Form No. 3365-151 Rev A

TORO®

Count on it.

Operator's Manual

Rotary Broom

Groundsmaster® 4000-D and 4100-D

Model No. 30426—Serial No. 310000001 and Up

CE

To register your product or download an *Operator's Manual* or *Parts Catalog* at no charge, go to www.Toro.com.

Original Instructions (EN)

Introduction

This product complies with all relevant European directives, for details please see the separate product specific Declaration of Conformity (DOC) sheet.

This rotary broom is mounted to a ride-on machine and is intended to be used by professional, hired operators in commercial applications. It is primarily designed for sweeping large areas in a single pass.

Read this information carefully to learn how to operate and maintain your product properly and to avoid injury and product damage. You are responsible for operating the product properly and safely.

You may contact Toro directly at www.Toro.com for product and accessory information, help finding a dealer, or to register your product.

Whenever you need service, genuine Toro parts, or additional information, contact an Authorized Service Dealer or Toro Customer Service and have the model and serial numbers of your product ready. Write the numbers in the space provided.

Model No. _____

Serial No. _____

This manual identifies potential hazards and has safety messages identified by the safety alert symbol (Figure 1), which signals a hazard that may cause serious injury or death if you do not follow the recommended precautions.

Figure 1

1. Safety alert symbol

This manual uses 2 other words to highlight information. **Important** calls attention to special mechanical information and **Note** emphasizes general information worthy of special attention.

Contents

8111 Lyndale Avenue South
Bloomington, MN 55420

Safety

Hazard control and accident prevention are 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 for injury or death, comply with the following safety instructions.

Before Operating

- Read and understand the contents of this Operator's Manual before operating the machine. Become familiar with all of the controls and know how to stop quickly.
- Never allow children to operate the machine. Do not allow adults to operate machine without proper instruction. Only trained operators who have read this manual should operate this machine
- Never operate the machine when under the influence of drugs or alcohol.
- Keep all bystanders away from the operating area.
- Keep all shields and safety devices in place. If a shield, safety device, or decal is illegible or damaged, repair or replace it before operation is commenced. Also tighten any loose nuts, bolts, and screws to ensure that the machine is in safe operating condition.
- Do not operate the machine while wearing sandals, tennis shoes, sneakers, or shorts. Also, do not wear loose fitting clothing which could get caught in moving parts. Always wear long pants and substantial shoes. Wearing safety glasses, safety shoes, and a helmet is advisable and required by some local ordinances and insurance regulations.

While Operating

- This product may exceed noise levels of 85 dB(A) at the operator position. Hearing protection is recommended for prolonged exposure to reduce the potential of permanent hearing damage.
- Optional attachments may impact the operating characteristics of the traction unit. For example, slopes that have been mowed with cutting decks may be unsafe to travel on with a narrow attachment, such as a broom, due to the loss of support and stability provided by the width of the decks. Further, the decks may have prevented the traction unit from coming too close to holes, dips, drop off's, obstacles and uneven terrain which may cause a roll over. Use extra caution when operating a traction unit with a broom attached in place of mowing decks.
- Using the machine demands attention. To prevent loss of control:
  - Operate only in daylight or when there is good artificial light.
  - Drive slowly and watch for holes or other hidden hazards
  - Do not drive close to a sand trap, ditch, creek, or other hazard.
  - Reduce your speed when making sharp turns and when turning on hillsides.
  - Avoid sudden starts and stops.
  - Before backing up, look to the rear and ensure that no one is behind the machine.
  - Watch out for traffic when near or crossing roads. Always yield the right-of-way.
- Stay away from the discharge area when the machine is operating. Keep all bystanders away from the discharge area and don't direct discharge toward bystanders.
- If the engine stalls or the machine loses headway and cannot make it to the top of a slope, do not turn the machine around. Always back slowly straight down the slope
- Do not take an injury risk! When a person or pet appears unexpectedly in or near the operating area, stop operation. 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.
- Lightning can cause severe injury or death. If lightning is seen or thunder is heard in the area, do not operate the machine; seek shelter.
- Lower the broom to the ground and remove the key from the ignition switch whenever the machine is left unattended.

Maintenance

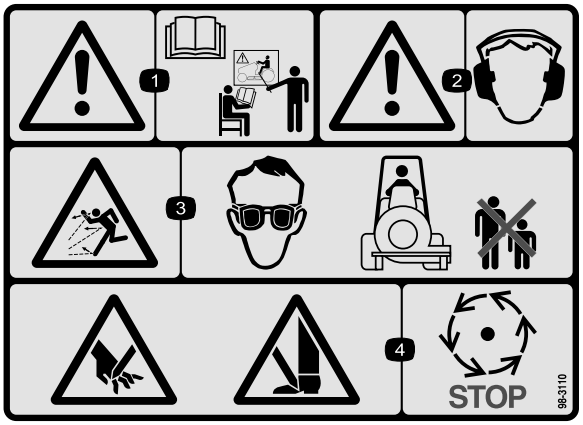
- Remove the key from the ignition switch to prevent accidental starting of the engine when servicing, adjusting, or storing the machine.
- Perform only those maintenance instructions described in this manual. If major repairs are ever needed or assistance is desired, contact an Authorized Toro Distributor
- Be sure that the machine is in safe operating condition by keeping nuts, bolts, and screws tight.

Check all bolts and nuts frequently to be sure that they are tightened to specification.

- Make sure all hydraulic line connectors are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system.
- Keep your body and hands away from pin hole leaks or nozzles that eject hydraulic fluid under high pressure. Use paper or cardboard, not your hands, to search for leaks. Hydraulic fluid escaping under pressure can have sufficient force to penetrate the skin and cause serious injury. Seek immediate medical attention if fluid is injected into skin.
- Before disconnecting or performing any work on the hydraulic system, all pressure in the system must be relieved by stopping the engine and lowering the cutting units and attachments to the ground.
- If the engine must be running to perform a maintenance adjustment, keep hands, feet, clothing, and any parts of the body away from the cutting units, attachments, and any moving parts. Keep everyone away.
- To ensure optimum performance and safety, always purchase genuine Toro replacement parts and accessories to keep the machine all Toro. Never use "will-fit" replacement parts and accessories made by other manufacturers. Look for the Toro logo to ensure genuineness. Using unapproved replacement parts and accessories could void the warranty.

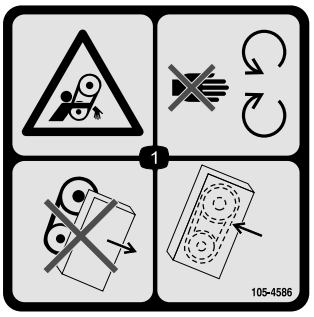
Safety and Instructional Decals

Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



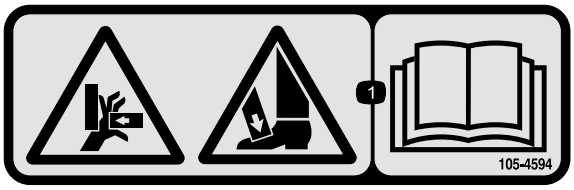
98-3110

1. Warning—read the *Operator's Manual* and receive training.
2. Warning—wear hearing protection.
3. Thrown object hazard—wear eye protection and keep bystanders a safe distance from the machine.
4. Cutting hazard of hand or foot—wait for moving parts to stop.



105-4586

1. Entanglement hazard, belt—stay away from moving parts. Do not operate the machine with the shields or guards removed; keep the shields and guards in place.



105-4594

1. Crushing hazard, hand and foot—read the *Operator's Manual*.

Setup

Loose Parts

Use the chart below to verify that all parts have been shipped.

Procedure	Description	Qty.	Use
1	Wire harness cap Cable tie	1 1	Remove front cutting unit and lift arms
2	Lift arm assembly (R.H.) Lift arm assembly (L.H.) Spacer (GM 4100 only) Pin assembly (GM 4100 only) Screw 3/8 x 1–1/4 inch Flat washer .406 x .813 Flange lock nut 3/8 Connection channel	1 1 2 2 10 10 10 1	Attach the lift arms to the traction unit
3	Spacer Thrust washer Screw, 3/4 x 6–1/2 inches Flat washer, .813 x 1.500 Jam nut, 3/4 inch	2 4 2 2 2	Attach the lift arms to the broom assembly
4	Flat washer 1.063 x 2.000 Cotter pin Screw M6–1 x 60 Lock nut M6	1 1 1 1	Attach the hydraulic cylinder to broom assembly
5	Hose assembly (extension) Hose assembly (extension) Straight fitting w/ O–ring Cable tie	1 1 1 4	Connect the traction unit hoses to the broom
6	Chain cover assembly	1	Install the chain cover to the broom assembly
7	No parts required	–	Adjust the counterbalance
8	No parts required	–	Adjust the lift pressure
9	No parts required	–	Adjust the drop speed
10	No parts required	–	Check the chain tension
11	No parts required	–	Check the castor wheel tire pressure

Media and Additional Parts

Description	Qty.	Use
ORS plug w/ O-ring (–6)	7	Plug unused hydraulic hoses & ports.Review the material and save in an appropriate place.
ORS plug w/ O-ring (–12)	4	
Cap plug w/ O-ring (–6)	6	
Cap plug w/ O-ring (–12)	4	
Operator's Manual	1	
Parts Catalog	1	
Declaration of Conformity	1	

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

Note: Implements are heavy and may require two people to handle

Note: Install the rotary broom in a clean work area; cleanliness is extremely important. Before disconnecting the hydraulic lines, thoroughly clean the port areas. After disconnecting hydraulic lines, plug ports and cap lines

Note: Wire Harness Kit, Part No.110–3263 is required for traction unit model numbers 30410 and 30411 or Part No. 115–8492 for models numbers 30412, 30413, 30446, 30447, 30448 and 30449. Order the appropriate kit from your Local Toro Distributor.

