FORM NO. 3318-401 GB

TORO®

MODEL NO. 09600—60001 & UP

OPERATOR'S MANUAL

HC 4000 AERATOR®

To understand this product, and for safety and optimum performance, read this manual before starting operation. Pay special attention to SAFETY INSTRUCTIONS highlighted by this symbol.

Foreword

The HC 4000 Aerator has advanced concepts in engineering and design, and if properly maintained, will provide excellent service.

Since the Aerator is a high quality product, TORO is concerned about its future use and safety of the user. Therefore, anyone involved with the product, including the operator, should read and understand this manual. Major sections are**.**

- **Safety Instructions**
- **Specifications**
- **Before Operating**
- **Operating Instructions**
- **Lubrication**
- **Maintenance**

This manual emphasizes safety, mechanical and general product information. DANGER, WARNING and CAUTION identify safety messages. Whenever the triangular safety alert symbol appears, understand the safety message that follows. For complete safety instructions, read page 3. IMPORTANT highlights special mechanical information and NOTE emphasizes general product information worthy of special attention.

If help concerning set-up, operation, maintenance or safety is ever needed, contact the local Authorized TORO Distributor. In addition to genuine TORO replacement parts, the distributor also has optional equipment for the complete line of TORO turf care equipment. Keep your Toro all TORO. Buy genuine TORO replacement parts and accessories.

Table of Contents

Safety

BEFORE OPERATING

1. Read and understand the contents of this manual and tow vehicle manual before operating the machine. Become familiar with all controls and know how to stop quickly.

2. The power take-off drive of the aerator requires a tractor with operating speeds of 540 rpm and output power of 25 hp or higher. All safety shields for the tractor drive shaft must always be in place.

3. The tractor tire tread width, tire load capacity and brake system must have adequate capacity to allow installation of a 2100 lb. implement operating at 2 mph (15 mph maximum transport speed). Consult your tractor service agency if you have any questions on the safe operation of your tractor.

4. Do not allow children to operate the machine. Do not allow adults to operate the machine without proper instruction.

5. Remove debris or objects that might interfere with operation. Keep bystanders away from the work area.

6. Keep all shields and safety devices in place. If a safety device, shield or decal malfunctions, becomes damaged or illegible, replace it before operation is commenced. To assure machine is in safe operating condition, tighten loose nuts, bolts and screws.

7. Do not operate 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, ear protection and a helmet is advisable and required by some local ordinances and insurance regulations.

8. The aerator attaches directly to the tow tractor. Therefore, read your tractor operators manual or contact the tractor service agency regarding safety and installation for power take-off driven, semi-mounted implements.

WHILE OPERATING

9. Using the machine demands attention. To prevent loss of control:

- **A.** Use only in daylight or when there is good artificial light.
- **B.** Watch for holes or other hidden hazards.
- **C.** Do not transport machine close to sand traps, ditches, creeks or other hazards.
- **D.** Operate aerator in straight lines only.
- **E.** Reduce speed on side hills and before making sharp turns to prevent tipping or loss of control.
- **F.** Look behind the aerator before backing up.
- **G.** Observe public road regulations.

10. If the tines strike a solid object or the machine vibrates abnormally, raise aerator, disengage power to aerator, stop prime mover, shift into neutral and engage parking brake before leaving the operator's position. Lift safety/transport stops to full upright position and lower coring head onto stops. Stop engine and disengage power to aerator before making repairs or adjustments. Inspect coring head and other machine parts for damaged or malfunctioning parts and repair or replace before resuming operation. Be sure all parts are in good condition and all fasteners are tight.

11. Before leaving machine unattended, raise aerator to transport position, disengage power to aerator, shift into neutral and set parking brake. Lift safety/transport stops to full upright position and lower unit onto stops. Stop engine. Remove keys from tractor ignition.

12. Never dismount while prime mover is in motion. Never get on or off prime mover while engine is running and PTO drive is engaged. Never step over PTO shaft to reach other side of aerator - walk around the machine.

13. Before transporting machine from one area to another, raise aerator to transport position, disengage

power to aerator, stop prime mover, shift into neutral and set parking brake. Lift safety/transport stops to full upright position and lower unit onto stops.

MAINTENANCE

14. Before servicing machine, raise aerator, disengage power to aerator, shift prime mover into neutral and set parking brake. Lift safety/transport stops to full upright position and lower unit onto stops. Stop engine. Disconnect PTO shaft and hydraulic hose connection.

