts (45), washers (44), distance bushes (42) and bolts (43) that secures the flow cover (41) to the upper conveyor frame.
- 2. Remove the flow cover from the upper conveyor.
- 3. Remove the tension on conveyor belt by loosening the nuts (37) on right side of the conveyor.
- 4. Disassemble the upper conveyor by using the Figure 44 as a guide.

### Assembling the Upper Conveyor

- 1. Assemble the upper conveyor using the Figure 44 as a guide.
- 2. Adjust the tension on conveyor belt by tightening the nuts (37) on right side of the conveyor; refer to *Operator's Manual*.
- 3. Position the flow cover to the upper conveyor and secure with four bolts (43), distance bushes (42), washers (44) and self-locking nuts (45).
- 4. Lubricate the grease fittings; refer to Operator's Manual.

### Gearbox





#### Figure 45 (continued)

- 1. Bearing support
- 2. Splined shaft
- 3. Bearing (2 each)
- 4. Circlip (2 each)
- 5. Circlip (2 each)
- 6. Key
- 7. Washer (8 each)
- 8. Self-locking nut (6 each)
- 9. Bolt (4 each)
- 10. Taperlock
- 11. Taperlock
- 12. Self-locking nut (2 each)

- 13. Key
- 14. Washer (2 each)
- 15. Spring washer (4 each)
- 16. Bolt (4 each)
- 17. Bolt (4 each)
- 18. Nut (4 each)
- 19. Bolt (2 each)
- 20. Spring washer (4 each)
- 21. Eye bolt (2 each)
- Bolt (2 each)
  Gearbox
- 24. Bush (4 each)

- 25. Weight (5 each)
- 26. Weight plate (6 each)
- 27. Breather
- 28. Splined push pin yoke
- 29. Universal joint (2 each)
- 30. Splined yoke
- 31. Double yoke
- 32. Pulley (2 each)
- 33. PTO shaft cover
- 34. V-Belt (3 each)

### **Removing the Gearbox**

CAUTION

## Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Remove the PTO from the machine; refer to Operator's Manual.
- 5. Remove the gearbox cover and driveshaft cover from the machine; refer to Removing the Covers (page 5–5).
- 6. Slide and remove the splined yoke (item 30 in Figure 45) of the driveshaft from the gearbox shaft (23).

### 

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### CAUTION

To prevent personal injury, make sure that the gearbox is supported as it is removed from the machine. Gearbox weighs approximately 20 kg (44 lbs).

- 7. Support gearbox to prevent it from shifting.
- 8. Remove the four bolts (17), spring washers (20) and bushes (24) that secures the gearbox (23) to the machine frame.
- 9. Carefully remove gearbox (23) from the machine.

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### CAUTION

To prevent personal injury, make sure that the gearbox is supported as it is installed to the machine. Gearbox weighs approximately 20 kg (44 lbs).

- 1. Carefully position the gearbox (23) onto the machine.
- 2. Apply thread locking compound to the bolts (17).
- 3. Secure the gearbox (23) to the machine frame with four bolts (17), spring washers (20) and bushes (24).



- 4. Fill the gearbox (23) with 1.2 L (1.26 qt) of GL-5 80W-90 I oil.
- 5. Slide and install the driveshaft to the gearbox.
- 6. Install the driveshaft cover and gearbox cover; refer to Installing the Covers (page 5–6).
- 7. Install the PTO to the machine; refer to Operator's Manual.
- 8. Lubricate the grease fittings; refer to Operator's Manual.
- 9. Connect the machine to the traction unit and check the operation of the machine.

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## **Driveshaft and Pulleys**

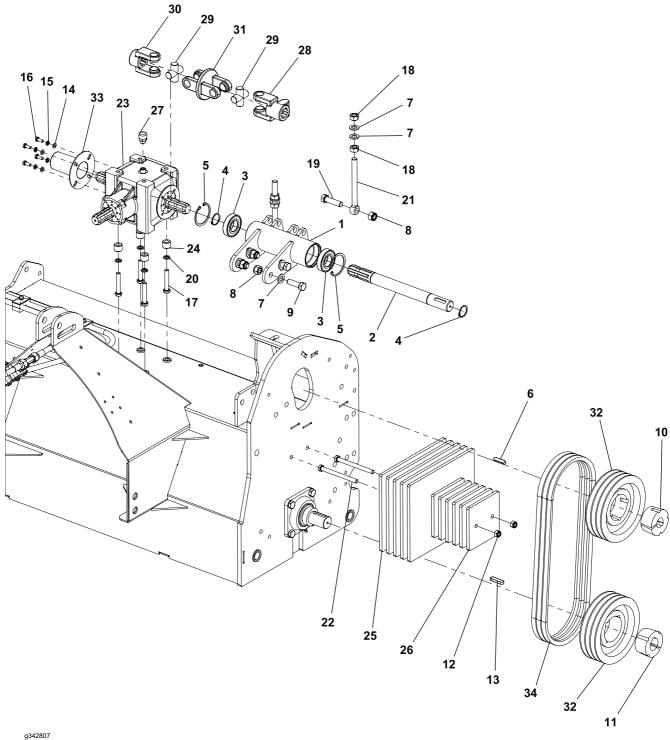


Figure 46

#### Figure 46 (continued)

- 1. Driveshaft housing
- 2. Driveshaft
- 3. Bearing (2 each)
- 4. Circlip (2 each)
- 5. Circlip (2 each)
- 6. Key
- 7. Washer (8 each)
- 8. Self-locking nut (6 each)
- 9. Bolt (4 each)
- 10. Taperlock
- 11. Taperlock
- 12. Self-locking nut (2 each)

- 13. Key
- 14. Washer (2 each)
- 15. Spring washer (4 each)
- 16. Bolt (4 each)
- 17. Bolt (4 each)
- 18. Nut (4 each)
- 19. Bolt (2 each)
- 20. Spring washer (4 each)
- 21. Eye bolt (2 each)
- 22. Bolt (2 each)
- 23. Gearbox
- 24. Bush (4 each)

- 25. Weight (5 each)
- 26. Weight plate (6 each)
- 27. Breather
- 28. Splined push pin yoke
- 29. Universal joint (2 each)
- 30. Splined yoke
- 31. Double yoke
- 32. Pulley (2 each)
- 33. PTO shaft cover
- 34. V-Belt (3 each)

### **Removing the Driveshaft and Pulleys**

### 

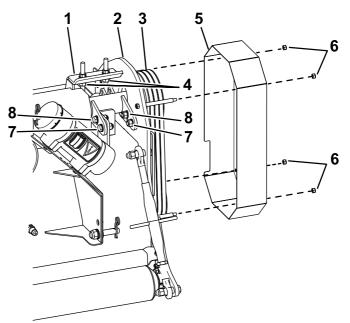
### CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. To remove the driveshaft from the machine:
  - A. Slide and remove the splined yoke (item 30 in Figure 46) of the driveshaft from the gearbox shaft (23).
  - B. Slide and remove the splined push pin yoke (28) of the driveshaft from the bearing driveshaft (2).
  - C. Carefully remove the driveshaft from the machine.
  - D. For servicing the universal joint; refer to Servicing the Driveshaft Universal Joint and Bearing Assembly (page 5–36).
- 5. To remove the pulleys (32) from the machine:

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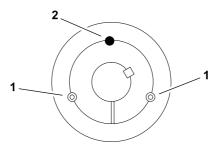
#### **Removing the Driveshaft and Pulleys (continued)**



g346321

Figure 47

- 1. Top locknut
- 2. Left side
- 3. V-belts
- 4. Lock nut under the plate
- 5. Belt cover
- 6. Nuts
- 7. Pivot bolt
- Bolt in slot
- A. Remove the tension on the V-belts (18) by loosening the four nuts (item 4 in Figure 47) and self-locking nuts (7 and 8) on the bearing driveshaft assembly.
- B. Remove the three V-belts (34) from the pulleys (32).
- C. Remove the two set screw that secures the taper lock (10) to drive the pulley on the bearing drive shaft (2).



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Figure 48

1. Set screw installation position

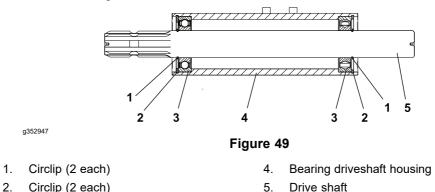
2. Set screw removal position

- D. Install one of the removed set screws into the threaded hole of the taper lock (10); refer to Figure 48. Tighten the set screw to loosen the taper lock (10) from the pulley (32).
- E. Repeat the steps C and D to remove the taper lock (11) from the pulley (32).
- F. Slide and remove the pulleys (32).
- G. Locate and retrieve the keys (6 and 13).

#### Removing the Driveshaft and Pulleys (continued)

- 6. To remove the bearing driveshaft assembly from the machine:
  - A. Remove the four self-locking nuts (8), washers (7) and bolts (9) that secures the bearing driveshaft assembly to the machine frame.
  - B. Remove the nuts (18) and washers (7) that secures the eye bolt spanners (21) and bearing driveshaft assembly to the machine frame.
  - C. Remove the bearing drive shaft assembly from the machine.
  - D. Remove the two self-locking nuts (8) and bolts (19) that secures the eye bolt spanners (21) to the bearing driveshaft assembly.
- 7. To disassemble the bearing driveshaft assembly:
  - A. Remove the four circlips (4 and 5) in the bearing driveshaft housing (1) that secures the bearings (3).
  - B. Use a press to remove the bearings (3) from the bearing driveshaft housing (1).
  - C. Discard the bearings (3).
  - D. Thoroughly clean and inspect the bearing driveshaft housing (1).

#### Installing the Driveshaft and Pulleys

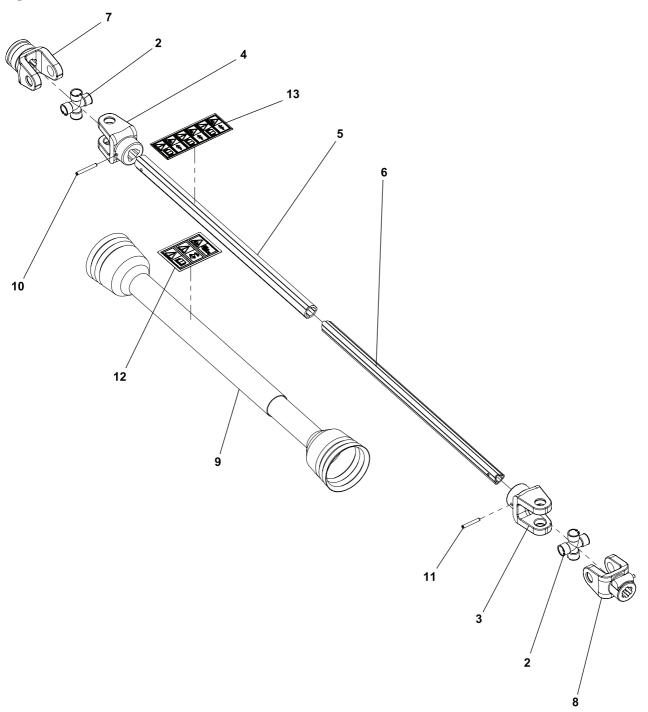


- 2. Circlip (2 each)
- 3. Bearing (2 each)
- 1. To assemble the bearing drive shaft assembly:
  - A. Apply a coat of grease to the new bearings (3).
  - B. Press one bearing (3) partially into the bearing driveshaft housing (1).
  - C. Carefully insert the drive shaft (2) into the bearing driveshaft housing (1) and the bearing (3); refer to Figure 46 for correct orientation of the bearing driveshaft (2).
  - D. Install another bearing (3) into the bearing drive shaft housing (1).
  - E. Check that the bearings (3) are properly seated inside the bearing drive shaft housing (1); refer to Figure 49.
  - F. Secure the bearings (3) with the four circlips (4 and 5); refer to Figure 49.
- 2. To install the bearing driveshaft assembly:
  - A. Position the two eye bolt spanners (21) onto the bearing drive shaft assembly.
  - B. Secure the two eye bolt spanners (21) with two bolts (19) and self-locking nuts (8).
  - C. Position the bearing driveshaft assembly and eye bolt spanners (21) onto the machine; refer to Figure 46 for correct orientation of the bearing driveshaft assembly.

#### Installing the Driveshaft and Pulleys (continued)

- D. Secure the eye bolt spanners to the machine frame with four washers (7) and nuts (18).
- E. Secure the bearing driveshaft assembly to the machine frame with four bolts (9), washers (7) and self-locking nuts (8).
- 3. To install the pulleys (32) onto the machine:
  - A. Clean the bearing driveshaft output shaft, pulley ID (inner diameter) and taper lock (10).
  - B. Position the key (6), pulley (32), and then the taper lock (10) to the bearing driveshaft output shaft. Slide the taper lock to the shoulder on the shaft (2). Align the threaded holes of the pulley with the non-threaded holes of the taper lock.
  - C. Apply oil to the threads of the set screws and install the screws into the threads of the pulley (32). Alternately and evenly tighten the set screws.
  - D. Fill the allen recess in the set screws and taper lock threads with grease to prevent dirt from packing into the crevices.
  - E. Repeat the steps A and D to install the pulley (32) onto the rotor shaft.
  - F. Install the three V-belts (34) onto the pulleys (32).
  - G. Adjust the tension of the V-belts; refer to the Operator's Manual.
- 4. To install the driveshaft onto the machine:
  - A. Carefully position the driveshaft onto the machine.
  - B. The splined yoke (30) should be positioned towards the gearbox (24) and the splined push pin yoke (28) should be positioned towards the bearing housing driveshaft (2).
  - C. Slide and secure the splined push pin yoke (28) of the driveshaft to the bearing housing driveshaft (2).
  - D. Slide and secure the splined yoke (30) of the driveshaft to the gearbox shaft (23).
- 5. Install the pulley cover and driveshaft covers to the machine; refer to Installing the Covers (page 5–6).
- 6. Lubricate the grease fittings; refer to Operator's Manual.
- 7. Connect the machine to the traction unit and check the operation of the machine.

ΡΤΟ



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- 1. Circlip (8 each)
- 2. Universal joint (2 each)
- 3. Inner tube yoke
- 4. Outer tube yoke
- 5. Outer tube

#### Figure 50

- 6. Inner tube
- 7. Complete collar yoke
- 8. Push pin yoke
- 9. Complete guard
- 10. Roll pin

- 11. Roll pin
- 12. Decal PTO outside
- 13. Decal PTO inner

#### IMPORTANT

Never use the PTO over 30° angle.

Measure correct length of the PTO first.

Always deburr the parts when you cut to correct length.

#### **Disassemble the PTO**

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- 1. Park the machine on a level surface and disengage the PTO. Disconnect the machine from the tow vehicle; refer to the *Operator's Manual*.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.

#### CAUTION

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To prevent personal injury, make sure that the PTO is supported as it is removed from the machine. PTO weighs approximately 16 kg (35 lbs).

- 4. Remove the PTO from the machine; refer to Operator's Manual.
- 5. Remove the complete shield (9) from the PTO.
- 6. Disassemble the PTO by using the Figure 50 as a guide.
- 7. For servicing the universal joint; refer to Servicing the Driveshaft Universal Joint and Bearing Assembly (page 5–36).

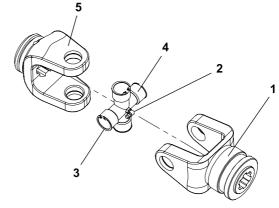
#### Assemble the PTO

# CAUTION

To prevent personal injury, make sure that the PTO is supported as it is installed to the machine. PTO weighs approximately 16 kg (35 lbs).

- 1. Assemble the PTO using the Figure 50 as a guide.
- 2. Install the complete shield (9) to the PTO.
- 3. Install the PTO between the machine; refer to Operator's Manual.
- 4. Lubricate the grease fittings; refer to Operator's Manual.
- 5. Connect the machine to the traction unit and check the operation of the machine.

### Servicing the Driveshaft Universal Joint and Bearing Assembly



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Figure 51

5.

Shaft yoke

1. End yoke

2.

3

4. Universal joint and bearing assembly

- Grease fitting Circlip (4 each)
- 1. Remove the circlips (item 3 in Figure 51) that secure the bearings in the yokes.
  - IMPORTANT

# Support the yokes when removing and installing the bearings to prevent damage.

- 2. Use a press to remove the cross and bearings from the yokes.
- 3. Thoroughly clean and inspect all components.
- 4. Install new cross and bearings as follows:
  - A. Apply a thick layer of grease to the bearing bores in the end yoke and shaft yoke.
  - B. Press one bearing partially into yoke.

#### IMPORTANT

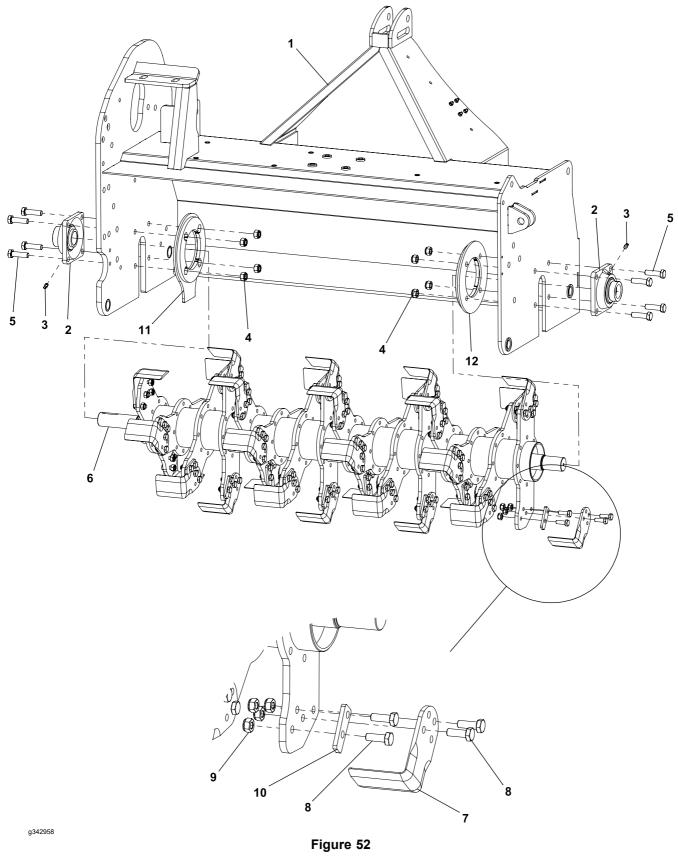
# Take care when installing cross into bearing to avoid damaging bearing seal.

- C. Insert the cross into the yoke and bearing.
- D. Hold the cross in alignment and press the bearing in until it hits the yoke.
- E. Install the snap ring into the yoke groove to secure the installed bearing.
- F. Place second bearing into the yoke bore and onto the cross shaft. Press the bearing into the yoke and secure with the snap ring.
- G. Repeat the procedure for the other yoke.
- H. Apply grease to the cross until it comes out of all the 4 bearing cups.

# Servicing the Driveshaft Universal Joint and Bearing Assembly (continued)

5. Ensure that the assembled joint moves without any binding. Lightly rap the yoke lugs with a soft-faced hammer to remove slight binding. If the binding continues, disassemble the joint to identify the source of binding.

# **Rotor Assembly**



- 1. Main frame
- 2. Rotor support (2 each)
- 3. Grease nipple (2 each)
- 4. Self-locking nut (8 each)
- 5. Bolt (8 each)
- 6. Rotor shaft
- 7. Frase blade (32 each)
- 8. Bolt (128 each)

- 9. Self-locking nut (128 each)
- 10. Plate (32 each)
- 11. Ring connection plate
- 12. Ring connection plate

#### **Removing the Rotor Assembly**

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#### CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Park the machine on a level surface and disengage the PTO. Disconnect the machine from the tow vehicle; refer to the *Operator's Manual*.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Remove the pulley drive cover from the machine; refer to Removing the Covers (page 5–5).
- 5. Remove the pulleys; refer to Removing the Driveshaft and Pulleys (page 5–30).

#### CAUTION

To prevent personal injury, make sure that the rotor assembly is supported as it is removed from the machine. Rotor assembly weighs approximately 135 kg (298 lbs).

- 6. Remove four self-locking nuts (4), ring connection plate (12) and bolts (5) that secures the left side of the rotor support (2) to the machine frame (1).
- 7. Remove four self-locking nuts (4), ring connection plate (11) and bolts (5) that secures the right side of the rotor support (2) to the machine frame (1).

#### CAUTION

To prevent personal injury, make sure that the machine frame is supported as it is removed from the rotor. The machine frame weighs approximately 150 kg (331 lbs).

- 8. Raise the machine frame while allowing the rotor assembly on the ground.
- 9. Disassemble the rotor assembly from the machine by using the Figure 52 as a guide.

#### Installing the Rotor Assembly

- 1. Assemble the rotor assembly onto the machine using the Figure 52 as a guide.
- 2. If removed, install the frase blades to the rotor; refer to Operator's Manual.



To prevent personal injury, make sure that the machine frame is supported as it is installed to the rotor. The machine frame weighs approximately 150 kg (331 lbs).

3. Slowly lower the machine frame onto the rotor assembly.

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#### Installing the Rotor Assembly (continued)

- 4. Secure left side of the rotor support (2) to the machine frame (1) with four bolts (5), ring connection plate (12) and self-locking nuts (4).
- 5. Secure right side of the rotor support (2) to the machine frame (1) with four bolts (5), ring connection plate (11) and self-locking nuts (4).
- 6. Install the pulleys and V-belts; refer to Installing the Driveshaft and Pulleys (page 5–32).
- 7. Install the pulley covers; refer to Installing the Covers (page 5-6).
- 8. Lubricate the grease fittings; refer to Operator's Manual.
- 9. Connect the machine to the traction unit and check the operation of the machine.

# Chapter 6

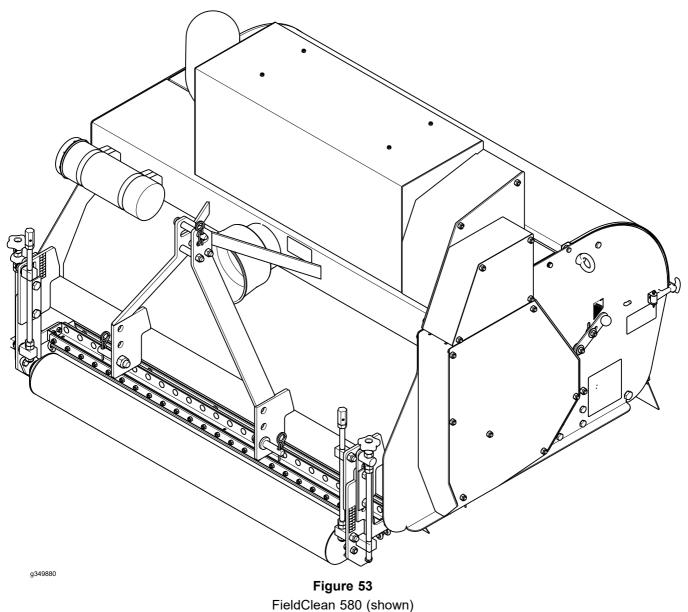
# FieldClean 580 (Model No. 46425)

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# **General Information**

The operators manuals provides information regarding the operation, general maintenance, and maintenance intervals for your FieldClean 580 (Model No. 46425). Refer to the Operator's Manual for additional information when servicing the machine.



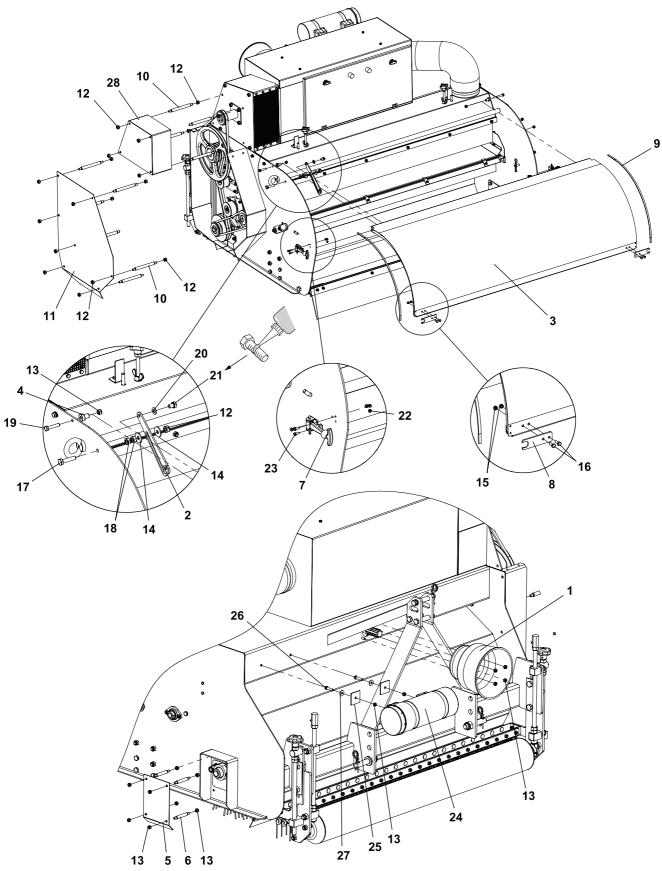
# **Technical Data**

#### FieldClean 580

Item	Description		
Working width	1.47 meters (57.8 in)		
Working depth	0 to 26 mm (0 to 1.02 in)		
Working speed	Maximum 12 km/h (7.5 mph)		
Weight	515 kg (1,135 lbs)		
Receptacle volume	170 L (6.0 ft)		
Three-point connection	Cat. 1		
Gearbox oil to be used	SAE 90		
Bearing grease to be used	EP2		
Recommended tractor HP	25 HP		
Minimum lift capacity of the tractor	600 kg (1,323 lbs)		
PTO rpm	540		
Standard items	PTO		
Optional	Easily exchangeable sieve		

# **Service and Repairs**

# Covers



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Figure 54

#### Figure 54 (continued)

- 1. PTO Cover
- 2. Cover lock strip
- 3. Rear cover
- 4. Bush (2 each)
- 5. Cover plate right
- 6. Stud (4 each)
- 7. Rubber lock assy (2 each)
- 8. Latch for rubber lock (2 each)
- 9. Rubber U-seal (2 each)
- 10. Stud (11 each)

- 11. Cover plate
- 12. Self-locking nut (20 each)
- 13. Self-locking nut (16 each)
- 14. Large washer (2 each)
- 15. Self-locking nut (4 each)
- 16. Bolt (4 each)
- 17. Bolt
- 18. Nut (2 each)
- 19. Bolt (2 each)
- 20. Washer

- 21. Bolt
- 22. Self-locking nut (6 each)
- 23. Bolt (6 each)
- 24. Toolbox complete
- 25. Toolbox contraplate (2 each)
- 26. Bolt (2 each)
- 27. Large washer (2 each)
- 28. Cover plate

#### **Removing the Covers**

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#### CAUTION

A

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the roller to prevent it from moving.
- 4. To remove the PTO cover (item 1 in Figure 54):
  - A. Remove the four self-locking nuts (13) that secures the PTO cover (1) to the main frame.
  - B. Remove the PTO cover (1) from the main frame.
- 5. To remove the pulley drive covers (11 and 28):
  - A. Remove the 11 self-locking nuts (12) that secures the pulley drive covers (11 and 28) to the main frame.
  - B. Remove the pulley drive covers (11 and 28) from the main frame.
  - C. If required, remove the 11 studs (10) and self-locking nuts (12) from the main frame.
- 6. To remove the right cover plate (5):
  - A. Remove the four self-locking nuts (13) that secures the right cover plate (5) to the main frame.
  - B. Remove the right cover plate (5) from the main frame.
  - C. If required, remove the four studs (6) and self-locking nuts (13) from the machine frame.



A

CAUTION

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To prevent personal injury, make sure that rear cover assembly is supported as it is removed from the machine. The rear cover assembly weighs approximately 23 kg (51 lbs).

7. To remove the rear cover (3):

#### **Removing the Covers (continued)**

A

- A. Open the rubber latches (7) on both sides of the rear cover (3).
- B. Remove the bolt (21) and washer (20) that secures the cover lock strip (2) to the rear cover (3).
- C. Remove the two self-locking nuts (13), bolts (19) and bushes (4) that secures the rear cover (3) to the main frame.
- D. Remove the rear cover (3) from the machine.
- E. If necessary, disassemble the rear cover (3) by using the Figure 54 as a guide.

#### Installing the Covers

#### CAUTION

To prevent personal injury, make sure that rear cover assembly is supported as it is installed to the machine. The rear cover assembly weighs approximately 23 kg (51 lbs).

- 1. If removed, assemble the rear cover (3) by using the Figure 54 as a guide.
- 2. To install the rear cover (3):
  - A. Install the two bushes (4) into the rear cover (3).
  - B. Position the rear cover (3) onto the main frame.
  - C. Secure the rear cover (3) to the main frame with two bolts (19) and self-locking nuts (13).
  - D. Apply a coat of thread locking compound to threads of the bolt (21).
  - E. Secure the cover lock strip (2) to the rear cover (3) with a bolt (21) and washer (20).
- 3. To install the right cover plate (5):
  - A. If removed, install the four studs (6) and self-locking nuts (13) to the main frame.
  - B. Position the right cover plate (5) to the main frame.
  - C. Secure the right cover plate (5) to the main frame with four self-locking nuts (13).
- 4. To install the pulley drive covers (11 and 28):
  - A. If removed, install the 11 studs (10) and self-locking nuts (12) to the main frame.
  - B. Position the pulley drive covers (11 and 28) to the main frame.
  - C. Secure the pulley drive covers (11 and 28) to the main frame with 11 self-locking nuts (12).
- 5. To install the PTO cover (1):
  - A. Position the PTO cover (1) to the main frame.
  - B. Secure the PTO cover (1) to the main frame with four nuts (13).
- 6. Lubricate the grease fittings; refer to Operator's Manual.
- 7. Connect the machine to the traction unit and check the operation of the machine.

### Front Roller and Rake Assembly

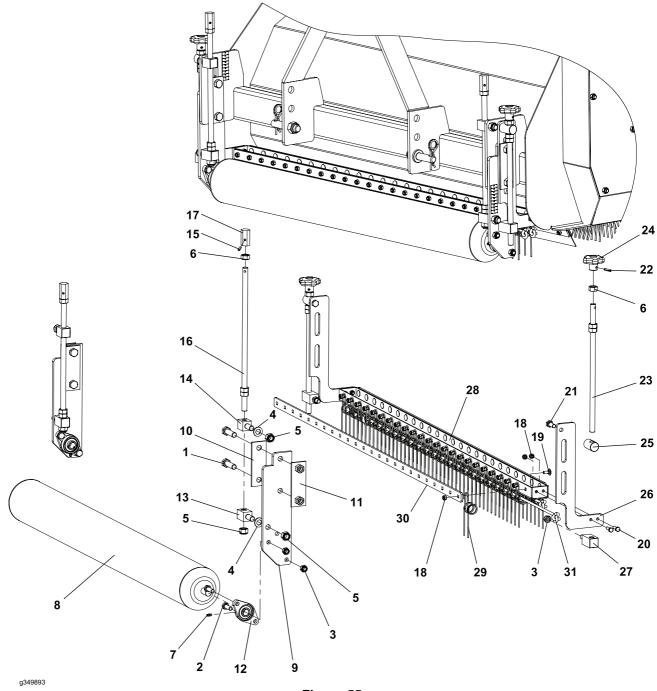


Figure 55

#### Figure 55 (continued)

2.Bolt (4 each)13.Front roller adjustment (2 each)24.Kr3.Self-locking nut (6 each)14.Adjustment bush with thread (2 each)25.Ra4.Washer (2 each)15.Roll pin (2 each)26.Si5.Self-locking nut (6 each)16.Spindle (2 each)27.Ad6.Nut (2 each)v17.Spindle nut (2 each)28.Ra7.Grease nipple (2 each)18.Self-locking nut (48 each)29.Tin8.Roller19.MH Bolt (48 each)30.Loc						
3.Self-locking nut (6 each)14.Adjustment bush with thread (2 each)25.Ra4.Washer (2 each)15.Roll pin (2 each)26.Si5.Self-locking nut (6 each)16.Spindle (2 each)27.Ad6.Nut (2 each)v17.Spindle nut (2 each)28.Ra7.Grease nipple (2 each)18.Self-locking nut (48 each)29.Tit8.Roller19.MH Bolt (48 each)30.Lc9.Front roller guide (2 each)20.Bolt (4 each)31.Ro10.Strip (2 each)21.Bolt (2 each)11.Lock plate height adjustment (222.Roll pin (2 each)	1.	Bolt (4 each)	12.	Bearing (2 each)	23.	Spind
4. Washer (2 each)    15. Roll pin (2 each)    26. Si      5. Self-locking nut (6 each)    16. Spindle (2 each)    27. Ac      6. Nut (2 each)v    17. Spindle nut (2 each)    28. Ra      7. Grease nipple (2 each)    18. Self-locking nut (48 each)    29. Til      8. Roller    19. MH Bolt (48 each)    30. Lo      9. Front roller guide (2 each)    20. Bolt (4 each)    31. Ro      10. Strip (2 each)    21. Bolt (2 each)    11. Lock plate height adjustment (2	2.	Bolt (4 each)	13.	Front roller adjustment (2 each)	24.	Knurle
5.Self-locking nut (6 each)16.Spindle (2 each)27.Ader6.Nut (2 each)v17.Spindle nut (2 each)28.Ra7.Grease nipple (2 each)18.Self-locking nut (48 each)29.Tit8.Roller19.MH Bolt (48 each)30.Loc9.Front roller guide (2 each)20.Bolt (4 each)31.Ro10.Strip (2 each)21.Bolt (2 each)11.Lock plate height adjustment (222.Roll pin (2 each)	3.	Self-locking nut (6 each)	14.	, , , , , , , , , , , , , , , , , , ,	25.	Rake
6.Nut (2 each)v17.Spindle nut (2 each)28.Ra7.Grease nipple (2 each)18.Self-locking nut (48 each)29.Til8.Roller19.MH Bolt (48 each)30.Lo9.Front roller guide (2 each)20.Bolt (4 each)31.Ro10.Strip (2 each)21.Bolt (2 each)11.Lock plate height adjustment (222.Roll pin (2 each)	4.	Washer (2 each)	15.	Roll pin (2 each)	26.	Side s
7.Grease nipple (2 each)18.Self-locking nut (48 each)29.Til8.Roller19.MH Bolt (48 each)30.Loc9.Front roller guide (2 each)20.Bolt (4 each)31.Ro10.Strip (2 each)21.Bolt (2 each)31.Ro11.Lock plate height adjustment (222.Roll pin (2 each)11.	5.	Self-locking nut (6 each)	16.	Spindle (2 each)	27.	Adjus <sup>.</sup> each)
8.Roller19.MH Bolt (48 each)30.Lock9.Front roller guide (2 each)20.Bolt (4 each)31.Ro10.Strip (2 each)21.Bolt (2 each)31.Ro11.Lock plate height adjustment (222.Roll pin (2 each)Strip (2 each)	6.	Nut (2 each)v	17.	Spindle nut (2 each)	28.	Rake
9.Front roller guide (2 each)20.Bolt (4 each)31.Ro10.Strip (2 each)21.Bolt (2 each)31.Ro11.Lock plate height adjustment (222.Roll pin (2 each)	7.	Grease nipple (2 each)	18.	Self-locking nut (48 each)	29.	Tine f
10.Strip (2 each)21.Bolt (2 each)11.Lock plate height adjustment (222.Roll pin (2 each)	8.	Roller	19.	MH Bolt (48 each)	30.	Lock
11. Lock plate height adjustment (2 22. Roll pin (2 each)	9.	Front roller guide (2 each)	20.	Bolt (4 each)	31.	Rope
	10.	Strip (2 each)	21.	Bolt (2 each)		
	11.		22.	Roll pin (2 each)		

- 23. Spindle (2 each)
- 24. Knurled knob (2 each)
- 25. Rake adjustment bush (2 each)
- 26. Side support (2 each)
- 27. Adjustment bush with thread (2 each)
- 28. Rake tine beam
- 29. Tine for rake (48 each)
- 30. Lock strip (2 each)
- 31. Rope (2 each)

#### Removing the Front Roller and Rake Assembly

#### 

A

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

CAUTION

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the rear roller to prevent it from moving.

#### CAUTION

To prevent personal injury, make sure that the roller and rake assembly is supported as it is removed from the machine. Roller and rake assembly weighs approximately 32 kg (71 lbs).

- 4. Remove the nut (item 5 in Figure 55) that secure the adjustment bush (13) to the front roller guide (9).
- 5. Remove the nut (5) that secures the adjustment bush (14) to the main frame.
- 6. Remove the height adjustment assembly (items 13, 14, 15, 16, 17) and washers (4) from the main frame.
- 7. To remove the height adjustment assembly (items 13, 14, 15, 16, 17) from other side of the machine, repeat the steps 4 to 6.
- 8. Remove the two bolts (1) and lock plate (11) (on each side of the machine) that secures the front roller and rake assembly to the main frame.
- 9. Remove the front roller and rake assembly from the machine.
- 10. If necessary, disassemble the front roller and rake assembly by using the Figure 55 as a guide.

A

#### Installing the Front Roller and Rake Assembly

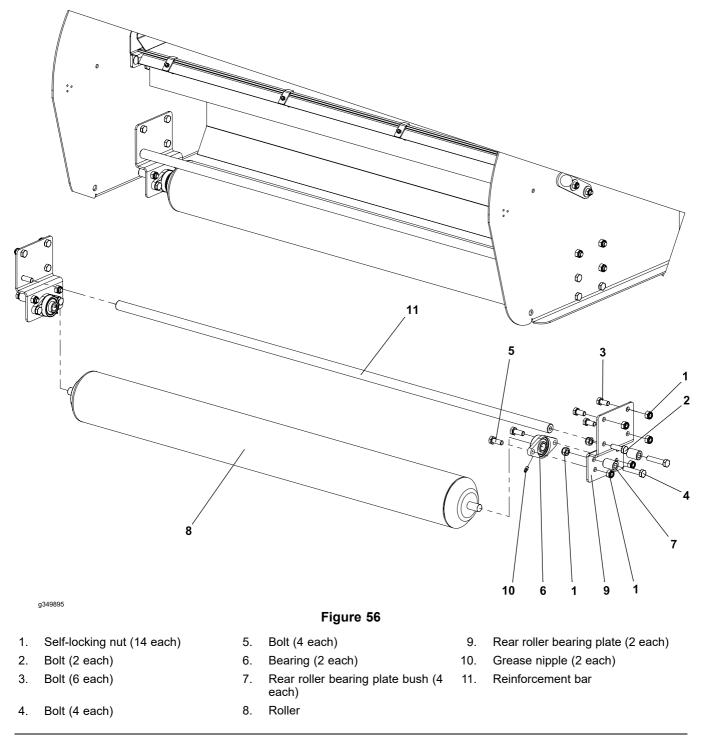
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#### CAUTION

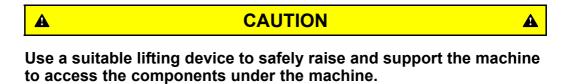
To prevent personal injury, make sure that the roller and rake assembly is supported as it is installed to the machine. Roller and rake assembly weighs approximately 32 kg (71 lbs).