1

Remove the Front Cutting Unit and Lift Arms

Parts needed for this procedure:

1	Wire harness cap
1	Cable tie

Procedure

1. Position machine on a level surface, lower mower decks to the floor, engage parking brake, be sure traction pedal is in neutral position, PTO lever in OFF position, shut engine OFF and remove key from switch.

   Note: Steps 2 thru 5 pertain only to the installation on a Groundsmaster 4100–D only

2. Remove the hairpin cotters securing dampers to lift arms (Figure 2). Pivot dampers toward deck housing

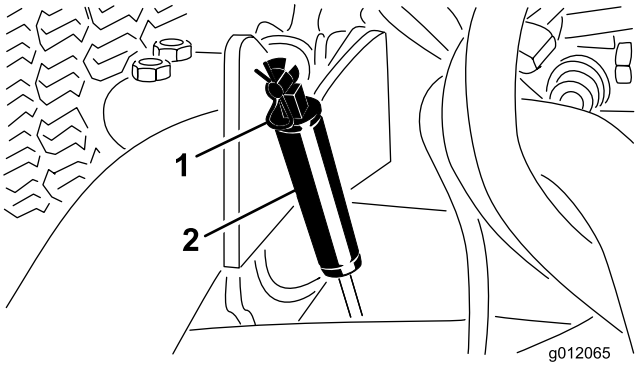


Figure 2

1. Hair pin cotter
2. Damper

3. Disconnect the wing deck lift cylinder hydraulic hoses from the hydraulic ports on the traction unit (Figure 3). Cap unused ports and plug unused hoses.

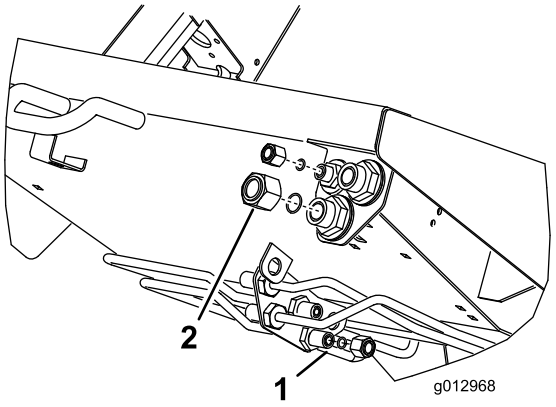


Figure 3

1. Wing deck lift cylinder ports and caps
2. Wing deck motor ports and caps

4. Disconnect the wing deck motor hoses from the hydraulic ports under the traction unit platform (Figure 3). Cap unused ports and plug unused hoses.
5. Locate and unplug the cutting unit wire harness from the traction unit wire harness (Figure 4). Connect the wire harness cap (included in the loose parts) to the traction unit wire harness to protect the terminals. To retain cap when not in use, secure the cap loop to traction unit with a cable tie.

6. Remove any cable ties securing the cutting unit wire harness to any traction unit components.

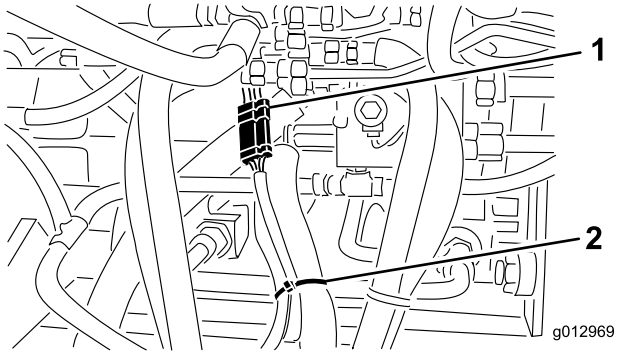


Figure 4

1. Wire harness
2. Cable tie

7. Slightly raise deck to remove tension from the height-of-cut chains. Remove hair pin cotters and clevis pins securing height-of-cut chains to rear of deck (Figure 5). Retain hair pin cotters and clevis pins for re–installation of front deck.

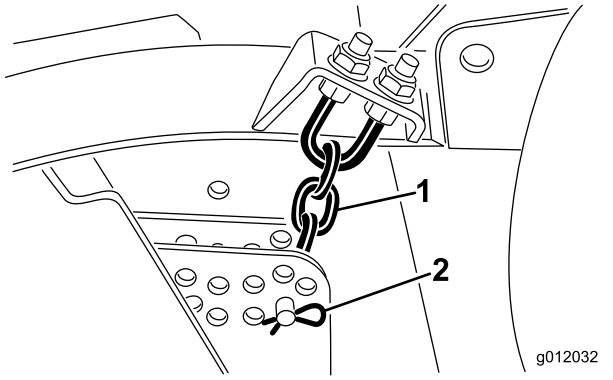


Figure 5

1. Height of cut chain
2. Clevis pin & hairpin cotter

8. Lower deck. Remove bolts, washers and locknuts securing each lift arm ball joint mount to cutting unit castor arm tube (Figure 6).

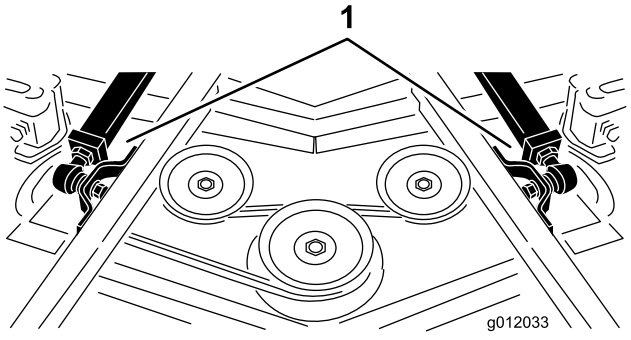


Figure 6

1. Lift arm ball joint mount (2)

9. Disconnect the hydraulic hoses from the fittings on the hydraulic motor (center deck only) (Figure 7).

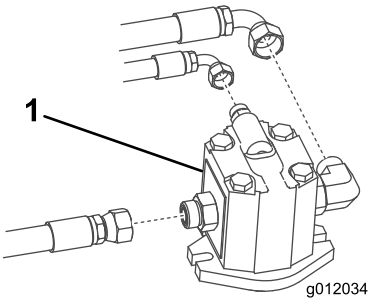


Figure 7

1. Hydraulic motor

Important: Cap or plug hydraulic hoses and motor ports to prevent contaminating system during installation of broom or storage of deck.

10. Move mower deck away from traction unit.
11. Jack up the machine until front wheels are off the ground. Use jack stands or block the machine to prevent if from falling. Refer to Traction Unit Operator's Manual for Jacking instructions.
12. To gain access to the lift arms, the front wheel and tire assemblies must be removed.
13. Remove fasteners securing cylinder pin to lift arm. Remove cylinder pin and disconnect cylinder end from lift arm (Figure 8).

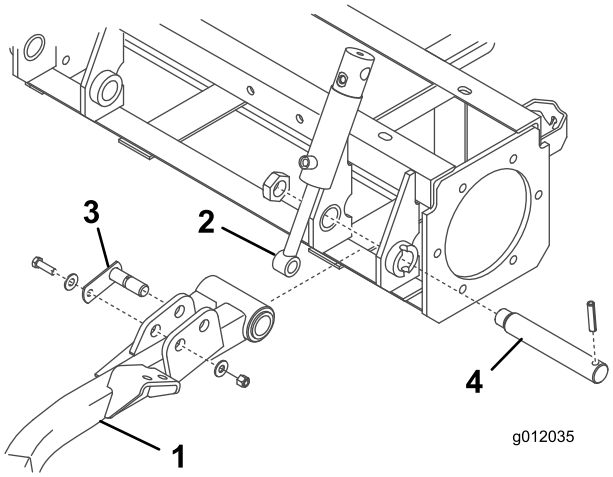


Figure 8

1. Left lift arm
2. Lift cylinder
3. Cylinder pin
4. Lift arm pin

14. Remove nut securing lift arm pin to frame (Figure 8).
15. Remove lift arm pin and remove lift arm. Repeat procedure on opposite cylinder and lift arm.