15. Ensure machine is in safe operating condition. Keep nuts, bolts and screws tight. Check tine mounting nuts and studs frequently to insure they are tightened to specification.

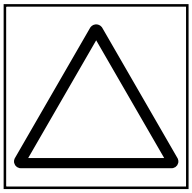
16. Before applying hydraulic pressure to the system, be sure all hydraulic line connectors are tight and hydraulic hoses and lines are in good condition.

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

18. When aerator is removed from tow tractor, always store it on storage stand, positioned on a level surface.

19. To be sure of optimum performance and safety, always purchase genuine TORO replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous. Such use could void the product warranty of The Toro Company.

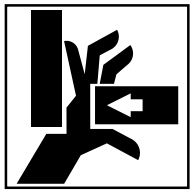
Symbol Glossary



SAFETY ALERT SYMBOL

GENERAL HAZARD SAFETY ALERT

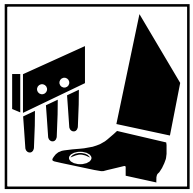
CRUSHING OF WHOLE BODY, APPLIED FROM ABOVE



CRUSHING OF FINGERS OR HAND, FORCE APPLIED FROM SIDE

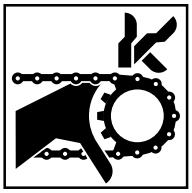
CUTTING OF FINGERS OR HAND

CUTTING OF FOOT



CRUSHING OR PUNCTURE OF FOOT, CORING HEAD

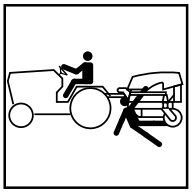
WHOLE BODY ENTANGLEMENT, IMPLEMENT INPUT DRIVE LINE



FINGERS OR HAND ENTANGLEMENT, CHAIN DRIVE

THROWN OR FLYING OBJECTS, WHOLE BODY EXPOSURE

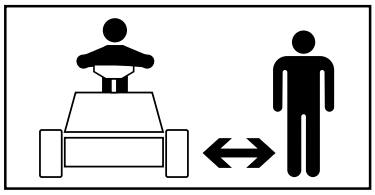
RUNOVER/BACKOVER, GREENS AERATOR



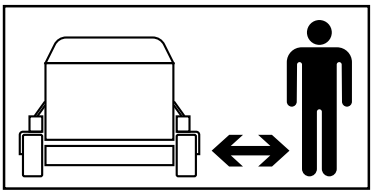
RUNOVER/BACKOVER, HC 4000 AERATOR

SECURE LIFTING CYLINDER WITH LOCKING DEVICE BEFORE GETTING IN HAZARDOUS AREA

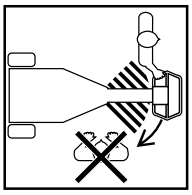
INSERT SAFETY LOCK BEFORE GETTING IN HAZARDOUS AREA



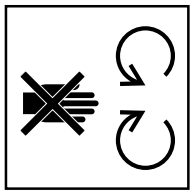
STAY A SAFE DISTANCE FROM MACHINE, GREENS AERATOR



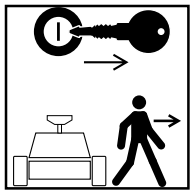
STAY A SAFE DISTANCE FROM MACHINE, HC 4000 AERATOR



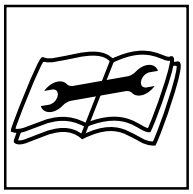
STAY CLEAR OF ARTICULATION AREA WHILE ENFINE IS RUNNING, GREENS AERATOR



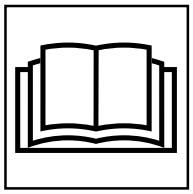
DO NOT OPEN OR REMOVE SAFETY SHIELDS WHILE ENGINE IS RUNNING



SHUT OFF ENGINE & REMOVE KEY BEFORE LEAVING OPERATOR POSITION, GREENS AERATOR



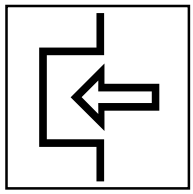
CONSULT TECHNICAL MANUAL FOR PROPER SERVICE PROCEDURES