- 1. If removed, assemble the front roller and rake assembly using the Figure 55 as a guide.
- 2. Position the front roller and rake assembly onto the machine.
- 3. Secure the front roller and rake assembly to the main frame with two bolts (1) and lock plate (11) (on each side of the machine).
- 4. Position the height adjustment assembly (items 13, 14, 15, 16, 17) and washers (4) onto the main frame.
- 5. Secure the adjustment bush (14) to the main frame with the nut (5).
- 6. Secure the adjustment bush (13) to the front roller guide (9) with the nut (5).
- 7. To install the height adjustment assembly (items 13, 14, 15, 16, 17) to other side of the machine, repeat the steps 4 to 6.
- 8. Check that the roller is free to rotate and no binding exists.
- 9. Adjust the position of the brush; refer to Operator's Manual.
- 10. Adjust the position of the rake; refer to Operator's Manual.
- 11. Lubricate the grease fittings; refer to Operator's Manual.
- 12. Connect the machine to the traction unit and check the operation of the machine.

## **Rear Roller Assembly**



#### **Removing the Rear Roller Assembly**



#### Removing the Rear Roller Assembly (continued)

A

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.

#### CAUTION

A

A

To prevent personal injury, make sure that the roller assembly is supported as it is removed from the machine. Roller assembly weighs approximately 25 kg (55 lbs).

- 4. Remove the debris hopper and rear brush; refer to Removing the Debris Hopper and Rear Brush (page 6–12).
- 5. Remove the three self-locking nuts (item 1 in Figure 56) and bolts (3) that secures the rear roller bearing plate (9) to the main frame.
- 6. Remove the bolt (2) that secures the reinforcement bar (11) and rear roller bearing plate (9) to the main frame.
- 7. Remove the two nuts (1), bolts (4) and rear roller bearing plate bushes (7) that secures the rear roller bearing plate (9) to the main frame.
- 8. Repeat the steps 4 to 7 other side of the roller.
- 9. Remove the rear roller assembly from the main frame.
- 10. If necessary, disassemble the rear roller assembly by using the Figure 56 as a guide.

#### Installing the Rear Roller Assembly

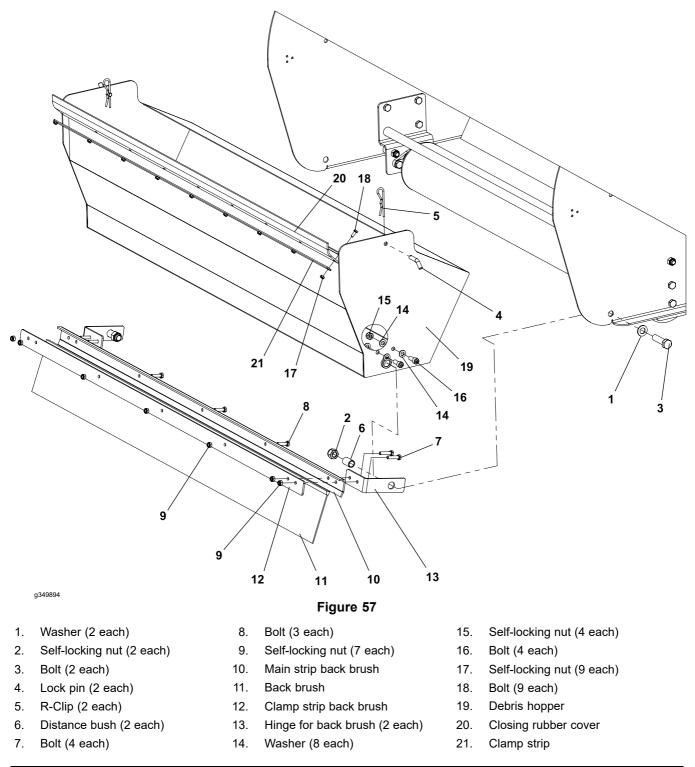
A

#### CAUTION

To prevent personal injury, make sure that the roller assembly is supported as it is installed to the machine. Roller assembly weighs approximately 25 kg (55 lbs).

- 1. If removed, assemble the rear roller assembly using the Figure 56 as a guide.
- 2. Position the rear roller assembly onto the machine.
- 3. Secure the rear roller bearing plate (9) to the main frame with the two bolts (4), rear roller bearing plate bushes (7) and nuts (1).
- 4. Install the reinforcement bar (11) onto the rear roller bearing plate (9) secure with the bolt (2).
- 5. Secure the rear roller bearing plate (9) to the main frame with three bolts (3) and self-locking nuts (1).
- 6. Repeat the steps 3 to 5 other side of the roller.
- 7. Install the debris hopper and rear brush; refer to Installing the Debris Hopper and Rear Brush (page 6–14).
- 8. Check that the roller is free to rotate and that no binding exists.
- 9. Lubricate the grease fittings; refer to Operator's Manual.
- 10. Connect the machine to the traction unit and check the operation of the machine.

### **Debris Hopper and Rear Brush**



#### **Removing the Debris Hopper and Rear Brush**

A

### CA

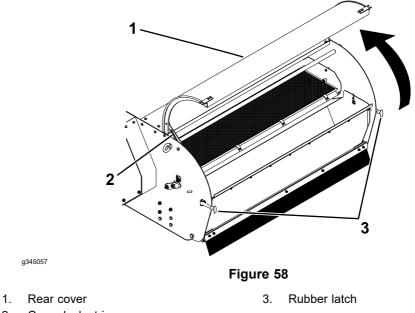
CAUTION

A

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

#### **Removing the Debris Hopper and Rear Brush (continued)**

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.



2. Cover lock strip

Â

#### CAUTION

A

To prevent personal injury, make sure that the debris hopper and rear brush assembly is supported as it is removed from the machine. Debris hopper and rear brush assembly weighs approximately 39 kg (86 lbs).

- 4. Open the rubber latches (item 1 in Figure 58) on both sides of the rear cover and secure it properly with cover locking strip (2).
- 5. Remove the two R-clips (item 5 in Figure 57) and lock pins (4) that secures the debris hopper (19) to the main frame.
- 6. Remove the two self-locking nuts (2), bolts (3), washers (1) and distance bushes (6) that secures the debris hopper and rear brush assembly to the main frame.
- 7. Remove the debris hopper and rear brush assembly from the machine.
- 8. If necessary, disassemble the debris hopper and rear brush assembly by using the Figure 57 as a guide.

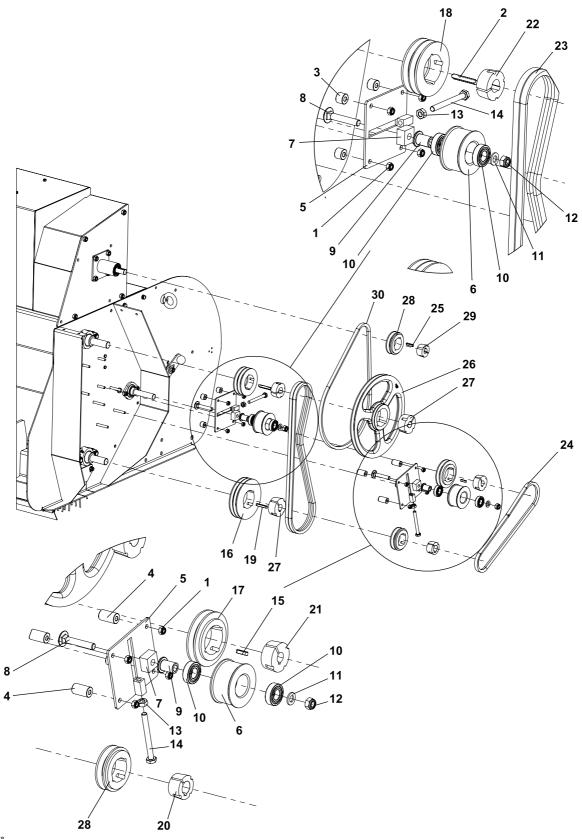
#### 

#### CAUTION

To prevent personal injury, make sure that the debris hopper and rear brush assembly is supported as it is installed to the machine. Debris hopper and rear brush assembly weighs approximately 39 kg (86 lbs).

- 1. If removed, assemble the debris hopper and rear brush assembly by using the Figure 57 as a guide.
- 2. Position the debris hopper and rear brush assembly to the main frame.
- 3. Secure the debris hopper and rear brush assembly to the main frame with two distance bushes (6), washers (1), bolts (3) and self-locking nuts (2).
- 4. Secure the debris hopper (19) to the main frame with two lock pins (4) and R-clips (5).
- 5. Unlock the cover locking strip of the rear cover and close the rear cover.
- 6. Secure the rear cover with the two rubber latches.
- 7. Lubricate the grease fittings; refer to Operator's Manual.
- 8. Connect the machine to the traction unit and check the operation of the machine.

**Pulleys** 



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#### Figure 59 (continued)

Washer (2 each) 1. Self-locking nut (8 each) 11. Self-locking nut (2 each) 2. Key 12. Nut (2 each) 3. Distance bush (4 each) 13. 4. Distance bush (4 each) 14. Bolt (2 each) Spanner plate (2 each) 15. Key 5. 6. Idler pulley (2 each) 16. Pulley Spanner block pulley (2 each) 7. 17. Pulley 8. Bolt (2 each) 18. Pulley Idler distance shaft (2 each) 9. 19. Key

A

20.

Taperlock

- 21. Taperlock
- 22. Taperlock
- 23. V-Belt (2 each)
- 24. V-Belt
- 25. Key (2 each)
- 26. Pulley
- 27. Taperlock (2 each)
- 28. Pulley (2 each)
- 29. Taperlock
- 30. V-Belt

#### **Removing the Pulleys**

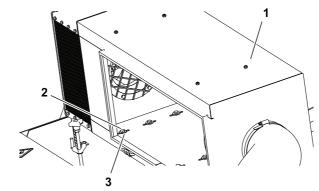
Bearing (4 each)

10.

#### CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- Remove pulley cover from the machine; refer to Removing the Covers (page 6–5)



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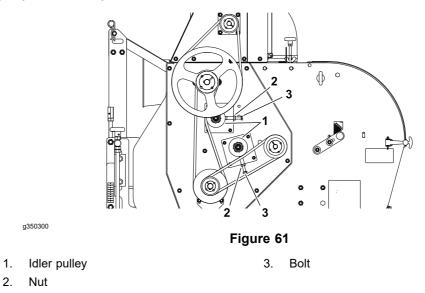
Figure 60

1. Vacuum unit

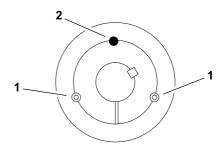
3. Washer (9 each)

- 2. Bolt (9 each)
- 5. Remove the tension on the V-belt (30) by loosening the bolts (item 2 in Figure 60) inside the vacuum unit..
- 6. Remove the V-belt (30) from the pulleys (26 and 28).

#### **Removing the Pulleys (continued)**



- 7. Remove the tension on the V-belts (23 and 24) by loosening the nuts (item 2 in Figure 61) and bolts (3).
- 8. Remove the V-belt (24) from the pulleys (28 and 17).
- 9. Remove the two V-belts (23) from the pulleys (16 and 18).
- 10. Remove the two set screw that secures the taper lock (27) to drive the pulley (26).



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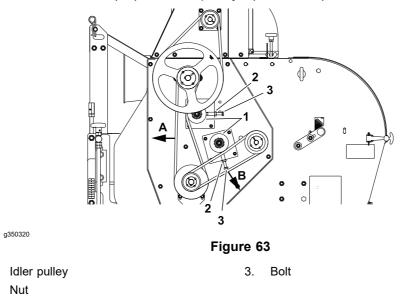
#### Figure 62

1.Set screw installation position2.Set screw removal position

- 11. Install one of the removed set screws into the threaded hole of the taper lock (27); refer to Figure 62. Tighten the set screw to loosen the taper lock (27) from the pulley (26).
- 12. Slide and remove the pulley (26).
- 13. Repeat the steps 10 and 11 to remove:
  - The taper lock (20) from the pulley (28).
  - The taper lock (21) from the pulley (17).
  - The taper lock (27) from the pulley (16).
  - The taper lock (22) from the pulley (18).
  - The taper lock (29) from the pulley (28).
- 14. Slide and remove the pulleys (28, 17, 16, 18 and 28).
- 15. Locate and retrieve the keys (19, 15, 2 and 25).
- 16. If necessary, remove and replace the idler pulley components using the Figure 59 as a guide.

#### Installing the Pulleys

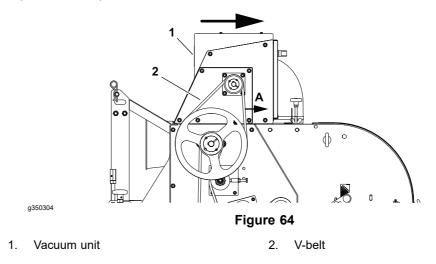
- 1. If removed, install the idler pulleys to the main frame using the Figure 59 as a guide.
- 2. Clean the drive shaft, pulley inner diameter (18) and taper lock (22).
- 3. Position the key (2), pulley (18) and then the taper lock (22) to the drive shaft. Align the threaded holes of the pulley with the non-threaded holes of the taper lock.
- 4. Apply oil to the threads of the set screws and install the screws into the threads of the pulley (18). Alternately and evenly tighten the set screws.
- 5. Fill the allen recess in the set screws and taper lock threads with grease to prevent dirt from packing into the crevices.
- 6. Repeat the steps 2 and 5 to install:
  - The pulley (16) and taper lock (27).
  - The pulley (28) and taper lock (20).
  - The pulley (17) and taper lock (21).
  - The pulley (28) and taper lock (29).
  - The pulley (26) and taper lock (27).
- 7. Install the two V-belts (23) onto the pulleys (16 and 18).
- 8. Install the V-belt (24) onto the pulleys (28 and 17).
- 9. Install the V-belt (30) onto the pulleys (26 and 28).



- 10. Adjust the tension of the V-belts (23 and 24) by tightening the bolts (item 3 in Figure 63) and nuts (2).
- 11. Verify that the belts deflects 2 mm (0.08 inch) when pulled with 4.5 kg (9.9 lbs) of force at points A and B (refer to Figure 63). Continue adjusting the tension as needed.

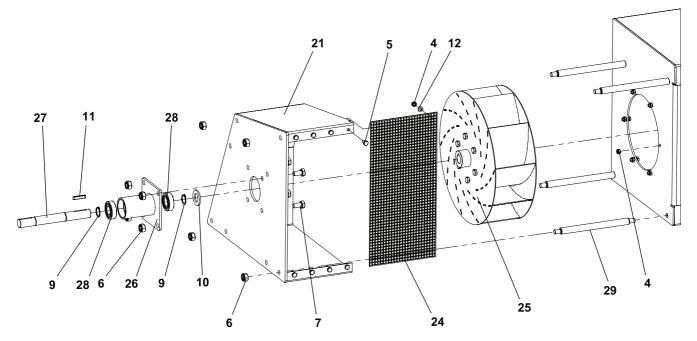
1.

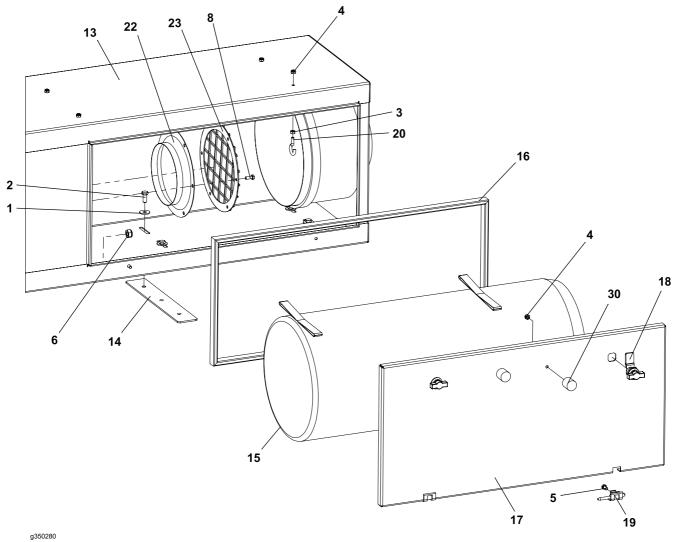
2.



- 12. Adjust the tension of the V-belt (30) by moving the vacuum unit (refer to Figure 64) and tightening the bolts (item 2 in Figure 60).
- 13. Verify that the belt deflects 2 mm (0.08 inch) when pulled with 4.5 kg (9.9 lbs) of force at point A (refer to Figure 64). Continue adjusting the tension as needed.
- 14. Install the pulley covers onto the machine; refer to Installing the Covers (page 6–6)
- 15. Lubricate the grease fittings; refer to Operator's Manual.
- 16. Connect the machine to the traction unit and check the operation of the machine.

# Vacuum Unit Assembly







#### Figure 65 (continued)

- 1. Large washer (9 each)
- 2. Bolt (9 each)
- 3. Nut (4 each)
- 4. Self-locking nut (20 each)
- 5. Bolt (10 each)
- 6. Self-locking nut (12 each)
- 7. Bolt (4 each)
- 8. Bolt (6 each)
- 9. Circlip (2 each)
- 10. Washer

- 11. Key
- 12. Washer (8 each)
- 13. Box vacuum unit
- 14. Mounting strip (3 each)
- 15. Dust bag
- 16. Vacuum rubber
- 17. Container lid
- 18. Lock (2 each)
- 19. Hinge (2 each)
- 20. Cup hook (4 each)

- 21. Cover fan wheel
- 22. Flange
- 23. Intake protection
- 24. Mesh cover wire
- 25. Fan wheel complete with hub
- 26. Bearing support
- 27. Pulley axle
- 28. Bearing (2 each)
- 29. Stud (4 each)
- 30. Vibration damper (2 each)

#### **Removing the Vacuum Unit Assembly**

A

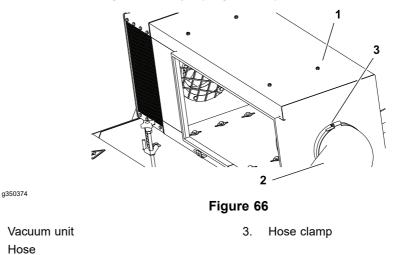
1.

2.

#### CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Remove the dust bag (item 15 in Figure 65) from the vacuum unit; refer to *Operator's Manual*.
- 5. Remove the pulley covers from the machine; refer to Removing the Covers (page 6–5).
- 6. Remove the vacuum unit drive V-belt (item 30 in Figure 59) from the machine; refer to Removing the Pulleys (page 6–16).



7. Remove the hose clamp (item 3 in Figure 66) that secures the hose (2) to the vacuum unit (1). Remove the hose (2) from the vacuum unit (1).

A

CAUTION

To prevent personal injury, make sure that the vacuum unit is supported as it is removed from the machine. Vacuum unit weighs approximately 30 kg (66 lbs).

- 8. Remove the nine bolts (item 2 in Figure 65) and washers (1) that secures the vacuum unit assembly to main frame.
- 9. Carefully remove the vacuum unit assembly and three mounting strips (14) from the main frame.
- 10. If necessary, disassemble the vacuum unit assembly by using the Figure 65 as a guide.

#### Installing the Vacuum Unit Assembly

A

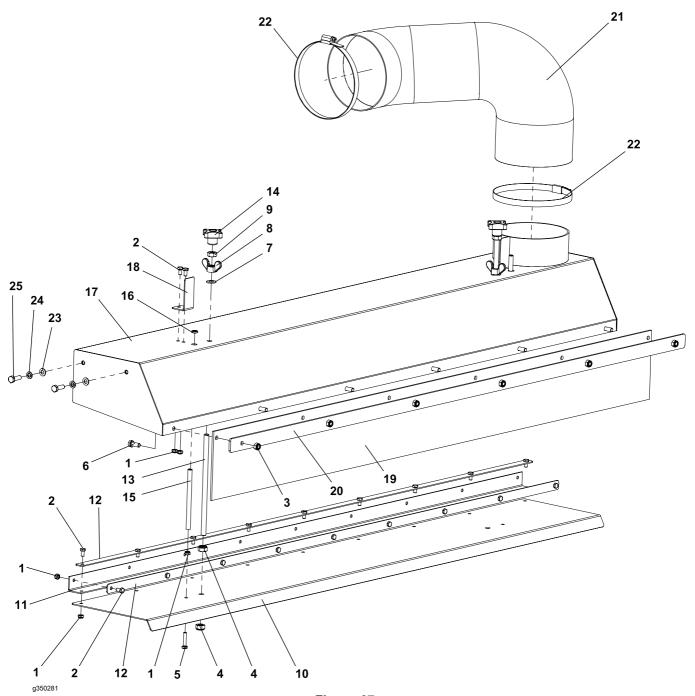
CAUTION

To prevent personal injury, make sure that the vacuum unit is supported as it is installed to the machine. Vacuum unit weighs approximately 30 kg (66 lbs).

- 1. If removed, assemble the vacuum unit assembly using the Figure 65 as a guide.
- Install the vacuum unit assembly and on top of the three mounting strips (14) and secure with the nine washers (1) and bolts (2). Don't fully tighten the bolts (2).
- 3. Install the vacuum drive V-belt (item 30 in Figure 59) to the machine; refer to Installing the Pulleys (page 6–18).
- 4. Adjust the tension of the vacuum drive V-belt and tighten the nine bolts; refer to Installing the Pulleys (page 6–18).
- 5. Install the pulley covers onto the machine; refer to Installing the Covers (page 6–6).
- 6. Install the hose (item 2 in Figure 66) to the vacuum unit (1) and secure with the hose clamp (3).
- 7. Install the dust bag (15) into the vacuum unit; refer to Operator's Manual.
- 8. Check and adjust the vacuum suction force; refer to *Operator's Manual*.
- 9. Lubricate the grease fittings; refer to Operator's Manual.
- 10. Connect the machine to the traction unit and check the operation of the machine.

A

## **Vacuum Extractor Assembly**



- Self-locking nut (24 each) 1.
- 2. Bolt (22 each)
- Self-locking nut (6 each) 3.
- 4. Self-locking nut (4 each)
- 5. Bolt (2 each)
- 6. Bolt (6 each)
- 7. Washer (2 each)
- Wing nut (2 each) 8.
- Nut (2 each) 9.

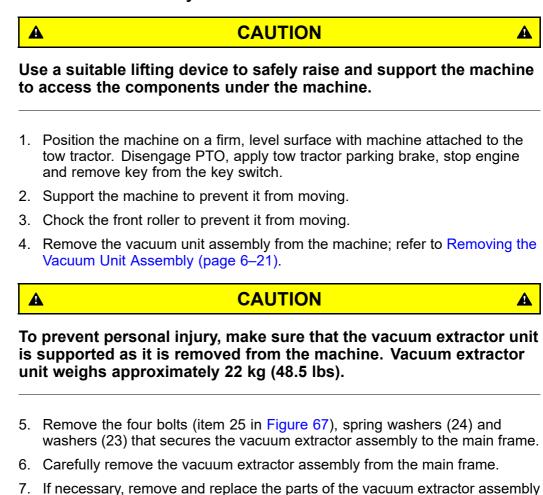
#### Figure 67

Valve plate 11. Rubber hinge

10.

- 12. Clamp strip hinge (2 each)
- 13. Threaded rod (2 each)
- 14. Knob (2 each)
- 15. Stud height indicator (2 each)
- 16. Rubber grommet (2 each)
- 17. Vacuum head
- 18. Height indicator (2 each)

- 19. Rubber guide strip
- 20. Clamp strip top rubber
- 21. Hose
- 22. Hose clamp (2 each)
- 23. Washer (4 each)
- 24. Spring washer (4 each)
- 25. Bolt (4 each)



### Installing the Vacuum Extractor Assembly

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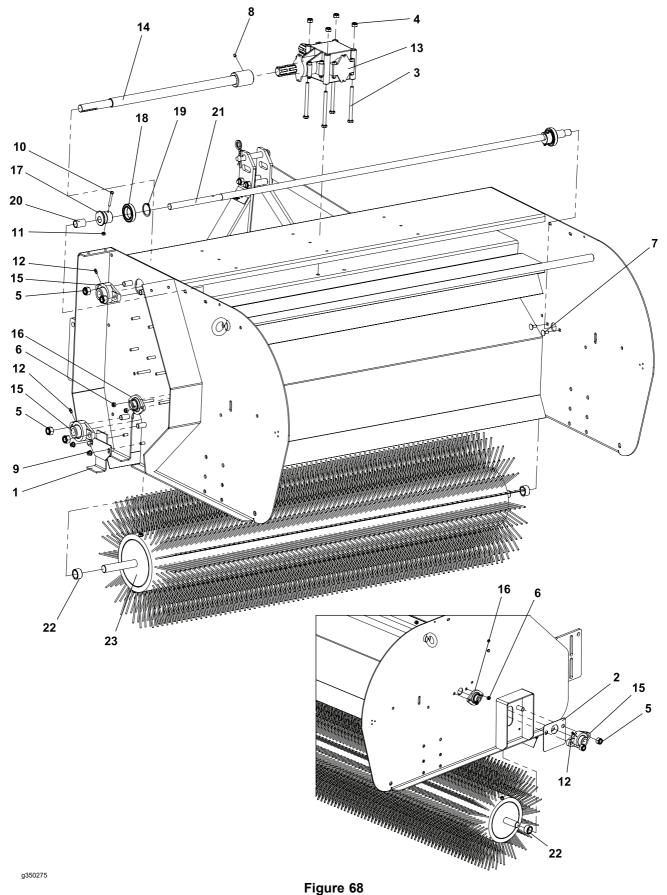
by using the Figure 67) as a guide.

To prevent personal injury, make sure that the vacuum extractor unit is supported as it is installed to the machine. Vacuum extractor unit weighs approximately 22 kg (48.5 lbs).

CAUTION

- 1. If removed, assemble the vacuum extractor assembly by using the Figure 67 as a guide.
- 2. Install the vacuum extractor assembly onto the main frame and secure with four washers (23), spring washers (24) and bolts (25).
- 3. Install the vacuum unit assembly onto the machine; refer to Installing the Vacuum Unit Assembly (page 6–22).
- 4. Check and adjust the vacuum suction force; refer to *Operator's Manual*.
- 5. Lubricate the grease fittings; refer to Operator's Manual.
- 6. Connect the machine to the traction unit and check the operation of the machine.

# **Gearbox and Brush**



#### Figure 68 (continued)

- 1. Cover plate brush
- 2. Cover plate
- 3. Bolt (4 each)
- 4. Self-locking nut (4 each)
- 5. Self-locking nut (6 each)
- 6. Self-locking nut (4 each)
- 7. Bolt (4 each)
- 8. Set screw

- 9. Flanged self-locking nut (2 each)
- 10. Bolt (2 each)
- 11. Self-locking nut (2 each)
- 12. Grease nipple (3 each)
- 13. Gearbox
- 14. Drive shaft
- 15. Bearing (3 each)
- 16. Bearing (2 each)

- 17. Excenter (2 each)
- 18. Bearing (2 each)
- 19. Circlip (2 each)
- 20. Distance bush (2 each)
- 21. Excenter shaft
- 22. Distance bush (2 each)
- 23. Brush

#### **Removing the Gearbox and Brush**

A

### CAUTION

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Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Remove the covers from the machine; refer to Removing the Covers (page 6–5).
- Remove the pulleys from the machine: refer to Removing the Pulleys (page 6–16)
- 6. Remove the vacuum unit assembly from the machine; refer to Removing the Vacuum Unit Assembly (page 6–21)
- 7. Remove the vacuum extractor assembly from the machine; refer to Removing the Vacuum Extractor Assembly (page 6–24)
- 8. Remove the four nuts (item 4 in Figure 68) and bolts (3) that secures the gearbox (13) to the main frame.

#### 

#### CAUTION

A

To prevent personal injury, make sure that the brush is supported as it is removed from the machine. Brush weighs approximately 31 kg (68 lbs).

9. If necessary, remove the drive shaft (14), excenter shaft (21) and brush (23) from the main frame by using the Figure 68 as a guide.

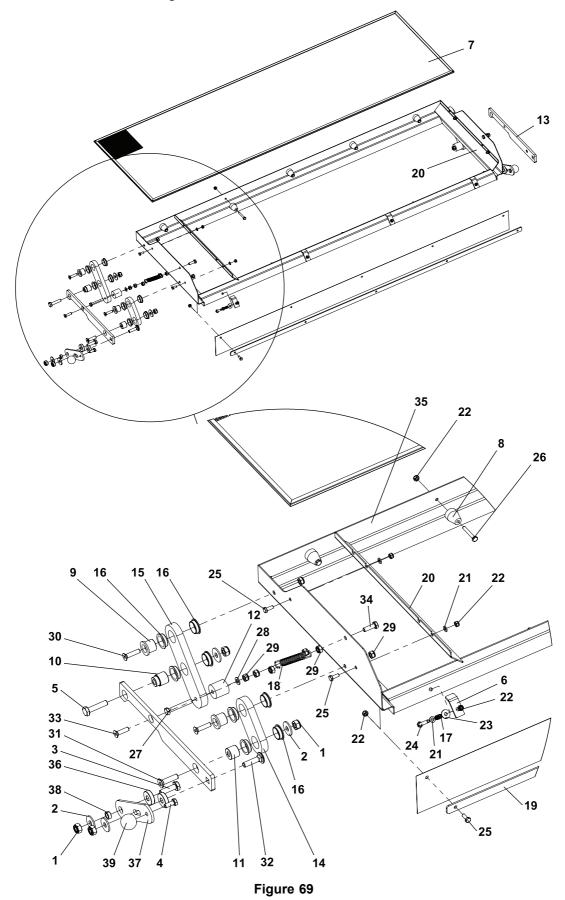
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#### CAUTION

A

To prevent personal injury, make sure that the brush is supported as it is installed to the machine. Brush weighs approximately 31 kg (68 lbs).

- 1. If removed, Install the brush (23), excenter shaft (21) and drive shaft (14) to the main frame using the Figure 68 as a guide.
- Position the gear box (13) onto the main frame and secure with four bolts (3) and nuts (4).
- 3. Install the vacuum extractor assembly onto the machine; refer to Installing the Vacuum Extractor Assembly (page 6–24).
- 4. Install the vacuum unit assembly onto the machine; refer to Installing the Vacuum Unit Assembly (page 6–22).
- 5. Install the pulleys onto the machine: refer to Installing the Pulleys (page 6–18).
- 6. Install the covers onto the machine; refer to Installing the Covers (page 6–6).
- 7. Check and adjust the vacuum suction force; refer to Operator's Manual.
- 8. Lubricate the grease fittings; refer to Operator's Manual.
- 9. Connect the machine to the traction unit and check the operation of the machine.



g350279

#### Figure 69 (continued)

1. Self-locking nut (8 each) 14. Strip short (2 each) 27. Bolt (2 each) 2. Large washer (8 each) 15. Strip long (2 each) 28. Washer (2 each) 3. Bolt (2 each) 16. Bearing bush (16 each) 29. Self-locking nut (12 each) 4. Bolt (2 each) 17. Compression spring (4 each) 30. Bolt (4 each) 5. Bolt (2 each) 18. Tension spring (2 each) 31. Bolt (2 each) 32. Bolt (2 each) 6. Lock strip (4 each) 19. Clamp strip 7. Sieve mesh 20. Rubber deflector (2 each) 33. Bolt (2 each) 8. Lock plug (5 each) 21. Washer (4 each) 34. Bolt (2 each) 9. Bush (4 each) 22. Self-locking nut (18 each) 35. Frame sieve 23. 10. Distance bush (2 each) Large washer (4 each) 36. Spacer ring (4 each) Distance bush (2 each) 24. Bolt (4 each) 37. Strip (2 each) 11. 12. Bush (2 each) 25. Bolt (9 each) 38. Pivot bush (2 each) Connecting strip 26. Bolt (5 each) 39. Plastic ball knob (2 each) 13.

#### **Removing the Sieve Frame Assembly**

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Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

CAUTION

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- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Remove the covers from the machine; refer to Removing the Covers (page 6–5).
- 5. Remove the vacuum extractor assembly from the machine; refer to Removing the Vacuum Extractor Assembly (page 6–24).
- 6. Remove the nut (item 1 in Figure 69), large washer (2) and bolt (5) that secures the sieve frame assembly to the main frame.
- 7. Remove the two nuts (1), large washers (2), bolt (3) and carriage bolt (32) that secures the sieve frame assembly to the main frame.
- 8. Repeat the steps 6 to 7 other side of the sieve frame assembly.

#### CAUTION

To prevent personal injury, make sure that the sieve frame assembly is supported as it is removed from the machine. Sieve frame assembly weighs approximately 50 kg (110 lbs).

- 9. Slowly slide back and remove the sieve frame assembly from the machine.
- 10. If necessary, remove and replace the parts of the sieve frame assembly by using the Figure 69 as a guide.

#### 

#### CAUTION

To prevent personal injury, make sure that the sieve frame assembly is supported as it is installed to the machine. Sieve frame assembly weighs approximately 50 kg (110 lbs).

- 1. If removed, assemble the parts of the sieve frame assembly by using the Figure 69 as a guide.
- 2. Position the sieve frame assembly onto the main frame and secure with a carriage bolt (32), bolt (3), two large washers (2) and two nuts (1).
- 3. Secure the sieve frame assembly to the main frame with bolt (5), large washer (2) and nut (1).
- 4. Repeat the steps 2 to 3 other side of the sieve frame assembly.
- 5. Install the vacuum extractor assembly onto the machine; refer to Installing the Vacuum Extractor Assembly (page 6–24).
- 6. Install the covers onto the machine; refer to Installing the Covers (page 6–6).
- 7. Check and adjust the angle of the sieve; refer to Operator's Manual.
- 8. Check and adjust the vacuum suction force; refer to Operator's Manual.
- 9. Lubricate the grease fittings; refer to Operator's Manual.
- 10. Connect the machine to the traction unit and check the operation of the machine.

### **Main Frame**

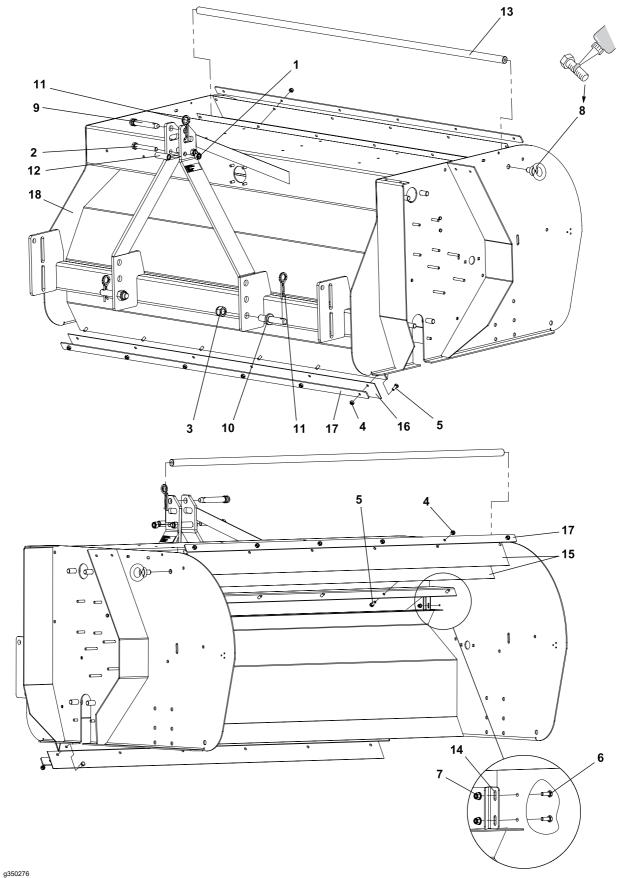


Figure 70

### Main Frame (continued)

- 1. Self-locking nut (2 each)
- 2. Bolt (2 each)
- 3. Self-locking nut (2 each)
- 4. Self-locking nut (12 each)
- 5. Bolt (12 each)
- 6. Bolt (4 each)

#### Figure 70 (continued)

- 7. Self-locking nut (4 each)
- 8. Eye bolt (2 each)
- 9. Top link pin
- 10. Bottom 3-point pin (2 each)
- 11. R-clip (3 each)
- 12. Distance bush (2 each)
- 13. Reinforcement bar
- 14. Output dividing plate (2 each)
- 15. Top rubber (2 each)
- 16. Rubber guide strip
- 17. Clamp strip top rubber (2 each)
- 18. Main frame

#### 

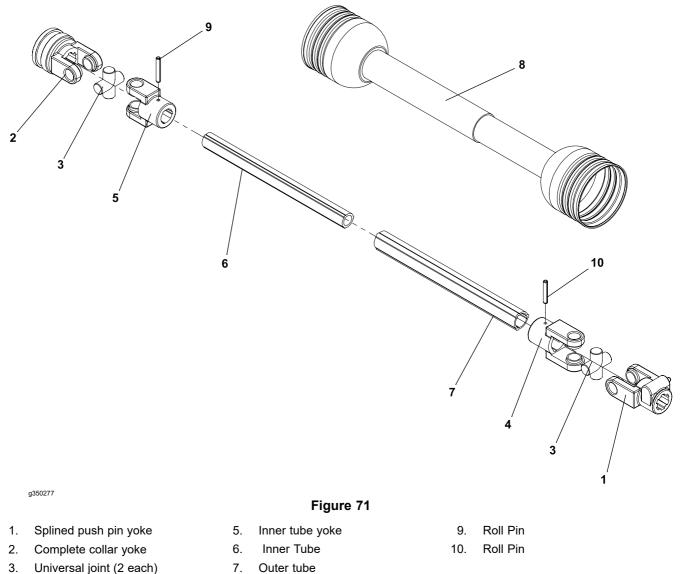
#### CAUTION

A

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. If necessary, remove and replace the parts of the main frame using the Figure 70 as a guide.
- 5. Apply a coat of thread locking compound to the threads of the eye bolt (8) and install onto the main frame.
- 6. Lubricate the grease fittings; refer to Operator's Manual.
- 7. Connect the machine to the traction unit and check the operation of the machine.