2

Attaching the Lift Arms to the Traction Unit

Parts needed for this procedure:

1	Lift arm assembly (R.H.)
1	Lift arm assembly (L.H.)
2	Spacer (GM 4100 only)
2	Pin assembly (GM 4100 only)
10	Screw 3/8 x 1–1/4 inch
10	Flat washer .406 x .813
10	Flange lock nut 3/8
1	Connection channel

Procedure

1. Mount left lift arm assembly to frame with lift arm pin and nut previously removed (Figure 9). Torque the nut to 60–70 ft–lb.

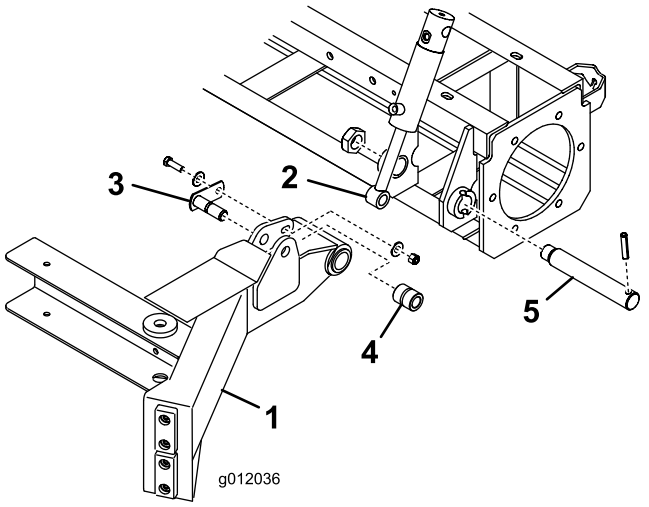


Figure 9

1. Left lift arm
2. Lift cylinder
3. Cylinder pin (GM 4100–D pins supplied in kit)
4. Spacer (GM 4100–D only)
5. Lift arm pin

2. Mount cylinder end to lift arm with cylinder pin, spacer (GM 4100 only), 3/8 x 1–1/4 inch screw, .406 x .813 flatwasher and 3/8 flange locknut. (Figure 9). Torque to 27–33 ft–lb. Spacer to be positioned between lift arm plates and on cylinder pin when installed in cylinder end.
3. Repeat procedure on opposite side of machine.
4. Secure right and left lift arms together with the connection channel and (10) 3/8 x 1–1/4 inch screws, .406 x .813 flatwashers and 3/8 flange locknuts. Position as shown in figure Figure 10. Torque the nuts to 27–33 ft–lb.

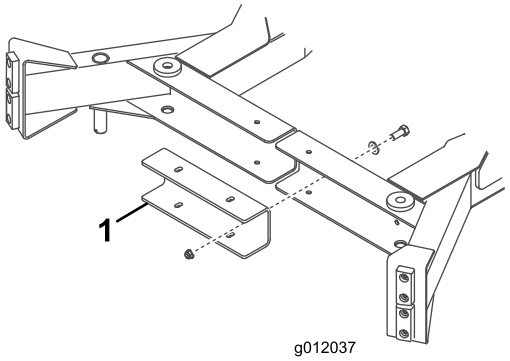


Figure 10

1. Connection channel

3

Attaching the Lift Arms to the Broom Assembly

Parts needed for this procedure:

2	Spacer
4	Thrust washer
2	Screw, 3/4 x 6–1/2 inches
2	Flat washer, .813 x 1.500
2	Jam nut, 3/4 inch

Procedure

1. Secure left broom arm to left lift arm with a 3/4 x 6–1/2 inch screw, spacer, (2) thrust washers, .813 x 1.500 flatwasher and 3/4 jam nut (Figure 11). Thrust washers to be positioned between broom arm bushings and inside of lift arm. Torque the jam nut to 145–190 ft–lb.
2. Repeat procedure on opposite broom arm.

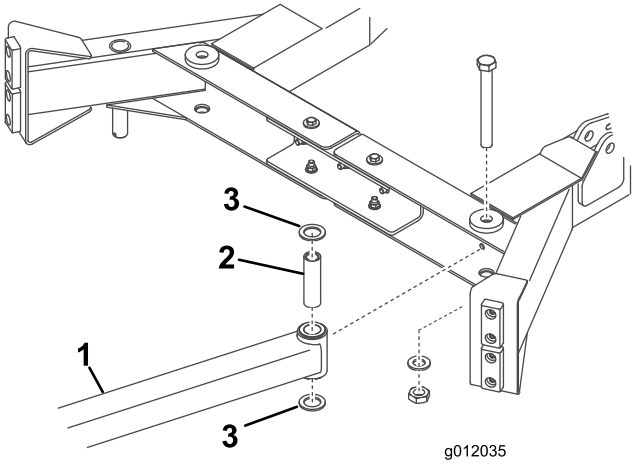


Figure 11

1. Left broom arm
2. Spacer
3. Thrust washers

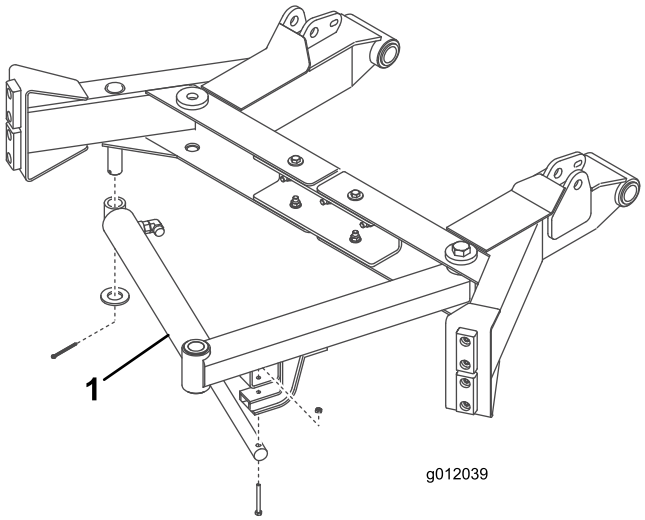


Figure 12

1. Cylinder

4

Attaching the Hydraulic Cylinder to Broom assembly

Parts needed for this procedure:

1	Flat washer 1.063 x 2.000
1	Cotter pin
1	Screw M6–1 x 60
1	Lock nut M6

Procedure

1. Secure cylinder to post on underside of right lift arm with a 1.063 x 2.000 flat washer and cotter pin (Figure 12).
2. Secure shaft end of cylinder to mounting gusset on under side of left broom arm with a M6–1 x 60 capscrew and M6 locknut (Figure 12). Torque the locknut to 87–105 in–lb.

5

Connecting the Traction Unit Hoses to the broom

Parts needed for this procedure:

1	Hose assembly (extension)
1	Hose assembly (extension)
1	Straight fitting w/ O–ring
4	Cable tie

Procedure

Groundsmaster 4100–D only

1. Connect the (2) extension hoses (Figure 13) to the large traction unit hoses as follows:
   - Connect the 90 degree fitting of the extension hose to the 90 degree fitting on the traction unit hose with a straight adapter.

     Important: Make sure O–rings are lubricated and in position when making all hydraulic connection

   - Connect the extension hose with the straight fitting to the hose with the straight fitting.
   - Torque the hose fittings to 43-48 ft.-lb.

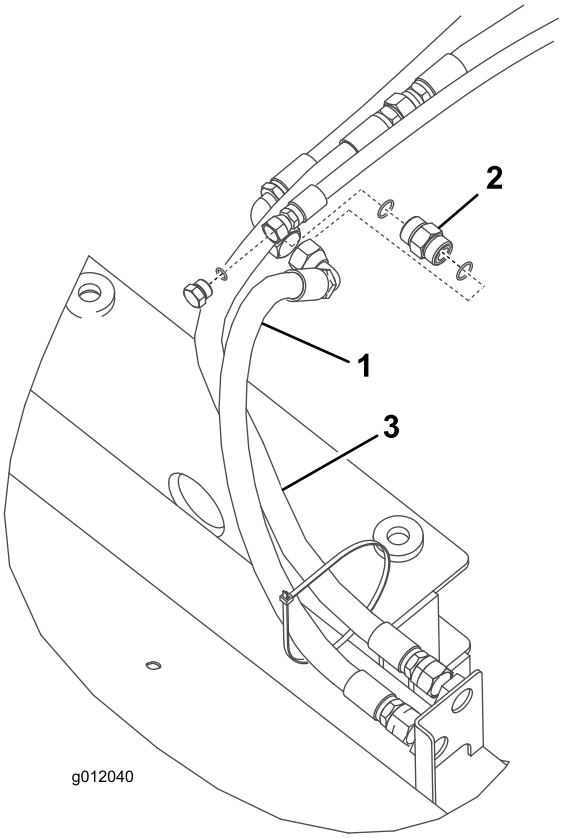


Figure 13
GM 4100–D Shown

1. Extension hose w/90 degree fitting
2. Straight adapter
3. Extension hose w/straight fitting

2. Route and connect the extension hoses (Figure 13 and Figure 15) to the broom bulkhead fittings as follows:
   - Extension hose with 90 degree fitting to bottom bulkhead fitting.
   - Extension hose with straight fitting to top bulkhead fitting.
   - Torque hoses to 43-48 ft.-lb.
   - Plug small hose with O–ring and plug. Torque fitting to 24-29 ft-lb.