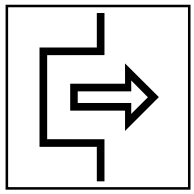
READ OPERATOR'S MANUAL

HEARING PROTECTION MUST BE WORN

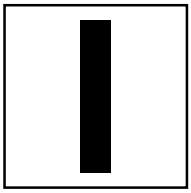
BRAKE SYSTEM



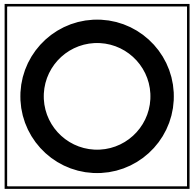
ENGAGE



DISENGAGE

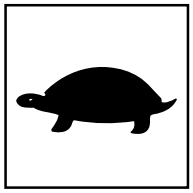


ON/START

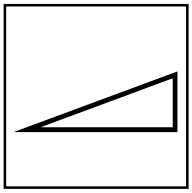


OFF/STOP

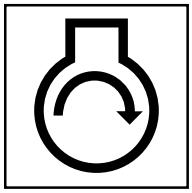
FAST



SLOW



CONTINUOUS VARIABLE, LINEAR

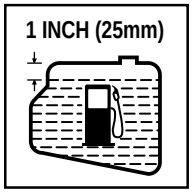


ENGINE START

ENGINE STOP

PARK

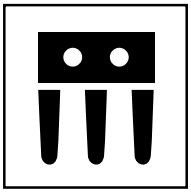
UNLEADED FUEL



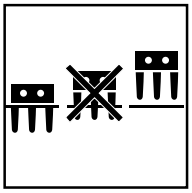
FUEL TANK FILL LINE

LOCK

UNLOCK

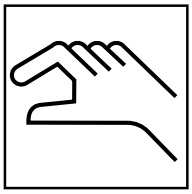


CORING HEAD

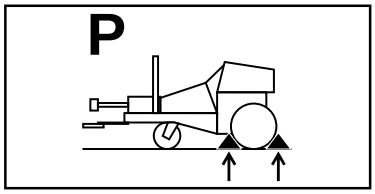


ALWAYS HAVE CORING HEAD FULLY UP FOR TRANSPORT & FULLY DOWN FOR CORING

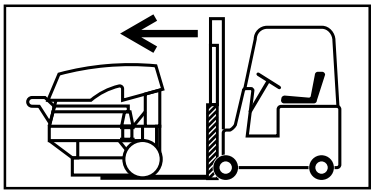
TRACTION DRIVE



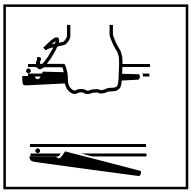
MANUAL



CHOCK WHEELS IN PARKED POSITION, ALWAYS PARK ON LEVEL SURFACE, FAIRWAY AERATOR



ALWAYS FORK FROM FRONT OR REAR OF MACHINE, HC 4000 AERATOR



LEVER OPERATION

Specifications

Type: Semi-mounted tow-behind, PTO-driven, deep coring mechanical turf/fairway aerator.

Tractor Requirements: 18.6–33.6 KW (25–45 hp) @ 540 PTO rpm, category 1, three-point hitch with snubber chains to restrain side movement and a hydraulic system with "Lift" and "Float" control provisions. The tractor should also have provisions for a hydraulic control valve and system pressure relief valve to operate two remote single acting hydraulic cylinders. System pressure should be between 6,895–13,790 kPA (1000 p.s.i. and 2000 p.s.i.)

The hydraulic cylinders, hoses and quick connection coupler are supplied with aerator. The aerator attaches directly to the tow tractor. Therefore, read your tractor operators manual or contact the tractor service agency regarding installation for power take-off driven, semi-mounted implements.

Tractor Attachment: Two pins are provided provided for attaching the lower links of the tractor, and three-point hitch to the aerator . Clamps are provided for rigid mounting. The upper link of the hitch is not used or required. The tractor hydraulic system provides the power to raise the aerator for transport, and provides the "Float" control so the aerator will follow the ground contour. A rack- and- pinion gear, along with a screw-adjustable link maintain attitude control for the aerator. Two caster wheels, out board from the aerator, partially support the weight of the unit. The remaining weight is transferred to the tractor.

Speed: 2.9–3.5 kmh (1.8 to 2.2 mph)—Aerating. 24 kmh (15 mph) maximum—Transport. Transport speed should vary with tractor and terrain.

Maximum PTO Speed: 540 rpm, 1-3⁄8" six-spline drive shaft.

Maximum Top Crankshaft Speed: 400 rpm.

Frame Construction: Welded tubular and structural steel.

Coring Head Construction: Welded structural steel bar and plate.

Tires: 16.5 x 6.5-8 ,6 ply, two wheels mounted on caster forks, out board of frame.

Tire Scrapers: Removes soil build up from each wheel. Adjustable for desired clearance.

Drive Line: Ag-type, telescoping drive shaft with safety shields. Two cardan-type universal joints with ratchet type torque limiting clutch. Quick-lock, toolless coupling, provided at both ends. Grease fittings for lubrication.