**PTO** 



4. Outer tube yoke

- 7. Outer tube
- 8. Complete guard

#### IMPORTANT

Never use the PTO over 30° angle.

Measure correct length of the PTO first.

Always deburr the parts when you cut to correct length.

#### **Disassembling the PTO**

- 1. Park the machine on a level surface and disengage the PTO. Disconnect the machine from the tow vehicle; refer to the Operator's Manual.
- 2. Support the machine to prevent it from moving.
- 3. Chock the front roller to prevent it from moving.
- 4. Remove the PTO from the machine; refer to Operator's Manual.
- 5. Remove the complete shield (8) from the PTO.
- 6. Disassemble the PTO by using the Figure 71 as a guide.

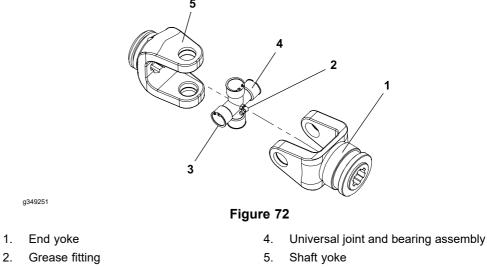
#### **Disassembling the PTO (continued)**

7. For servicing the universal joint; refer to Servicing the Driveshaft Universal Joint and Bearing Assembly (page 6–35).

#### **Assembling the PTO**

- 1. Assemble the PTO using the Figure 71 as a guide.
- 2. Install the complete shield (8) to the PTO.
- 3. Position and install the PTO between the machine and traction unit; refer *Operator's Manual.*
- 4. Lubricate the grease fittings; refer to Operator's Manual.
- 5. Connect the machine to the traction unit and check the operation of the machine.

### Servicing the Driveshaft Universal Joint and Bearing Assembly



- 3. Circlip (4 each)
- 1. Remove the circlips (item 3 in Figure 72) that secure the bearings in the yokes.

#### IMPORTANT

# Support the yokes when removing and installing the bearings to prevent damage.

- 2. Use a press to remove the cross and bearings from the yokes.
- 3. Thoroughly clean and inspect all components.
- 4. Install new cross and bearings as follows:
  - A. Apply a thick layer of grease to the bearing bores in the end yoke and shaft yoke.
  - B. Press 1 bearing partially into yoke.

#### IMPORTANT

# Take care when installing cross into bearing to avoid damaging bearing seal.

- C. Insert the cross into the yoke and bearing.
- D. Hold the cross in alignment and press the bearing in until it hits the yoke.
- E. Install the snap ring into the yoke groove to secure the installed bearing.
- F. Place second bearing into the yoke bore and onto the cross shaft. Press the bearing into the yoke and secure with the snap ring.
- G. Repeat the procedure for the other yoke.
- H. Apply grease to the cross until it comes out of all the 4 bearing cups.
- 5. Ensure that the assembled joint moves without any binding. Lightly rap the yoke lugs with a soft-faced hammer to remove slight binding. If the binding continues, disassemble the joint to identify the source of binding.

### Chapter 7

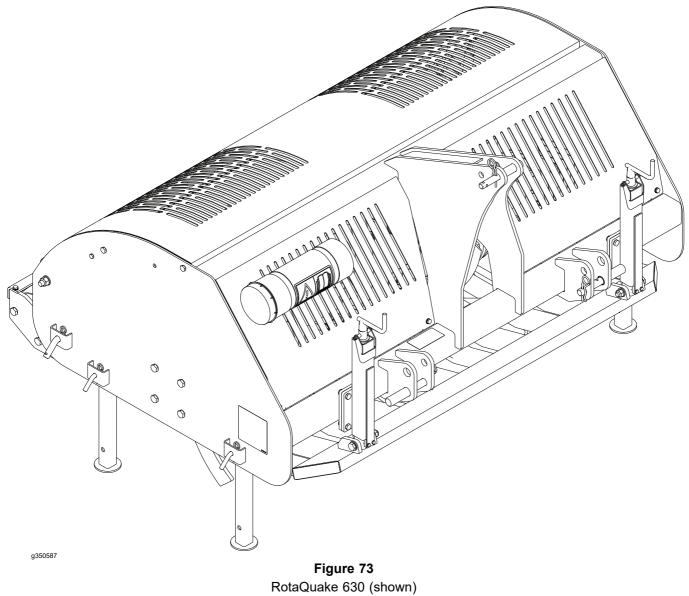
# RotaQuake 630 (Model No. 46454)

# **Table of Contents**

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# **General Information**

The operators manual provides information regarding the operation, general maintenance, and maintenance intervals for your RotaQuake 630 (Model No. 46454). Refer to the *Operator's Manual* for additional information when servicing the machine.



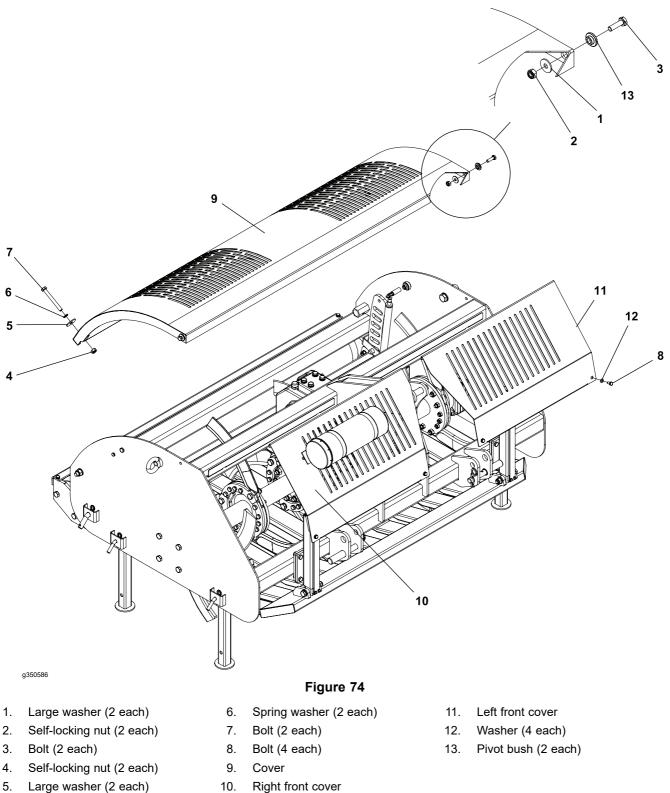
### **Technical Data**

#### RotaQuake 630

ltem	Description
Working width	1.6 meters (63 in)
Working depth	250 mm (9.8 in)
Working speed	0.5 to 1.5 km/h (0.3 to 0.9 mph)
Weight	575 kg (1355 lbs)
Three-point connection	Cat. 1 & 2
Gearbox oil to be used	80W90
Number of knives	18
Number of knife discs	6
Distance between knife discs	260 mm (10.2 in)
Knife thickness	12 mm (0.47 in)
Bearing grease to be used	EP2
Recommended tractor HP	35 to 45 HP
Minimum lift capacity of the tractor	750 kg (1653 lbs)
PTO rpm	540
Standard items	PTO Knives
Optional	Coulter knives

# **Service and Repairs**

### Covers



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CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface on the machine legs attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. To remove the right and left front covers (items 10 and 11 in Figure 74):
  - A. Remove the four bolts (8) and washers (12) that secures the right and left front covers (10 and 11).
  - B. Lift and remove the right and left front covers (10 and 11) from the machine.

#### CAUTION

To prevent personal injury, make sure that rear cover is supported as it is removed from the machine. The rear cover weighs approximately 23 kg (51 lbs).

- 4. To remove the rear cover (9):
  - A. Loosen the two bolts (7) and open the rear cover (9).
  - B. Remove the two self locking nuts (2), large washers (1) and bolts (3) that secures the rear cover (9) to machine.
  - C. Remove the rear cover (9) from the machine.
  - D. If necessary, remove the two pivot bushes (13) from the rear cover (9).
- 5. If necessary, remove the two self locking nuts (4), bolts (7), large washers (5) and spring washers (6) from the machine.

#### Installing the Covers

### CAUTION

To prevent personal injury, make sure that rear cover is supported as it is installed to the machine. The rear cover weighs approximately 23 kg (51 lbs).

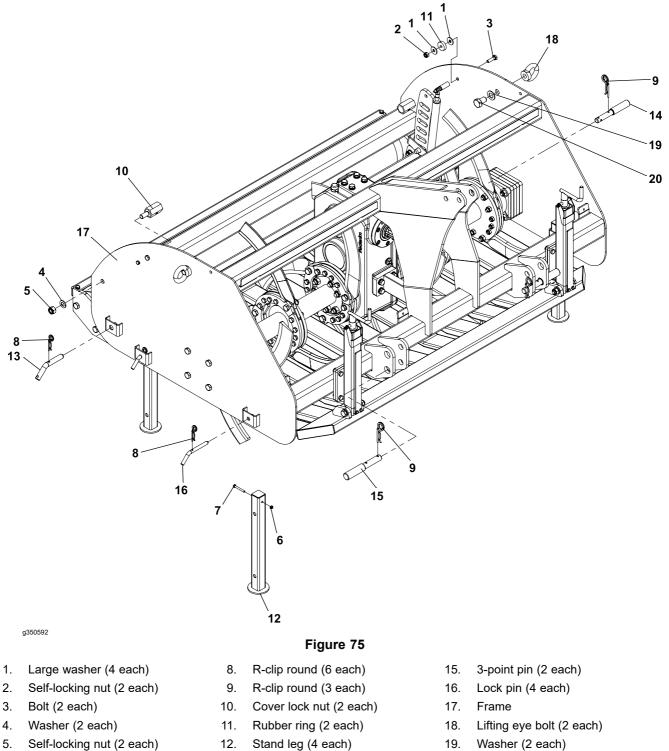
- 1. If removed, install the two bolts (7), spring washers (6), large washers (5) and self locking nuts (4) to the machine.
- 2. To install the rear cover (9):
  - A. If removed, install the two pivot bushes (13) to the rear cover (9).
  - B. Position the rear cover (9) onto the machine.
  - C. Secure the rear cover (9) to the machine with two bolts (3), large washers (1) and self locking nuts (2).
  - D. Lower and secure the rear cover (9) by tightening the two bolts (7).

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#### Installing the Covers (continued)

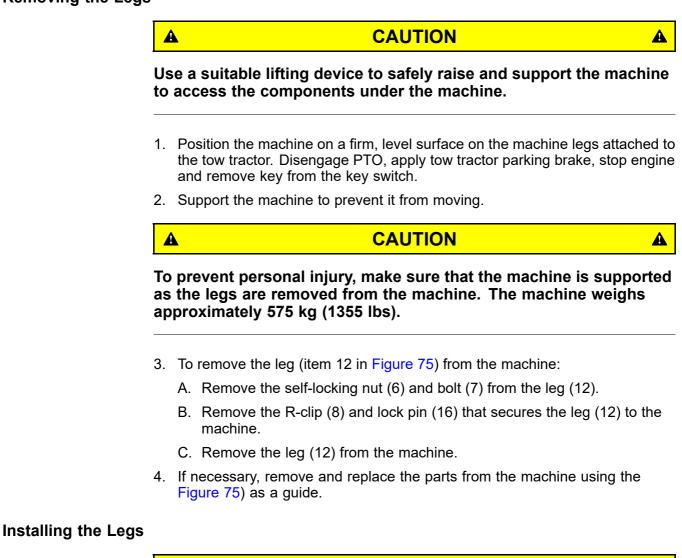
- 3. To install the right and left front covers (10 and 11):
  - A. Position the right and left front covers (10 and 11) to the machine.
  - B. Secure the right and left front covers (10 and 11) to the machine with four bolts (8) and washers (12).
- 4. Lubricate the grease fittings; refer to Operator's Manual.
- 5. Check the operation of the machine.



- Self-locking nut (4 each) 6.
- 7. Bolt (4 each)

- 13. Lock pin (2 each)
- 14. Top link pin

- 19. Washer (2 each)
- Bolt (2 each) 20.



To prevent personal injury, make sure that the machine is supported as the legs are installed to the machine. The machine weighs approximately 575 kg (1355 lbs).

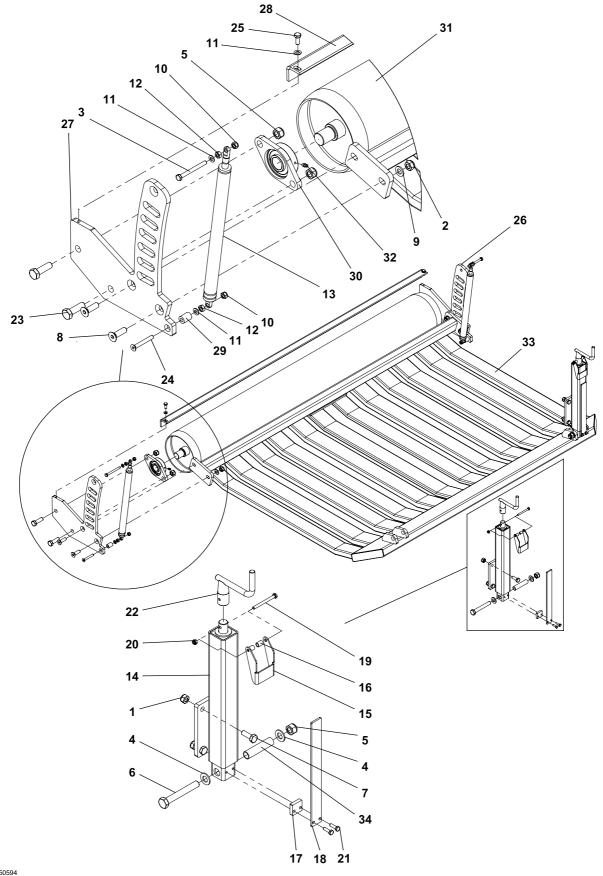
CAUTION

- 1. If removed, assemble the parts of the machine using the Figure 75 as a guide.
- 2. To install the leg (12) to the machine:
  - A. Position the leg (12) into the machine leg hole.
  - B. Secure the leg (12) to the machine frame with the lock pin (16) and R-clip (8).
  - C. Install the bolt (7) and self-locking nut (6) to the leg (12).
- 3. Lubricate the grease fittings; refer to Operator's Manual.
- 4. Check the operation of the machine.

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### **Roller and Skid Assembly**



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Figure 76

#### Figure 76 (continued)

- 1. Self-locking nut (8 each)
- 2. Self-locking nut (4 each)
- 3. Bolt (2 each)
- 4. Washer (4 each)
- 5. Self-locking nut (6 each)
- 6. Bolt (2 each)
- 7. Bolt (8 each)
- 8. Bolt (4 each)
- 9. Washer (4 each)
- 10. Self-locking nut (4 each)
- 11. Washer (6 each)
- 12. Nut (4 each)

- 13. Gas strut complete (2 each)
- 14. Weldment jack (2 each)
- 15. Lock plate (2 each)
- 16. Distance bush (4 each)
- 17. Distance block (2 each)
- 18. Height indicator strip (2 each)
- 19. Bolt (2 each)
- 20. Self-locking nut (2 each)
- 21. Bolt (4 each)
- 22. Lever jack (2 each)
- 23. Bolt (4 each)
- 24. Bolt (2 each)

- 25. Bolt (2 each)
- 26. Left support plate
- 27. Right support plate
- 28. Scraper
- 29. Distance bush (2 each)
- 30. Bearing (2 each)
- 31. Rear roller
- 32. Grease nipple (2 each)
- 33. Skid
- 34. Distance bush (2 each)

#### **Removing the Roller and Skid Assembly**

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#### CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface on the machine legs attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Adjust the roller assembly (item 31 in Figure 76) to the maximum lower position and make sure that the gas strut (13) is fully extended.
- 4. Remove the two self-locking nuts (10) that secures the gas strut (13) to the support plate (27) and main frame.
- 5. Repeat the step 4 to remove the other side of the gas strut (13) from the machine.
- 6. Remove the gas struts (13) from the machine.

### CAUTION

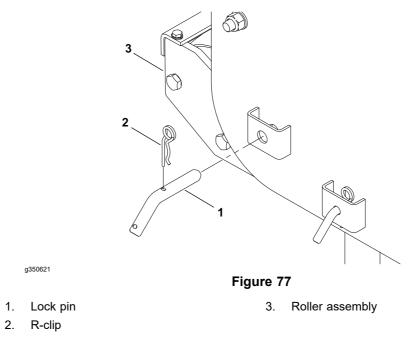
To prevent personal injury, make sure that the roller and skid assembly is supported as it is removed from the machine. Roller and skid assembly weighs approximately 120 kg (265 lbs).

7. Remove the two self locking nuts (5), washers (4) and bolts (6) that secures the skid assembly (33) to the weldment jacks (14).

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#### Removing the Roller and Skid Assembly (continued)



- 8. Remove the two R-clips (item 2 in Figure 77) and lock pins (1) that secures the roller assembly (1) to the main frame.
- 9. Slowly remove the roller and skid assembly from the machine.
- 10. If necessary, remove and replace the parts from the roller and skid assembly using the Figure 76) as a guide.
- 11. If necessary, remove the four self-locking nuts (1) and bolts (7) that secures the weldment jack (14) to the main frame.

#### Installing the Roller and Skid Assembly

- 1. If removed, position the weldment jack (14) to the main frame and secure with four bolts (7) and self-locking nuts (1).
- 2. If removed, assemble the roller and skid assembly using the Figure 76 as a guide.



#### CAUTION

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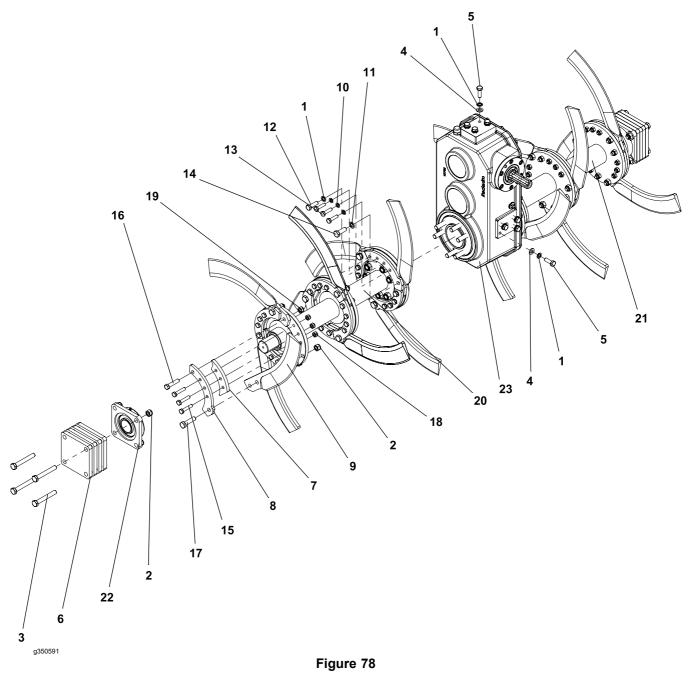
To prevent personal injury, make sure that the roller and skid assembly is supported as it is installed to the machine. Roller and skid assembly weighs approximately 120 kg (265 lbs).

- 3. Position the roller and skid assembly to the machine.
- 4. Secure the roller assembly (item 1 in Figure 77) to the main frame using the two lock pins (1) and R-clips (2).
- 5. Secure the skid assembly (33) to the weldment jacks (14) with two bolts (6), four washers (4) and two self locking nuts (5).
- 6. Make sure that the roller assembly is in maximum lower position.
- 7. Position the two gas struts (13) to the support plate (27) and main frame. Secure the gas strut (13) with two self-locking nuts (10).
- 8. Check that the roller is free to rotate and no binding exists.
- 9. Adjust the operating depth of the machine; refer to Operator's Manual.

#### Installing the Roller and Skid Assembly (continued)

- 10. Lubricate the grease fittings; refer to Operator's Manual.
- 11. Check the operation of the machine.

### **Gearbox and Knife Assembly**



- 1. Spring washer (14 each)
- 2. Self-locking nut (20 each)
- 3. Bolt (8 each)
- 4. Washer (8 each)
- 5. Bolt (8 each)
- 6. Distance plate (8 each)
- 7. Fill plate (18 each)
- 8. Lock plate (18 each)

- Blade (18 each)
- 10. Spring washer (18 each)
- 11. Spring washer (6 each)
- 12. Bolt (6 each)

9.

- 13. Bolt (18 each)
- 14. Bolt (6 each)
- 15. Bolt (36 each)
- 16. Bolt (12 each)

- 17. Bolt (12 each)
- 18. Self-locking nut (36 each)
- 19. Self-locking nut (12 each)
- 20. Right weldment knife section
- 21. Left weldment knife section
- 22. Bearing (2 each)
- 23. Gearbox

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#### CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface on the machine legs attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Remove the covers from the machine; refer to Removing the Covers (page 7–5).
- 4. If necessary, remove the roller and skid assembly from the machine; refer to Removing the Roller and Skid Assembly (page 7–10).

#### WARNING

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# The knifes are sharp; contacting a knife can result in serious personal injury.

#### Wear gloves when removing the knives.

- 5. Remove the bolts (17, 16 and 15) that secures the knifes (9), lock plates (8) and fill plates (7) to the weldment knife sections (20 and 21).
- 6. Remove the knifes (9), lock plates (8) and fill plates (7) from the machine.
- 7. Remove the bolts (14, 13 and 12) that secures the knifes (9), lock plates (8) and fill plates (7) to the weldment knife sections (20 and 21).

**Note:** The bolts (14, 13 and 12) are shorter in length and used to secure the knifes next to the gear box (23).

8. Remove the knifes (9), lock plates (8) and fill plates (7) from the machine.

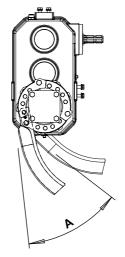
### CAUTION

To prevent personal injury, make sure that the gearbox and knife assembly is supported as it is removed from the machine. Gearbox and knife assembly weighs approximately 175 kg (386 lbs).

- 9. Support the gearbox and weldment knife assembly from shifting, remove the eight self-locking nuts (2) and bolts (3) that secures the gearbox and weldment knife assembly.
- 10. Remove the eight bolts (5), spring washers (1) and washers (4) that secures the gearbox (23) to the main frame.
- 11. Carefully remove the gearbox and weldment knife assembly and distance blocks (6) from the main frame.
- 12. Using a marker, mark the position of the right weldment knife section (20) and left weldment knife section (21) positions to the gearbox (23) for assembly purpose.
- 13. If necessary, remove and replace the parts from the gearbox and weldment knife assembly using the Figure 78 as a guide.
- 14. For servicing the gearbox; refer to Servicing the Gearbox (page 7–17).

#### Installing the Gearbox and Knife Assembly

- 1. If removed, thoroughly clean the parts of the gearbox and weldment knife assembly.
- 2. Assemble the parts of gearbox and weldment knife assembly using the marks marked during the removal process and Figure 78 as a guide.



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Figure 79

- A = Angle between the left and right weldment knife sections should be 46°
- 3. Make sure that the angle between the left and right weldment knife section is 46°; refer to Figure 79.



To prevent personal injury, make sure that the gearbox and knife assembly is supported as it is installed to the machine. Gearbox and knife assembly weighs approximately 175 kg (386 lbs).

- 4. Position the gearbox and weldment knife assembly and distance blocks (6) to the main frame.
- 5. Secure the gearbox (23) to the main frame with eight washers (4), spring washers (1) and bolts (5).
- 6. Secure the gearbox and weldment knife assembly to the main frame with eight bolts (3) and self-locking nuts (2).

WARNING

The knifes are sharp; contacting a knife can result in serious personal injury.

Wear gloves when installing the knives.

- 7. Use the bolts (14, 13 and 12) to secure the knifes (9) next to the gear box to the weldment knife sections (20 and 21).
- 8. Use the bolts (17, 16 and 15) to secure the knifes (9) to the weldment knife sections (20 and 21).

#### Installing the Gearbox and Knife Assembly (continued)

- Position the fill plates (7) and lock plates (8) onto the weldment knife sections (20 and 21) and secure with the bolts. Don't fully tighten the bolts to allow some clearance to install the knifes (9).
- 10. Position the knifes (9) in between the lock plates (8) and weldment knife section. Secure the knifes with the bolts. Tighten the bolts that secures the fill plates (7), lock plates (8) and knifes (9).



- 11. Make sure that the angle between the left and right weldment knife section is 46°; refer to Figure 79.
- 12. If removed, install the roller and skid assembly to the machine; refer to Installing the Roller and Skid Assembly (page 7–11).
- 13. Install the covers to the machine; refer to Installing the Covers (page 7-5).
- 14. Check that the roller is free to rotate and no binding exists.
- 15. Adjust the operating depth of the machine; refer to Operator's Manual.
- 16. Lubricate the grease fittings; refer to Operator's Manual.
- 17. Check the operation of the machine.

### Servicing the Gearbox

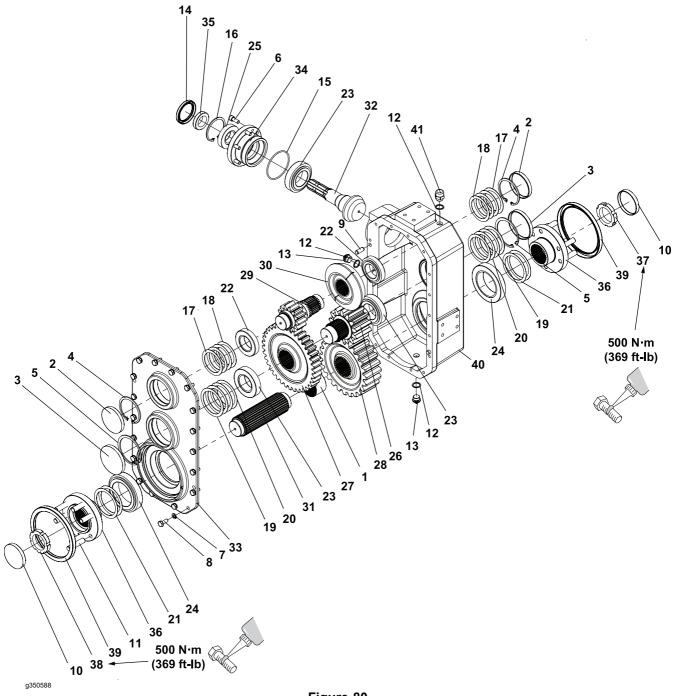


Figure 80

#### Figure 80 (continued)

1.	Distance bush	15.	O-Ring	29.	First shaft with gear
2.	End cap (2 each)	16.	Circlip	30.	Conical crown
3.	End cap (2 each)	17.	Shim (4 each)	31.	Axle
4.	Circlip (2 each)	18.	Shim (4 each)	32.	Bevel pinion
5.	Circlip (2 each)	19.	Shim (4 each)	33.	Cover
6.	Socket head bolt (6 each)	20.	Shim (4 each)	34.	Pinion flange
7.	Spring washer (18 each)	21.	Shim (4 each)	35.	Nut on pinion
8.	Bolt (18 each)	22.	Bearing (2 each)	36.	Flange for transmission (2 each)
9.	Parallel pin (2 each)	23.	Bearing (3 each)	37.	Nut
10.	End cap (2 each)	24.	Bearing (2 each)	38.	Nut
11.	Stud (12 each)	25.	Bearing	39.	Seal (2 each)
12.	Copper washer (3 each)	26.	Gear	40.	Gearbox housing
13.	Tap (2 each)	27.	Gear	41.	Breather
14.	Seal	28.	Gear		

#### **Disassembling the Gearbox**

- 1. Remove the breather (item 41 in Figure 80) from the gearbox.
- 2. Remove the two taps (13) and copper washers (12) from the gearbox. Drain the gearbox oil.
- 3. Remove the six end caps (2, 3 and 10) from the gear box.
- 4. Remove the four circlips (4 and 5) from the gearbox.
- 5. Remove the two nuts (37 and 38) that secures the two flanges (36) to the gearbox
- 6. Carefully remove the two flanges (36) and seals (39) from the gearbox. Discard the seals (39).
- 7. Remove the four shims (21) and two bearings (24) from the gearbox.
- 8. Remove the seal (14) and nut (35) from the pinion flange (32). Discard the seal (14).
- 9. Remove the circlip (16) from the pinion flange (34).
- 10. Remove the six socket head bolts (6) that secures the pinion flange (34) to the gearbox.
- 11. Carefully remove the pinion flange (34) and bevel pinion (32) from the gearbox.
- 12. Remove the bevel pinion (32) and bearing (25) from the pinion flange (34).
- 13. Remove the bearing (23) from the bevel pinion (32).
- 14. Remove and discard the O-ring (15) from the pinion flange (34).
- 15. Use a press and remove the bearing cups from the pinion flange (34).
- 16. Remove the 18 bolts (8) and spring washers (7) that secures the cover (33) to the gearbox housing (40).
- 17. Carefully remove the cover (33) from the gearbox housing (40).
- 18. Remove the bearing (22) from the gear shaft (29) and the bearing (23) from the gear shaft (26).
- 19. Remove the center gear shaft (26), first gear shaft (29) and axle shaft (31) as an assembly from the gearbox housing (40).
- 20. Remove the bearing (22) from the gear shaft (29) and the bearing (23) from the gear shaft (26).

#### **Disassembling the Gearbox (continued)**

**Note:** Hard shims (17) and soft shims (18) are used to adjust shaft end play. Take note of number and location of shims to assist in assembly process.

21. Remove the shims (17 and 18) and bearing cup (22) from the gearbox cover (33) and gearbox housing (40).

**Note:** Hard shims (19) and soft shims (20) are used to adjust shaft end play. Take note of number and location of shims to assist in assembly process.

- 22. Remove the shims (19 and 20) and bearing cup (23) from the gearbox cover (33) and gearbox housing (40).
- 23. Thoroughly clean and inspect all gearbox components. Replace all worn or damaged parts using the Figure 80 as a guide.

#### Assembling the Gearbox

**Note:** The hard shims (17 and 19) and soft shims (18 and 20) between bearing cups and gearbox housing (40) are used to adjust gear mesh and pattern. During assembly, install same number of hard and soft shims as were removed.



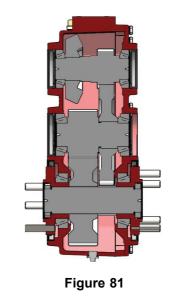
- 1. Position the shims (19 and 20) in the gearbox housing and then press the bearing cup (23) fully into the gearbox housing (40).
- 2. Position the shims (17 and 18) in the gearbox housing and then press the bearing cup (22) fully into the gearbox housing (40).
- 3. Press the bearing cup (24) fully into the gearbox housing (40).
- 4. Position the axle shaft assembly (31, 28 and 1) into the gearbox housing (40).
- 5. Install the bearing (22) to the first shaft assembly (29 and 30).
- 6. Position the first shaft assembly (29 and 30) with bearing (22) into the gearbox housing (40).
- 7. Install the bearing (23) to the center gear shaft (28).
- 8. Position the center gear shaft (28) into the gearbox housing (40).
- 9. Position the gear (27) onto the gear shaft (28).
- 10. Install the bearing (22) onto the gear shaft (29) and the bearing (23) onto the gear shaft (26).

**Note:** The hard shims (17 and 19) and soft shims (18 and 20) between bearing cups and gearbox cover (33) are used to adjust shaft end play. During assembly, install same number of hard and soft shims as were removed.

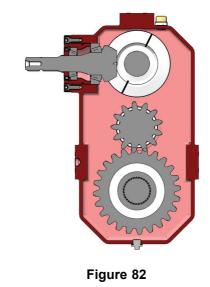


- 11. Position the shims (19 and 20) in the gearbox cover and then press the bearing cup (23) fully into the gearbox cover (33).
- 12. Position the shims (17 and 18) in the gearbox cover and then press the bearing cup (22) fully into the gearbox cover (33).
- 13. Press the bearing cup (24) fully into the gearbox cover (33).
- 14. If removed, install the parallel pins (9) to the gearbox housing (40).

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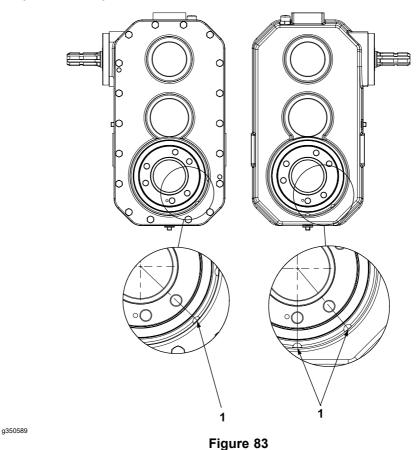
- 15. Carefully position the gearbox cover (33) onto the gearbox housing (40) and secure with 18 spring washers (7) and bolts (8); refer to Figure 81.
- 16. Slide the bearing (23) to the bevel pinion (32).
- 17. Install the bearing (25) to the pinion flange (34).
- 18. Lightly apply grease to new O-ring (15) and install onto the pinion flange (34).
- 19. Position the bevel pinion (32) into the pinion flange (34).



- 20. Carefully position the pinion flange (34) and bevel pinion (32) into the gearbox housing (40); refer to Figure 82.
- Make sure that bevel pinion gear teeth mesh properly with the conical gear (30). Secure the bevel pinion (32) with six socket head bolts (6).
- 22. Install the circlip (16) into the pinion flange (34)
- 23. Install the nut (35) to the pinion flange (34).
- 24. Install the two bearings (24) and four shims (21) into the gearbox.

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#### Assembling the Gearbox (continued)



- 1. Check marker for correct angle alignment
- 25. Position the two flanges (36) into the gearbox and check the marker for correct angle alignment; refer to Figure 83.

Note: Apply a coat of threadlocking compound to two nuts (37 and 38).

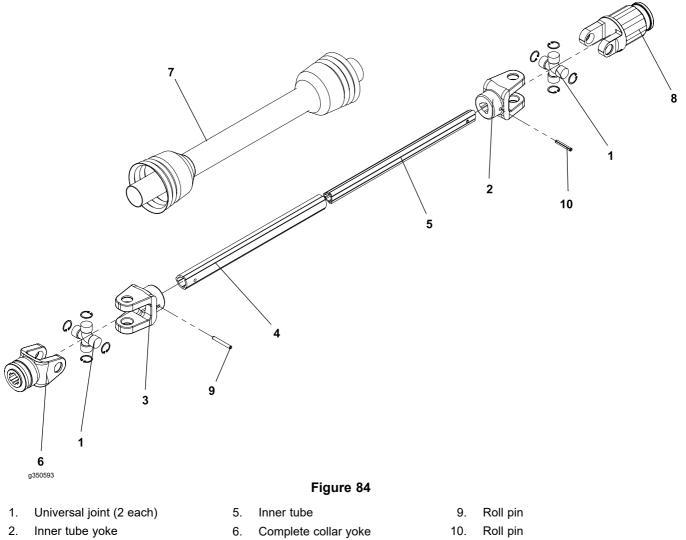
26. Secure the two flanges (36) to the gearbox with two nuts (37 and 38).



- 27. Torque tighten the nuts (37 and 38) to **500 N·m (369 ft-lbs)**.
- Apply a light coating of grease on seal lips and seal OD. Install seals (14 and 39) into gearbox taking care to not damage seals during installation. Seals should be installed until they are flush with the housing.
- 29. Install the four circlips (4 and 5) into the gearbox.
- 30. Install the six end caps (2, 3 and 10) to the gear box.
- 31. Install the two taps (13) and copper washers (12) to the gearbox.



32. Fill the gearbox with 5.5 L (1.45 gal) of 80W90.



- 3. Outer tube yoke
- Outer tube 4.

7. Complete guard 8. Ratchet clutch yoke

#### **IMPORTANT**

Never use the PTO over 30° angle.

Measure correct length of the PTO first.

Always deburr the parts when you cut to correct length.

#### **Disassembling the PTO**

- 1. Position the machine on a firm, level surface on the machine legs attached to the tow tractor. Disengage PTO, apply tow tractor parking brake, stop engine and remove key from the key switch. .
- 2. Support the machine to prevent it from moving.
- 3. Remove the PTO from the machine; refer to Operator's Manual.
- 4. Remove the complete shield (7) from the PTO.
- 5. Disassemble the PTO by using the Figure 84 as a guide.

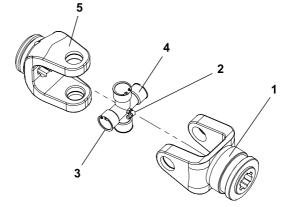
#### **Disassembling the PTO (continued)**

6. For servicing the universal joint; refer to Servicing the Driveshaft Universal Joint and Bearing Assembly (page 7–24).

#### Assembling the PTO

- 1. Assemble the PTO using the Figure 84 as a guide.
- 2. Install the complete shield (7) to the PTO.
- 3. Position and install the PTO between the machine and traction unit; refer *Operator's Manual*.
- 4. Lubricate the grease fittings; refer to Operator's Manual.
- 5. Connect the machine to the traction unit and check the operation of the machine.

### Servicing the Driveshaft Universal Joint and Bearing Assembly



g349251

2.

Figure 85

1. End yoke

4. Universal joint and bearing assembly

Grease fitting

5. Shaft yoke

- 3. Circlip (4 each)
- 1. Remove the circlips (item 3 in Figure 85) that secure the bearings in the yokes.
  - **IMPORTANT**

# Support the yokes when removing and installing the bearings to prevent damage.

- 2. Use a press to remove the cross and bearings from the yokes.
- 3. Thoroughly clean and inspect all components.
- 4. Install new cross and bearings as follows:
  - A. Apply a thick layer of grease to the bearing bores in the end yoke and shaft yoke.
  - B. Press 1 bearing partially into yoke.