   Note: Route hoses so they slide on top of the formed rod when operating rotary broom.

   Groundsmaster 4000–D only

3. Route and connect the traction unit hoses (Figure 14 and Figure 15) to the broom bulkhead fittings as follows:
   - Connect hose with 90 degree fitting to bottom bulkhead fitting.

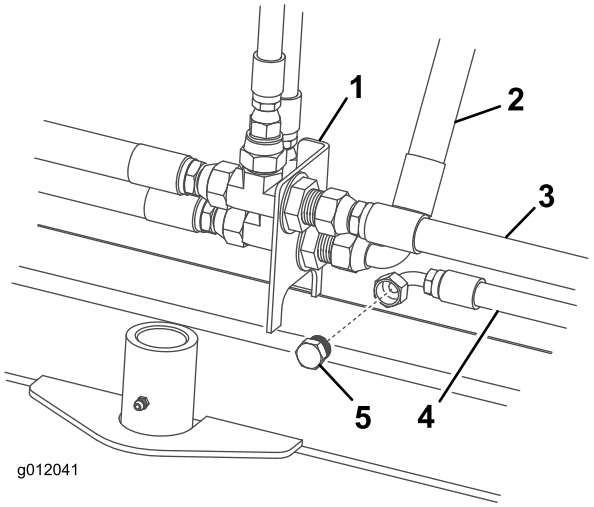


Figure 14
GM 4000–D Shown

1. Bulkhead
2. Hose w/90 degree fitting
3. Hose w/straight fitting
4. Small hose
5. Plug w/O–ring

   Important: Make sure O–rings are lubricated and in position when making all hydraulic connections.
   - Connect hose with straight fitting to top bulkhead fitting.
   - Torque hoses to 43–48 ft.-lb.
   - Plug small hose with O–ring and plug. Torque to 24–29 ft–lb.

   Note: Route hoses so they slide on top of the formed rod when operating rotary broom.

4. Secure hydraulic hoses with (4) cable ties as shown in Figure 15. Space wire ties along length of hoses.

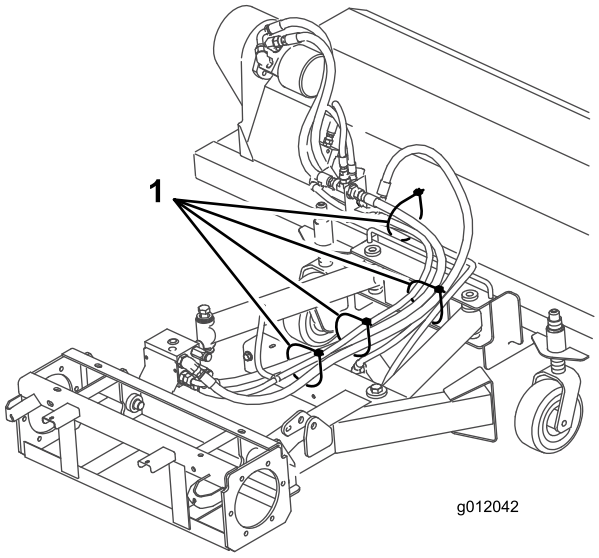


Figure 15

1. Wire ties

Note: Hoses must not contact sharp edges or moving parts and must be free of twists. Also, make sure the right broom lift arm does not contact the deck sensor.

6

Installing the Chain Cover to the Broom Assembly

Parts needed for this procedure:

1	Chain cover assembly

Procedure

Install the chain cover assembly onto the frame and secure the capscrew (Figure 16).

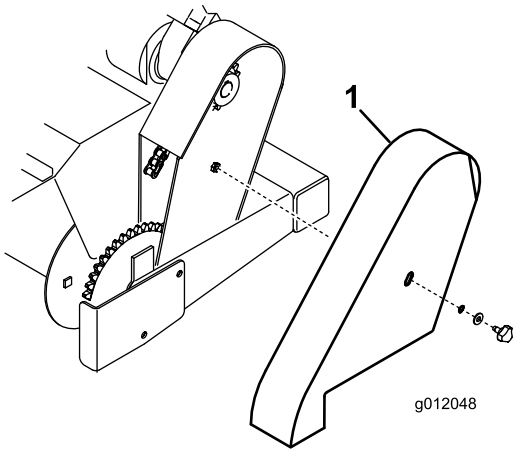


Figure 16

1. Chain cover assembly

7

Adjusting the Counterbalance

No Parts Required

Models 30411 and 30413

Reduce counterbalance by unscrewing the stem on the valve approximately 3 turns (Figure 17).

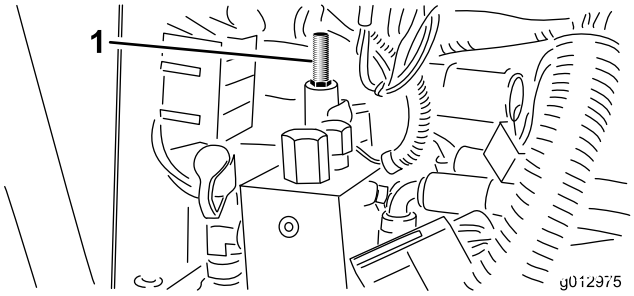


Figure 17

1. Counterbalance adjusting screw

Important: Whenever rotary broom is removed, make sure to readjust the counterbalance pressure to it's original setting.

Models 30446, 30447, 30448 and 30449

1. Remove the cover on the right side of the platform, under the control arm, to access the manifold.
2. Loosen the locknut on the counterbalance adjusting screw (Figure 18)
3. Rotate the adjusting screw clockwise to increase the pressure or counterclockwise to decrease the pressure.
4. Tighten the locknut.

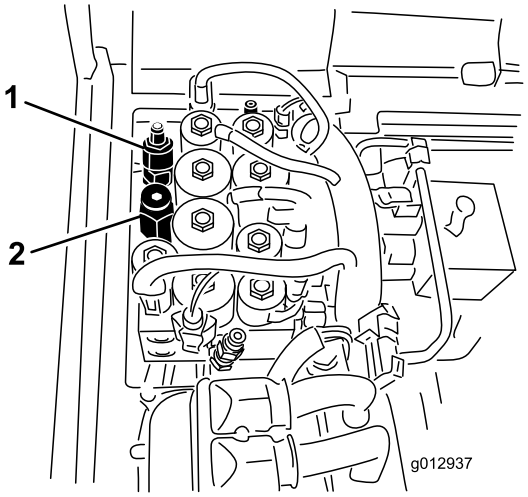


Figure 18

1. Counterbalance adjusting screw
2. Lift pressure adjusting valve

Important: Whenever rotary broom is removed, make sure to readjust the counterbalance pressure to it's original setting.

8

Adjusting the Lift Pressure

No Parts Required

Models 30410 and 30412

1. Remove the jam nut securing the plug assembly in the lift control valve (Figure 19) Remove the plug and the washers from the lift control valve. Note the order of the components during removal.

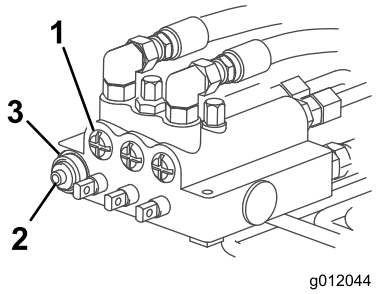


Figure 19

1. Control valve
2. Lift pressure plug assembly
3. Jam nut

2. Remove the gray lift pressure spring from the lift control valve and replace it with the green spring included in the kit (Figure 20). Retain the gray spring to reinstall if the rotary broom is removed.

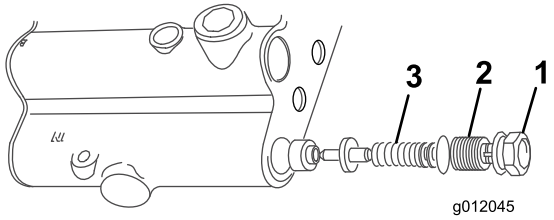


Figure 20

1. Jam nut
2. Plug assembly
3. Spring

3. Reinstall all the components but do not tighten the jam nut on the plug assembly.
4. With a 5000 psi pressure gauge installed, run the engine and raise the broom.
5. Rotate the plug assembly to attain 2700 psi minimum
6. Tighten the jam nut on the plug assembly.

Important: Whenever the rotary broom is removed, make sure to reinstall the gray spring into the lift control valve and readjust the lift relief pressure to it's original setting (1500 to 1600 psi).