#### IMPORTANT

# Take care when installing cross into bearing to avoid damaging bearing seal.

- C. Insert the cross into the yoke and bearing.
- D. Hold the cross in alignment and press the bearing in until it hits the yoke.
- E. Install the snap ring into the yoke groove to secure the installed bearing.
- F. Place second bearing into the yoke bore and onto the cross shaft. Press the bearing into the yoke and secure with the snap ring.
- G. Repeat the procedure for the other yoke.
- H. Apply grease to the cross until it comes out of all the 4 bearing cups.
- 5. Ensure that the assembled joint moves without any binding. Lightly rap the yoke lugs with a soft-faced hammer to remove slight binding. If the binding continues, disassemble the joint to identify the source of binding.

### **Chapter 8**

# RapidSeed 430 and RapidSeed 590 (Model No. 46435 and 46440)

## **Table of Contents**

General Information Technical Data	
Service and Repairs	
Covers	
Rollers	
Hopper Assembly	
Seed Guide Plates	
Gearbox and Wheel	
Servicing the Gearbox	

# **General Information**

The operators manual provides information regarding the operation, general maintenance, and maintenance intervals for your RapidSeed 430 and RapidSeed 590 (Model Numbers 46435 and 46440). Refer to the *Operator's Manual* for additional information when servicing the machine.

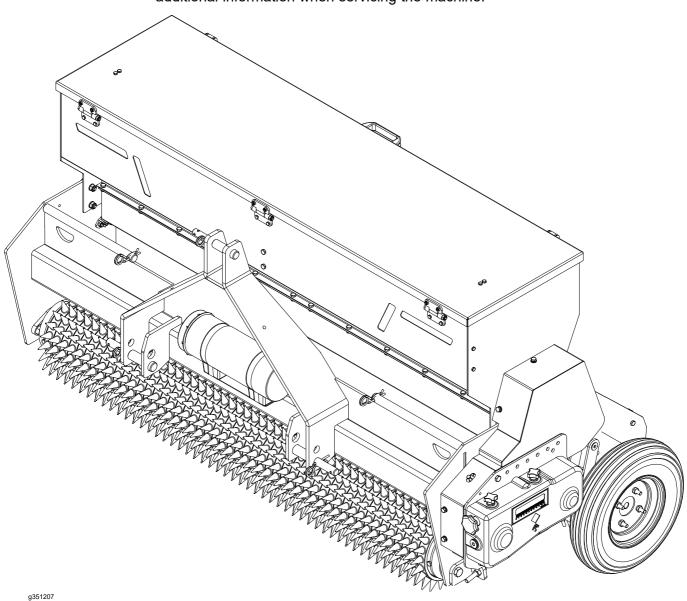


Figure 86 RapidSeed 590 (shown)

# **Technical Data**

#### RapidSeed 430

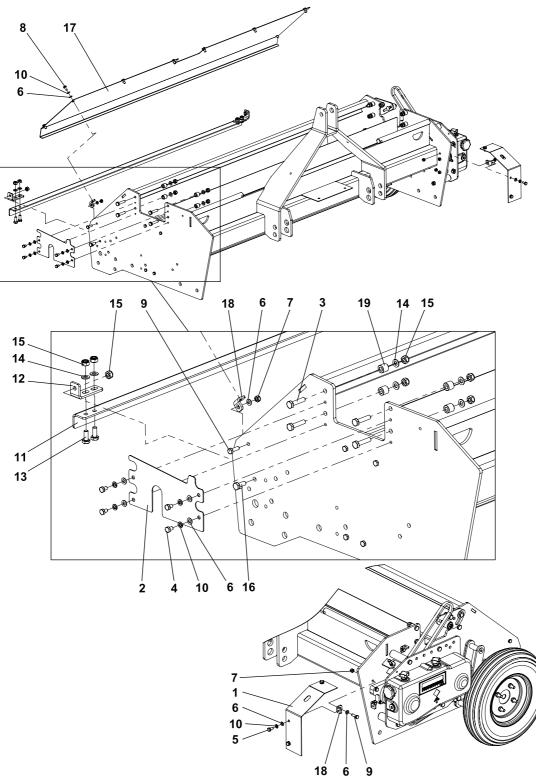
ltem	Description
Working width	1.1 meters (43.3 in)
Working depth	5 to 20 mm (0.19 to 0.78 in)
Sowing speed	Maximum 12 km/h (7.5 mph)
Weight	380 kg (836 lbs)
Three-point connection	Cat. 1-2
Tire pressure	1 to 2 bar (14.5 to 29 psi)
Recommended tractor HP	20 HP
Minimum lift capacity of the tractor 610 mm (24 in) behind the link arms	450 kg (992 lbs)
Sow hole distance	Square 30 mm (1.18 in)
Hopper capacity	169 L (5.9 cu.ft.)
Standard items	Rear roller including a scraper

#### RapidSeed 590

ltem	Description
Working width	1.5 meters (59 in)
Working depth	5 to 20 mm (0.19 to 0.78 in)
Sowing speed	Maximum 12 km/h (7.5 mph)
Weight	468 kg (1030 lbs)
Three-point connection	Cat. 1-2
Tire pressure	1 to 2 bar (14.5 to 29 psi)
Recommended tractor HP	30 HP
Minimum lift capacity of the tractor 610 mm (24 in) behind the link arms	550 kg (1,213 lbs)
Sow hole distance	Square 30 mm (1.18 in)
Hopper capacity	224 L (7.84 cu.ft.)
Standard items	Rear roller including a scraper

# **Service and Repairs**

## Covers



g351206

Figure 87 RapidSeed 590 (shown)

- 1. Cover
- 2. Side cover plate
- 3. Bolt (8 each)
- 4. Bolt (4 each)
- 5. Bolt (3 each)
- 6. Washer (18 each)
- 7. Self-locking nut (5 each)

#### **Removing the Covers**

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- 8. Bolt (6 each)
- 9. Bolt (5 each)
- 10. Spring washer (13 each)
- 11. Scraper
- 12. Bracket scraper (2 each)
- 13. Bolt (4 each)
- 14. Washer (12 each)

- 15. Self-locking nut (14 each)
- 16. Bolt (2 each)
- 17. Cover plate
- 18. Cover mounting bracket (5 each)

A

19. Distance bush (8 each)

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

CAUTION

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the roller to prevent it from moving.
- 4. To remove left side cover (item 1 in Figure 87):
  - A. Remove the three bolts (5), spring washers (10) and washers (6) that secures the left side cover (1) to the cover mounting brackets (18).
  - B. Remove the left side cover (1) from the machine.
- 5. To remove the right side cover plate (2):
  - A. Remove the four bolts (4), spring washers (10) and washers (6) that secures the right side cover plate (2) to the main frame.
  - B. Remove the right side cover plate (2) from the machine.
- 6. To remove the rear cover plate (17):
  - A. Remove the six bolts (8), spring washers (10) and washers (6) that secures the rear cover plate (17) to the main frame.
  - B. Remove the rear cover plate (17) from the machine.
- 7. If necessary, remove the scraper (11) from the main frame using the Figure 87 as a guide.

#### Installing the Covers

- 1. If removed, install the scraper (11) to the main frame using the Figure 87 as a guide.
- 2. To install the rear cover plate (17):
  - A. Position the rear cover plate (17) onto the machine.
  - B. Secure the rear cover plate (17) to the main frame with six bolts (8), spring washers (10) and washers (6).
- 3. To install the right side cover plate (2):
  - A. Position the right side cover plate (2) onto the machine.
  - B. Secure the right side cover plate (2) to the main frame with four bolts (4), spring washers (10) and washers (6).

### Installing the Covers (continued)

- 4. To install the left side cover (1):
  - A. Position the left side cover (1) onto the cover mounting brackets (18).
  - B. Secure the left side cover (1) to the cover mounting brackets (18) with three bolts (5), spring washers (10) and washers (6).
- 5. Lubricate the grease fittings; refer to Operator's Manual.
- 6. Check the operation of the machine.

**Rollers** 

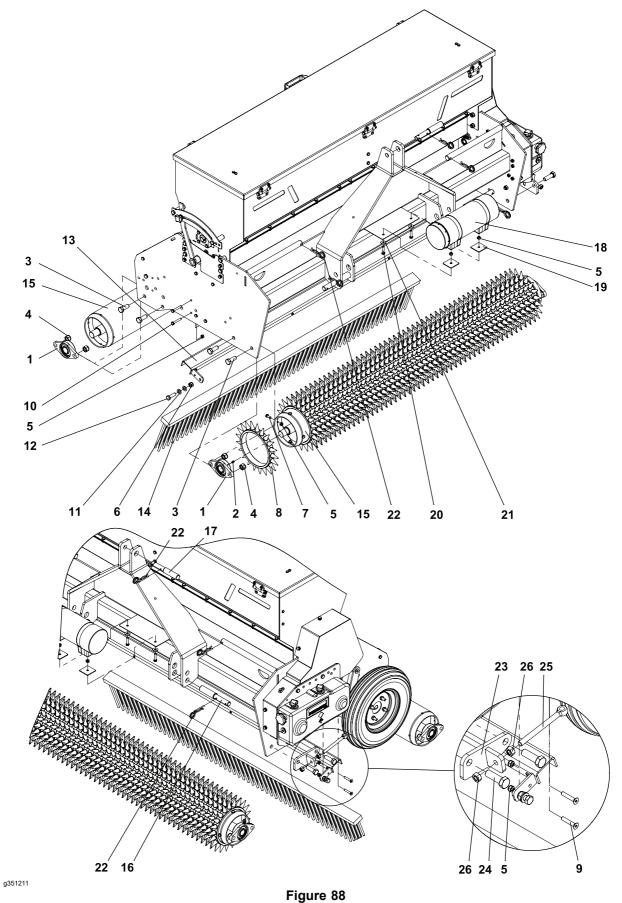


Figure 88 RapidSeed 590 (shown)

#### Figure 88 (continued)

- 1. Bearing (4 each)
- 2. Grease nipple (4 each)
- 3. Bolt (6 each)
- 4. Self-locking nut (8 each)
- 5. Self-locking nut (14 each)
- 6. Self-locking nut (2 each)
- 7. Bolt (8 each)
- 8. Spiked segment (50 each)
- 9. Bolt (2 each)

## **Removing the Rollers**

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A

#### 10. Bolt (2 each)

- 11. Washer (4 each)
- 12. Bolt (2 each)
- 13. Weld assy U-channel brush
- 14. Rear lag brush
- 15. Back roller
- 16. 3-point pin (2 each)
- 17. Top link pin
- 18. Toolbox complete

- 19. Toolbox contraplate (2 each)
- 20. Bolt (2 each)
- 21. Large washer (2 each)
- 22. R-clip round (5 each)
- 23. Bracket spring tensioner
- 24. Bolt (2 each)
- 25. Eye Bolt
- 26. Nut (2 each)

## CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.

To prevent personal injury, make sure that the rear roller assembly is supported as it is removed from the machine. Rear roller weighs approximately 28 kg (62 lbs).

CAUTION

- 3. To remove the rear roller (item 15 in Figure 88):
  - A. Remove the four self-locking nuts (4) and bolts (3) that secures the rear roller (15) and bearings (1) to the main frame.
  - B. Carefully remove the rear roller (15) and bearings (1) from the machine.
  - C. If necessary, remove the set screws that secures the bearings (1) to the rear roller (15).

## CAUTION

To prevent personal injury, make sure that the front roller assembly is supported as it is removed from the machine. Front roller assembly weighs approximately 136 kg (300 lbs).

4. To remove the front roller assembly (15):

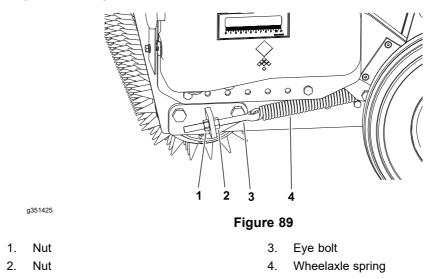
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A

A

#### **Removing the Rollers (continued)**



- A. Remove the adjusting nuts (item 1 and 2 in Figure 89) that secures the wheelaxle spring eye bolt (3) to the bracket.
- B. Remove the eye bolt from the bracket.
- C. Remove the four self-locking nuts (item 4 in Figure 88) and bolts (3) that secures the front roller assembly (15) and bearings (1) to the main frame.
- D. Carefully remove the front roller assembly (15) and bearings (1) from the machine.
- E. If necessary, remove the set screws that secures the bearings (1) to the front roller (15).
- F. If necessary, remove the four self-locking nuts (5) and bolts (7) that secures the spiked segments (8) to the front roller (15).
- G. Carefully, slide and remove the spiked segments (8) from the front roller (15).
- 5. If necessary, remove and replace the parts of rear lag brush (14) using the Figure 88 as a guide.

#### Installing the Rollers

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1. If removed, install the rear lag brush (14) to the main frame using the Figure 88 as a guide.

## CAUTION

To prevent personal injury, make sure that the front roller assembly is supported as it is installed to the machine. Front roller assembly weighs approximately 136 kg (300 lbs).

- 2. To install the front roller assembly (15):
  - A. If removed, slide and install the spiked segments (8) to the front roller (15). RapidSeed 430 uses 37 spiked segments (8).

RapidSeed 590 uses 50 spiked segments (8).

B. Secure the spiked segments (8) to the front roller (15) with four bolts (7) and self-locking nuts (5).

A

#### Installing the Rollers (continued)

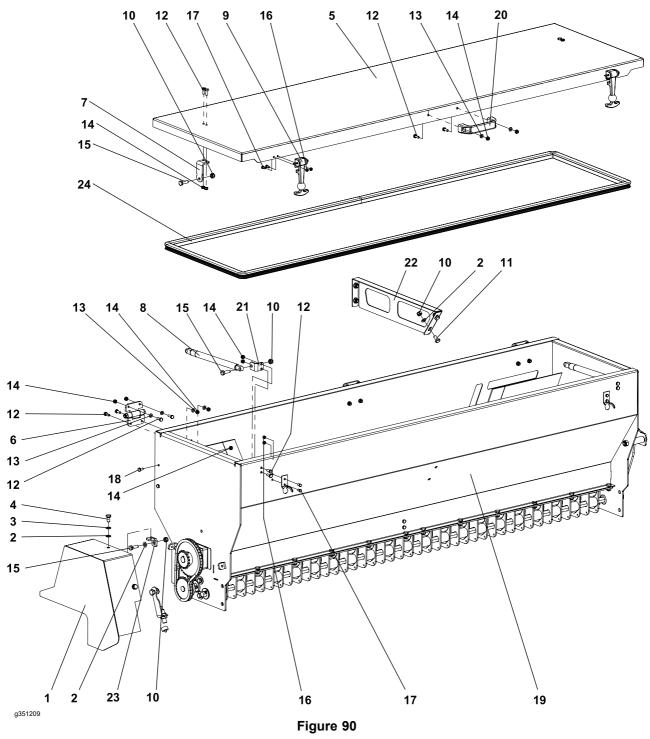
- C. If removed, install the bearings (1) to the front roller assembly (15) and secure with the set screws.
- D. Position the front roller assembly (15) onto the machine and secure with four bolts (3) and self-locking nuts (4).
- E. Install the eye bolt (item 3 in Figure 89) into the bracket and secure with the two nuts (1 and 2). Adjust the wheel axle spring tension by tightening the nuts (1 and 2).
- 3. To install the rear roller (15):



To prevent personal injury, make sure that the rear roller assembly is supported as it is installed to the machine. Rear roller assembly weighs approximately 28 kg (62 lbs).

- A. If removed, install the bearings (1) to the rear roller (15) and secure with the set screws.
- B. Position the rear roller (15) onto the machine and secure with four bolts (3) and self-locking nuts (4).
- 4. Check that the rollers are free to rotate and no binding exists.
- 5. Lubricate the grease fittings; refer to Operator's Manual.
- 6. Check the operation of the machine.

# **Hopper Assembly**



RapidSeed 590 (shown)

#### Figure 90 (continued)

- 1. Cover
- 2. Washer (10 each)
- Spring washer (3 each) 3.
- 4. Bolt (3 each)
- Top cover 5.
- Hinge (3 each) 6.
- Support (2 each) 7.
- 8. Gas strut (2 each)

- 9. Rubber lock assy (2 each)
- 10. Self-locking nut (11 each)
- 11. Bolt (4 each)
- 12. Bolt (22 each)
- Washer (8 each) 13.
- 14. Self-locking nut (24 each)
- Bolt (7 each) 15.
- 16. Self-locking nut (8 each)

- 17. Bolt (8 each)
- 18. Bolt (2 each)
- 19. Hopper
- 20. Handle
- Support (2 each) 21.
- 22. Center plate
- Cover mounting bracket (3 each) 23.

A

24. Glass rubber

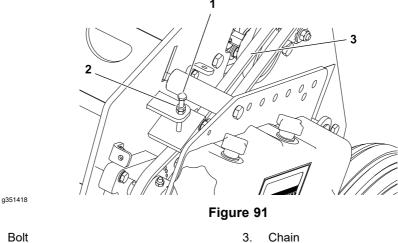
#### Removing the Hopper Assembly

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## CAUTION

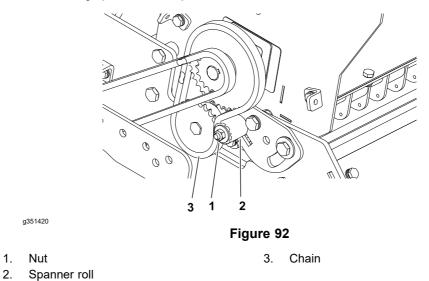
#### Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the rear roller to prevent it from moving.
- 4. Remove the three bolts (item 4 in Figure 90), spring washers (3) and washers (2) that secures the pulley cover (1) to the hopper assembly (19).
- 5. Remove the pulley cover (1) from the machine.
- 6. Remove the left side cover and right side cover from the machine; refer to Removing the Covers (page 8–5).



- 1. Bolt
- 2. Nut
- 7. Loosen the bolt (item 1 in Figure 91) and nut (2) that removes tension from the drive chain (3).
- 8. Locate and remove the chain connector from drive chain (3). Note the direction of chain connector clip for assembly purposes. Remove the drive chain from the machine.

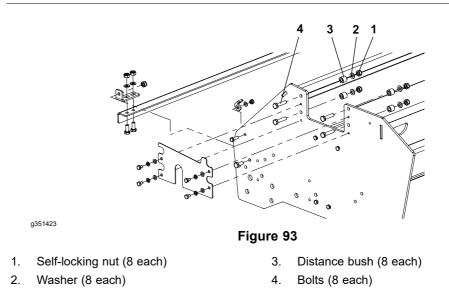
#### **Removing the Hopper Assembly (continued)**



- 9. Loosen the nut (item 1 in Figure 92) that removes tension from the chain (3).
- 10. If necessary, locate and remove the chain connector from chain. Note the direction of chain connector clip for assembly purposes. Remove the drive chain.

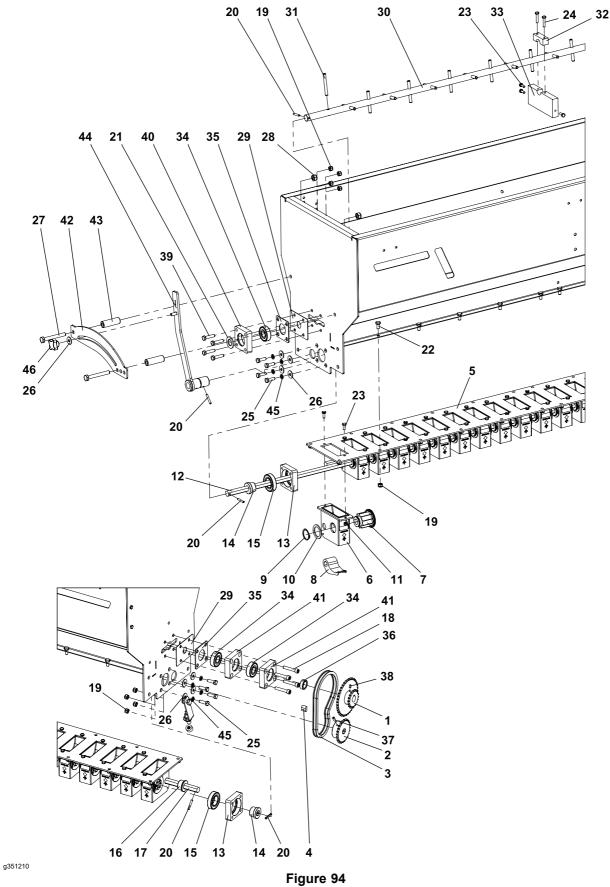
CAUTION A A

To prevent personal injury, make sure that the hopper assembly is supported as it is removed from the machine. Hopper assembly weighs approximately 82 kg (181 lbs).



11. Remove the eight self-locking nuts (item 1 in Figure 93), washers (2), distance bushes (3) and bolts (4) that secures the hopper assembly to the main frame.

### **Removing the Hopper Assembly (continued)**



RapidSeed 590 (shown)

#### Removing the Hopper Assembly (continued) Figure 94 (continued)

1.	Weldment sprocket	17.	Shaft	33.	Guide lock block
2.	Sprocket	18.	Bolt (4 each)	34.	Bearing (3 each)
3.	Chain	19.	Self-locking nut (28 each)	35.	Cover plate (2 each)
4.	Chain connector	20.	Roll pin (5 each)	36.	Distance bush
5.	Plate	21.	Washer	37.	Set screw
6.	Seed element casing (15 each)	22.	Bolt (20 each)	38.	Set screw
7.	Seed element rotor (15 each)	23.	Bolt (33 each)	39.	Bolt (4 each)
8.	Seed element valve (15 each)	24.	Bolt (2 each)	40.	Bearing block
9.	Circlip (15 each)	25.	Bolt (8 each)	41.	Bearing block (2 each)
10.	Washer (15 each)	26.	Large washer (9 each)	42.	Guide strip
11.	Self-locking nut (30 each)	27.	Bolt (2 each)	43.	Distance bush (2 each)
12.	Shaft	28.	Self-locking nut (2 each)	44.	Valve adjustment
13.	Bearing block (2 each)	29.	Cover plate (2 each)	45.	Spring washer (8 each)
14.	Bush (2 each)	30.	Agitator shaft complete	46.	Closed knob
15.	Bearing (2 each)	31.	Roll pin (15 each)		
16.	Bush	32.	Guide block support		

12. If necessary, remove and replace the parts from hopper assembly using the Figure 90 and Figure 94 as a guide.

#### Installing the Hopper Assembly

A

1. If removed, assemble the hopper assembly using the Figure 90 and Figure 94 as a guide.

To prevent personal injury, make sure that the hopper assembly is supported as it is installed to the machine. Hopper assembly weighs approximately 82 kg (181 lbs).

CAUTION

A

- 2. Carefully position the hopper assembly onto the main frame and secure with the eight bolts (item 4 in Figure 93), distance bushes (3), washers (2) and self-locking nuts (1).
- 3. If removed, install the drive chain (item 3 in Figure 92) and secure the chain ends with chain connector. Make sure that the closed end of the chain connector is facing the direction of the chain rotation.
- 4. Adjust the tension of the chain by moving the spanner roll (2). Secure spanner roll (2) by tightening the nut (1). A properly adjusted chain should allow for free rotation of drive components.
- 5. Install the drive chain (item 3 in Figure 91) and secure the chain ends with chain connector. Make sure that the closed end of the chain connector is facing the direction of the chain rotation.
- 6. Adjust the tension of the chain by tightening the bolt (1) and nut (2). A properly adjusted chain should allow for free rotation of drive components.
- 7. Install the right side cover and left side cover to the machine; refer to Installing the Covers (page 8–5).
- 8. Install the pulley cover (item 1 in Figure 90) onto the machine and secure with the three washers (2), spring washers (3) and bolts (4).
- 9. Lubricate the grease fittings and gearbox; refer to Operator's Manual.

## Installing the Hopper Assembly (continued)

10. Connect the machine to the traction unit and check the operation of the machine.

# **Seed Guide Plates**

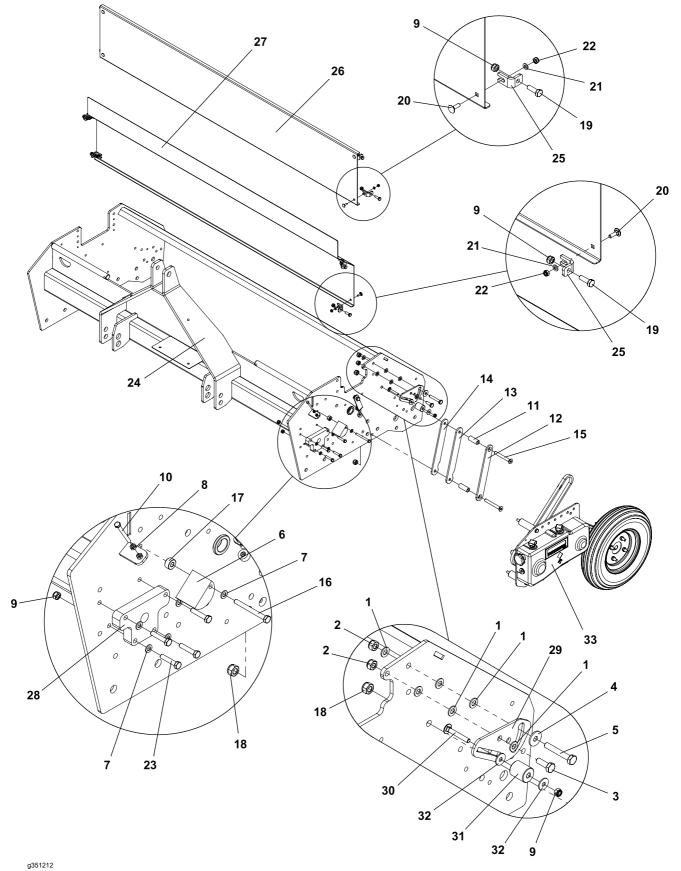


Figure 95 RapidSeed 590 (shown)

#### Figure 95 (continued)

- 1. Washer (6 each) 12. Guide swing arm 2. Self-locking nut (2 each) 13. Guide swing arm Bolt 14. Spacer 3. 4. Large washer 15. CSK screw (2 each) Bolt 16. Bolt 5. Distance bush 6. Chain tensioner 17. Washer (5 each) Self-locking nut (2 each) 7. 18. 8. Nut 19. Bolt (8 each) Self-locking nut (13 each) Bolt (8 each) 9. 20. Bolt Washer (8 each) 10. 21. Block bush swing arm (2 each) 22. Self-locking nut (8 each) 11.
- 23. Bolt (4 each)
- 24. Base frame
- 25. Cover mounting bracket (8 each)
- 26. Seed guide plate front
- 27. Seed guide plate front
- 28. Bearing plate
- 29. Spanner plate
- 30. Mushroom head bolt
- 31. Spanner roll
- 32. Large washer (2 each)
- 33. Gearbox and wheel

#### **Removing the Seed Guide Plates**

### 

## CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

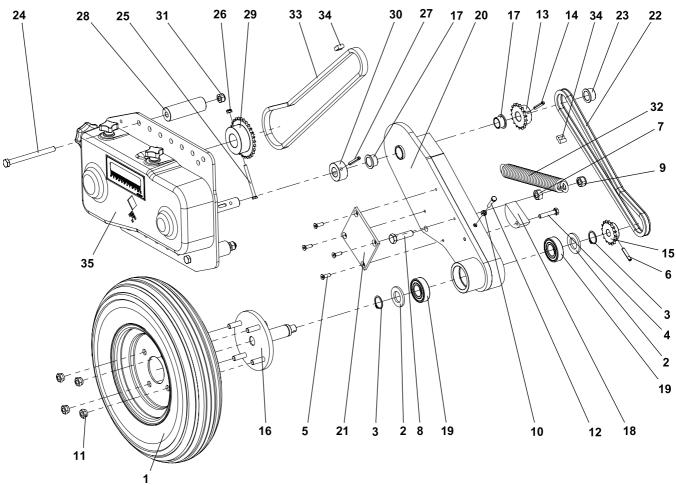
- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the rear roller to prevent it from moving.
- 4. If necessary, remove the hopper assembly from the machine; refer to Removing the Hopper Assembly (page 8–12).
- 5. If necessary, remove and replace the seed guide plates and main frame parts using the Figure 95 as a guide.

#### Installing the Seed Guide Plates

- 1. If removed, assemble the seed guide plates and parts of main frame using the Figure 95 as a guide.
- 2. If removed, install the hopper assembly onto the machine; refer to Installing the Hopper Assembly (page 8–15).
- 3. Lubricate the grease fittings and gearbox; refer to Operator's Manual.
- 4. Connect the machine to the traction unit and check the operation of the machine.

A

## **Gearbox and Wheel**



g351208

#### Figure 96 RapidSeed 590 (shown)

- 1. Wheel complete
- 2. Washer (2 each)
- 3. Circlip (2 each)
- 4. Bolt
- 5. Bolt (4 each)
- 6. Roll pin
- 7. Nut
- 8. Bolt
- 9. Self-locking nut
- 10. Nut
- 11. Wheel nut (4 each)
- 12. Bolt

- 13. Sprocket
- 14. Roll pin
- 15. Sprocket
- 16. Wheel hub
- 17. Bearing bush swingarm (2 each)
- 18. Chain tensioner
- 19. Bearing (2 each)
- 20. Chain connector (2 each)
- 21. Frame swingarm
- 22. Guide plate swingarm
- 23. Chain
- 24. Bearing bush gearaxle

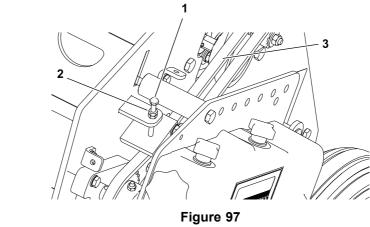
- 25. Bolt (3 each)
- 26. Bolt
- 27. Self-locking nut
- 28. Roll pin
- 29. Magnet bush
- 30. Spacer (3 each)
- 31. Sprocket
- 32. Self-locking nut (3 each)
- 33. Spring wheelaxle
- 34. Chain
- 35. Gearbox

#### 

CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the rear roller to prevent it from moving.
- 4. Remove the three bolts (item 4 in Figure 90), spring washers (3) and washers (2) that secures the pulley cover (1) to the hopper assembly (19).
- 5. Remove the pulley cover (1) from the machine.
- 6. Remove the left side cover from the machine; refer to Removing the Covers (page 8–5).



g351418

- 1. Bolt
- 2. Nut
- 7. Loosen the bolt (item 1 in Figure 97) and nut (2) that removes tension from the drive chain (3).

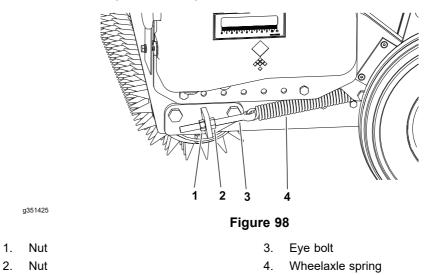
3.

Chain

8. Locate and remove the chain connector from drive chain. Note the direction of chain connector clip for assembly purposes. Remove the drive chain from the machine.

A

#### **Removing the Gearbox and Wheel (continued)**



- 9. Remove the adjusting nuts (item 1 and 2 in Figure 98) that secures the wheelaxle spring eye bolt (3) to the bracket.
- 10. Remove the eye bolt from the bracket.
- 11. Loosen the bolt (item 12 in Figure 96) and nut (10) that removes tension from the drive chain (22).
- 12. Remove the three self-locking nuts (31), spacers (28) and bolts (24) that secures the gearbox and wheel assembly to the machine.
- 13. Remove the gearbox and wheel assembly from the machine.
- 14. Locate and remove the chain connector from drive chain (22). Note the direction of chain connector clip for assembly purposes. Remove drive chain.
- 15. If necessary, remove and replace the parts of the gearbox and wheel assembly using the Figure 96 as a guide.
- 16. If necessary, service the gearbox; refer to Servicing the Gearbox (page 8–23).

#### Installing the Gearbox and Wheel

- 1. If removed, assemble the parts of the gearbox and wheel assembly using the Figure 96 as a guide.
- 2. Install the drive chain (item 22 in Figure 96) and secure the chain ends with chain connector. Make sure that the closed end of the chain connector is facing the direction of the chain rotation.
- 3. Position the gearbox and wheel assembly onto the machine.
- 4. Secure the gearbox and wheel assembly to the machine using the three bolts (24), spacers (28) and self-locking nuts (31).
- 5. Install the eye bolt (item 3 in Figure 98) into the bracket and secure with the two nuts (1 and 2). Adjust the wheel axle spring tension by tightening the nuts (1 and 2).
- 6. Install the drive chain (item 3 in Figure 97) and secure the chain ends with chain connector. Make sure that the closed end of the chain connector is facing the direction of the chain rotation.
- 7. Adjust the tension of the chain (3) by tightening the bolt (1) and nut (2). A properly adjusted chain should allow for free rotation of drive components.
- 8. Adjust the tension of the chain (item 22 in Figure 96) by tightening the bolt (12) and nut (10). A properly adjusted chain should allow for free rotation of drive components.

#### Installing the Gearbox and Wheel (continued)

- 9. Install the left side cover to the machine; refer to Installing the Covers (page 8–5).
- 10. Install the pulley cover (item 1 in Figure 90) onto the machine and secure with the three washers (2), spring washers (3) and bolts (4).
- 11. Lubricate the grease fittings and gearbox; refer to Operator's Manual.
- 12. Connect the machine to the traction unit and check the operation of the machine.

# Servicing the Gearbox

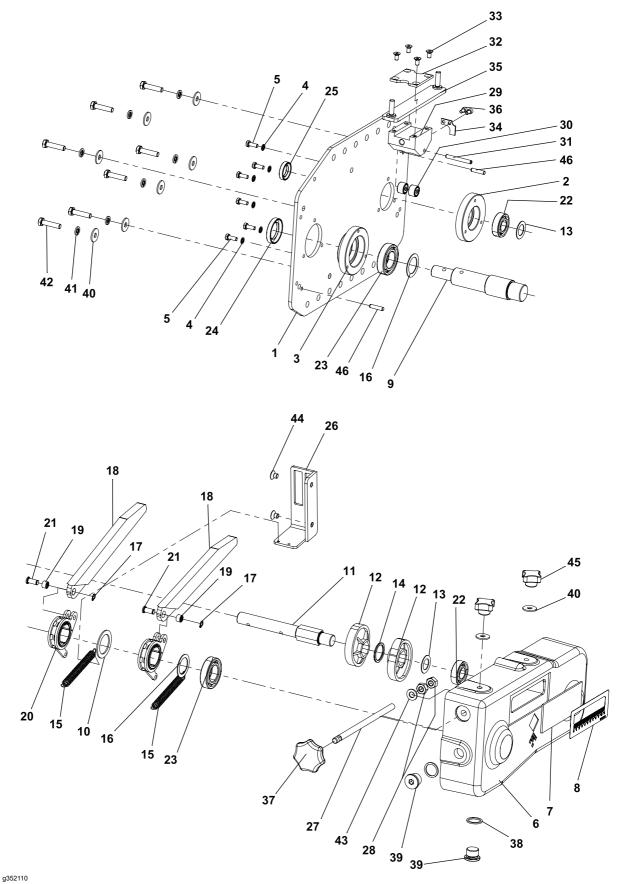


Figure 99

#### Figure 99 (continued)

1.	Lid plate	17.	Circlip (2 each)	33.	Bolt (4 each)
2.	Bearing hub	18.	Rocker strip (2 each)	34.	Indicator
3.	Bearing hub	19.	Bearing (2 each)	35.	Slider bracket
4.	Bonded seal ring (6 each)	20.	Rocker arm assembly (2 each)	36.	Socket head screw (2 each)
5.	Bolt (6 each)	21.	Pin (2 each)	37.	Knob with set screw
6.	Casted gearbox housing	22.	Bearing (2 each)	38.	Copper washer (2 each)
7.	Window	23.	Bearing (2 each)	39.	Blind plug (2 each)
8.	Gauge decal	24.	Oil seal	40.	Large washer (9 each)
9.	Shaft	25.	Oil seal	41.	Spring washer (7 each)
10.	Washer	26.	Guide	42.	Bolt (7 each)
11.	Shaft	27.	Threaded rod	43.	Washer
12.	Excenter (2 each)	28.	Nut (2 each)	44.	Bolt (2 each)
13.	Shim (2 each)	29.	Slider block	45.	Closed knob (2 each)
14.	Spacer	30.	Roller bearing (2 each)	46.	Parallel pin (2 each)
15.	Spring (2 each)	31.	Roll pin		
16.	Shim (2 each)	32.	Lock plate		

#### **Disassembling the Gearbox**

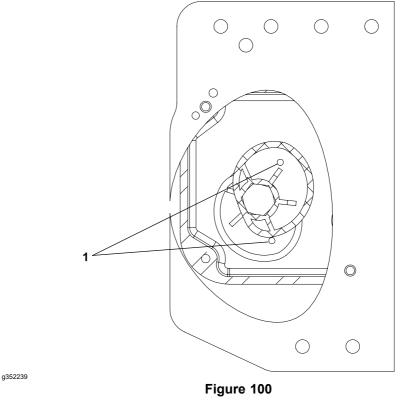
- 1. Remove the two blind plugs (item 39 in Figure 99) and copper washers (38) from the gearbox.
- 2. Drain the gearbox oil from the gearbox.
- 3. Remove the seven bolts (42), spring washers (41) and washers (40) that secures the lid plate (1) to the gearbox housing (6).
- 4. Remove the six bolts (5) and seal rings (4) that secures the bearing hubs (2 and 3) to the lid plate (1).
- 5. Remove the lid plate (1) from the gearbox housing (6).
- 6. Remove and discard the oil seals (24 and 25) from the bearing hubs (3 and 2).
- 7. Carefully slide and remove the bearing hub (2), bearing (22) and shim (13) from the shaft (11).
- 8. Carefully slide and remove the bearing hub (3), bearing (23) and shim (16) from the shaft (9).
- 9. Remove the springs (15) from the guide (26) and rocker arms (20).
- 10. Use a marker to make a diagonal line across the excenters (12), shaft (11) and gearbox housing (6) for assembly purpose.
- 11. Remove the shaft (11), excenters (12), spacer (14) and shim (13) as an assembly from the gearbox housing (6).
- 12. Remove the two bolts (44) that secures the guide (26) to the gearbox housing (6).
- 13. Remove the shaft (9), guide (26), rocker strips (18), rocker arms (20), washer (10) and shim (16) as an assembly from the gearbox housing (6).
- 14. If necessary, remove and replace parts of the slider block (29) from the gearbox housing (6) using the Figure 99 as a guide.

#### Assembling the Gearbox

- 1. Thoroughly clean and inspect all gearbox components. Replace all worn or damaged parts using the Figure 99 as a guide.
- If removed, install the parts of the slider block (29) to the gearbox housing (6) using the Figure 99 as a guide.

#### Assembling the Gearbox (continued)

- 3. Install the shaft (9), guide (26), rocker strips (18), rocker arms (20), washer (10) and shim (16) as an assembly to the gearbox housing (6).
- 4. Secure the guide (26) to the gearbox housing (6) with the two bolts (44).



1. Marks on the excenters



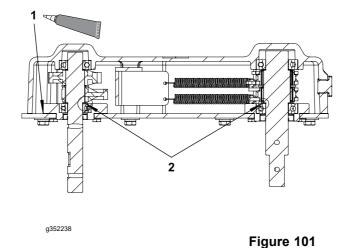
Make sure that the excenters are positioned correct:

- The marks on the excenters are facing to the lid plate.
- The marks on the excenters must be 180° shifted to each other.
- The improper installation of the excenters causes the shocked rotation at the output shaft.



- 5. Make sure that the excenters (12) are correctly positioned on the shaft (11) using the marks made during the disassembly; refer to Figure 100.
- 6. Install the shaft (11), excenters (12), spacer (14) and shim (13) as an assembly to the gearbox housing (6).
- 7. Install the springs (15) to the guide (26) and rocker arms (20).

### Assembling the Gearbox (continued)



Apply loctite to the lid plate 2. Adjust with shims

8. Carefully position the shim (16), bearing (23) and bearing hub (3) to the shaft (9).

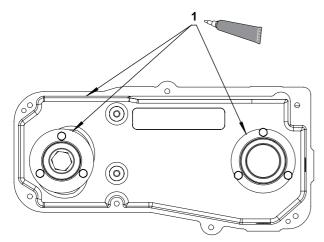


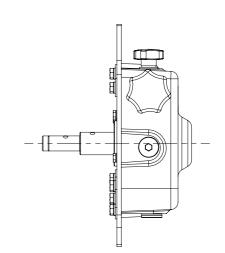
1.

9. Carefully position the shim (13), bearing (22) and bearing hub (2) to the shaft (11).

**Note:** Adjust the shims (13 and 16) to maintain the free play of the shafts (9 and 11) is **0 to 0.5 mm (0 to 0.02 in)**; refer to Figure 101.

10. Install the new oil seals (24 and 25) from the bearing hubs (3 and 2).





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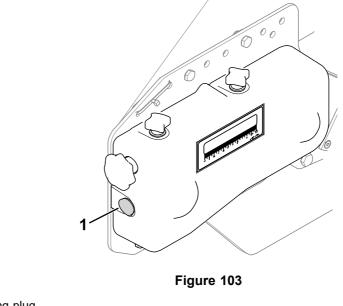
1. Apply loctite



- 11. Apply **loctite #5970 (or equivalent)** on the gearbox housing (6) and bearing hubs (2 and 3); refer to Figure 102. Make sure that the loctite is applied around the threaded holes of the bearing hubs (2 and 3).
- 12. Make sure to clean the edges of the excess loctite; refer to Figure 101 and Figure 102.
- 13. Install the lid plate (1) onto the gearbox housing (6).

#### Assembling the Gearbox (continued)

- 14. Secure the bearing hubs (2 and 3) to the lid plate (1) with the six seal rings (4) and bolts (5).
- 15. Secure the lid plate (1) to the gearbox housing (6) with the seven washers (40), spring washers (41) and bolts (42).



1. Filling plug

g348974

16. Install the two copper washers (38) and blind plugs (39) to the gearbox.



- 17. Fill the gearbox with **1.4 L (0.37 gal) of 80W90** oil till the level of the filling plug; refer to Figure 103.
- 18. Check the gearbox for any oil leaks before returning it to service.

# **Chapter 9**

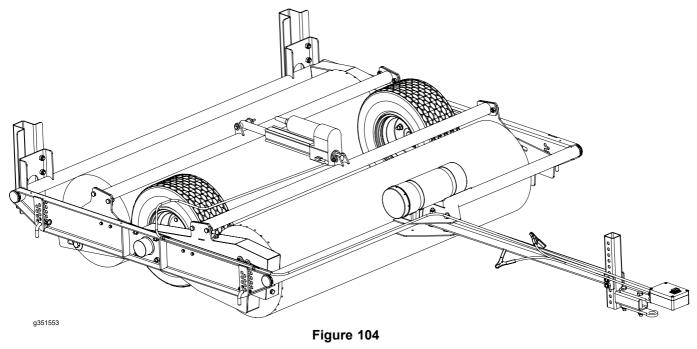
# QuickGroom 550 (Model No. 46400)

# **Table of Contents**

General Information	
Technical Data	
Service and Repairs	
Draw Bar Assembly	
Electric Actuator	
Brush Assembly	9_9
Wheels	

# **General Information**

The operators manual provides information regarding the operation, general maintenance, and maintenance intervals for your QuickGroom 550 (Model No. 46400). Refer to the *Operator's Manual* for additional information when servicing the machine.



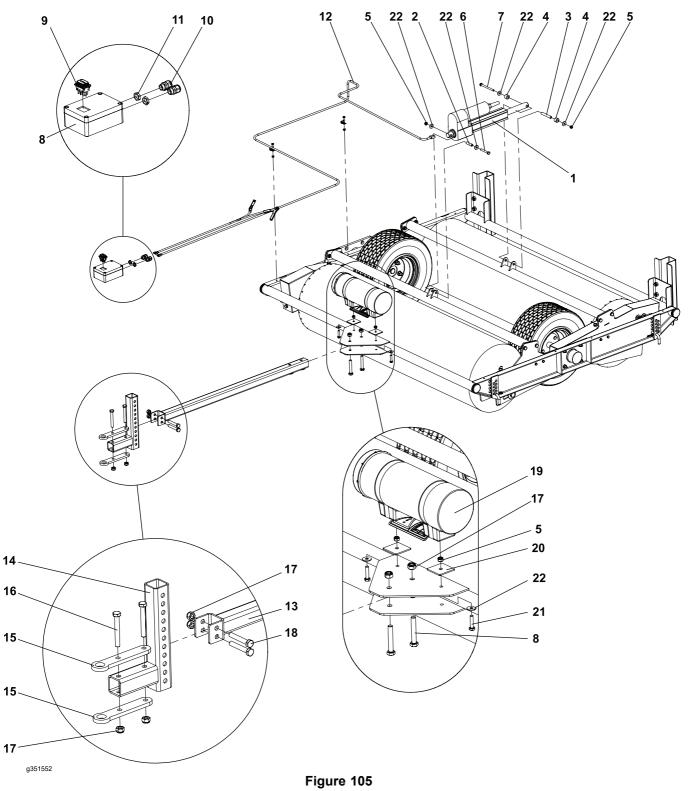
# **Technical Data**

#### QuickGroom 550

Item	Description
Working width	1.4 meters (55.1 in)
Working speed	Maximum 15 km/h (9.3 mph)
Weight	181 kg (399 lbs)
Requirements for the towing vehicle	12V connection for the electrical cylinder

# **Service and Repairs**

# **Draw Bar Assembly**



#### Figure 105 (continued)

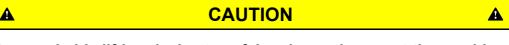
- 1. Electric actuator
- 2. Bush
- 3. Bush
- 4. Bush (2 each)
- 5. Self-locking nut (4 each)
- 6. Bolt
- 7. Bolt
- 8. Case

- 9. Rocker switch up/down
- 10. Cable plug (2 each)
- 11. Nut cable plug (2 each)
- 12. Cable for actuator
- 13. Draw bar tube
- 14. Draw bar front
- 15. Pull eye (2 each)
- 16. Bolt (2 each)

- 17. Self-locking nut (6 each)
- 18. Bolt (4 each)
- 19. Toolbox complete
- 20. Toolbox contraplate (2 each)
- 21. Bolt (2 each)
- 22. Large washer (6 each)

#### Removing the Draw Bar Assembly

A



Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Chock the wheels to prevent it from moving.

### CAUTION

A

To prevent personal injury, make sure that the draw bar assembly is supported as it is removed from the machine.

- 3. Remove the two self-locking nuts (item 17 in Figure 105) and bolts (18) that secure the draw bar assembly to the main frame.
- 4. Remove the draw bar assembly form the machine.
- 5. If necessary, remove and replace the parts of draw bar assembly using the Figure 105 as a guide.

#### Installing the Draw Bar Assembly

A

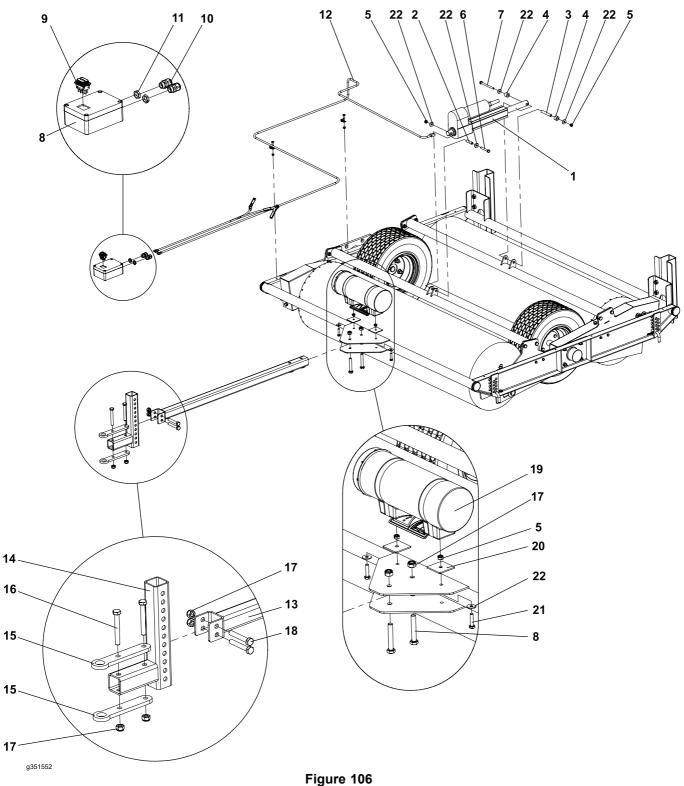
CAUTION

A

To prevent personal injury, make sure that the draw bar assembly is supported as it is assembled to the machine.

- 1. If removed, assemble the parts of the draw bar assembly using the Figure 105 as a guide.
- 2. Position the draw bar assembly to the main frame.
- 3. Secure the draw bar assembly to the main frame with two bolts (18) and self-locking nuts (17).
- 4. Lubricate the grease fittings; refer to Operator's Manual.
- 5. Connect the machine to the tow vehicle; refer to Operator's Manual.
- 6. Check the operation of the machine.

**Electric Actuator** 



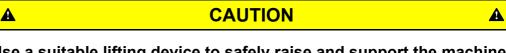
#### Figure 106 (continued)

- 1. Electric actuator
- 2. Bush
- 3. Bush
- 4. Bush (2 each)
- 5. Self-locking nut (4 each)
- 6. Bolt
- 7. Bolt
- 8. Case

- 9. Rocker switch up/down
- 10. Cable plug (2 each)
- 11. Nut cable plug (2 each)
- 12. Cable for actuator
- 13. Draw bar tube
- 14. Draw bar front
- 15. Pull eye (2 each)
- 16. Bolt (2 each)

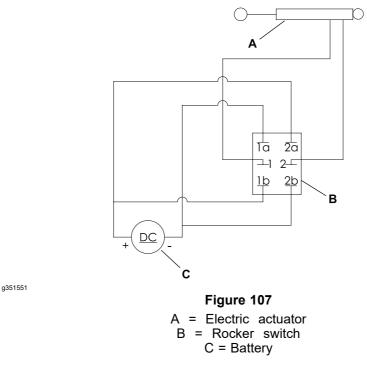
- 17. Self-locking nut (6 each)
- 18. Bolt (4 each)
- 19. Toolbox complete
- 20. Toolbox contraplate (2 each)
- 21. Bolt (2 each)
- 22. Large washer (6 each)

#### **Removing the Electric Actuator**



# Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Chock the wheels to prevent it from moving.
- 3. Disconnect the wire harness electrical connector (item 12 in Figure 106) from the electric actuator (1).
- 4. Remove the self-locking nut (5), large washers (22), bushes (3 and 4) and bolt (7) that secures the electric actuator to the rear cross beam.
- 5. Remove the self-locking nut (5), large washers (22), bush (2) and bolt (6) that secures the electric actuator to the front cross beam.
- 6. Remove the electric actuator from the machine. The electric actuator is not serviceable.



- 1. If necessary, Use a multimeter (ohms setting) to determine whether continuity exists between the various terminals for each rocker switch position; refer to the Figure 107.
- 2. Replace the rocker switch if necessary.
- 3. If the switch tests correctly and a circuit problem still exists, check the wire harnesses; refer to Figure 107.

#### Installing the Electric Actuator

- 1. Position the electric actuator onto the machine.
- 2. Secures the electric actuator housing end to the front cross beam with the bolt (6), bush (2), large washers (22) and self-locking nut (5).
- 3. Secures the electric actuator rod end to the rear cross beam with the bolt (7), bushes (3 and 4), large washers (22) and self-locking nut (5).
- 4. Lubricate the grease fittings; refer to Operator's Manual.
- 5. Connect the machine to the tow vehicle; refer to Operator's Manual.
- 6. Check the operation of the machine.

## **Brush Assembly**

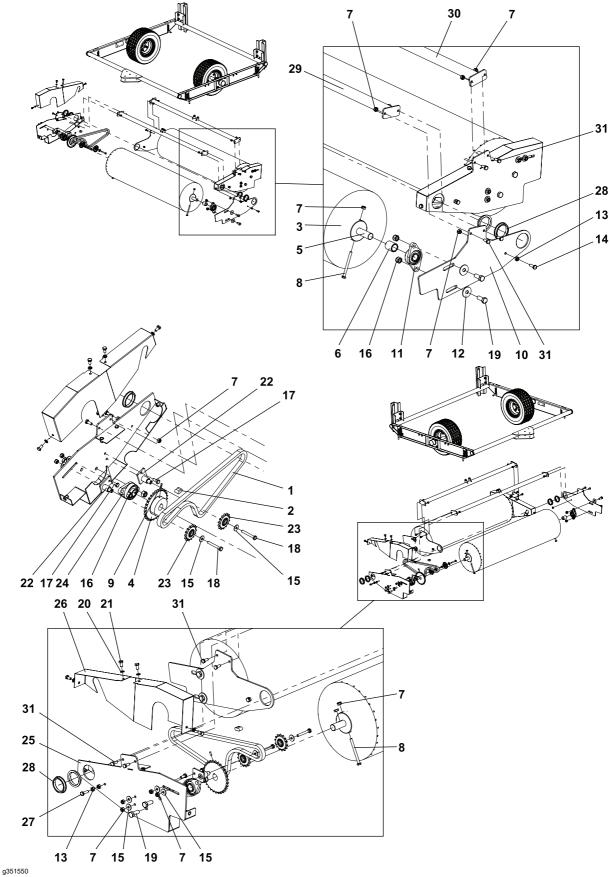


Figure 108

#### Figure 108 (continued)

- 1. Chain (2 each)
- 2. Chain connector (2 each)
- 3. Brush for rotation (2 each)
- 4. Sprocket (2 each)
- 5. Brush axle (2 each)
- 6. Distance bush (2 each)
- 7. Self-locking nut (20 each)
- 8. Bolt (2 each)
- 9. Set screw (2 each)
- 10. Swing arm (2 each)
- 11. Bearing (2 each)

- 12. Large washer (4 each)
- 13. Nut (4 each)
- 14. Bolt (2 each)
- 15. Large washer (12 each)
- 16. Self-locking nut (8 each)
- 17. Bolt (2 each)
- 18. Bolt (4 each)
- 19. Bolt (8 each)
- 20. Spring washer (8 each)
- 21. Bolt (8 each)
- 22. Spanner (2 each)

- 23. Spanner (2 each)
- 24. Bearing (2 each)
- 25. Swingarm driven (2 each)
- 26. Cover back (2 each)
- 27. Bolt (2 each)
- 28. Nylon bush (4 each)
- 29. Cross beam front
- 30. Cross beam back
- 31. Bolt (8 each)

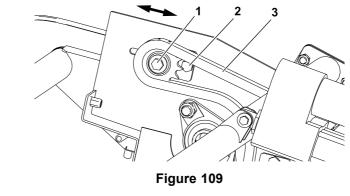
#### **Removing the Brush Assembly**

### 

CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Remove the wheels from the machine; refer to Removing the Wheels (page 9–13).
- 3. To remove the covers (item 26 in Figure 108):
  - A. Remove the eight bolts (21) and spring washers (20) that secures the covers (26) to the machine.
  - B. Remove the covers from the machine.



1. Bolt and nut

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- 2. Bolt and nut
- 4. Loosen the nuts (items 1 and 2 in Figure 109) and slide the spanner (23) to remove the tension on the chain (1).

3.

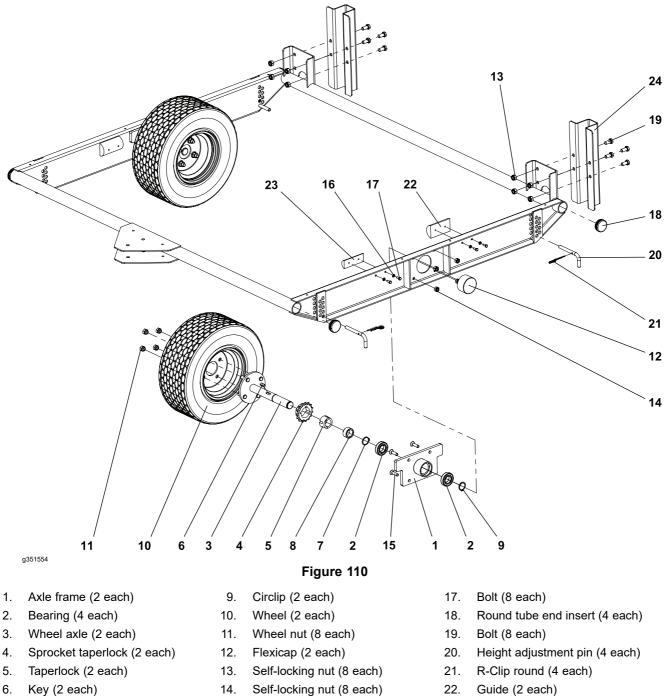
Chain

- 5. Locate and remove the chain connector (2) from the chain (1). Note the direction of chain connector clip for assembly purposes. Remove the chain.
- 6. If necessary, remove and replace the parts of the brush assembly using the Figure 108 as a guide.

#### Installing the Brush Assembly

- 1. If removed, assemble the parts of the brush assembly using the Figure 108 as a guide.
- 2. Install the chain (1) and secure the chain ends with chain connector (2). Make sure that the closed end of the chain connector is facing the direction of the chain rotation.
- 3. Adjust the tension of the chain by moving the spanner (23) and tightening the nuts (items 1 and 2 in Figure 109). A properly adjusted chain should allow for free rotation of drive components.
- 4. To install the covers:
  - A. Position the covers (26) onto the machine.
  - B. Secure the covers (26) with eight spring washers (20) and bolts (21).
- 5. Install the wheels to the machine; refer to Installing the Wheels (page 9–13).
- 6. If necessary, adjust the working depth; refer to Operator's Manual.
- 7. If necessary, adjust the brush angles; refer to Operator's Manual.
- 8. Lubricate the grease fittings; refer to Operator's Manual.
- 9. Connect the machine to the tow vehicle; refer to Operator's Manual.
- 10. Check the operation of the machine.

#### Wheels



- 7. Circlip (2 each)
- Distance bush (2 each) 8.
- Self-locking nut (8 each)
- 15. Bolt (8 each)
- 16. Spring washer (8 each)
- 22. Guide (2 each)
- 23. Guide (2 each)
- 24. U-bracket (2 each)

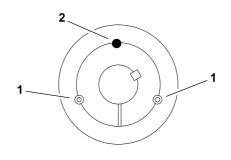
A

#### CAUTION

A

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Remove the four wheel nuts (item 11 in Figure 110) that secures the wheel (10) to the machine.
- 3. Remove the wheel (10) from the machine.
- 4. Remove the flexicap (12) from the axle frame (1).
- Remove the chain from the machine; refer to Removing the Brush Assembly (page 9–10).
- 6. Remove the circlip (9) that secures the wheel axle (3) to the axle frame (1).
- 7. Slide and remove the wheel axle assembly from the axle frame.
- Remove the circlip (7) that secures the distance bush (8) to the wheel axle (3). Slide and remove the distance bush from the wheel axle.
- 9. Remove the two set screw that secures the taper lock (5) to the sprocket (4) and wheel axle (3).



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Figure 111

- 1. Set screw installation position 2. Set screw removal position
- Install one of the removed set screws into the threaded hole of the taper lock (5); refer to Figure 111. Tighten the set screw to loosen the taper lock (5) from the sprocket (4).
- 11. Slide and remove the sprocket (4) and taper lock (5) from the wheel axle (3).
- 12. Locate and retrieve the key (6).
- 13. If necessary, remove and replace the parts from the main frame using the Figure 110 as a guide.

#### Installing the Wheels

- 1. If removed, install the parts of the main frame using the Figure 110 as a guide.
- 2. Thoroughly clean the wheel axle (3) and inner dia of the sprocket (4).
- 3. Slide the taper lock (5) to the wheel axle (3). Position the key (6) and install the sprocket (4) to the wheel axle (3).
- 4. Align the threaded holes of the sprocket with the non-threaded holes of the taper lock.

#### Installing the Wheels (continued)

- 5. Apply oil to the threads of the set screws and install the screws into the threads of the sprocket (4). Alternately and evenly tighten the set screws.
- 6. Slide the distance bush (8) to the wheel axle and secure with the circlip (7).
- 7. Slide and install the wheel axle assembly to the axle frame.
- 8. Secure the wheel axle assembly with the circlip (9).
- Install the chain to the machine; refer to Installing the Brush Assembly (page 9–11).
- 10. Install the flexicap (12) to the axle frame (1).
- 11. Position the wheel (10) to the wheel axle and secure with four wheel nuts (11).
- 12. If necessary, adjust the working depth; refer to Operator's Manual.
- 13. If necessary, adjust the brush angles; refer to Operator's Manual.
- 14. Lubricate the grease fittings; refer to Operator's Manual.
- 15. Connect the machine to the tow vehicle; refer to Operator's Manual.
- 16. Check the operation of the machine.

### Chapter 10

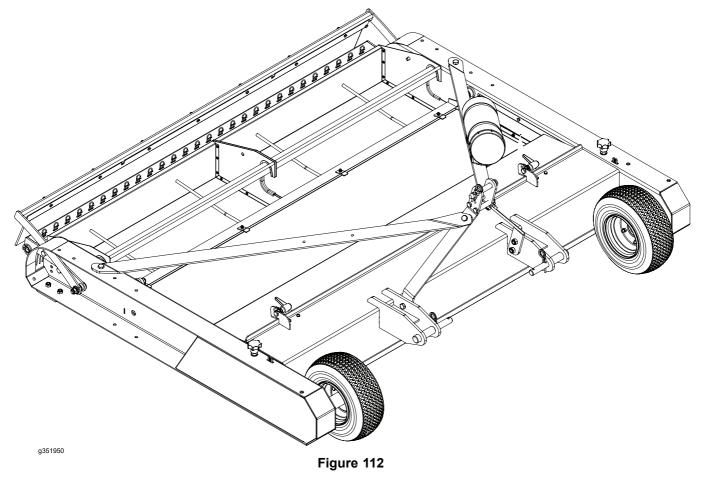
## FieldSweep 660 (Model No. 46412)

### **Table of Contents**

General Information	
Technical Data	
Service and Repairs	
Frame Strips	
Rake Frame and Rear Brush	
Covers and Guard Plate	
Wheel and Gear Assembly	
Sieve Assembly	
Brush Assembly	10–15

### **General Information**

The operators manual provides information regarding the operation, general maintenance, and maintenance intervals for your FieldSweep 660 (Model No. 46412). Refer to the *Operator's Manual* for additional information when servicing the machine.



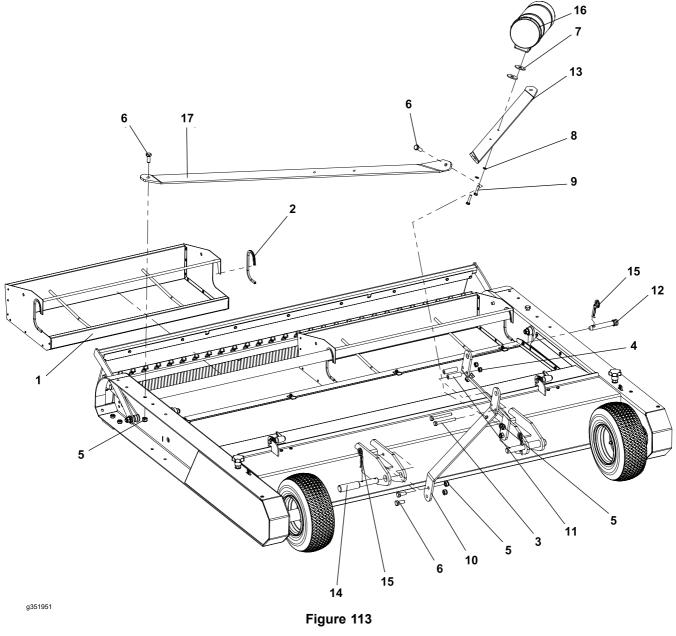
### **Technical Data**

#### FieldSweep 660

Item	Description
Working width	1.670 meters (65.7 in)
Working depth	0 to 10 mm (0 to 0.4 in)
Working speed	The working speed depends on the conditions and the required result. It is maximum 12 km/h (7.4 mph).
Weight	220 kg (485 lbs)
Three-point connection	Cat.1
Minimum lift capacity of the tractor at the lift eyes	250 kg (550 lbs)
Standard items	Removable dirt receiving bin
	Ground-hugging dragging brush
	Easily changeable sieve
	Rake section
Optional	Sieve elements with various drainage dimensions

### **Service and Repairs**

### **Frame Strips**



- 1. Debris bin (2 each)
- 2. Rubber U-seal (4 each)
- 3. Bolt (2 each)
- 4. Self-locking nut (2 each)
- 5. Self-locking nut (8 each)
- 6. Bolt (8 each)

- 7. Large washer (2 each)
- 8. Spring washer (2 each)
- 9. Bolt (2 each)
- 10. 3-point strip (2 each)
- 11. Spacer for gearplate (2 each)
- 12. Top link pin

- 13. Frame strip right
- 14. 3-point pin (2 each)
- 15. R-clip round (3 each)
- 16. Toolbox complete
- 17. Frame strip left

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#### CAUTION

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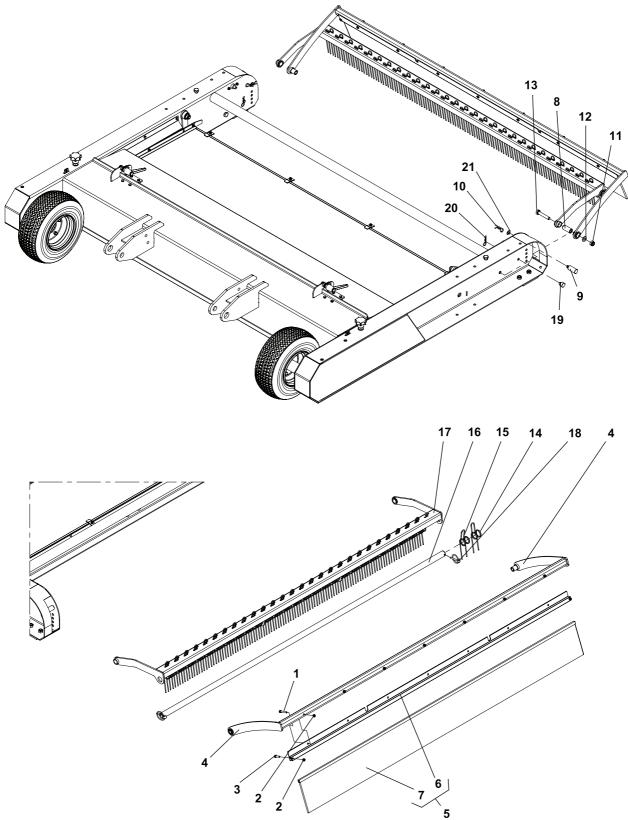
Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Chock the wheels to prevent it from moving.
- 3. Remove the debris bins from the machine; refer to Operator's Manual.
- 4. If necessary, remove and replace the parts of the frame using the Figure 113 as a guide.

#### Installing the Frame Strips

- 1. If removed, install the parts of the frame using the Figure 113 as a guide.
- 2. Install and secure the debris bins to the machine; refer to Operator's Manual.
- 3. Adjust the working depth of the machine; refer to Operator's Manual.
- 4. Adjust the rake and rear frame of the machine; refer to Operator's Manual.
- 5. Lubricate the grease fittings; refer to Operator's Manual.
- 6. Connect the machine to the traction unit; refer to Operator's Manual.
- 7. Check the operation of the machine.

#### **Rake Frame and Rear Brush**



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#### Figure 114 (continued)

- 1. Bolt (7 each)
- 2. Self-locking nut (9 each)
- 3. Bolt (2 each)
- 4. Brush frame
- 5. Rear brush
- 6. H-profile
- 7. Brush

- 8. Distance bush (2 each)
- 9. Brush stop (2 each)
- 10. R-Clip (2 each)
- 11. Self-locking nut (2 each)
- 12. Washer (2 each)
- 13. Bolt (2 each)
- 14. Tine for rake (28 each)

- 15. Tine for rake (28 each)
- 16. Rake tube
- 17. Rake frame
- 18. Linch pin (2 each)
- 19. Rake stop (2 each)
- 20. R-Clip (2 each)
- 21. Washer (2 each)

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#### Removing the Rake Frame and Rear Brush

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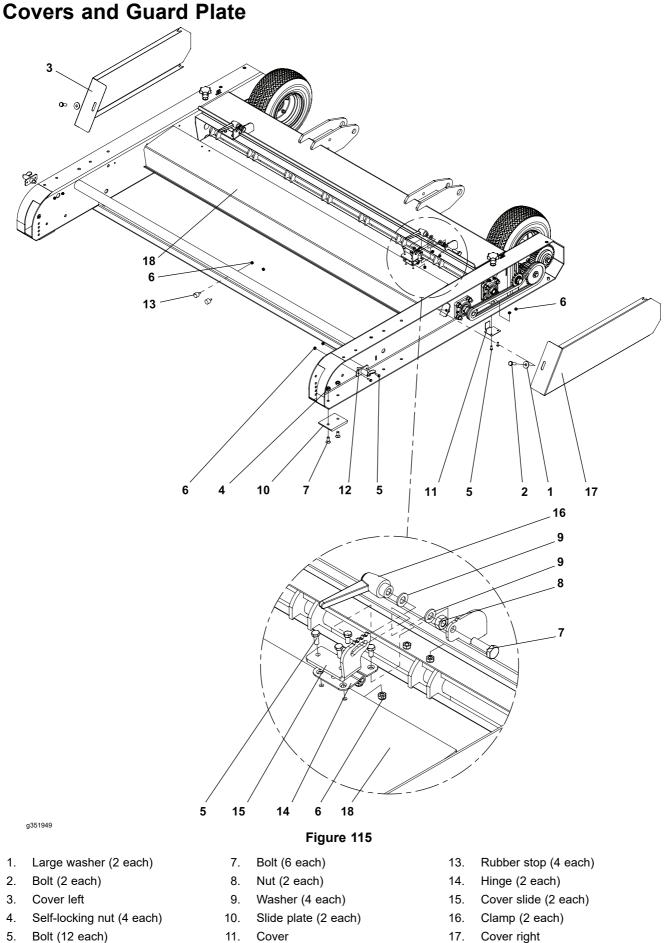
#### CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Chock the wheels to prevent it from moving.
- 3. Remove the debris bins from the machine; refer to Operator's Manual.
- 4. Remove the two self-locking nuts (item 11 in Figure 114), washers (12) and bolts (13) that secures the rake frame (17) and rear brush (5) to the machine.
- 5. Remove the rake frame (17), distance bush (8) and rear brush (5) from the machine.
- 6. If necessary, remove and replace the parts of the rake frame assembly using the Figure 114 as a guide.
- 7. If necessary, remove and replace the parts of the rear brush assembly using the Figure 114 as a guide.

#### Installing the Rake Frame and Rear Brush

- 1. If removed, install the parts of the rear brush assembly using the Figure 114 as a guide.
- 2. If removed, install the parts of the rake frame assembly using the Figure 114 as a guide.
- 3. Position the rake frame (17), distance bush (8) and rear brush (5) onto the machine.
- 4. Secure the rake frame (17) and rear brush (5) to the machine with two bolts (13), washers (12) and self-locking nuts (11).
- 5. Install and secure the debris bins to the machine; refer to Operator's Manual.
- 6. Adjust the working depth of the machine; refer to Operator's Manual.
- 7. Adjust the rake and rear frame of the machine; refer to Operator's Manual.
- 8. Lubricate the grease fittings; refer to Operator's Manual.
- 9. Connect the machine to the traction unit; refer to Operator's Manual.
- 10. Check the operation of the machine.



Lock (2 each) 12.

- 17. Cover right
- Guard plate 18.

#### **Removing the Covers and Guard Plate**

# ▲ CAUTION ▲

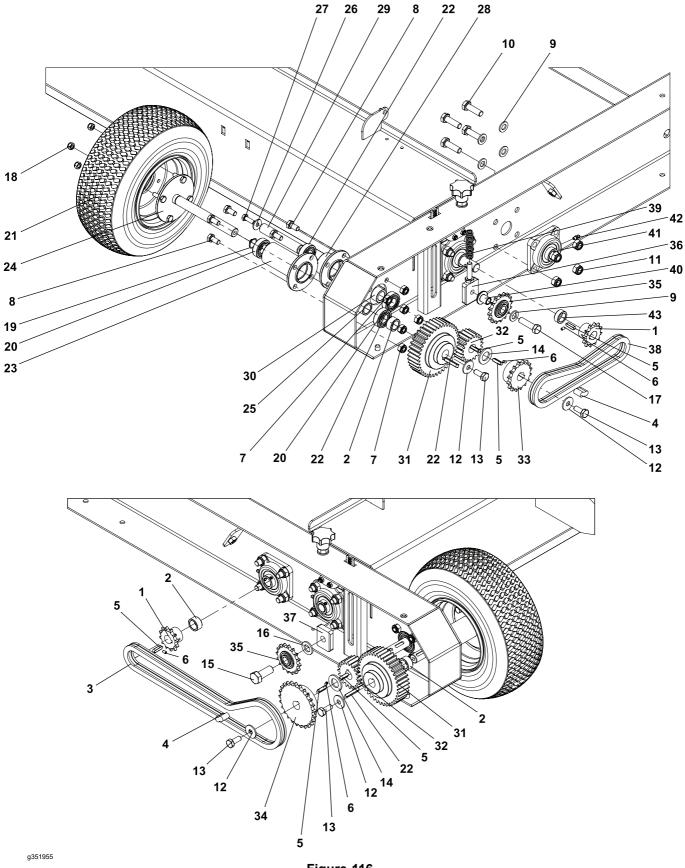
Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Chock the wheels to prevent it from moving.
- 3. To remove the side covers (items 3 and 17 in Figure 115):
  - A. Remove the bolts (2) and washers (1) that secures the side covers (3 and 17) to the machine.
  - B. Remove the side covers (3 and 17) from the machine.
- 4. To remove the guard plate (18):
  - A. Remove the four self-locking nuts (6) and bolts (5) that secures the guard plate (18) to the cover slide (15) and hinge (14).
  - B. Remove the guard plate (18) from the machine.
- 5. If necessary, remove and replace the parts of the guard plate hinge assembly using the Figure 115 as a guide.

#### Installing the Covers and Guard Plate

- 1. If removed, install the parts of the guard plate hinge assembly using the Figure 115 as a guide.
- 2. To install the guard plate (18):
  - A. Position the guard plate (18) onto the machine.
  - B. Secure the guard plate (18) to the hinge 14) and cover slide (15) with four bolts (5) and self-locking nuts (6).
- 3. To install the side covers (3 and 17):
  - A. Position the side covers (3 and 17) onto the machine.
  - B. Secure the side covers (3 and 17) to the machine with two bolts (2) and washers (1).
- 4. Adjust the working depth of the machine; refer to Operator's Manual.
- 5. Adjust the rake and rear frame of the machine; refer to Operator's Manual.
- 6. Lubricate the grease fittings; refer to Operator's Manual.
- 7. Connect the machine to the traction unit; refer to Operator's Manual.
- 8. Check the operation of the machine.

#### Wheel and Gear Assembly

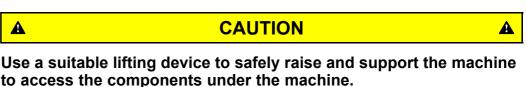


#### Figure 116 (continued)

1.	Sprocket (2 each)	16.	Washer	31.	Gear (2 each)
2.	Bush (3 each)	17.	Bolt	32.	Gear (2 each)
3.	Chain	18.	Self-locking nut (8 each)	33.	Sprocket
4.	Chain connector (2 each)	19.	Circlip (2 each)	34.	Sprocket
5.	Key (6 each)	20.	Bearing (8 each)	35.	Chain spanner (2 each)
6.	Set screw (4 each)	21.	Wheel complete (2 each)	36.	Tensioner
7.	Self-locking nut (16 each)	22.	Key (2 each)	37.	Tensioner strip
8.	Bolt (16 each)	23.	Bearing bracket wheel shaft (2 each)	38.	Chain
9.	Washer (9 each)	24.	Wheel shaft (2 each)	39.	Tensioner spring
10.	Bolt (8 each)	25.	Distance bush (2 each)	40.	Tensioner bush
11.	Self-locking nut (8 each)	26.	Large washer (2 each)	41.	Bearing (2 each)
12.	Large washer (4 each)	27.	Bolt (2 each)	42.	Grease nipple (2 each)
13.	Bolt (4 each)	28.	Bearing bracket drive shaft (2 each)	) 43.	Bush
14.	Washer (2 each)	29.	Shaft (2 each)		
15.	Bolt	30.	Distance bush (2 each)		

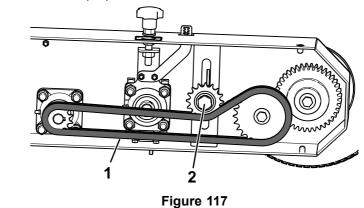
#### **Removing the Wheel and Gear Assembly**

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 Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.