Models 30446, 30447, 30448 and 30449

1. Stop the engine and remove the key from the ignition.
2. Remove the cover on the right side of the platform, under the control arm, to access the manifold.
3. Remove the cap from the top of the lift pressure adjusting valve (Figure 18).
4. Using an Allen wrench, screw in the valve to increase the lift pressure or unscrew the valve to decrease the lift pressure.
5. Reinstall the valve cap before starting the engine to test the adjustment.
6. Repeat the procedure as required.

9

Adjusting the Drop Speed

No Parts Required

Procedure

(Models 30410, 30411, 30412 and 30413 only)

Refer to Adjusting the Cutting Unit Flow Control in Traction Unit Operator's Manual.

10

Checking the Chain Tension

No Parts Required

Procedure

New chains will stretch during the first few days of operation, therefore; check chain tension frequently. If chain requires adjustment, refer to Adjusting the Chain.

11

Checking the Castor Wheel Tire Pressure

No Parts Required

Procedure

Castor wheel tires to be inflated to 50 psi.

Important: Before the rotary broom is operated, it must be greased to assure proper lubricating characteristics: refer to Lubrication section of manual. Failure to properly grease the unit will result in premature failure of critical parts.

Product Overview

Specifications

Broom Filament Material	Virgin polypropylene, high carbon wire or combination of both.
Broom Diameter	Uses 24 inch broom elements.
Oscillation Angle	8 degrees.
Sweeping Width Angle	Broom swings 25 degrees in both directions. 70.5 inches sweeping width at center position, 64 inches minimum sweeping width at full swing left or right.
Castor Wheels	Two 8.0 inch x 3.5 inch pneumatic rubber tires
Ground Clearance	6 inch
Broom Speed	220 rpm, no load for Groundsmaster 4000. 240 rpm, no load for Groundsmaster 4100
Broom Ground Pressure Adjustment	Adjustment is with .5 inch spacers and holes in castor fork.
Hydraulic/Mechanical Broom Drive	6.10 cubic inch roller vane motor drives directly into 16 tooth sprocket. A 40 tooth sprocket is mounted on broom shaft. One #60 chain connects motor and broom.
Broom Swing/Control	A 2 inch bore, 15 inch stroke, swing cylinder is connected in parallel with hydraulic broom drive. The cylinder is controlled by 3–position, closed center, 4–way solenoid directional valve. A 6 mm grade 8.8 shear bolt connects rod end of cylinder to 4–bar linkage.
Electrical Connection	Wire Harness Kit, Part No.110–3263 is required for traction unit model numbers 30410 and 30411 or Part No. 115–8492 for models numbers 30412, 30413, 30446, 30447, 30448 and 30449. Order the appropriate kit from your Local Toro Distributor.
Net Weight	642 lbs.

Attachments/Accessories

A selection of Toro approved attachments and accessories are available for use with the machine to enhance and expand its capabilities. Contact your Authorized Service Dealer or Distributor or go to www.Toro.com for a list of all approved attachments and accessories.

Operation

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

⚠ WARNING

Thrown debris has considerable force and could cause injury.

- **Stay away from the sweeping area when the machine is operating.**
- **Keep bystanders away from the sweeping area when the machine is running.**

Operation

1. Lower the broom to the ground ensuring the lift circuit is in the float position. The float position is engaged by moving the center lift lever forward and releasing it to return to the neutral position.
2. Increase engine speed to full throttle position.
3. Engage PTO switch.
4. Drive traction unit at a slow, comfortable speed.

Adjust Broom Down Pressure

Improper downward pressure can decrease broom life up to 95% (depending on the incorrect amount of pressure).

A broom sweeps with the tips of its bristles. When too much down pressure is applied, the broom is no longer using it's tips; the broom is now working with the sides of the bristles. This limits the flicking action of the bristles and limits it's sweeping effectiveness

To check for correct downward pressure, operate broom on the ground, rotating at normal operating speed with traction unit remaining stationary. Stop operation, raise broom and measure width of swept path. A properly adjusted broom will have a sweeping path width of 2–4 inches.

Adjust castor height for proper broom ground pressure. The castor wheel height is adjustable from 4 to 7 inches in 1/2 inch increments by adding or removing an equal amount of spacers from each castor wheel.

1. Start engine and raise broom. Stop engine after broom is raised.
2. Remove cap securing castor spindle to frame bracket (Figure 21).

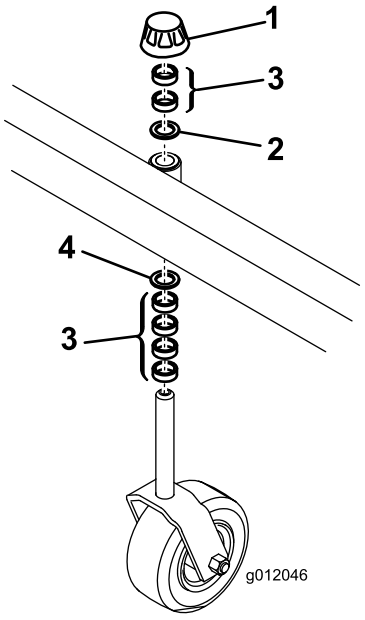


Figure 21

1. Cap
2. Thrust washers
3. Spacers

3. Move desired amount of spacers to top or bottom of bracket (Figure 21). Make sure spacers are equal on both castor wheels and a thrust washer is positioned on each side of frame bracket
4. Install cap and lower broom (Figure 21).

Ground Speed

Bulldozing produces a side thrust and excessive stress on the broom, core and frame. While operating under the plow effect, the bristles are flexed against the steel ring which holds them and, eventually, this flexing will break the bristles from the ring.

If ground speed is too fast, debris will pile up in front of broom causing broom to bulldoze instead of sweep. This can damage not only the broom, but also the core, chains, sprockets, drive lines and frame.

Switch Operation

(Models 30410, 30411, 30412 and 30413)

One switch will rotate the broom to the right and the other switch will rotate the broom to the left. The broom must be on the ground and rotating to change the angle of operation.

(Models 30446, 30447, 30448 and 30449)

One switch will pivot the broom angle left and right. If the pivot direction of the broom is opposite of the switch and control angle, reverse the harness plugs on the solenoids located on the broom. The broom must be on the ground and rotating to change the angle of operation.

Operating Tips

You can add measurable sweeping hours to your broom by remembering these simple things:

1. More pressure doesn't give a better sweep.
2. A level broom lasts longer.
3. Faster ground speed will cause the broom to wear faster.

Maintenance

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

Lubrication

The rotary broom must be lubricated regularly. If machine is operated under normal conditions, lubricate bearings and bushings with No. 2 general purpose lithium base grease after every 8 hours of operation or daily, whichever comes first. Lubricate fittings immediately after every washing.

The rotary broom has (12) fittings that must be lubricated (Figure 22).

- Castor shaft bushings (2)
- Axle shaft bearings (2)
- Right and left lift arms (2)
- Right and left broom arms (4)
- Pivot pin (1)
- Cylinder pivot (1)

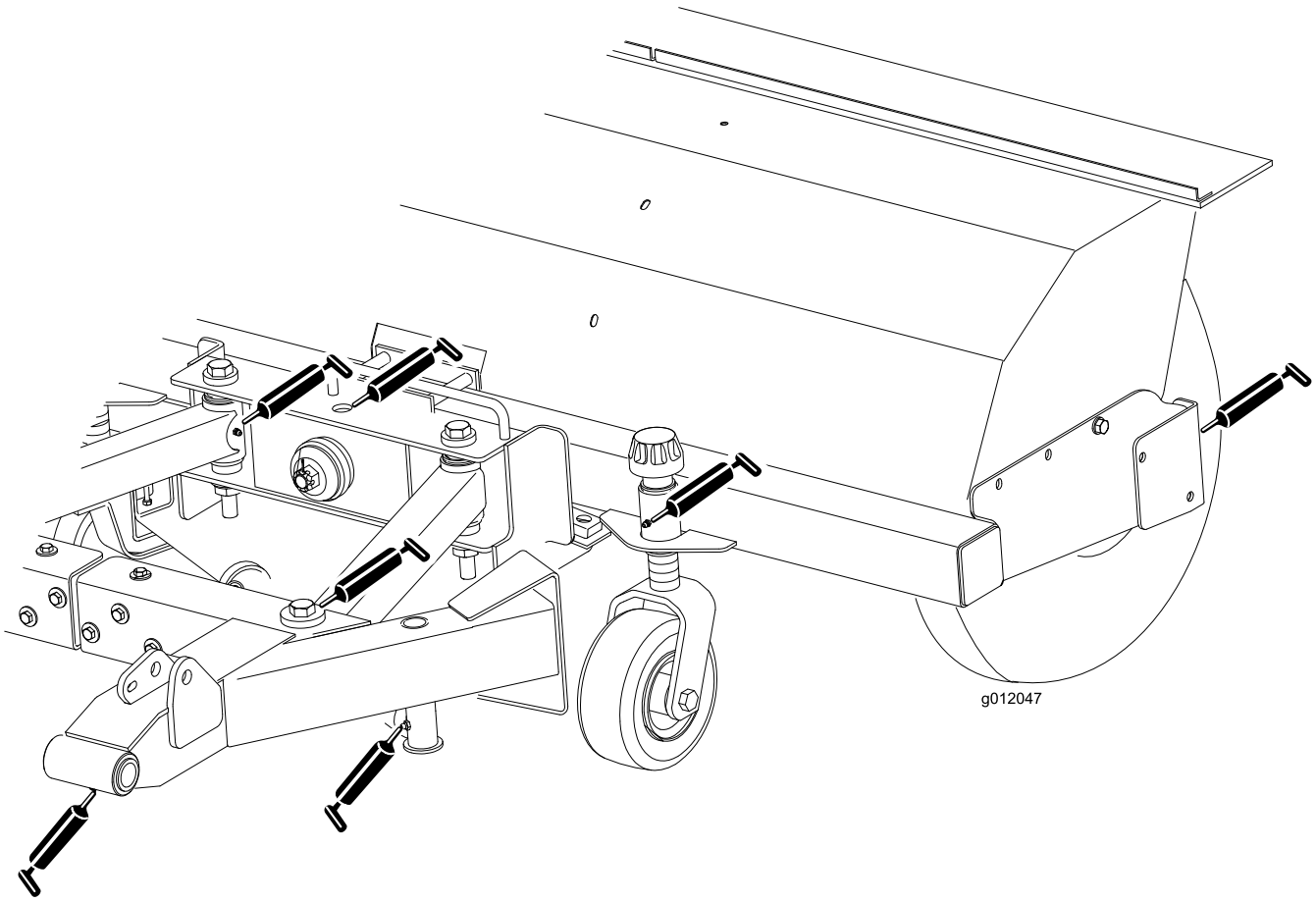


Figure 22

Adjusting Chain Tension

Make sure chain is properly tensioned to assure proper operation of the machine and unnecessary wear. Check chain tension by pressing side of chain at mid span of drive sprockets with 10 lbs. of force. Chain should deflect .10 in. in each direction from center (.20 in. total deflection from side to side).

1. Loosen the capscrew securing the chain cover to the frame and remove the cover (Figure 23). The fastener on the cover is designed to remain on the cover after removal.

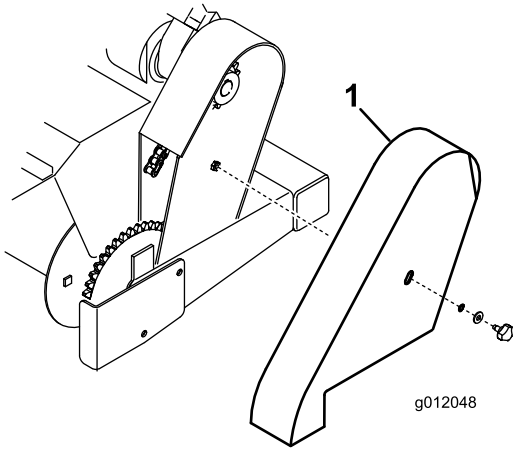


Figure 23

1. Chain cover

2. To adjust the chain tension:
   - Loosen socket head screws and nuts securing hydraulic motor to frame sideplate (Figure 24).

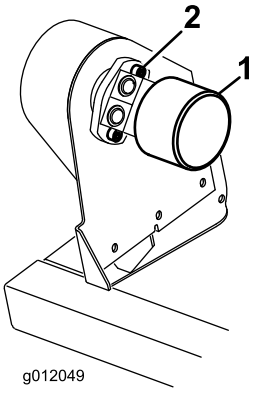


Figure 24

1. Hydraulic motor
2. Mounting screw & nut

   - Rotate motor until desired chain tension is attained, then tighten nuts (Figure 24).
3. Install chain cover

Changing Broom Elements

The axle assembly contains 32 broom elements.

Summer use: Polypropylene elements.

Winter use: Alternating Polypropylene and steel elements (16 ea.).

1. Relieve chain tension. Refer to Adjusting Chain Tension.
2. Remove chain from sprocket.
3. Remove fasteners securing axle bearings to right and left guards. This will allow removal of axle assembly and bearings (Figure 25).
4. Remove axle plate from axle assembly (Figure 25).
5. Slide broom elements off axle assembly (Figure 25).
6. Slide new broom element onto axle assembly so alignment pins of element ride over bottom bar of axle assembly.
7. Rotate next broom element 180 degrees from side to side and top to bottom and slide onto axle assembly so alignment pins of element ride over top bar of axle assembly. Alternating broom elements allows each wafer to obtain maximum sweeping width

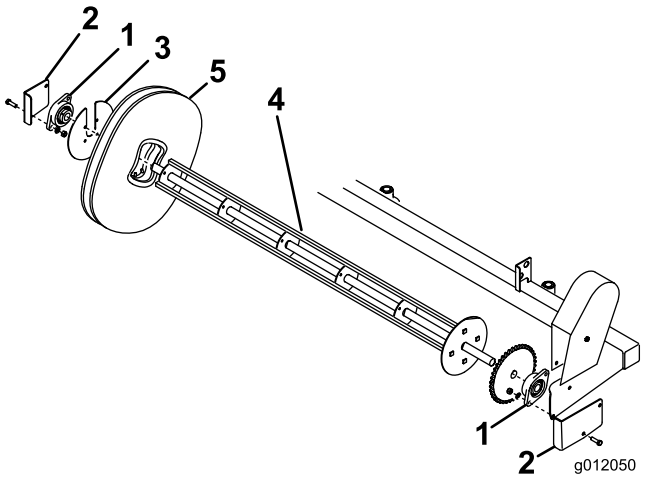


Figure 25

1. Axle bearing
2. Guard
3. Axle plate
4. Axle
5. Broom element

Servicing Bumper Bushings

After many hours of operation, the bushings pressed into the top and bottom of the bumper will wear. To check the bushings, move castor fork fore and aft and from side to side. If castor spindle is loose in the bushings, the bushings are worn and must be replaced.

1. After many hours of operation, the bushings pressed into the top and bottom of the bumper will wear.

To check the bushings, move castor fork fore and aft and from side to side. If castor spindle is loose in the bushings, the bushings are worn and must be replaced.

2. Remove locking cap, thrust washers and spacers from top of castor spindle
3. Pull castor spindle out of bumper. Allow thrust washers and spacers to remain on bottom of spindle.
4. Insert pin punch into top or bottom of bumper and drive bushing out of tube (Figure 26). Also drive other bushing out of bumper. Clean inside of bumper to remove any dirt.

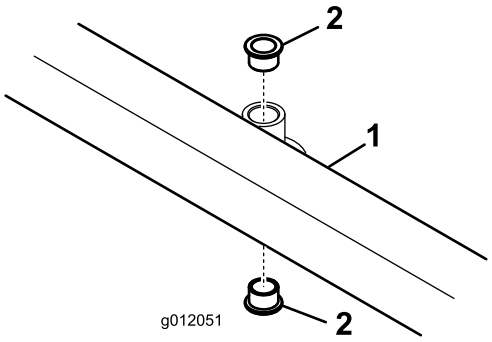


Figure 26

1. Bumper
2. Bushing

5. Apply grease to inside and outside of new bushings. Using a hammer and flat plate, drive bushings into bumper.
6. Inspect castor shaft for wear and replace if damaged.
7. Push castor shaft through bushings and bumper. Slide spacers onto shaft and secure with locking cap.

Servicing Castor Wheel and Bearing

The castor wheel rotates on a high–quality roller bearing and is supported by a spanner bushing. Even after many hours of use the bearing wear will be minimal. A wobbly castor wheel usually indicates a worn bearing.

1. Remove locknut from capscrew holding castor wheel assembly in castor fork (Figure 27). Grasp castor wheel and slide capscrew out of fork.