- 2. Remove the debris bins from the machine; refer to *Operator's Manual*.
- 3. Remove the sieve from the machine; refer to Operator's Manual.
- 4. If necessary, remove the frame strips from the machine; refer to Removing the Frame Strips (page 10–5)
- 5. Remove the covers and guard plate from the machine; refer to Removing the Covers and Guard Plate (page 10–9).
- 6. Remove the four self locking nuts (item 18 in Figure 116) that secures the wheel assembly (21) to the machine.
- 7. Remove the wheel (21) from the machine.



1. Tension spanner bolt 2. Drive chain

#### Removing the Wheel and Gear Assembly (continued)

- 8. Loosen the bolt (item 2 in Figure 117) to remove the tension on the drive chain (2).
- 9. Locate and remove the chain connector (item 4 in Figure 116) from the chain (3). Note the direction of chain connector clip for assembly purposes. Remove the chain.
- 10. If necessary, remove and replace the parts of the gear assembly using the Figure 116 as a guide.

#### Installing the Wheel and Gear Assembly

- 1. If removed, assemble the parts of the gear assembly using the Figure 116 as a guide.
- 2. Install the chain (3) and secure the chain ends with chain connector (4). Make sure that the closed end of the chain connector is facing the direction of the chain rotation.
- 3. Adjust the tension of the chain by moving the spanner (35) and tightening the bolt (item 2 in Figure 117). A properly adjusted chain should allow for free rotation of drive components.
- 4. Position the wheel (21) onto the machine.
- 5. Secure the wheel (21) to the machine with four self-locking nuts (18).
- 6. Install the covers and guard plate to the machine; refer to Installing the Covers and Guard Plate (page 10–9).
- 7. If removed, install the frame strips to the machine; refer to Installing the Frame Strips (page 10–5).
- 8. Install the sieve to the machine; refer to Operator's Manual.
- 9. Instal the debris bins to the machine; refer to Operator's Manual.
- 10. Adjust the working depth of the machine; refer to Operator's Manual.
- 11. Adjust the rake and rear frame of the machine; refer to Operator's Manual.
- 12. Lubricate the grease fittings; refer to Operator's Manual.
- 13. Connect the machine to the traction unit; refer to Operator's Manual.
- 14. Check the operation of the machine.

**Sieve Assembly** 

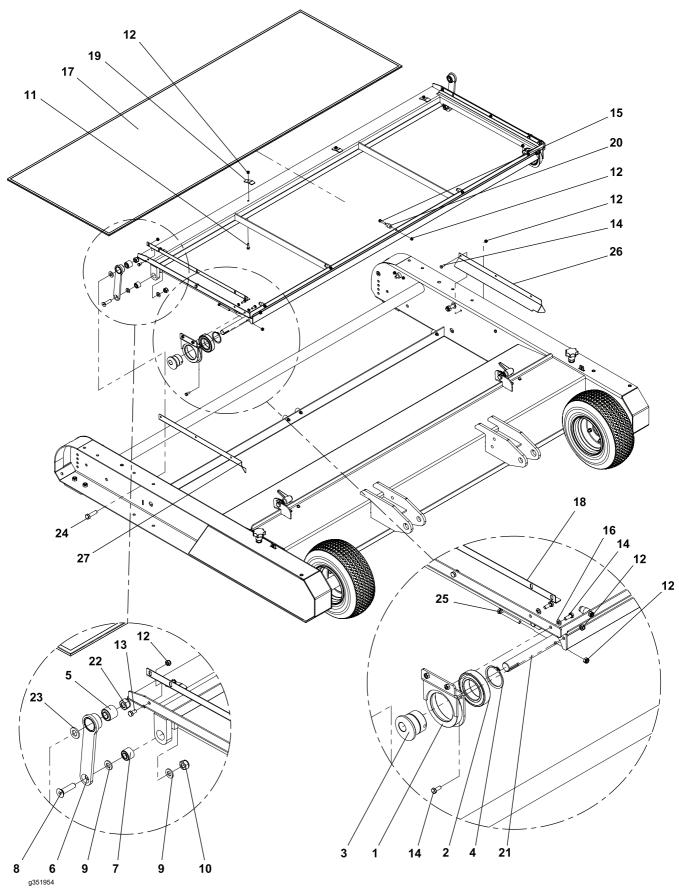


Figure 118

#### Figure 118 (continued)

- 1. Sieve bearing (2 each)
- 2. Bearing (2 each)
- 3. Sieve bush (2 each)
- 4. Circlip (2 each)
- 5. Vibration damper (2 each)
- 6. Sieve arm (2 each)
- 7. Vibration damper (2 each)
- 8. Bolt (2 each)
- 9. Washer (4 each)

- 10. Self-locking nut (2 each)
- 11. Bolt (4 each)
- 12. Self-locking nut (19 each)
- 13. Bolt (4 each)
- 14. Bolt (14 each)
- 15. Bolt (5 each)
- 16. Spring washer (4 each)
- 17. Sieve mesh
- 18. Lock plate (2 each)

- 19. Lock (4 each)
- 20. Bush (5 each)
- 21. Sieve axle
- 22. Self-locking nut (2 each)
- 23. Washer (2 each)
- 24. Bolt (2 each)
- 25. Bolt (2 each)
- 26. Sieve guide left
- 27. Sieve guide right

#### **Removing the Sieve Assembly**

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#### CAUTION

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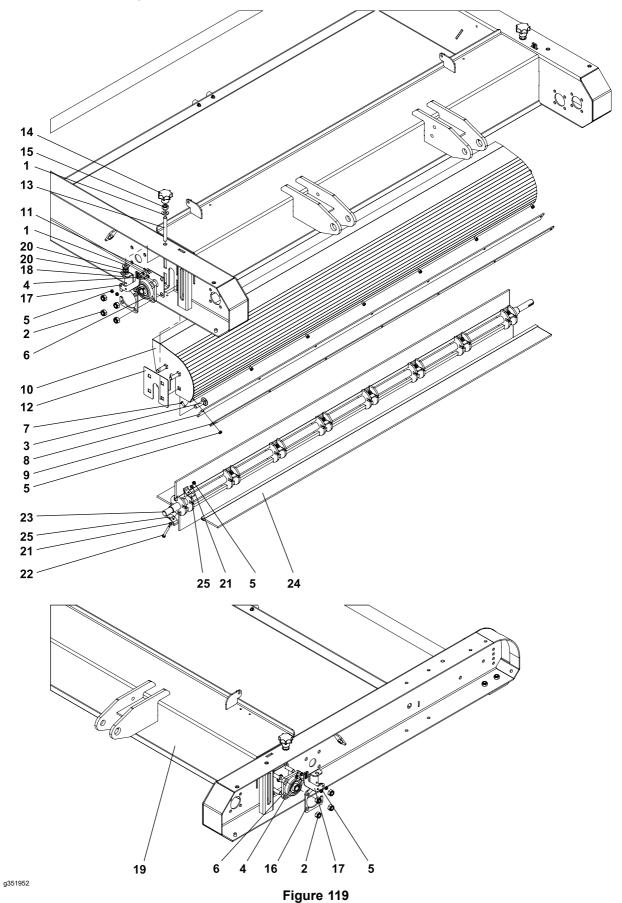
### Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Chock the wheels to prevent it from moving.
- 3. Remove the debris bins from the machine; refer to Operator's Manual.
- 4. Remove the sieve from the machine; refer to Operator's Manual.
- 5. Remove the frame strips from the machine; refer to Removing the Frame Strips (page 10–5).
- 6. Remove the covers and guard plate from the machine; refer to Removing the Covers and Guard Plate (page 10–9).
- 7. Remove the gear assembly from the machine; refer to Removing the Wheel and Gear Assembly (page 10–11)
- 8. If necessary, remove and replace the parts of the sieve assembly using the Figure 118 as a guide.

#### Installing the Sieve Assembly

- 1. If removed, assemble the parts of the sieve assembly using the Figure 118 as a guide.
- 2. Install the gear assembly to the machine; refer to Installing the Wheel and Gear Assembly (page 10–12).
- 3. Install the covers and guard plate to the machine; refer to Installing the Covers and Guard Plate (page 10–9).
- 4. Install the frame strips to the machine; refer to Installing the Frame Strips (page 10–5).
- 5. Install the sieve to the machine; refer to Operator's Manual.
- 6. Instal the debris bins to the machine; refer to Operator's Manual.
- 7. Adjust the working depth of the machine; refer to Operator's Manual.
- 8. Adjust the rake and rear frame of the machine; refer to Operator's Manual.
- 9. Lubricate the grease fittings; refer to Operator's Manual.
- 10. Connect the machine to the traction unit; refer to Operator's Manual.
- 11. Check the operation of the machine.

#### **Brush Assembly**



#### Figure 119 (continued)

- 1. Washer (4 each)
- 2. Self-locking nut (8 each)
- 3. Bolt (8 each)
- 4. Bolt (4 each)
- 5. Self-locking nut (19 each)
- 6. Bearing (2 each)
- 7. Bolt (7 each)
- 8. Rubber strip
- 9. Lock strip

- 10. Brush cover
- 11. Guide plate (2 each)
- 12. Brush guide (2 each)
- 13. Threaded rod (2 each)
- 14. Knob (2 each)
- 15. Nut (2 each)
- 16. Brush lift left
- 17. Indicator (2 each)
- 18. Brush lift right

- 19. Frame
- 20. Low nut (4 each)
- 21. Washer (16 each)
- 22. Bolt (8 each)
- 23. Brush shaft
- 24. Brush (4 each)
- 25. Lock plate (16 each)

#### **Removing the Brush Assembly**

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#### CAUTION

A

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Chock the wheels to prevent it from moving.
- 3. Remove the debris bins from the machine; refer to Operator's Manual.
- 4. Remove the sieve from the machine; refer to Operator's Manual.
- 5. Remove the frame strips from the machine; refer to Removing the Frame Strips (page 10–5).
- 6. Remove the covers and guard plate from the machine; refer to Removing the Covers and Guard Plate (page 10–9).
- 7. Remove the gear assembly from the machine; refer to Removing the Wheel and Gear Assembly (page 10–11).
- 8. If necessary, remove and replace the parts of the brush assembly using the Figure 119 as a guide.

#### Installing the Brush Assembly

- 1. If removed, assemble the parts of the brush assembly using the Figure 119 as a guide.
- 2. Install the gear assembly to the machine; refer to Installing the Wheel and Gear Assembly (page 10–12).
- 3. Install the covers and guard plate to the machine; refer to Installing the Covers and Guard Plate (page 10–9).
- 4. Install the frame strips to the machine; refer to Installing the Frame Strips (page 10–5).
- 5. Install the sieve to the machine; refer to Operator's Manual.
- 6. Instal the debris bins to the machine; refer to Operator's Manual.
- 7. Adjust the working depth of the machine; refer to Operator's Manual.
- 8. Adjust the rake and rear frame of the machine; refer to Operator's Manual.
- 9. Lubricate the grease fittings; refer to Operator's Manual.
- 10. Connect the machine to the traction unit; refer to Operator's Manual.
- 11. Check the operation of the machine.

### Chapter 11

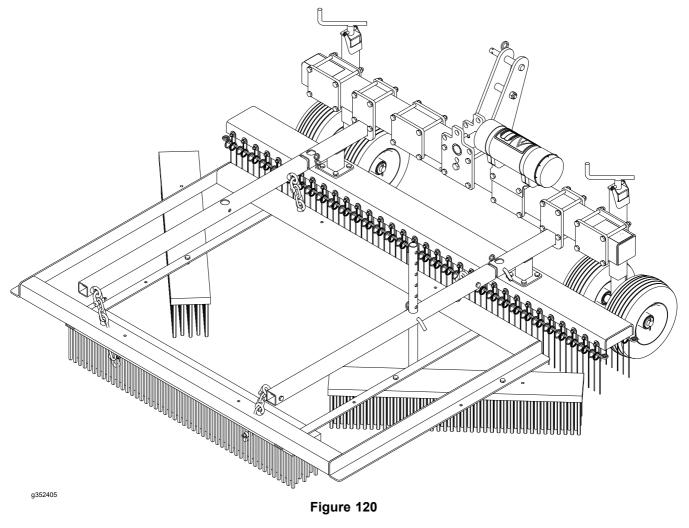
### FieldCombo 770 (Model No. 46420)

### **Table of Contents**

General Information    11–2      Technical Data    11–3      Service and Repairs    11–4
Brushes
Rake Assembly
Main Beam Assembly
Wheels

### **General Information**

The operators manual provides information regarding the operation, general maintenance, and maintenance intervals for your FieldCombo 770 (Model No. 46420). Refer to the *Operator's Manual* for additional information when servicing the machine.



### **Technical Data**

#### FieldCombo 770

ltem	Description
Working width	1.95 meters (77 in)
Working depth	0 to 35 mm (0 to 1.4 in)
Working speed	The working speed depends on the conditions and the required result. It is maximum 12 km/h (7.4 mph).
Weight	225 kg (495 lbs)
Three-point connection	Cat.1 or 2
Minimum lift capacity of the tractor at the lift eyes	300 kg (661 lbs)
Standard items	Running wheels adjustable in height

### **Service and Repairs**

#### **Brushes**

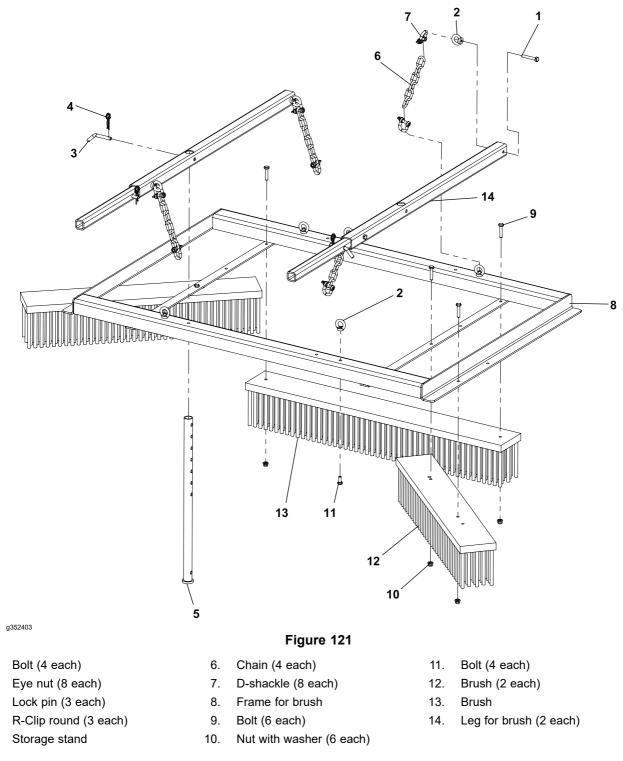
1.

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5.



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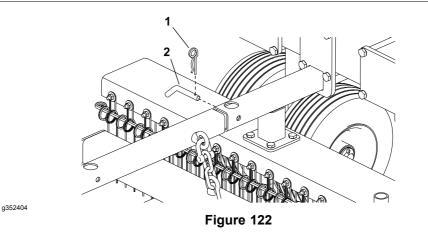
CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Chock the wheels to prevent it from moving.



To prevent personal injury, make sure that the brush frame assembly is supported as it is removed from the machine. Brush frame assembly weighs approximately 66 kg (146 lbs).



- 1. R-Clip round 2. Lock pin
- 3. Remove the two R-clip rounds (item 1 in Figure 122) and lock pins (2) that secures the brush frame assembly to the machine.
- 4. Carefully slide and remove the brush frame assembly from the machine.
- 5. If necessary, remove and replace the parts of the brush frame assembly using the Figure 121 as a guide.

#### Installing the Brushes

1. If removed, install the parts to the brush frame assembly using the Figure 121 as a guide.

|--|

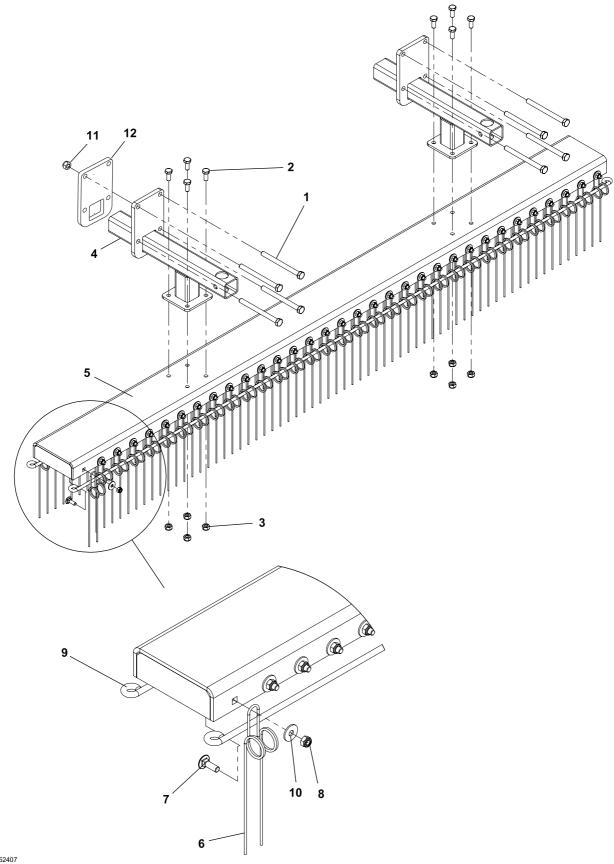
To prevent personal injury, make sure that the brush frame assembly is supported as it is installed to the machine. Brush frame assembly weighs approximately 66 kg (146 lbs).

- 2. Carefully position the brush frame assembly to the machine.
- 3. Secure the brush frame assembly to the machine with two lock pins (item 2 in Figure 122) and R-clip rounds (1).

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#### Installing the Brushes (continued)

- 4. Connect the machine to the traction unit and adjust the working depth of the machine; refer to *Operator's Manual*.
- 5. Check the operation of the machine.



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#### Figure 123 (continued)

- 1. Bolt (8 each)
- 2. Bolt (8 each)
- 3. Self-locking nut (8 each)
- 4. Leg (2 each)

- 5. Main beam
- 6. Tine (66 each)
- 7. Carriage bolt (66 each)
- 8. Self-locking nut (66 each)
- 9. Rope for spring tines (2 each)
- 10. Large washer (66 each)
- 11. Self-locking nut (8 each)
- 12. Leg plate (2 each)

#### **Removing the Rake Assembly**

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- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Remove the brush frame assembly from the machine; refer to Removing the Brushes (page 11–5).

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To prevent personal injury, make sure that the rake assembly is supported as it is removed from the machine. Rake assembly weighs approximately 35 kg (77 lbs).

- 3. Remove the eight self-locking nuts (item 11 in Figure 123) and bolts (1) that secures the rake assembly to the machine.
- 4. Carefully remove the leg plate (12) and rake assembly from the machine.
- 5. If necessary, remove and replace the parts of the rake assembly using the Figure 123 as a guide.

#### Installing the Rake Assembly

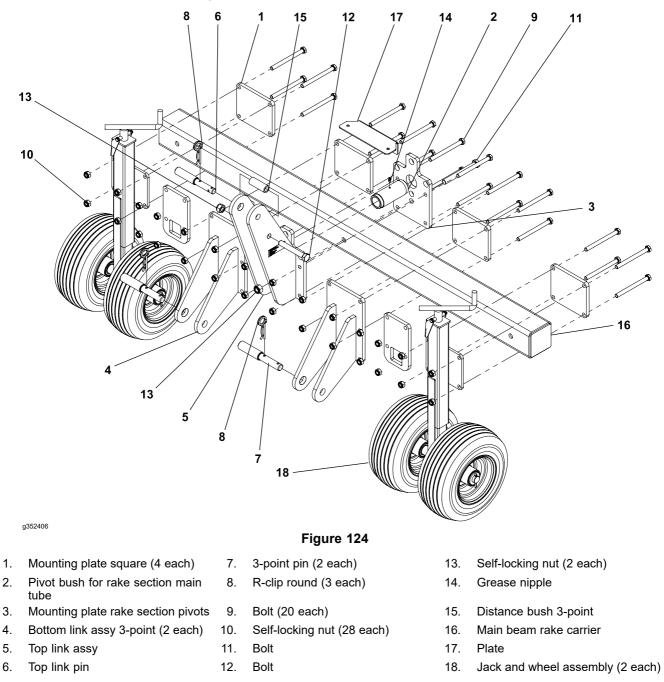
1. If removed, install the parts of the rake assembly using the Figure 123 as a guide.

CAUTION

To prevent personal injury, make sure that the rake assembly is supported as it is installed to the machine. Rake assembly weighs approximately 35 kg (77 lbs).

- 2. Position the rake assembly and leg plate (12) to the machine.
- 3. Secure the rake assembly and leg plate (12) to the machine with eight bolts (1) and self-locking nuts (11).
- 4. Install the brush frame assembly to the machine; refer to Installing the Brushes (page 11–5).
- 5. Connect the machine to the traction unit and adjust the working depth of the machine; refer to *Operator's Manual*.
- 6. Check the operation of the machine.

#### Main Beam Assembly



#### **Removing the Main Beam Assembly**



Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Remove the brush frame assembly from the machine; refer to Removing the Brushes (page 11–5).

#### **Removing the Main Beam Assembly (continued)**

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3. Remove the rake assembly from the machine; refer to Removing the Rake Assembly (page 11–8).

CAUTION

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To prevent personal injury, make sure that the main beam assembly is supported as it is removed from the machine. Main beam assembly weighs approximately 60 kg (132 lbs).

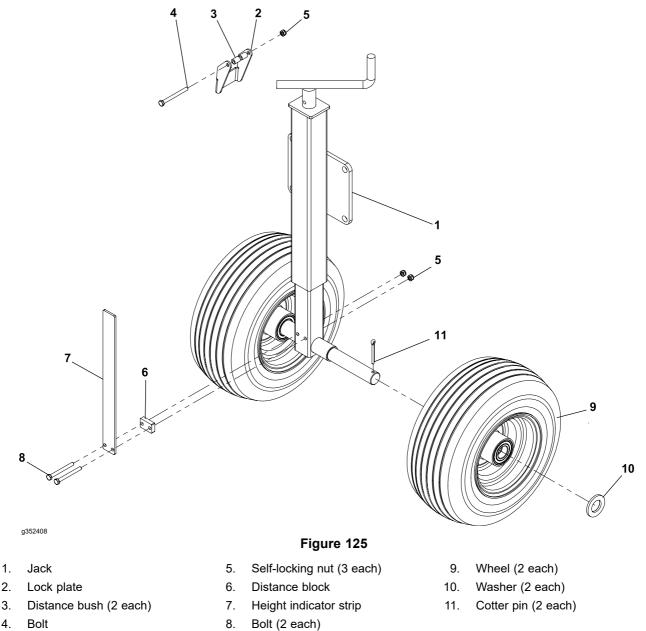
- 4. Remove the eight self-locking nuts (item 10 in Figure 124) and bolts (9) that secures the jack and wheel assemblies (18) to the main beam assembly.
- 5. If necessary, remove the wheels from the jack; refer to Removing the Wheels (page 11–11).
- 6. If necessary, remove and replace the parts of the main beam assembly using the Figure 124 as a guide.

#### Installing the Main Beam Assembly

#### ▲ CAUTION ▲ To prevent personal injury, make sure that the main beam assembly is supported as it is assembled to the machine. Main beam assembly weighs approximately 60 kg (132 lbs).

- 1. If removed, install the parts of the main beam assembly using the Figure 124 as a guide.
- 2. If removed, install the wheels to the jack; refer to Installing the Wheels (page 11–11).
- 3. Position the jack and wheel assemblies (18) and two mounting plates (1) to the main frame assembly and secure with eight bolts (9) and self-locking nuts (10).
- 4. Install the rake assembly to the machine; refer to Installing the Rake Assembly (page 11–8).
- 5. Install the brush frame assembly to the machine; refer to Installing the Brushes (page 11–5).
- 6. Connect the machine to the traction unit and adjust the working depth of the machine; refer to *Operator's Manual*.
- 7. Check the operation of the machine.

#### Wheels



#### **Removing the Wheels**

- 1. Remove the machine from the tow vehicle and position on a firm and level surface. Support the machine to prevent it from moving.
- 2. Remove the cotter pin (item 11 in Figure 125) and washer (10) that secures the wheel (9) to the jack (1).
- 3. Remove the wheel (9) from the jack (1).
- 4. If necessary, remove and replace the parts of the jack using the Figure 125 as a guide.

#### Installing the Wheels

- 1. If removed, install the parts of the jack using the Figure 125 as a guide.
- 2. Install the wheel (9) to the jack (1) and secure with the washer (10) and cotter pin (11).

#### Installing the Wheels (continued)

- 3. Connect the machine to the traction unit and adjust the working depth of the machine; refer to *Operator's Manual*.
- 4. Check the operation of the machine.

### Chapter 12

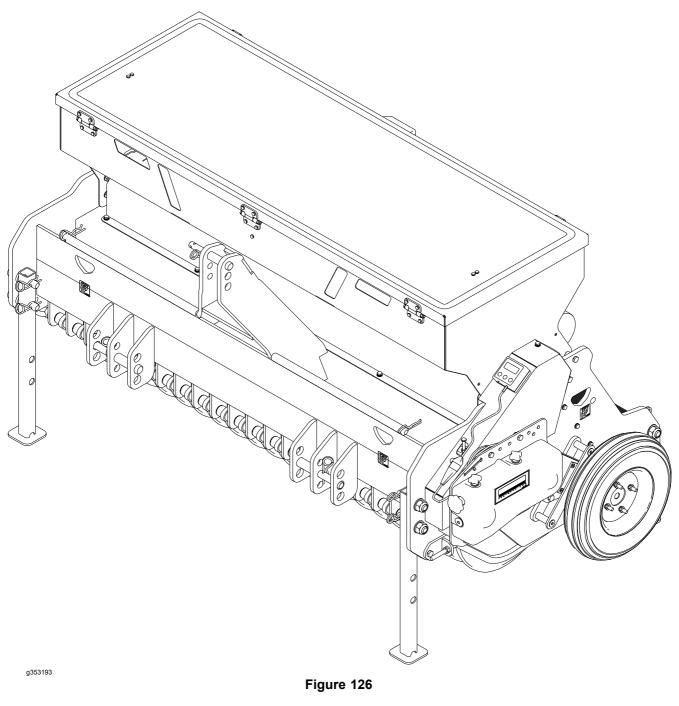
## AccuraSeed 620 (Model No. 46430)

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### **General Information**

The operators manual provides information regarding the operation, general maintenance, and maintenance intervals for your AccuraSeed 620 (Model No. 46430). Refer to the *Operator's Manual* for additional information when servicing the machine.



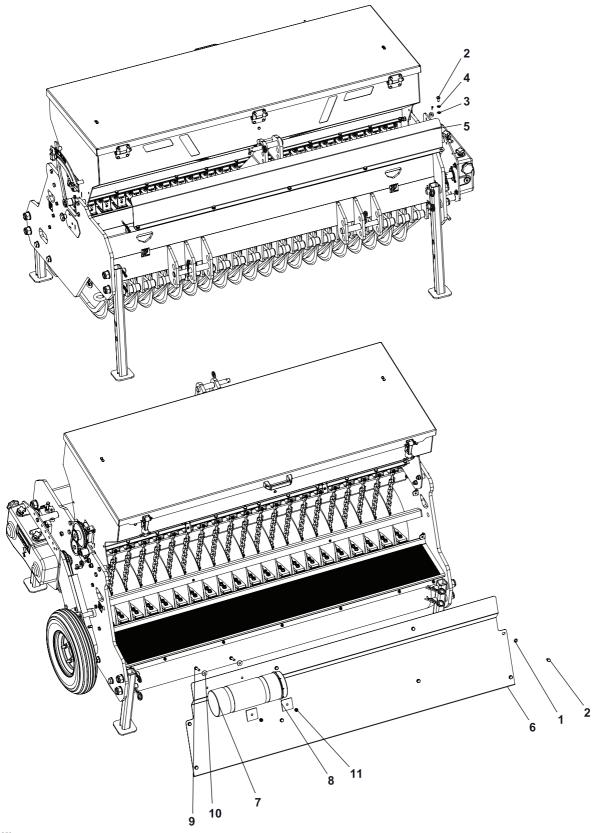
### **Technical Data**

#### AccuraSeed 620

ltem	Description
Working width	1.57 meters (62 in)
Working depth	5 to 20 mm (0.19 to 0.78 in)
Sowing speed	Maximum 12 km/h (7.5 mph)
Weight	1,184 kg (2,610 lbs)
Three-point connection	Cat. 2
Tire pressure	1 to 2 bar (14.5 to 29 psi)
Recommended tractor HP	45 HP
Minimum lift capacity of the tractor	1,300 kg (2,866 lbs)
Hopper capacity	276 L (9.7 cu.ft.)
Standard items	Rear roller that can be filled with water and roller scraper
	Infinitely adjustable gearbox to set seeding rate
	Adjustable legs for storage
	Independently floating discs
	Terrain-following seed dispensing wheel

### **Service and Repairs**

#### Covers



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Figure 127

#### Figure 127 (continued)

- 1. Washer (13 each)
- 2. Bolt (13 each)
- 3. Washer (13 each)
- 4. Spring washer (5 each)
- 5. Safety cover
- 6. Cover
- 7. Toolbox
- 8. Toolbox contraplate (2 each)
- 9. Bolt (2 each)
- 10. Large washer (2 each)
- 11. Self-locking nut (2 each)

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#### **Removing the Covers**

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#### CAUTION

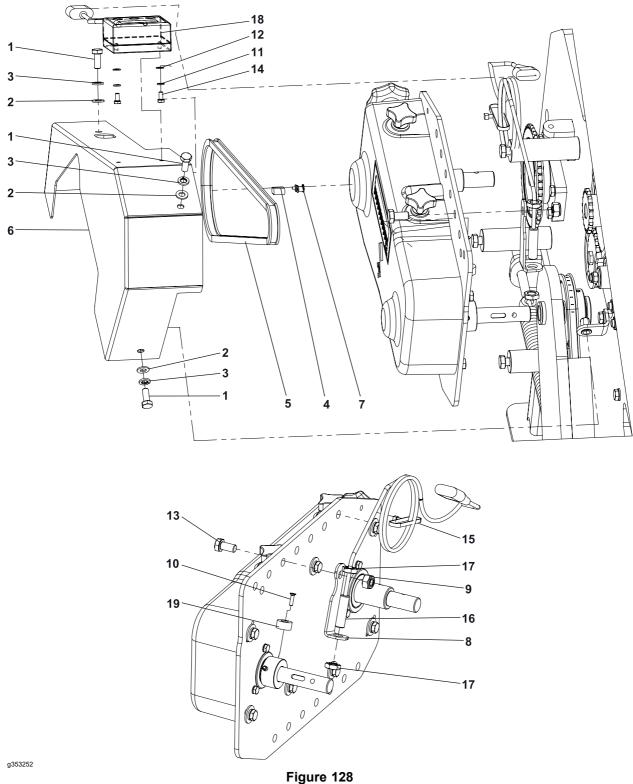
Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the roller to prevent it from moving.
- 4. To remove safety cover (item 5 in Figure 127):
  - A. Remove the five bolts (2), spring washer (4) and washer (3) that secures the safety cover (5) to the machine.
  - B. Remove the safety cover (5) from the machine.
- 5. To remove the cover (6):
  - A. Remove the eight bolts (2), and washers (1) that secures the safety cover (6) to the machine.
  - B. Remove the safety cover (6) from the machine.
  - C. If necessary, remove the toolbox (7) from the cover (6) using the Figure 127 as a guide.

### Installing the Covers

- 1. If removed, install the toolbox (7) to the cover (6) using the Figure 127 as a guide.
- 2. To install the cover (6):
  - A. Position the cover (6) onto the machine.
  - B. Secure the cover (6) to the machine with eight bolts (2) and washers (1).
- 3. To install the safety cover (5):
  - A. Position the safety cover (5) onto the machine.
  - B. Secure the safety cover (5) to the machine with five bolts (2), spring washers (4) and washers (3).
- 4. Lubricate the grease fittings; refer to Operator's Manual.
- 5. Check the operation of the machine.

# **Drive Chain**



- 1. Bolt (3 each)
- 2. Washer (3 each)
- 3. Spring washer (3 each)
- 4. Chain connector
- 5. Chain
- 6. Gear cover
- 7. Crank link

- 8. Sensor bracket
- 9. Self-locking nut
- 10. Bolt
- 11. Spring washer (2 each)
- 12. Washer (2 each)
- 13. Bolt
- 14. Bolt (2 each)

- 15. Cable-tie
- 16. Magnetic sensor
- 17. Nut (2 each)
- 18. Surface meter
- 19. Magnet

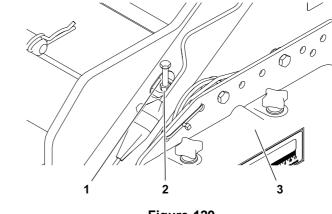
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# CAUTION

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Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the roller to prevent it from moving.
- 4. Disconnect the wire harness electrical connector of the surface meter (item 18 in Figure 128).
- 5. Remove the three bolts (1), spring washers (3) and washers (2) that secures the gear cover (6) to the machine.
- 6. Remove the gear cover (6) and surface meter (18) from the machine.
- 7. If necessary, remove the two bolts (14), spring washers (11) and washers (12) that secures the surface meter (18) to the gear cover (6).
- 8. Remove the surface meter (18) from the gear cover (6).



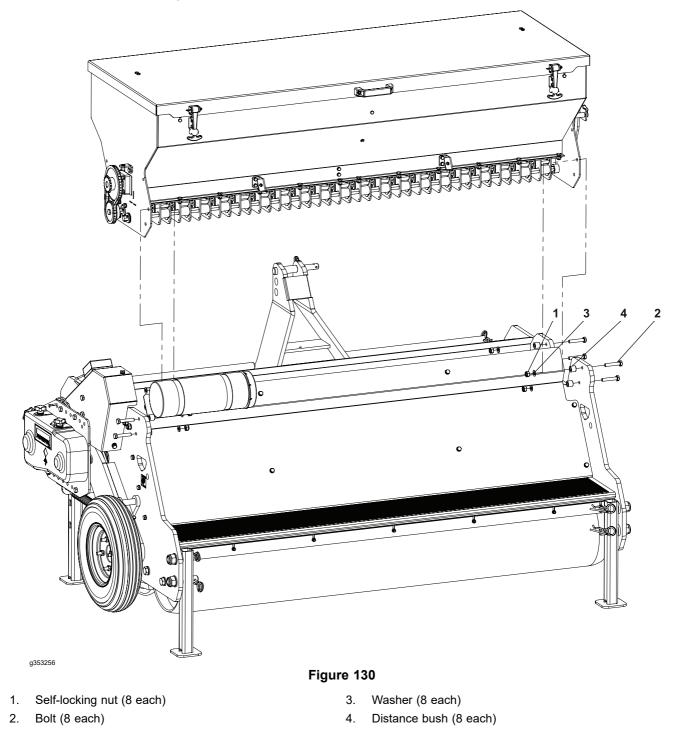
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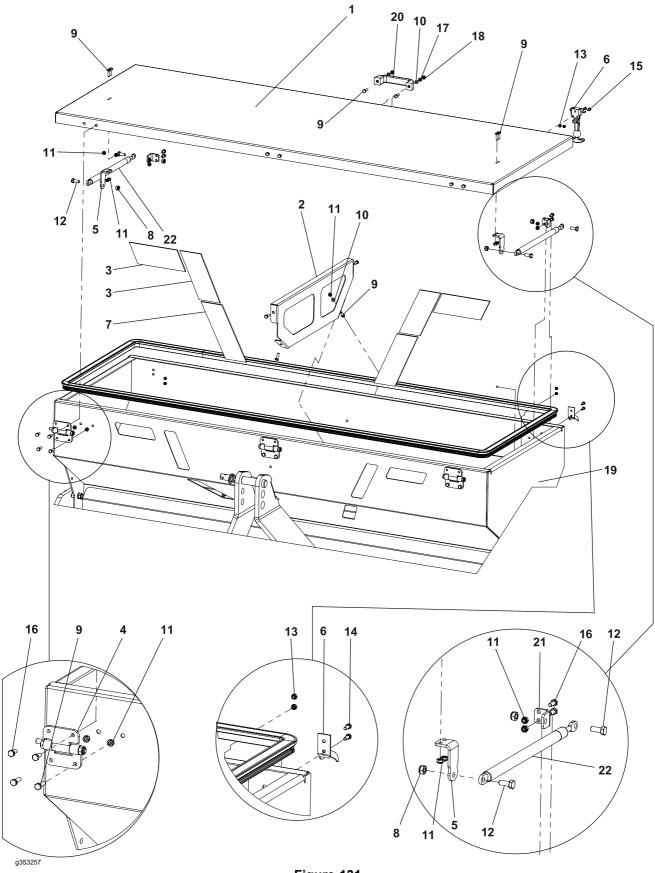
Figure 129

- 1. Bolt 3. Gearbox
- 2. Nut
- 9. Loosen the bolt (item 1 in Figure 129) and nut (2) that removes the tension from the drive chain.
- 10. Locate and remove the chain connector (4) from drive chain (5). Note the direction of chain connector clip for assembly purposes.
- 11. Remove the drive chain from the machine.
- 12. If necessary, remove the self-locking nut (9) and bolt (13) that secures the sensor bracket (8) to the gearbox.
- 13. Cut the cable tie (15) and remove the magnetic sensor (16) and sensor bracket (8) from the gearbox.
- 14. If necessary, remove the magnet (19) from the gearbox using the Figure 128 as a guide.