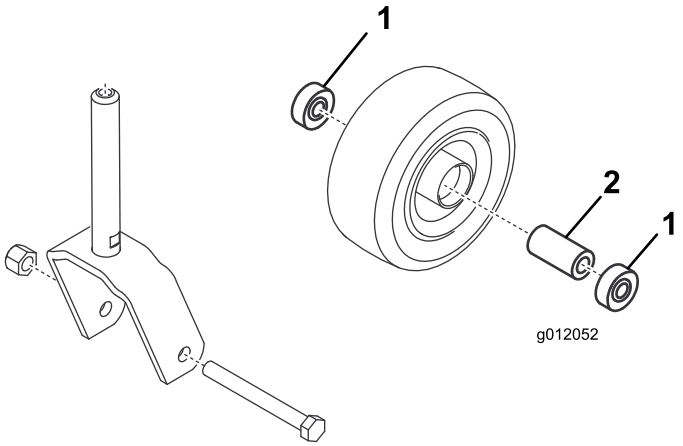
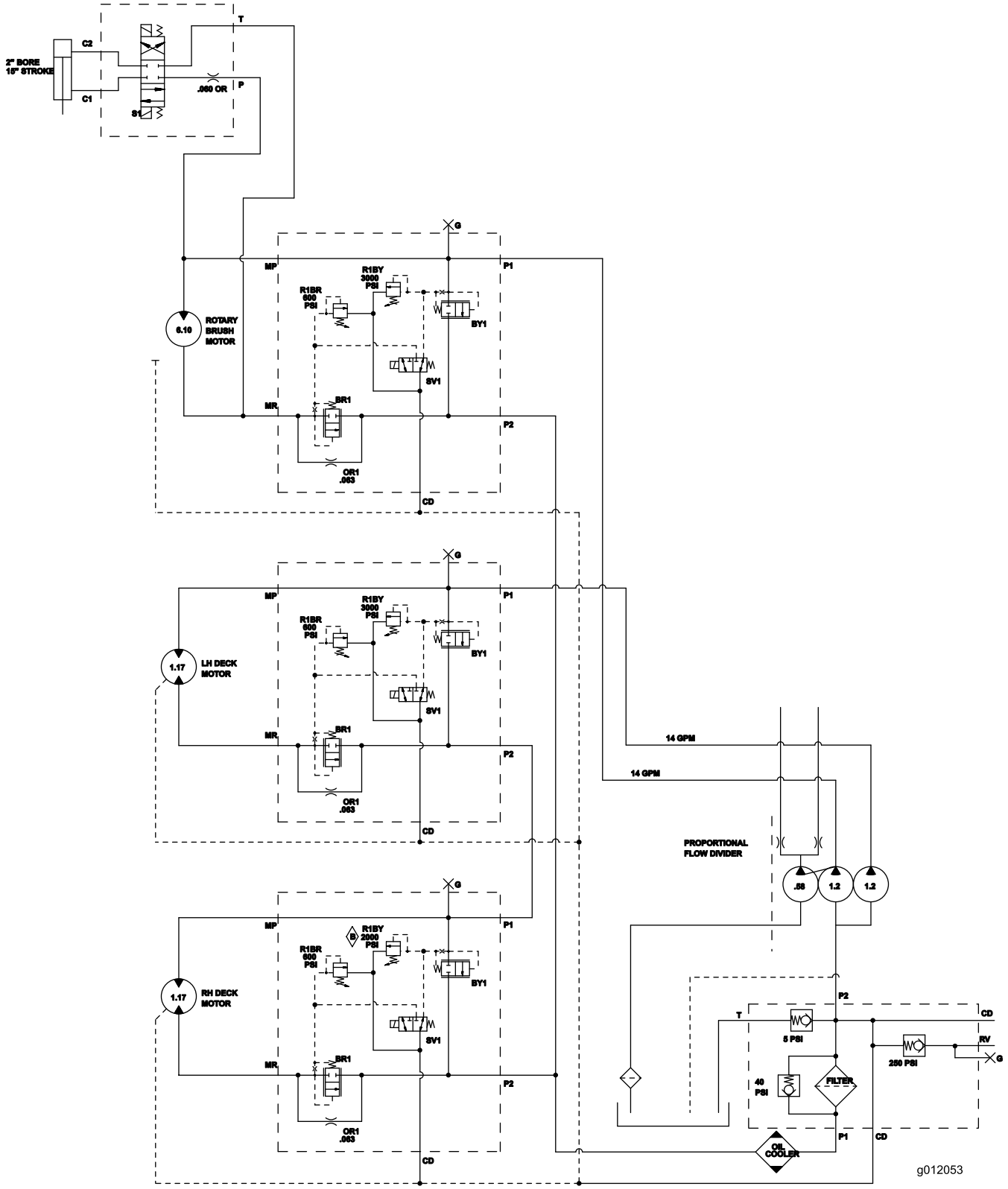


Figure 27

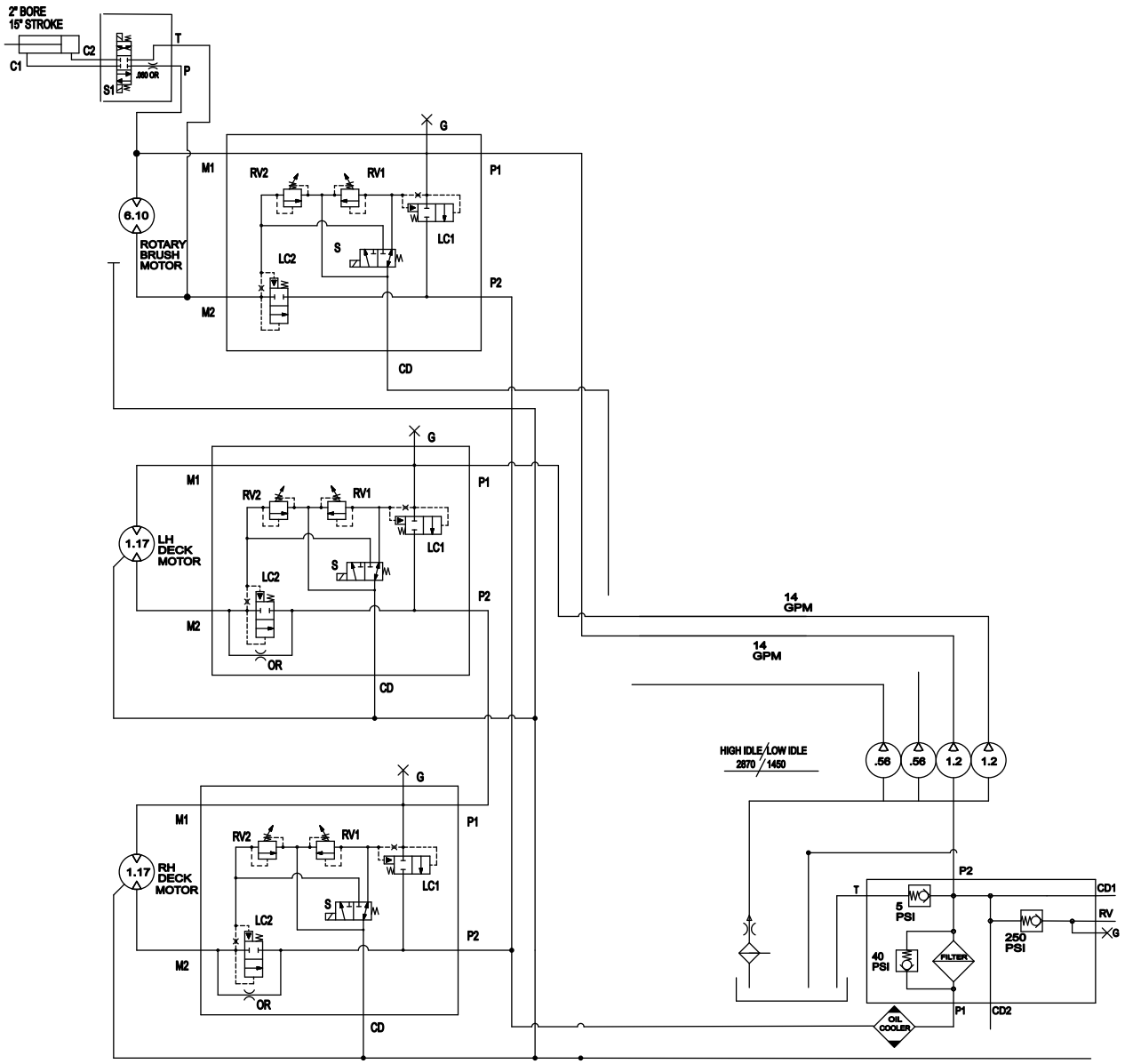
1. Outer bearing
2. Inner bearing

2. Remove outer bearing from wheel hub and allow inner bearing to fall out (Figure 27). Remove outer bearing from opposite side of wheel hub.
3. Check the bearings and inside of wheel hub for wear. Replace defective parts as required.
4. To assemble the castor wheel, push outer bearing into wheel hub. Slide inner bearing into wheel hub. Push other bearing into open end of wheel hub to captivate the inner bearing inside the wheel hub.
5. Install castor wheel assembly between castor forks and secure in place with capscrew and locknut.