#### Installing the Drive Chain

- 1. If removed, install the magnet (19) to the gearbox using the Figure 128 as a guide.
- 2. If removed, position the magnetic sensor (16) and sensor bracket (8) to the gearbox.
- 3. Secure the sensor bracket (8) to the gearbox with the bolt (13) and self-locking nut (9).
- 4. Secure the magnetic sensor cable (16) to the gearbox with the cable tie (15).
- 5. Install the drive chain (5) and secure the drive chain ends with the chain connector (4). Make sure that the closed end of the chain connector is facing the direction of the chain rotation.
- 6. Adjust the tension of the chain by tightening the bolt (item 1 in Figure 129) and nut (2). A properly adjusted chain should allow for free rotation of drive components.
- 7. If removed, install the surface meter (18) to the gear cover (6) and secure with two bolts (14), spring washers (11) and washers (12).
- 8. Position the gear cover (6) and surface meter (18) onto the machine.
- 9. Secure the gear cover (6) with three bolts (1), spring washers (3) and washers (2).
- 10. Connect the wire harness electrical connector of the surface meter (18) to the magnetic sensor (16).
- 11. Lubricate the grease fittings and gearbox; refer to Operator's Manual.
- 12. Connect the machine to the traction unit and check the operation of the machine.





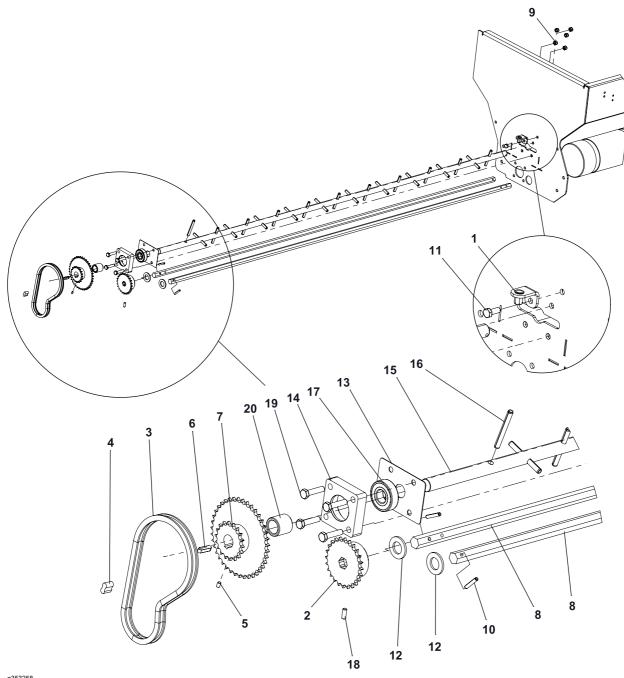


#### Figure 131 (continued)

- 1. Top cover
- 2. Hopper support bracket
- 3. Window glass seeder (4 each)
- 4. Hinge (3 each)
- 5. Support (2 each)
- 6. Rubber lock assy (2 each)
- 7. Window glass seeder (2 each)
- 8. Self-locking nut (4 each)

- 9. Bolt (16 each)
- 10. Washer (6 each)
- 11. Self-locking nut (24 each)
- 12. Bolt (4 each)
- 13. Self-locking nut (8 each)
- 14. Bolt (4 each)
- 15. Bolt (4 each)
- 16. Bolt (10 each)

- 17. Spring washer (2 each)
- 18. Nut (2 each)
- 19. Hopper
- 20. Handle
- 21. Support (2 each)
- 22. Gas strut (2 each)

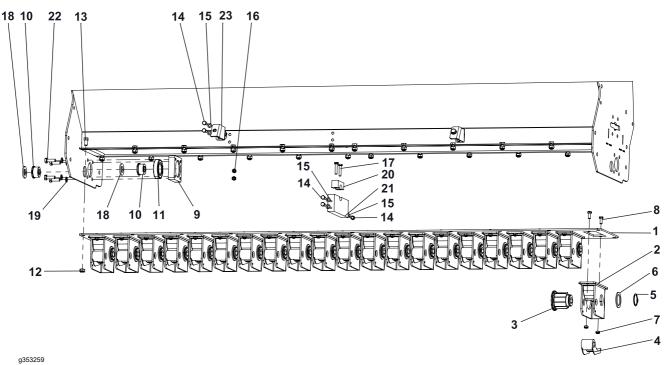


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- Bracket 1.
- Sprocket 2.
- Chain 3.
- Chain connector 4.
- 5. Set screw
- 6. Key
- 7. Weldment sprocket

- Figure 132
- 8. Shaft (2 each) Self-locking nut (5 each) 9.
- 10. Roll pin (2 each)
- 11. Bolt
- 12. Washer (3 each)
- 13. Cover plate
- 14. Bearing block

- 15. Agitator shaft assembly
- 16. Roll pin (21 each)
- 17. Bearing
- 18. Set screw
- Bolt (4 each) 19.
- 20. Distance bush



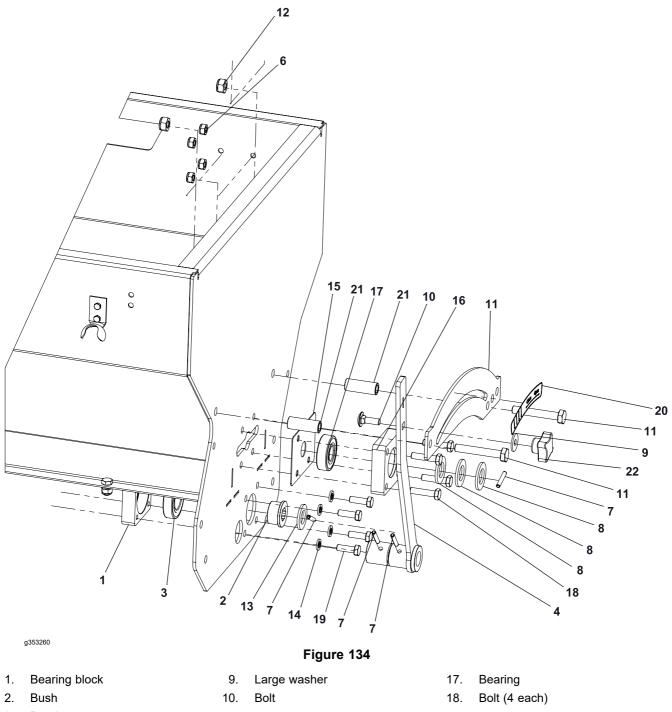
#### 1. Plate

- 2. Seed element casing (21 each)
- 3. Seed element rotor (21 each)
- 4. Seed element valve (21 each)
- 5. Circlip (21 each)
- 6. Washer (21 each)
- 7. Self-locking nut (42 each)
- 8. Bolt (42 each)

#### Figure 133

- 9. Bearing block (2 each)
- 10. Bush (2 each)
- 11. Bearing (2 each)
- 12. Self-locking nut (24 each)
- 13. Bolt (24 each)
- 14. Bolt (7 each)
- 15. Washer (7 each)
- 16. Self-locking nut (46 each)

- 17. Bolt (2 each)
- 18. Washer (2 each)
- 19. Spring washer (4 each)
- 20. Guide block support
- 21. Guide block lock
- 22. Bolt (4 each)
- 23. Cover support bracket (2 each)



- 3. Bearing
- 4. Valve adjustment
- 5. Guide strip
- 6. Self-locking nut (5 each)
- 7. Roll pin (4 each)
- 8. Washer (3 each)

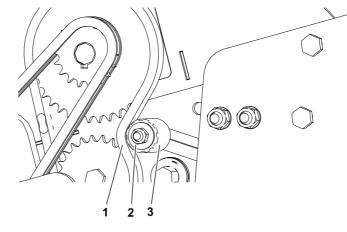
- 11. Bolt (2 each)
- 12. Self-locking nut (2 each)
- 13. Washer
- 14. Spring washer (4 each)
- 15. Cover plate
- 16. Bearing block

- 19. Bolt (4 each)
- 20. Decall adjustment valve
- 21. Distance bush (2 each)
- 22. Closed Knob



Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the rear roller to prevent it from moving.
- 4. Remove the drive chain from the machine; refer to Removing the Drive Chain (page 12–7).



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#### Figure 135

1. Chain

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3. Spanner roller

- 2. Self-locking nut
- 5. Loosen the self-locking nut (item 2 in Figure 135) and slide the spanner roller (3) that removes tension from the chain (1).
- 6. If necessary, locate and remove the chain connector from chain. Note the direction of chain connector clip for assembly purposes. Remove the drive chain.

#### CAUTION

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To prevent personal injury, make sure that the hopper assembly is supported as it is removed from the machine. Hopper assembly weighs approximately 82 kg (181 lbs).

- 7. Remove the eight self-locking nuts (item 1 in Figure 130), washers (3), bolts (2) and distance bushes (4) that secures the hopper assembly to the main frame.
- 8. Remove the hopper assembly from the machine.
- 9. If necessary, remove and replace the parts of the hopper assembly using the Figure 131, Figure 132, Figure 133 and Figure 134 as a guide.

#### Installing the Hopper Assembly

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1. If removed, assemble the hopper assembly using the Figure 131, Figure 132, Figure 133 and Figure 134 as a guide.

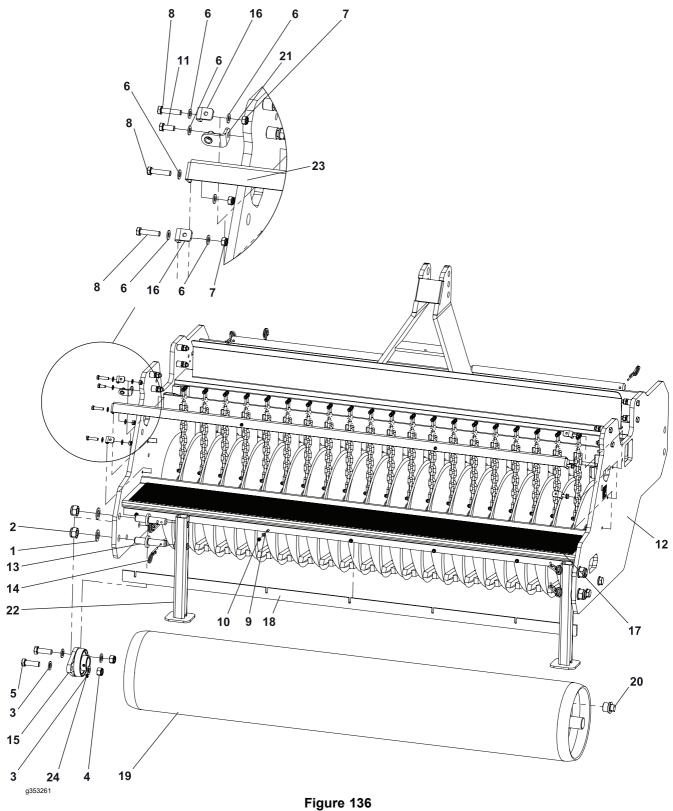
#### CAUTION

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To prevent personal injury, make sure that the hopper assembly is supported as it is installed to the machine. Hopper assembly weighs approximately 82 kg (181 lbs).

- 2. Carefully position the hopper assembly onto the main frame and secure with the eight bolts (item 2 in Figure 130), distance bushes (4), washers (3) and self-locking nuts (1).
- 3. If removed, install the drive chain (item 1 in Figure 135) and secure the chain ends with chain connector. Make sure that the closed end of the chain connector is facing the direction of the chain rotation.
- 4. Adjust the tension of the chain (1) by sliding the spanner roller (3) and tightening the self-locking nut (2). A properly adjusted chain should allow for free rotation of drive components.
- 5. Install the drive chain to the machine; refer to Installing the Drive Chain (page 12–8).
- 6. Lubricate the grease fittings and gearbox; refer to Operator's Manual.
- 7. Connect the machine to the traction unit and check the operation of the machine.

### Roller



#### Figure 136 (continued)

- 1. Washer (4 each)
- 2. Self-locking nut (4 each)
- 3. Washer (8 each)
- 4. Self-locking nut (4 each)
- 5. Bolt (4 each)
- 6. Washer (14 each)
- 7. Self-locking nut (6 each)
- 8. Bolt (6 each)

#### **Removing the Roller**

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- 9. Washer (7 each)
- 10. Self-locking nut (7 each)
- 11. Bolt
- 12. Frame
- 13. Pin for jack (4 each)
- 14. R-clip round (4 each)
- 15. Bearing (2 each)
- 16. Cover mounting bracket (4 each)

- 17. Rubber grip plate
- 18. Scraper strip
- 19. Rear roller
- 20. Plug
- 21. Bracket
- 22. Jack (2 each)
- 23. Cover mounting bracket
- 24. Grease nipple (2 each)

### CAUTION

Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.

#### CAUTION

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To prevent personal injury, make sure that the roller assembly is supported as it is removed from the machine. Roller weighs approximately 61 kg (135 lbs).

- 3. To remove the rear roller (item 19 in Figure 136):
  - A. Remove the four self-locking nuts (4), washers (3) and bolts (5) that secures the rear roller (19) and bearings (15) to the main frame.
  - B. Carefully remove the rear roller (19) and bearings (15) from the machine.
  - C. If necessary, remove the set screws that secures the bearings (15) to the roller (19).
- 4. If necessary, remove and replace the parts of the main frame using the Figure 136 as a guide.

#### Installing the Roller

- 1. If removed, install the parts of the main frame using the Figure 136 as a guide.
- 2. To install the roller (19):



To prevent personal injury, make sure that the roller assembly is supported as it is installed to the machine. Roller assembly weighs approximately 61 kg (135 lbs).

A. If removed, install the bearings (15) to the roller (19) and secure with the set screws.

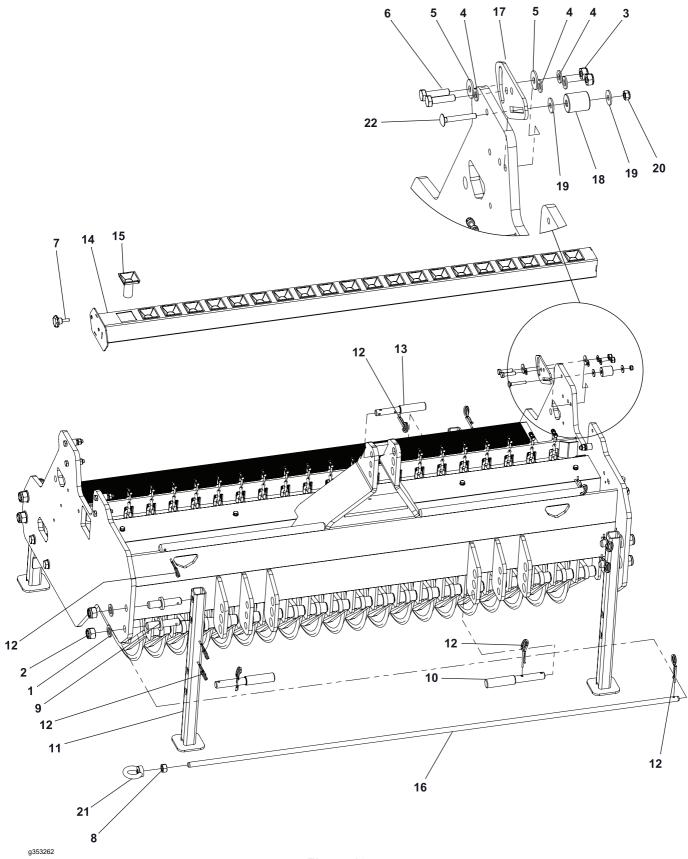
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#### Installing the Roller (continued)

- B. Position the rear roller (19) onto the machine and secure with four bolts (5), washers (3) and self-locking nuts (4).
- 3. Check that the roller is free to rotate and no binding exists.
- 4. Lubricate the grease fittings; refer to Operator's Manual.
- 5. Check the operation of the machine.

# Seed Guide





#### Figure 137 (continued)

- 1. Washer (4 each)
- 2. Self-locking nut (4 each)
- 3. Self-locking nut (2 each)
- 4. Washer (4 each)
- 5. Large washer (2 each)
- 6. Bolt (2 each)
- 7. Knurled knob

Nut

8.

- 9. Pin for jack (4 each)
- 10. 3-point pin (2 each)
- 11. Jack (2 each)
- 12. R-clip round (9 each)
- 13. Top link pin
- 14. Seed guide

- 15. Funnel (21 each)
- 16. Seed element shaft
- 17. Spanner plate
- 18. Spanner roll
- 19. Large washer (2 each)
- 20. Self-locking nut
- 21. Lifting eye nut

#### **Removing the Seed Guide**

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### CAUTION

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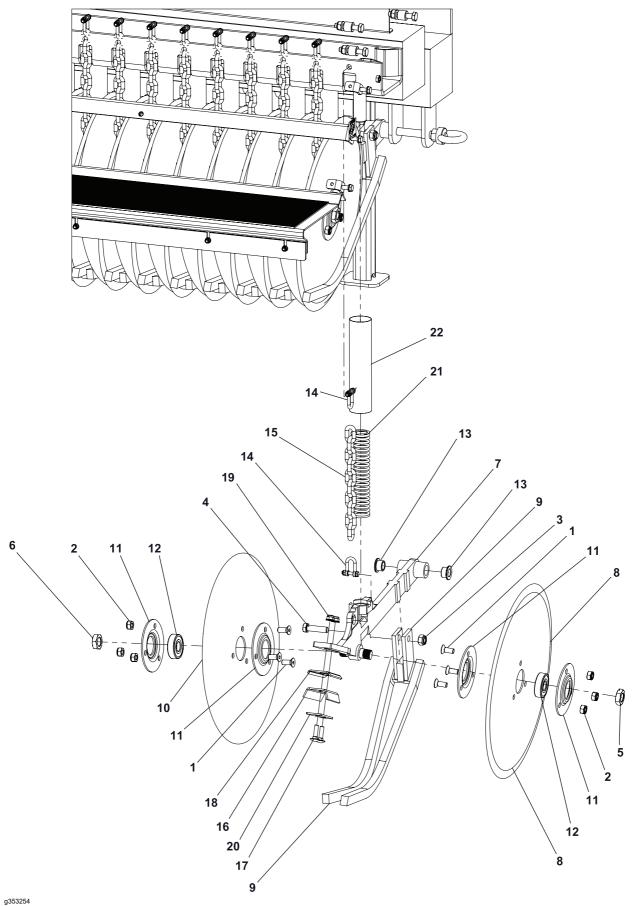
# Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the rear roller to prevent it from moving.
- 4. If necessary, remove the hopper assembly from the machine; refer to Removing the Hopper Assembly (page 12–15).
- 5. Remove the knurled knob (item 7 in Figure 137) that secures the seed guide (14).
- 6. Slide and remove the seed guide (14) from the main frame.
- 7. To remove the seed element shaft (16):
  - A. Remove the R-clip round (12) that secures the seed element shaft (16) to the main frame.
  - B. Carefully slide and remove the seed element shaft (16) from the main frame.
- 8. If necessary, remove and replace the parts of the main frame using the Figure 137 as a guide.

#### Installing the Seed Guide

- 1. If removed, install the parts of the main frame using the Figure 137 as a guide.
- 2. To install the seed element shaft (16):
  - A. Carefully slide and install the seed element shaft (16) securing the cutting disks to the main frame.
  - B. Secure the seed element shaft (16) to the main frame with R-clip round (12).
- 3. Slide and position the seed guide (14) to the main frame.
- 4. Secure the seed guide (14) to the main frame with knurled knob (7).
- 5. If removed, install the hopper assembly to the machine; refer to Installing the Hopper Assembly (page 12–16).
- 6. Lubricate the grease fittings and gearbox; refer to Operator's Manual.
- 7. Connect the machine to the traction unit and check the operation of the machine.

# **Cutting Disk**





#### Figure 138 (continued)

- 1. Bolt (126 each)
- 2. Self-locking nut (126 each)
- 3. Self-locking nut (21 each)
- 4. Bolt (21 each)
- 5. Thin nut (21 each)
- 6. Thin nut (21 each)
- 7. Seeding element (21 each)
- 8. Cutting disk (21 each)

- 9. Cutting depth guide (21 each)
- 10. Cutting disk (21 each)
- 11. Center plate (84 each)
- 12. Bearing (42 each)
- 13. Bearing bush (42 each)
- 14. D-Shackle (42 each)
- Chain seeding element (21 each)
  Rubber scraper (21 each)
- 17. Bolt (42 each)
- 18. Scraper strip (21 each)
- 19. Self lock nut (42 each)
- 20. Scraper support plate (21 each)
- 21. Spring (21 each)
- 22. Spring hose (21 each)

#### Removing the Cutting Disk

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Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

CAUTION

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the rear roller to prevent it from moving.
- 4. Remove the cover from the machine; refer to Removing the Covers (page 12–5).
- 5. Remove the self-locking nut and bolt that secures the D-shackle (item 14 in Figure 138) to the main frame.

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#### WARNING

The cutting disks are sharp; contacting a cutting disk can result in serious personal injury.

Wear gloves when removing the cutting disk.

#### 

### CAUTION

To prevent personal injury, make sure that the cutting disk assembly is supported as it is removed from the machine. Each cutting disk assembly weighs approximately 14 kg (31 lbs).

- 6. Remove the D-shackle (14) and chain (15) from the main frame.
- 7. Remove the seed element shaft that secures the cutting disk assembly to the main frame; refer to Removing the Seed Guide (page 12–21).
- 8. Carefully remove the cutting disk assembly from the machine.
- 9. If necessary, remove and replace the parts of the cutting disk assembly using the Figure 138 as a guide.

#### Installing the Cutting Disk

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1. If removed, assemble the cutting disk assembly using the Figure 138 as a guide.

WARNING

The cutting disks are sharp; contacting a cutting disk can result in serious personal injury.

Wear gloves when removing the cutting disk.

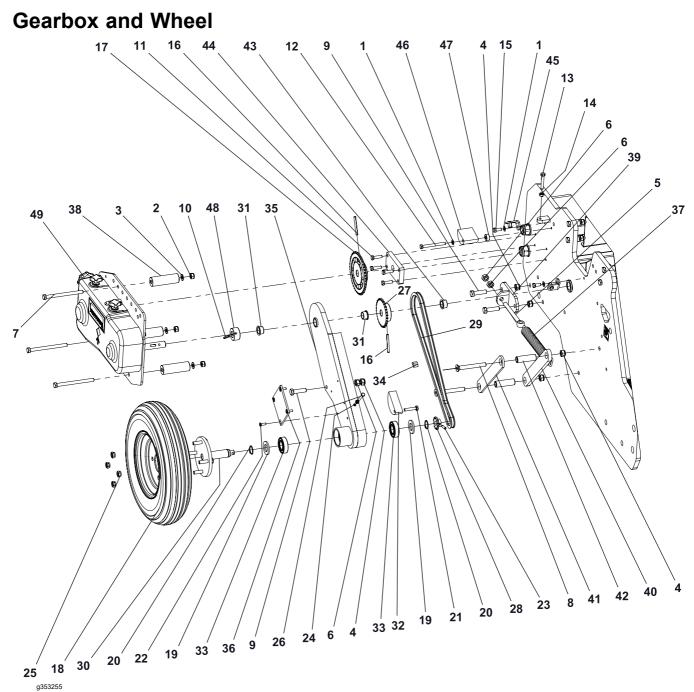
#### CAUTION

To prevent personal injury, make sure that the cutting disk assembly is supported as it is installed to the machine. Each cutting disk assembly weighs approximately 14 kg (31 lbs).

- 2. Carefully position the cutting disk assembly onto the machine.
- 3. Make sure that the bushes (13) are properly installed into the seeding element (7).
- 4. Make sure that the holes of the seeding element (7) are aligned with the main frame holes.
- 5. Carefully install the seeding element shaft that secures the cutting disk assembly to the main frame; refer to Installing the Seed Guide (page 12–21).
- 6. Install the D-shackle (14) to the main frame and secure with the bolt and self-locking nut.
- 7. Install the cover to the machine; refer to Installing the Covers (page 12–5).
- 8. Lubricate the grease fittings and gearbox; refer to Operator's Manual.
- 9. Connect the machine to the traction unit and check the operation of the machine.

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#### Figure 139 (continued)

1.	Washer (3 each)	17.	Chain wheel	33.	Bearing (2 each)
2.	Self-locking nut (3 each)	18.	Wheel complete	34.	Chain connector
3.	Washer (3 each)	19.	Washer (2 each)	35.	Frame swingarm
4.	Self-locking nut (5 each)	20.	Circlip (2 each)	36.	Guide plate swingarm
5.	Eye Bolt	21.	Bolt	37.	Spring wheelaxle
6.	Nut (2 each)	22.	Bolt (4 each)	38.	Spacer (3 each)
7.	Bolt (3 each)	23.	Roll pin	39.	Spring tensioner bracket
8.	CSK screw (2 each)	24.	Nut	40.	Swing arm guide
9.	Bolt (2 each)	25.	Wheel nut (4 each)	41.	Swing arm guide
10.	Roll pin	26.	Bolt	42.	Distance bush (2 each)
11.	Bolt (4 each)	27.	Chain wheel	43.	Bearing bush gearaxle
12.	Bolt	28.	Chain wheel	44.	Bearing plate
13.	Bolt	29.	Chain	45.	Bracket (2 each)
14.	Nut	30.	Wheel hub	46.	Chain tensioner
15.	Bolt (2 each)	31.	Bearing bush swingarm (2 each)	47.	Distance bush
16.	Roll pin (2 each)	32.	Chain tensioner	48.	Magnet bush

#### **Removing the Gearbox and Wheel**

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#### CAUTION

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# Use a suitable lifting device to safely raise and support the machine to access the components under the machine.

- 1. Position the machine on a firm, level surface with machine attached to the tow tractor. Apply tow tractor parking brake, stop engine and remove key from the key switch.
- 2. Support the machine to prevent it from moving.
- 3. Chock the rear roller to prevent it from moving.
- 4. Remove the drive chain from the machine; refer to Removing the Drive Chain (page 12–7).
- 5. Remove the adjusting nuts (item 6 in Figure 139) that secures the wheelaxle spring eye bolt (5) to the spring tensioner bracket (39).
- 6. Remove the eye bolt (5) from the spring tensioner bracket (39).
- 7. Remove the cover from the machine; refer to Removing the Covers (page 12–5).
- 8. Remove the two self-locking nuts (4) and CSK bolts (8) that secures the swing arm guides (40 and 41) to the main frame.
- 9. Remove the swing arm guides (40 and 41) and two distance bushes (42) from the main frame.
- 10. Loosen the bolt (26) and nut (24) that removes tension from the drive chain (29).
- 11. Remove the three self-locking nuts (2), washers (3), spacers (38) and bolts (7) that secures the gearbox and wheel assembly to the machine.
- 12. Remove the gearbox and wheel assembly from the machine.
- 13. Locate and remove the chain connector (34) from drive chain (29). Note the direction of chain connector clip for assembly purposes. Remove drive chain.

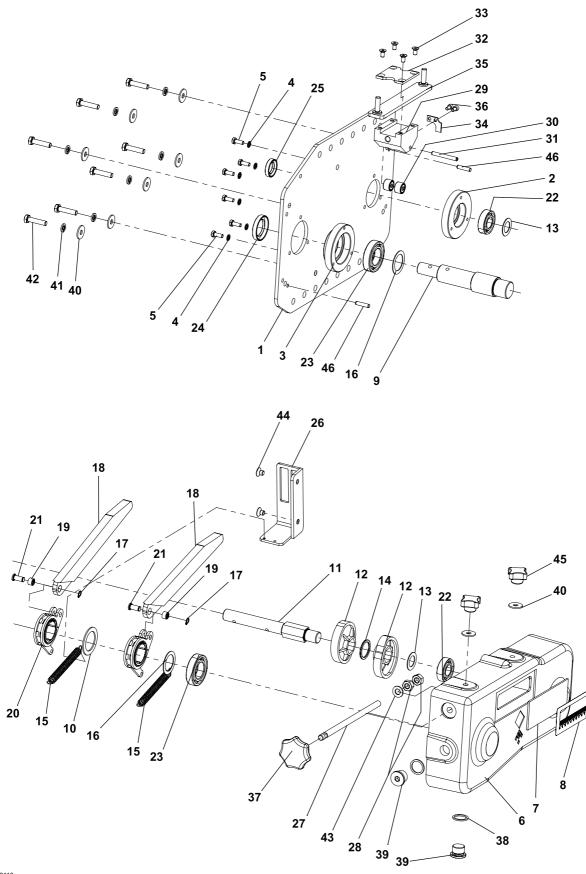
#### **Removing the Gearbox and Wheel (continued)**

- 14. If necessary, remove and replace the parts of the gearbox and wheel assembly using the Figure 139 as a guide.
- 15. If necessary, service the gearbox; refer to Servicing the Gearbox (page 12–28).

#### Installing the Gearbox and Wheel

- 1. If removed, assemble the parts of the gearbox and wheel assembly using the Figure 139 as a guide.
- Install the drive chain (29) and secure the chain ends with chain connector (34). Make sure that the closed end of the chain connector is facing the direction of the chain rotation.
- 3. Position the gearbox and wheel assembly onto the machine.
- 4. Secure the gearbox and wheel assembly to the machine using the three bolts (7), spacers (38), washers (3) and self-locking nuts (2).
- 5. Install the swing arm guides (40 and 41) and two distance bushes (42) to the main frame and secure with two CSK bolts (8) and self-locking nuts (4).
- 6. Install the cover to machine; refer to Installing the Covers (page 12-5).
- 7. Install the eye bolt (5) into the spring tensioner bracket (39) and secure with the two nuts (6). Adjust the wheel axle spring tension by tightening the nuts (6).
- 8. Install the drive chain to the machine; refer to Installing the Drive Chain (page 12–8).
- 9. Adjust the tension of the chain (29) by tightening the bolt (26) and nut (24). A properly adjusted chain should allow for free rotation of drive components.
- 10. Lubricate the grease fittings and gearbox; refer to Operator's Manual.
- 11. Connect the machine to the traction unit and check the operation of the machine.

# Servicing the Gearbox



g352110

Figure 140

#### Figure 140 (continued)

1.	Lid plate	17.	Circlip (2 each)	33.	Bolt (4 each)
2.	Bearing hub	18.	Rocker strip (2 each)	34.	Indicator
3.	Bearing hub	19.	Bearing (2 each)	35.	Slider bracket
4.	Bonded seal ring (6 each)	20.	Rocker arm assembly (2 each)	36.	Socket head screv
5.	Bolt (6 each)	21.	Pin (2 each)	37.	Knob with set scre
6.	Casted gearbox housing	22.	Bearing (2 each)	38.	Copper washer (2
7.	Window	23.	Bearing (2 each)	39.	Blind plug (2 each
8.	Gauge decal	24.	Oil seal	40.	Large washer (9 e
9.	Shaft	25.	Oil seal	41.	Spring washer (7
10.	Washer	26.	Guide	42.	Bolt (7 each)
11.	Shaft	27.	Threaded rod	43.	Washer
12.	Excenter (2 each)	28.	Nut (2 each)	44.	Bolt (2 each)
13.	Shim (2 each)	29.	Slider block	45.	Closed knob (2 ea
14.	Spacer	30.	Roller bearing (2 each)	46.	Parallel pin (2 eac
15.	Spring (2 each)	31.	Roll pin		
16.	Shim (2 each)	32.	Lock plate		

- ew (2 each)
- rew
- 2 each)
- :h)
- each)
- each)
- each)
- ach)

### **Disassembling the Gearbox**

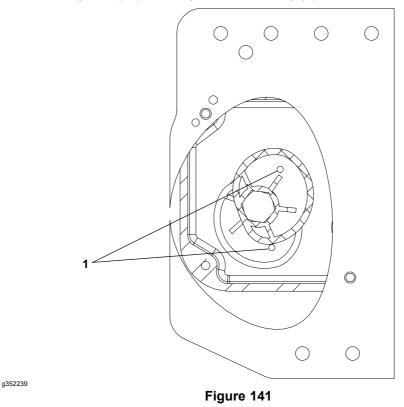
- 1. Remove the two blind plugs (item 39 in Figure 140) and copper washers (38) from the gearbox.
- Drain the gearbox oil from the gearbox.
- 3. Remove the seven bolts (42), spring washers (41) and washers (40) that secures the lid plate (1) to the gearbox housing (6).
- 4. Remove the six bolts (5) and seal rings (4) that secures the bearing hubs (2 and 3) to the lid plate (1).
- 5. Remove the lid plate (1) from the gearbox housing (6).
- 6. Remove and discard the oil seals (24 and 25) from the bearing hubs (3 and 2).
- 7. Carefully slide and remove the bearing hub (2), bearing (22) and shim (13) from the shaft (11).
- 8. Carefully slide and remove the bearing hub (3), bearing (23) and shim (16) from the shaft (9).
- 9. Remove the springs (15) from the guide (26) and rocker arms (20).
- 10. Use a marker to make a diagonal line across the excenters (12), shaft (11) and gearbox housing (6) for assembly purpose.
- 11. Remove the shaft (11), excenters (12), spacer (14) and shim (13) as an assembly from the gearbox housing (6).
- 12. Remove the two bolts (44) that secures the guide (26) to the gearbox housing (6).
- 13. Remove the shaft (9), guide (26), rocker strips (18), rocker arms (20), washer (10) and shim (16) as an assembly from the gearbox housing (6).
- 14. If necessary, remove and replace parts of the slider block (29) from the gearbox housing (6) using the Figure 140 as a guide.

### Assembling the Gearbox

- 1. Thoroughly clean and inspect all gearbox components. Replace all worn or damaged parts using the Figure 140 as a guide.
- 2. If removed, install the parts of the slider block (29) to the gearbox housing (6) using the Figure 140 as a guide.

#### Assembling the Gearbox (continued)

- 3. Install the shaft (9), guide (26), rocker strips (18), rocker arms (20), washer (10) and shim (16) as an assembly to the gearbox housing (6).
- 4. Secure the guide (26) to the gearbox housing (6) with the two bolts (44).



1. Marks on the excenters

A

### CAUTION

Make sure that the excenters are positioned correct:

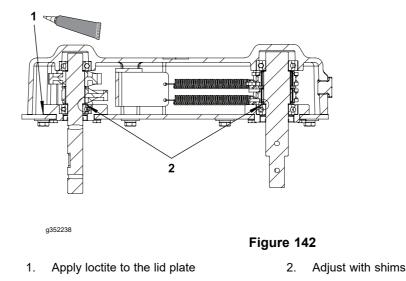
- The marks on the excenters are facing to the lid plate.
- The marks on the excenters must be 180° shifted to each other.
- The improper installation of the excenters causes the shocked rotation at the output shaft.



- 5. Make sure that the excenters (12) are correctly positioned on the shaft (11) using the marks made during the disassembly; refer to Figure 141.
- 6. Install the shaft (11), excenters (12), spacer (14) and shim (13) as an assembly to the gearbox housing (6).
- 7. Install the springs (15) to the guide (26) and rocker arms (20).

A

#### Assembling the Gearbox (continued)



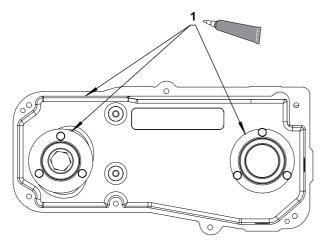
8. Carefully position the shim (16), bearing (23) and bearing hub (3) to the shaft (9).

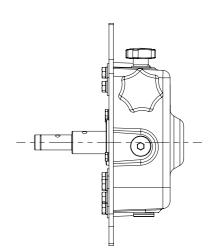


9. Carefully position the shim (13), bearing (22) and bearing hub (2) to the shaft (11).

**Note:** Adjust the shims (13 and 16) to maintain the free play of the shafts (9 and 11) is **0 to 0.5 mm (0 to 0.02 in)**; refer to Figure 142.

10. Install the new oil seals (24 and 25) from the bearing hubs (3 and 2).





g352237

Figure 143

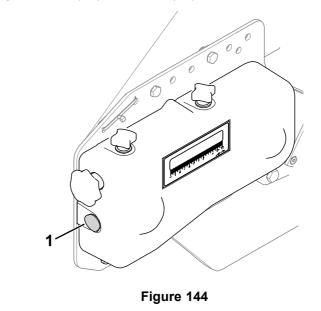
1. Apply loctite



- 11. Apply **loctite #5970 (or equivalent)** on the gearbox housing (6) and bearing hubs (2 and 3); refer to Figure 143. Make sure that the loctite is applied around the threaded holes of the bearing hubs (2 and 3).
- 12. Make sure to clean the edges of the excess loctite; refer to Figure 142 and Figure 143.
- 13. Install the lid plate (1) onto the gearbox housing (6).

#### Assembling the Gearbox (continued)

- 14. Secure the bearing hubs (2 and 3) to the lid plate (1) with the six seal rings (4) and bolts (5).
- 15. Secure the lid plate (1) to the gearbox housing (6) with the seven washers (40), spring washers (41) and bolts (42).



1. Filling plug

g348974

16. Install the two copper washers (38) and blind plugs (39) to the gearbox.



- 17. Fill the gearbox with **1.4 L (0.37 gal) of 80W90** oil till the level of the filling plug; refer to Figure 144.
- 18. Check the gearbox for any oil leaks before returning it to service.

# Chapter 13

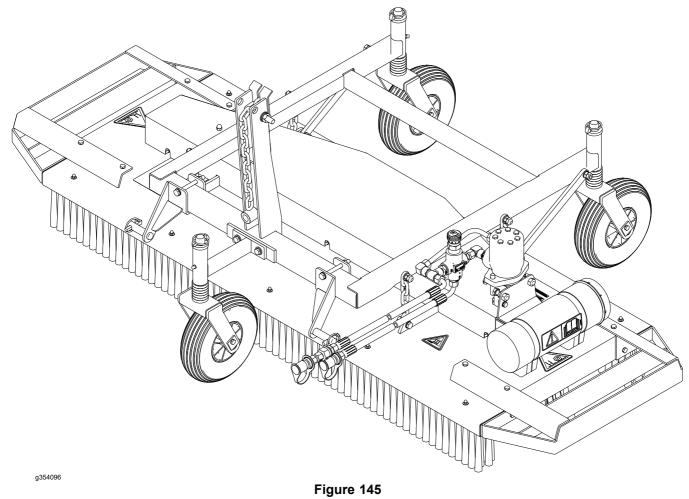
# FieldFill 660 (Model No. 46423)

# **Table of Contents**

General Information	
Technical Data	
Service and Repairs	
Frame Assembly	
Covers	13–6
Drive Chain	13–8
Hydraulic Motor	

# **General Information**

The operators manual provides information regarding the operation, general maintenance, and maintenance intervals for your FieldFill 660 (Model No. 46423). Refer to the *Operator's Manual* for additional information when servicing the machine.