Schematics

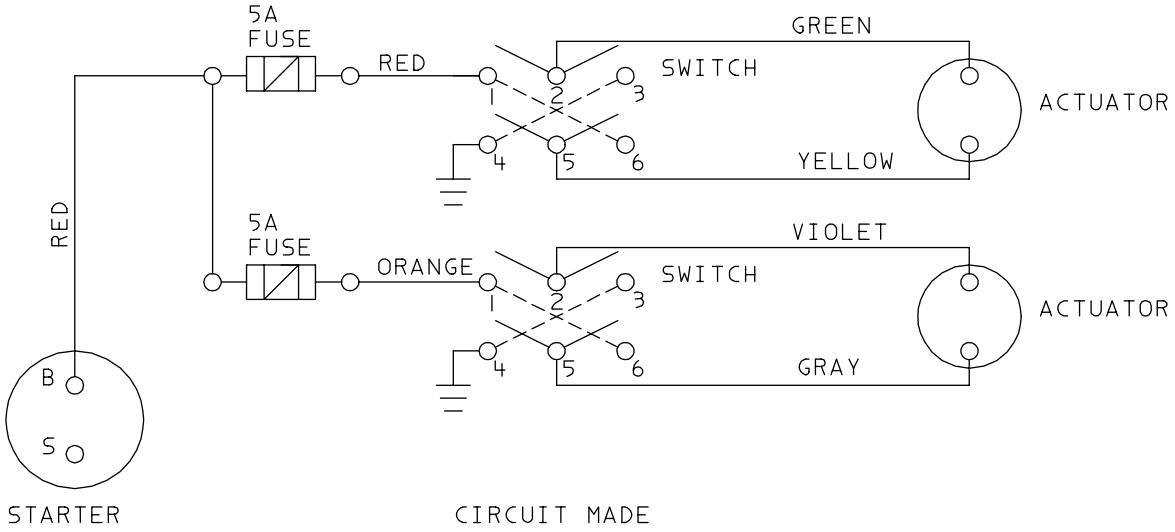


Hydraulic Schematic (Models 30410 and 30411) (Rev. -)

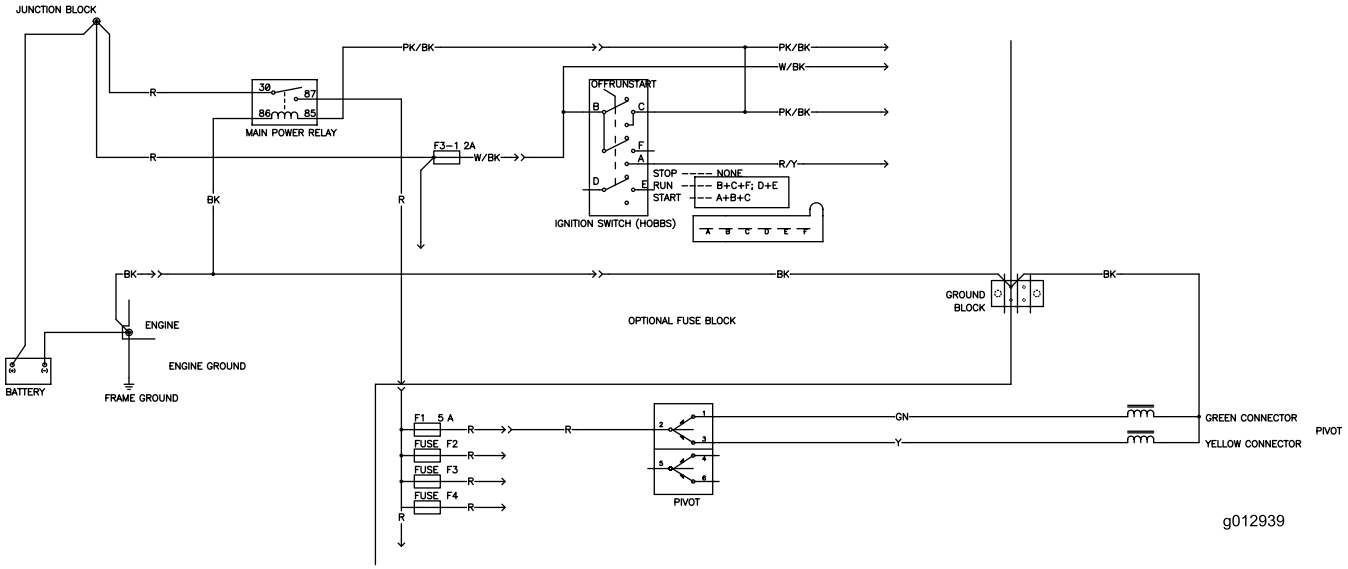


g012xxx

Hydraulic Schematic (Models 30412, 30413, 30446, 30447, 30448 and 30449) (Rev. -)



Electrical Schematic (Models 30410, 30411, 30412 and 30413) (Rev. -)



Electrical Schematic (Models 30446, 30447, 30448 and 30449) (Rev. -)

Notes:

Notes:

The Toro Total Coverage Guarantee

A Limited Warranty

Conditions and Products Covered

The Toro® Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrant your Toro Commercial product ("Product") to be free from defects in materials or workmanship for two years or 1500 operational hours*, whichever occurs first. This warranty is applicable to all products with the exception of Aerators (refer to separate warranty statements for these products). Where a warrantable condition exists, we will repair the Product at no cost to you including diagnostics, labor, parts, and transportation. This warranty begins on the date the Product is delivered to the original retail purchaser.
* Product equipped with an hour meter.

Instructions for Obtaining Warranty Service

You are responsible for notifying the Commercial Products Distributor or Authorized Commercial Products Dealer from whom you purchased the Product as soon as you believe a warrantable condition exists. If you need help locating a Commercial Products Distributor or Authorized Dealer, or if you have questions regarding your warranty rights or responsibilities, you may contact us at:

Commercial Products Service Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196
E-mail: commercial.warranty@toro.com

Owner Responsibilities

As the Product owner, you are responsible for required maintenance and adjustments stated in your Operator's Manual. Failure to perform required maintenance and adjustments can be grounds for disallowing a warranty claim.

Items and Conditions Not Covered

Not all product failures or malfunctions that occur during the warranty period are defects in materials or workmanship. This warranty does not cover the following:

- Product failures which result from the use of non-Toro replacement parts, or from installation and use of add-on, or modified non-Toro branded accessories and products. A separate warranty may be provided by the manufacturer of these items.
- Product failures which result from failure to perform recommended maintenance and/or adjustments. Failure to properly maintain your Toro product per the Recommended Maintenance listed in the *Operator's Manual* can result in claims for warranty being denied.
- Product failures which result from operating the Product in an abusive, negligent or reckless manner.
- Parts subject to consumption through use unless found to be defective. Examples of parts which are consumed, or used up, during normal Product operation include, but are not limited to, brakes pads and linings, clutch linings, blades, reels, bed knives, tines, spark plugs, castor wheels, tires, filters, belts, and certain sprayer components such as diaphragms, nozzles, and check valves, etc.
- Failures caused by outside influence. Items considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved coolants, lubricants, additives, fertilizers, water, or chemicals, etc.
- Normal noise, vibration, wear and tear, and deterioration.
- Normal "wear and tear" includes, but is not limited to, damage to seats due to wear or abrasion, worn painted surfaces, scratched decals or windows, etc.

Parts

Parts scheduled for replacement as required maintenance are warranted for the period of time up to the scheduled replacement time for that part. Parts replaced under this warranty are covered for the duration of the original product warranty and become the property of Toro. Toro will make the final decision whether to repair any existing part or assembly or replace it. Toro may use remanufactured parts for warranty repairs.

Note Regarding Deep Cycle Battery Warranty:

Deep cycle batteries have a specified total number of kilowatt-hours they can deliver during their lifetime. Operating, recharging, and maintenance techniques can extend or reduce total battery life. As the batteries in this product are consumed, the amount of useful work between charging intervals will slowly decrease until the battery is completely worn out. Replacement of worn out batteries, due to normal consumption, is the responsibility of the product owner. Battery replacement may be required during the normal product warranty period at owner's expense.

Maintenance is at Owner's Expense

Engine tune-up, lubrication cleaning and polishing, replacement of Items and Conditions Not Covered filters, coolant, and completing Recommended Maintenance are some of the normal services Toro products require that are at the owner's expense.

General Conditions

Repair by an Authorized Toro Distributor or Dealer is your sole remedy under this warranty.

Neither The Toro Company nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of the Toro Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty. Except for the Emissions warranty referenced below, if applicable, there is no other express warranty.

All implied warranties of merchantability and fitness for use are limited to the duration of this express warranty. Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Note regarding engine warranty:

The Emissions Control System on your Product may be covered by a separate warranty meeting requirements established by the U.S. Environmental Protection Agency (EPA) and/or the California Air Resources Board (CARB). The hour limitations set forth above do not apply to the Emissions Control System Warranty. Refer to the Engine Emission Control Warranty Statement printed in your *Operator's Manual* or contained in the engine manufacturer's documentation for details

Countries Other than the United States or Canada

Customers who have purchased Toro products exported from the United States or Canada should contact their Toro Distributor (Dealer) to obtain guarantee policies for your country, province, or state. If for any reason you are dissatisfied with your Distributor's service or have difficulty obtaining guarantee information, contact the Toro importer. If all other remedies fail, you may contact us at Toro Warranty Company.