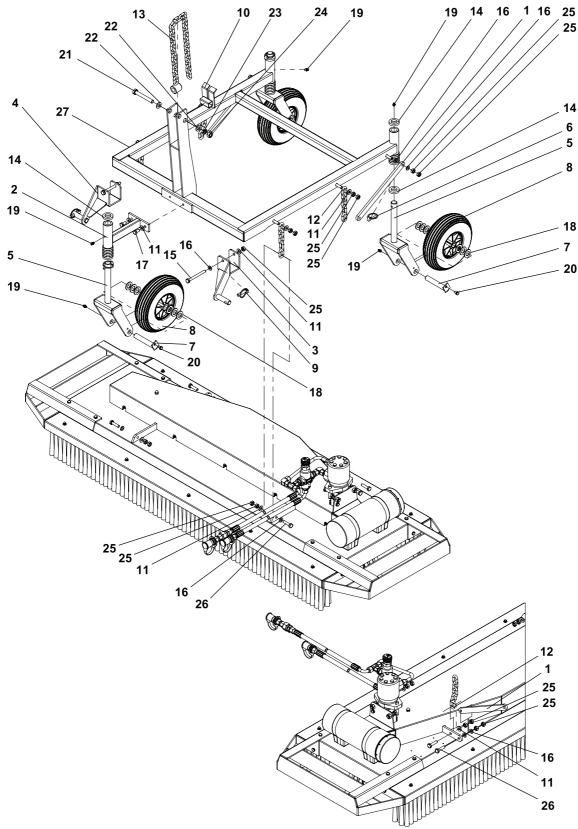
# **Technical Data**

#### FieldFill 660

Item	Description
Working width	1.67 meter (66 in)
Working speed	Maximum 8 km/h (5 mph)
Weight	170 kg (375 lbs)
Recommended tractor HP	10 HP
Three-point connection	Cat. 1
Minimum lift capacity of the tractor	200 kg (441 lbs)
Minimum hydraulic pressure	70 bar (1015 psi)

# **Service and Repairs**

# Frame Assembly



g354097

Figure 146

#### Figure 146 (continued)

1. Pull rod (2 each) 10. Chain suspension 19. Grease nipple (6 each) 2. Holder for wheel fork 11. Lock washer (12 each) 20. Bolt (3 each) 3. Bracket for brush - Right 12. Chain link (2 each) 21. Bolt 4. Bracket for brush - Left 13. Chain for top link 22. Washer (2 each) Spacer disk (24 each) Spring washer 5. Wheel fork (3 each) 14. 23. 6. Locking pin (3 each) 15. Bolt (2 each) 24. Nut 7. Wheel bolt (3 each) 16. Washer (12 each) 25. Nut (26 each) 8. Wheel (3 each) 17. Bolt (2 each) 26. Bolt (6 each) Washer (18 each) Frame 9. Locking pin (2 each) 18. 27.

#### **Removing the Frame Assembly**

- 1. Position the machine on a firm, level surface and remove the attachment from the traction unit; refer to *Operator's Manual*.
- 2. Place the blocks under the brush deck to support it.

#### IMPORTANT

#### Do not place the blocks under the brushes.

- 3. Remove the eight nuts (item 25 in Figure 146), lock washers (11), washers (16) and bolts (26) that secures the chain links (12) to the brush assembly.
- 4. Remove the four nuts (25), lock washers (11), washers (16) and bolts (26) that secures the pull rods (1) to the brush assembly.
- 5. Carefully remove the frame assembly from the brush assembly.
- 6. If necessary, remove and replace the parts of the frame assembly using the Figure 146 as a guide.

#### Installing the Frame Assembly

- 1. If removed, install the parts of the frame assembly using the Figure 146 as a guide.
- 2. Carefully position the frame assembly to the brush assembly.
- 3. Secure the pull rods (1) to the brush assembly with two bolts (26), washers (16), lock washers (11) and nuts (25).
- 4. Secure the chain links (12) to the brush assembly with four bolts (26), washers (16), lock washers (11) and nuts (25).
- 5. Lubricate the grease fittings; refer to Operator's Manual.
- 6. Connect the machine to the traction unit and check the operation of the machine.

### Covers

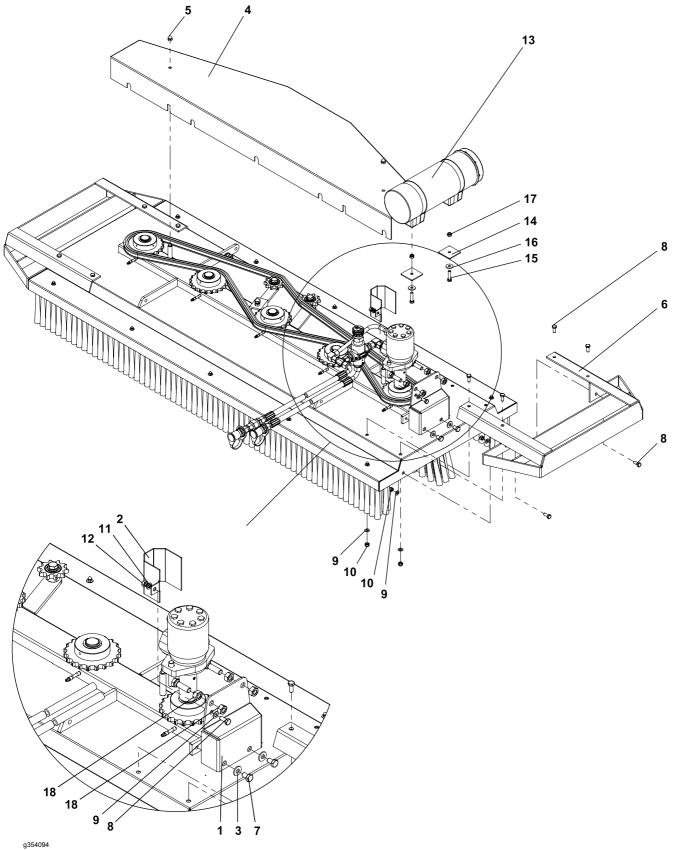


Figure 147

#### Figure 147 (continued)

- 1. Torque support bracket
- 2. Shaft cover
- 3. Lock washer (2 each)
- 4. Brush cover
- 5. Acorn nut (2 each)
- 6. Protection bar (2 each)

**Removing the Covers** 

- 7. Bolt (2 each)
- 8. Bolt (13 each)
- 9. Washer (13 each)
- 10. Self-locking nut (12 each)
  - Spring washer
- 12. Nut

11.

- 13. Toolbox complete
- 14. Toolbox contraplate (2 each)
- 15. Bolt (2 each)
- 16. Large washer (2 each)
- 17. Self-locking nut (2 each)
- 18. Nut (4 each)
- 1. Position the machine on a firm, level surface and remove the attachment from the traction unit; refer to *Operator's Manual*.
- 2. Place the blocks under the brush deck to support it.

#### IMPORTANT

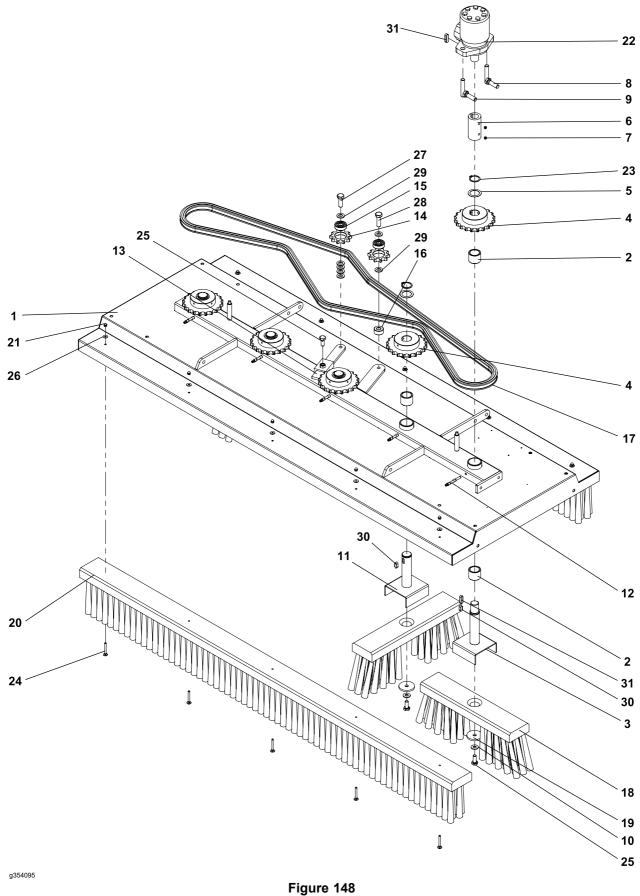
#### Do not place the blocks under the brushes.

- 3. Remove the frame assembly from the brush assembly; refer to Removing the Frame Assembly (page 13–5).
- 4. Remove the two nuts (item 5 in Figure 147) that secures the brush cover (4) to the brush assembly.
- 5. Remove the brush cover (4) from the brush assembly.
- 6. If necessary, remove the nut (12), spring washer (11), washer (9) and bolt (8) that secures the shaft cover (2) to the brush assembly.
- 7. If necessary, remove and replace the parts of the brush assembly using the Figure 147 as a guide.

#### Installing the Covers

- 1. If removed, install the parts of the brush assembly using the Figure 147 as a guide.
- 2. If removed, install the shaft cover (2) to the brush assembly and secure with the bolt (8), washer (9), spring washer (11) and nut (12).
- 3. Install the brush cover (4) to the brush assembly and secure with two nuts (5).
- 4. Install the frame assembly to the brush assembly; refer to Installing the Frame Assembly (page 13–5).
- 5. Lubricate the grease fittings; refer to Operator's Manual.
- 6. Connect the machine to the traction unit and check the operation of the machine.

# **Drive Chain**



#### Figure 148 (continued)

1. Main frame brush

Bearing bush (10 each)

Sprocket (5 each)

Washer (5 each)

Brush holder for hydraulic motor

2.

3.

4.

5.

6.

- 12. Grease nipple (10 each)
- 13. Holder
- 14. Chain tensioner wheel (2 each)
- Bearing (2 each)
- 17. Drive chain
- 18. Brush center (5 each)
- 19. Disc (5 each)
- 20. Brush front/rear (2 each)
- 21. Acorn nut (10 each)
- 22. Hydraulic motor

- 23. Circlip (5 each)
- 24. Carriage bolt (10 each)
- 25. Bolt (6 each)
- 26. Large washer (10 each)
- 27. Bolt
- 28. Bolt
- 29. Washer (7 each)
- 30. Key (5 each)
- 31. Key (2 each)

#### Removing the Drive Chain

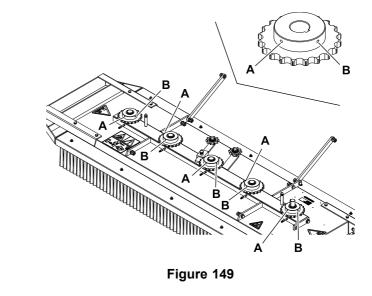
- 1. Position the machine on a firm, level surface and remove the attachment from the traction unit; refer to Operator's Manual.
- 2. Place the blocks under the brush deck to support it.

### IMPORTANT

#### Do not place the blocks under the brushes.

- 3. Remove the frame assembly from the brush assembly; refer to Removing the Frame Assembly (page 13–5).
- 4. Remove the covers from the brush assembly; refer to Removing the Covers (page 13–7).
- 5. Remove the tension on the drive chain (item 17 in Figure 148) by loosening the bolt (25) and moving the chain tensioner wheel (14).
- 6. Locate and remove the chain connector from drive chain (17). Note the direction of chain connector clip for assembly purposes. Remove the drive chain from the brush assembly.

#### Installing the Drive Chain



g370933

- 15. Spacer 16.
- 7. Grub screw (2 each)

Bushing

- 8. Torque bolt - Left 9. Torque bolt - Right
- 10. Lock washer (2 each)
- Brush holder (4 each) 11.

### Installing the Drive Chain (continued)

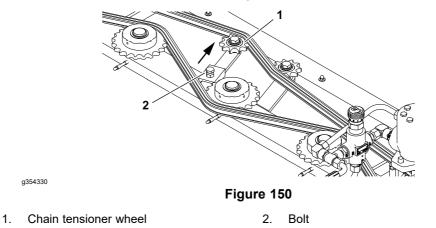
1. Before installing the drive chain (17) onto the sprockets (4), make sure that the sprockets are positioned as per Figure 149.



The improper installation of drive chain onto the sprockets (4) may result serious damage to the machine.

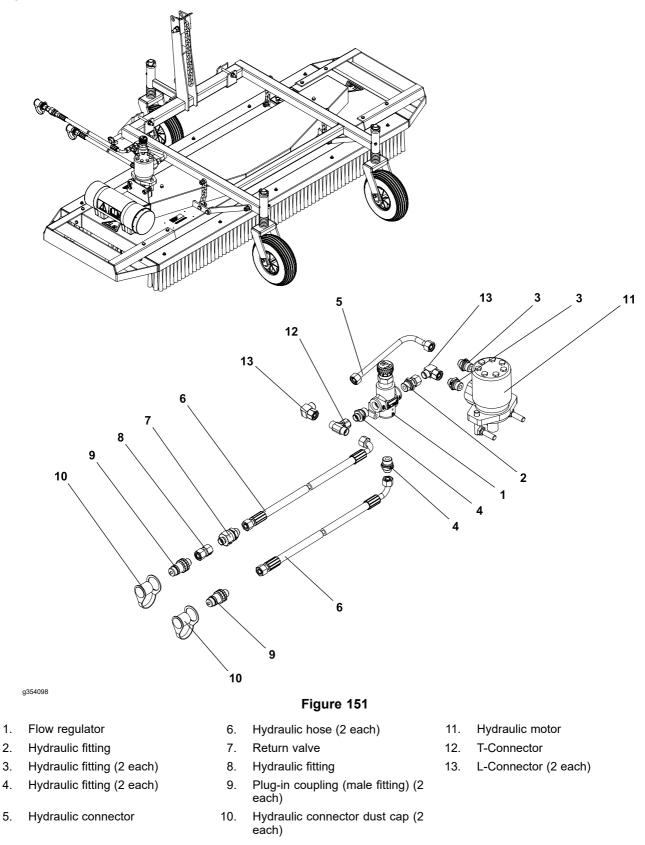
**Note:** Two timing holes are located on the sprockets, each sprocket should be rotated 90° with each other; refer to Figure 149.

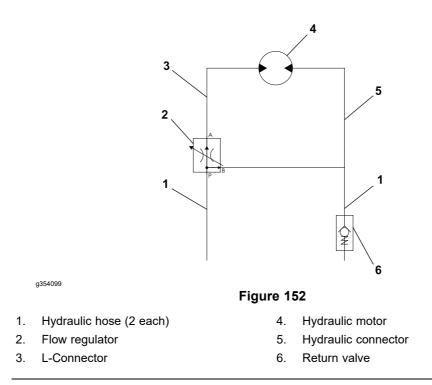
- 2. Position the drive chain (17) on to the brush assembly using the Figure 148 as a guide.
- 3. Secure the drive chain ends with chain connector. Make sure that the closed end of the chain connector is facing the direction of the chain rotation.



- 4. Adjust the tension of the drive chain (17) by pushing the chain tensioner wheel (item 1 in Figure 150) in the direction of the arrow until the drive chain is tightly tensioned.
- 5. Tightening the bolt (2). A properly adjusted chain should allow for free rotation of drive components.
- Install the covers to the brush assembly; refer to Installing the Covers (page 13–7).
- 7. Install the frame assembly to the brush assembly; refer to Installing the Frame Assembly (page 13–5).
- 8. Lubricate the grease fittings; refer to Operator's Manual.
- 9. Connect the machine to the traction unit and check the operation of the machine.

### **Hydraulic Motor**





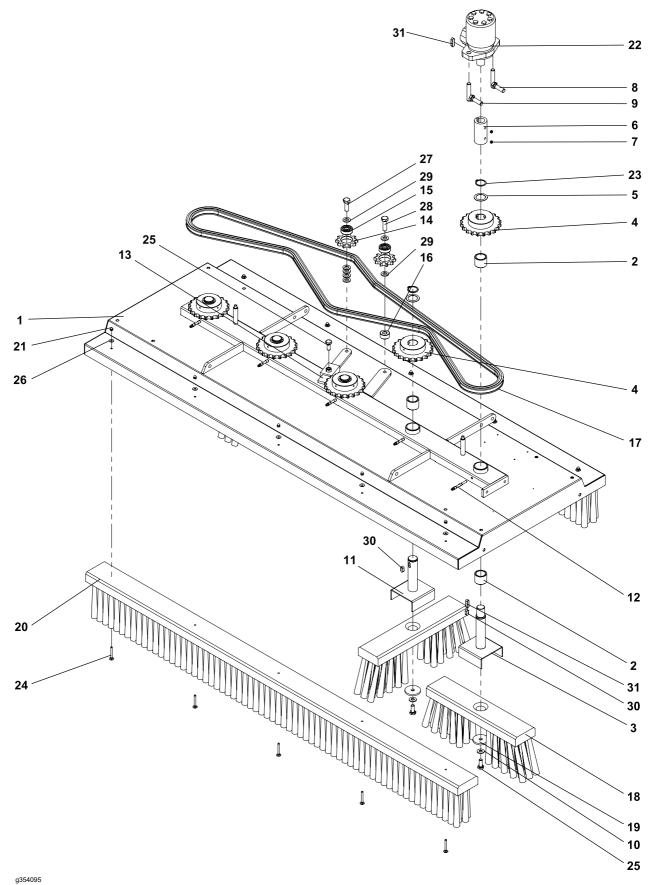
#### **Removing the Hydraulic Motor**

- 1. Position the machine on a firm, level surface and remove the attachment from the traction unit; refer to *Operator's Manual*.
- 2. Place the blocks under the brush deck to support it.

### IMPORTANT

#### Do not place the blocks under the brushes.

- 3. Remove the frame assembly from the brush assembly; refer to Removing the Frame Assembly (page 13–5).
- Remove the covers from the brush assembly; refer to Removing the Covers (page 13–7).
- 5. Remove the drive chain from the brush assembly; refer to Removing the Drive Chain (page 13–9).
- 6. To prevent contamination of hydraulic system during removal, thoroughly clean the exterior hydraulic fittings.
- 7. Read the General Precautions for Removing and Installing Hydraulic System Components (page 2–18).
- 8. Disconnect the hydraulic hoses from the hydraulic motor and put caps or plugs on open hydraulic lines and fittings. Label disconnected hydraulic lines for proper assembly; refer to Figure 151 and Figure 152.





#### **Removing the Hydraulic Motor (continued)** Figure 153 (continued)

#### Main frame brush 1.

- 2. Bearing bush (10 each)
- 3. Brush holder for hydraulic motor
- Sprocket (5 each) 4.
- Washer (5 each) 5.
- Bushing 6.
- 7. Grub screw (2 each)
- 8. Torque bolt - Left
- 9. Torque bolt - Right
- Lock washer (2 each) 10.
- Brush holder (4 each) 11.

#### Grease nipple (10 each) 12.

- 13. Holder
- 14. Chain tensioner wheel (2 each)
- Bearing (2 each) 15.
- Drive chain
- 18. Brush center (5 each)
- 19. Disc (5 each)
- 20. Brush front/rear (2 each)
- 21. Acorn nut (10 each)
- 22. Hydraulic motor

- 23. Circlip (5 each)
- 24. Carriage bolt (10 each)
- 25. Bolt (6 each)
- Large washer (10 each) 26.
- 27. Bolt
- 28. Bolt
- 29. Washer (7 each)
- 30. Key (5 each)
- 31. Key (2 each)
- 9. Remove the grub screw (item 7 in Figure 153) that secures the bushing (6) to the hydraulic motor shaft (22).
- 10. Carefully lift and remove the hydraulic motor (22) from the brush assembly. Locate and retrieve the key (31).
- 11. If necessary, remove the fittings and O-rings from the hydraulic motors; refer to Figure 151.
- 12. Discard the O-rings.
- 13. If necessary, remove and replace the parts of the brush assembly using the Figure 153 as a guide.

### Installing the Hydraulic Motor

- 1. If removed, install the parts of the brush assembly using the Figure 153 as a guide.
- 2. If removed, install the hydraulic fittings with new O-rings into the hydraulic motor ports; refer to Installing the Hydraulic Fittings (SAE Straight Thread O-Ring Fittings) (page 2–15).
- 3. Position the key (31) onto the hydraulic motor shaft (22). Install the hydraulic motor (22) onto the toque bolts (8 and 9) and secure the hydraulic motor shaft to the bushing (6) with the grub screw (7).
- 4. Remove the caps and plugs from the hydraulic hoses and fittings that are installed during removal procedure.
- 5. Install the hydraulic hoses using marks made during the removal process to properly orientate the parts. Refer to Installing Hydraulic Hoses and Tubes (O-Ring Face Seal) (page 2–13), Figure 151 and Figure 152.
- 6. Install the drive chain to the brush assembly; refer to Installing the Drive Chain (page 13-9).
- 7. Install the covers to the brush assembly; refer to Installing the Covers (page 13-7).
- 8. Install the frame assembly to the brush assembly; refer to Installing the Frame Assembly (page 13–5).
- 9. Lubricate the grease fittings; refer to Operator's Manual.
- 10. Connect the machine to the traction unit and check the operation of the machine.

- 16. Spacer
- 17.

### Chapter 14

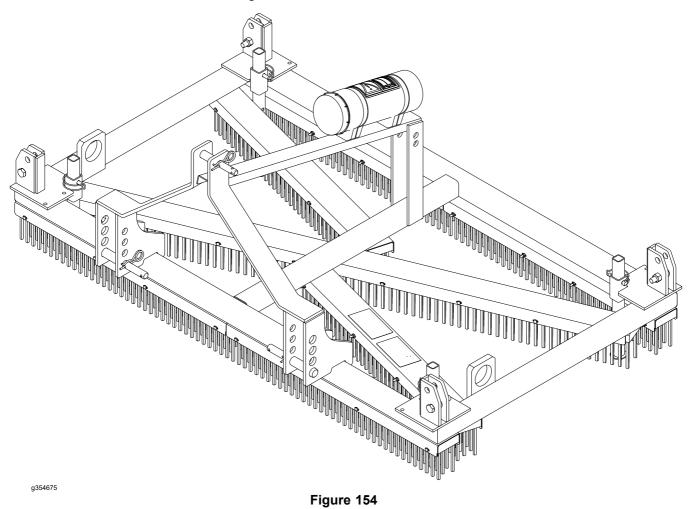
# QuickGroom 710 (Model No. 46405AA & 46405BA)

### **Table of Contents**

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Service and Repairs	
Brushes	

### **General Information**

The operators manual provides information regarding the operation, general maintenance, and maintenance intervals for your QuickGroom 710 (Model No. 46405AA & 46405BA). Refer to the *Operator's Manual* for additional information when servicing the machine.



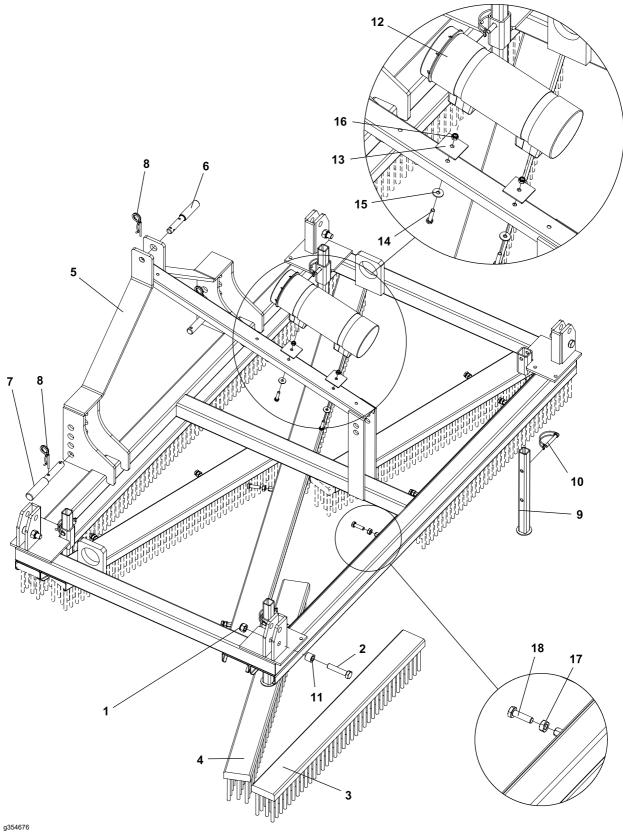
### **Technical Data**

#### QuickGroom 710

Item	Description
Working width	1.8 meter (71 in)
Working speed	Maximum 12 km/h (7.5 mph)
Weight	150 kg (331 lbs)
Recommended tractor HP	30 HP
Three-point connection	Cat. 1 or 2
Minimum lift capacity of the tractor	500 kg (1,103 lbs)

# **Service and Repairs**







#### Figure 155 (continued)

- 1. Self-locking nut (4 each)
- 2. Bolt (4 each)
- 3. Brush (4 each)
- 4. Brush (4 each)
- 5. Frame
- 6. Top link pin

- 7. 3-Point pin (2 each)
- 8. R-clip round (3 each)
- 9. Jack (4 each)
- 10. Pipe linch pin (4 each)
- 11. Distance bush (4 each)
- 12. Toolbox complete

- 13. Toolbox contraplate (2 each)
- 14. Bolt (2 each)
- 15. Large washer (2 each)
- 16. Self-locking nut (2 each)
- 17. Nut (16 each)
- 18. Bolt (16 each)

### **Removing the Brushes**

- 1. Position the machine on a firm, level surface and remove the attachment from the traction unit; refer to *Operator's Manual*.
- 2. Remove the eight bolts (item 18 in Figure 155) and nuts (17) that secures the brushes (3) to the frame (5).
- 3. Carefully remove the brushes (3) from the frame (5).
- 4. Remove the eight bolts (18) and nuts (17) that secures the brushes (4) to the frame (5).
- 5. Carefully remove the brushes (4) from the frame (5).
- 6. If necessary, remove and replace the parts of the frame using the Figure 155 as a guide.

### Installing the Brushes

- 1. If removed, install the parts of the frame using the Figure 155 as a guide.
- 2. Position the brushes (4) to the frame (5) and secure with eight nuts (17) and bolts (18).
- 3. Position the brushes (3) to the frame (5) and secure with eight nuts (17) and bolts (18).
- 4. Connect the machine to the traction unit and check the operation of the machine.

### Chapter 15

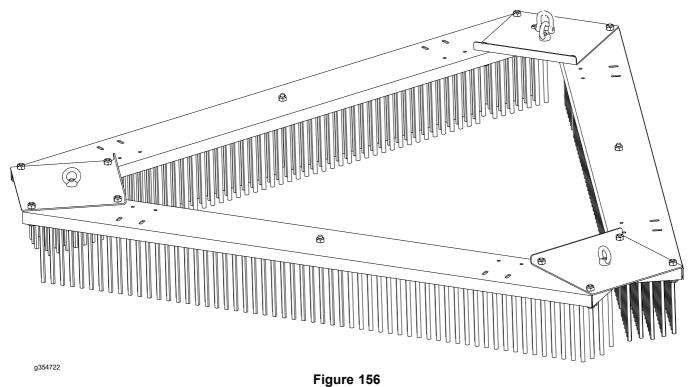
# QuickGroom 700 (Model No. 46402AA & 46402BA)

### **Table of Contents**

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### **General Information**

The installation instructions provides information regarding the operation and safety for your QuickGroom 700 (Model No. 46402AA & 46402BA). Refer to the *Installation Instructions* for additional information when servicing the machine.

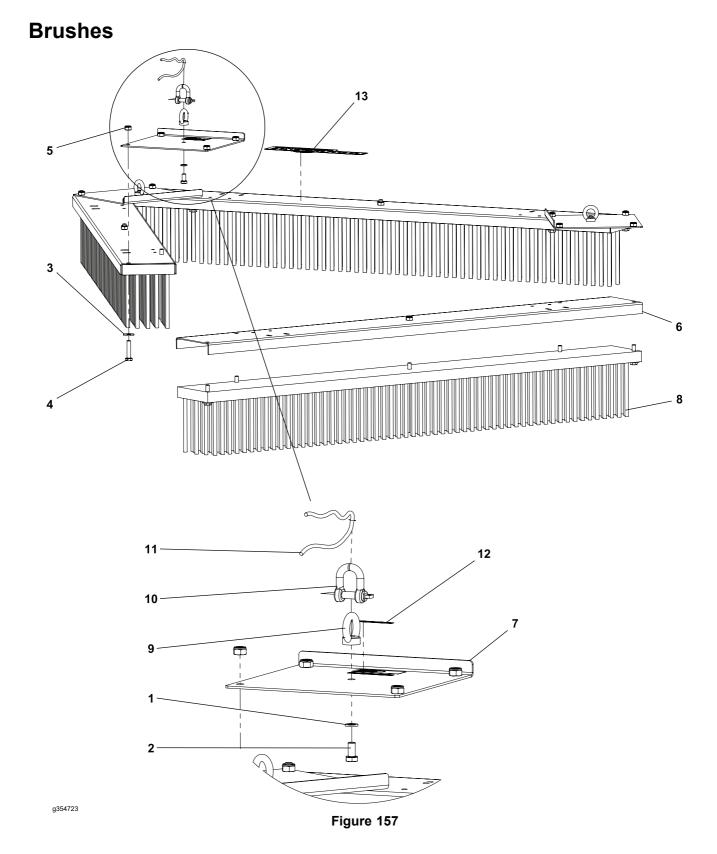


### **Technical Data**

### QuickGroom 700

Item	Description
Working width	1.85 meter (72.83 in)
Weight	50 kg (110 lbs)
Recommended tractor HP	10 HP

## **Service and Repairs**



#### Figure 157 (continued)

- 1. Spring washer (3 each)
- Bolt (3 each) 2.
- Large washer (15 each) 3.
- 4. Bolt (15 each)
- Self-locking nut (15 each) 5.

### **Removing the Brushes**

- 6. Plate (3 each)
- 7. Plate (3 each)
- 8. Brush (3 each)
- 9. Eye nut (3 each)

- 11. Nylon rope
- 12. Decal (2 each)
- 13. Decal

- 10. D-shackle
- 1. Position the groomer on a firm, level surface and remove the attachment from the traction unit.
- 2. Remove the 12 self-locking nuts (item 5 in Figure 157), washers (3) and bolts (4) that secures the three plates (7) to the brushes.
- 3. If necessary, remove the bolt (2) and spring washer (1) that secures the eye nut (9) to the plate (7).
- 4. Remove the self-locking nut (5), washer (3) and bolt (4) that secures the brush (8) to the plate (6). Remove the brush (8) from the plate (6).

### Installing the Brushes

- 1. Install the brush (8) to the plate (6) and secure with the bolt (4), washer (3) and self-locking nut (5).
- 2. If removed, install the eye nut (9) to the plate (7) and secure with the bolt (2) and spring washer (1).
- 3. Install the three plates (7) to the three brushes (8) and secure with 12 bolt (4), washer (3) and self-locking nut (5).
- 4. Connect the groomer to the traction unit and check the operation of the machine.

### Chapter 16

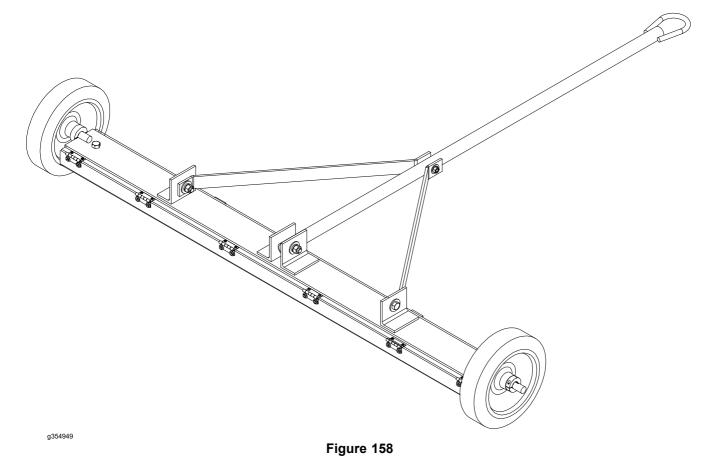
# FieldMagnet 600 (Model No. 46411)

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### **General Information**

The installation instructions provides information regarding the operation and safety for your FieldMagnet 600 (Model No. 46411). Refer to the *Installation Instructions* for additional information when servicing the machine.



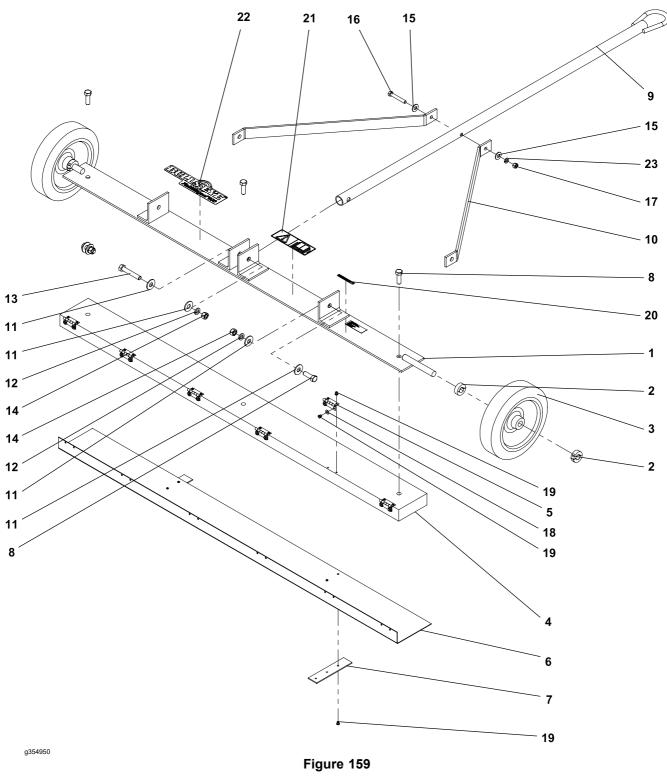
### **Technical Data**

#### FieldMagnet 600

ltem	Description
Working width	1.52 meter (60 in)
Weight	50.3 kg (111 lbs)
Working speed	Maximum 12 km/h (7.5 mph)

## **Service and Repairs**





#### Figure 159 (continued)

1. Frame 9. Tow bar 17. Nut Collar (4 each) 10. Tow bar supports (2 each) 18. Washer (12 each) 2. Tire (2 each) Washer (6 each) Blind rivet (30 each) 3. 11. 19. Magnet 20. Decal 4. 12. Spring washer (3 each) 21. Decal Hinge (6 each) 13. Bolt 5. Release tray Nut (3 each) 22. Decal 6. 14. 7. Plate for release tray (2 each) Washer (2 each) 23. Spring washer 15. Bolt (5 each) 16. Bolt 8.

### Removing the Magnet

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### WARNING

Magnetic field can disturb the pacemaker or other similar implanted devices operation and result in serious injury or death.

Keep tools and other metal objects away. The magnet is strong enough to pull them out of your hands.

To avoid damage, keep magnetic media such as computer disks, credit cards and tapes away. Stay clear.

- 1. Position the fieldmagnet on a firm, level surface and remove the attachment from the traction unit.
- 2. Loosen the set screws of the collars (item 2 in Figure 159) that secures the collars (2) to the frame (1).
- 3. Slide and remove the two tires (3) and four collars (2) from the frame (1).
- 4. Remove the two nuts (14), spring washers (12), washers (11) and bolts (8) that secures the tow bar supports (10) to the frame (1).
- 5. Remove the nut (14), spring washer (12), washers (11) and bolt (13) that secures the tow bar (9) to the frame (1).
- 6. Remove the two bar (9) from the frame (1).
- 7. If necessary, remove the nut (17), spring washer (23), washers (15) and bolt (16) that secures the tow bar supports (10) to the tow bar (9). Remove the tow bar supports (10) from the tow bar (9).

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### CAUTION

To prevent personal injury, make sure that the magnet is supported as it is removed from the frame. Magnet weighs approximately 30 kg (66 lbs).

- 8. Remove the three bolts (8) that secures the magnet (4) to the frame (1).
- 9. Remove the magnet (4) from the frame (1).
- 10. If necessary, remove the release tray (6) from the magnet (4) using the Figure 159 as a guide.

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### **Installing the Magnet**

1. If removed, install the release tray (6) to the magnet (4) using the Figure 159 as a guide.

CAUTION

To prevent personal injury, make sure that the magnet is supported as it is installed to the frame. Magnet weighs approximately 30 kg (66 lbs).

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2. Install the magnet (4) to the frame (1) and secures with three bolts (8).



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- 3. Torque tighten the bolts (8) from **91 to 113 N·m (67 to 83 ft-lb)**.
- 4. If removed, install the tow bar supports (10) to the tow bar (9) and secure with bolt (16), washers (15), spring washer (23) and nut (17).



- 5. Torque tighten the bolt (16) from **37 to 45 N·m (27 to 33 ft-lb)**.
- 6. Loosely install the tow bar (9) to the frame (1) with the bolt (13), washers (11), spring washer (12) and nut (14).
- 7. Loosely install the tow bar supports (10) to the frame (1) with two bolts (8), washers (11), spring washer (12) and nut (14).
- 8. Slide and install the two tires (3) and four collars (2) to the frame (1) and secure the collars (2) by tightening the set screws.
- 9. Secure the loop of the tow bar to a draw bar of a traction unit.
- 10. Adjust the height of the tow bar as needed so that the bottom of the magnet is parallel with the ground.