Gear Power Train: Spur gear type gear box with provisions for selecting the correct gear ratio to time the aerator's operating speed with the ground speed of the tractor. Two timing gears are required (not included) and must be selected for each individual application. Drive line drivesare completely sealed. All components operate in oil with anti-friction bearing provided.

Right angle gear box with two output shafts, coupled and driven from the gear box. Gear box is fully sealed with all components operating in oil. Hardened and tempered bevel gears with anti-friction bearings.

Two integral gear boxes within the aerator frame drive the flywheel and plungers for the coring tines. Gear boxes are fully sealed with anti-friction bearings and hardened and tempered spur gears operating in oil. These gear boxes are coupled and driven from the right angle gear box previously listed.

Lubrication: All gear boxes are filled at the factory with SAE 80w/90 multi-viscosity gear oil. Each gear case has provisions for checking oil level and drain plugs for servicing its components. A breather is provided to prevent excess pressure for each gear case. Grease fitting are provided to lubricate bearings and suspension components.

Hydraulic System: Two, single-acting hydraulic cylinders provide operation for raising and lowering the aerator. Hydraulic hoses with quick coupler fittings attach to the tractor hydraulic system.

Plungers: Fabricated structural steel tubing, coupled to two flywheel crankshafts to provide controlled entrance and exit of the coring tines into the turf grass. Anti-friction bearings provided. The standard tine holder has provisions for six tines and a optional tine holder

for provisions for two tines.

Turf Guards: Semi-rigid, mounted with compression spring floatation. Rear mounted roller, provides independent floatation and allows turf guard to follow turf grass contour. Adjustable roller scraper removes soil from roller.

Cover: High-density polyethylene material mounted to unit with flexible draw latches to provide a shield from rotating components.

Safety/Transport Stops: Swing-up safety/transport stops prevent accidental lowering of coring head during service or during transport operation.

Storage Stand: Provides support for aerator when removed from tractor and allows quick installation.

Standard Coring Tines: The aerator is assembled with (4) tine holders for (6) tines and matching turf guards. 24 tines are required (not included). Order tines from your Authorized Toro Distributor.

Required Optional Equipment: The aerator is shipped without timing gears due to various tractor tire sizes and ground speed ratio's. The correct timing gears must be determined and selected per the instructions in the Operator's Manual. Order gears from your Authorized Toro Distributor.

Coring Capacity (theoretical) at 2 mph
*(Assumes no reduction in total area due to overlap)

Coring pattern: 6 Tines—1.9cm (¾")
Effective Coring Width : 106 cm.
Total Tine Quantity: 2 rows of 12 = 24
Hole Pattern :8.9 cm " wide x 7.6 cm long
Depth: Up to 10.6 in.
*Sq ft/hr: 11,265 meter^2/hr

Optional Coring pattern: 2 Tines 2.22 cm (⅞")
Effective Coring Width: 106 cm.
Total Tine Quantity: 1 row of 8 tines
Hole Pattern: 13.3 cm wide x 15.24 cm long
Depth: Up to 5 in.
*Sq ft/hr: 2,121 meter^2 /hr

Dimensions:

Length: 121.9 cm
Width: 190.5
Height: 88.9 cm
Weight: 671.8 kg

Before Operating

CHECK 90° GEAR CASE OIL LEVEL

1. With machine on level surface, remove oil fill/dipstick plug from gear case (Fig. 1).

2. Oil level should be to mark indicated on dipstick. If oil is required, add SAE 80-90 (ISO 150/220) gear oil.

3. Install fill plug.

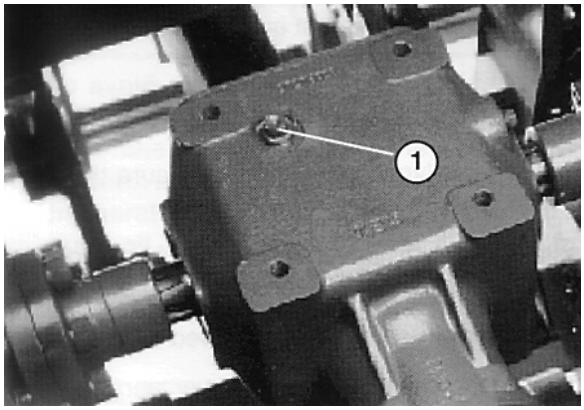


Figure 1
1. Oil fill/dipstick & vent

CHECK GEAR CASE OIL LEVEL

1. At front of aerator, remove (2) plugs from case ports (Fig. 2).

2. Oil level should be to top of each port. If oil is required, add SAE 80–90 (ISO 150/220) gear oil.

3. Install plugs into ports.

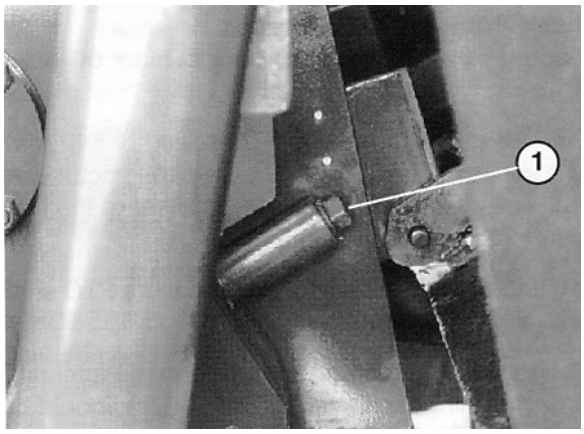


Figure 2
1. Reservoir fill plug (2)

CHECK PICK-OFF GEAR CASE OIL LEVEL

1. Remove cover from pick-off gear case (Fig. 3).

2. Oil level should be at midway point of lower gear shaft. Should oil be needed, add SAE 80-90 (ISO 150/220) gear oil.

3. Replace gear case cover.

TIMING THE AERATOR OPERATING SPEED TO THE TRACTOR

Tractor Preparation

To operate the aerator, the tractor must meet the following:

1. PTO rpm must be 540. It is desirable to have a tachometer on tractor to record speed.

2. With PTO operating at 540 rpm, a transmission gear must be selected that allows tractor to travel 30.48 meters within 30–38 seconds.

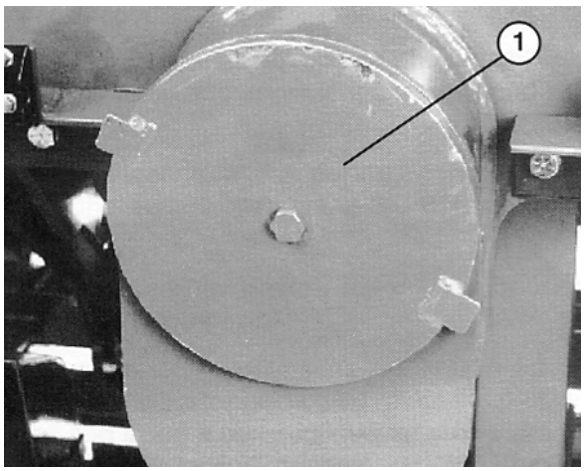


Figure 3
1. Pick-off gear case cover

To Check Tractor Ground Speed:

1. Find a test area and measure and mark off 30.5 meters.

2. Operate tractor engine at PTO speed of 540 rpm. Select a transmission gear and operate the tractor over the test area (with or without aerator). Record the time necessary to travel 30.5 m.

Note: If tractor lacks a tachometer, measure PTO shaft rpm with a hand tachometer.

3. Make three passes and record the time intervals. Average operating time over 30.5 should be between 30–38 seconds. If the time average is not within 30-38 seconds, select another transmission gear and recheck until the average falls within time limits.

IMPORTANT: Use the same tractor transmission gear and PTO rpm settings whenever operating the aerator. Never operate aerator in any other gear except the one the tractor was timed in.

Preparing the Aerator:

Select the proper timing gears for the aerator pick-off gear case. (Gears must be obtained from your Authorized Toro Distributor.) Use the following chart to determine which gears to use:

		Gears	
	Sec./30.5 m.	Driver	Driven
Increasing Hole Spacing	42.3	30	40
	39.9	31	39
	37.7	32	38
	35.5	33	37
	33.6	34	36
	31.7	35	35
Decreasing Hole Spacing	30.0	36	34
	28.3	37	33
	26.7	38	32
	25.2	39	31
	23.8	40	30

IMPORTANT: Selected number of gear teeth for the driver and driven gears must add up to 70.

Gear Installation:

1. Remove pick-off gear case cover (Fig. 21).

2. Remove the lynch pins used to secure the driver and driven gears.

3. Install driver and driven gears matching indicated chart time and secure with lynch pin.

Note: Number of gear teeth is stamped on the gear.

4. Install gear case cover and lower aerator cover. Verify timing of the aerator/tractor.

Operation

TRAINING PERIOD

Before using the aerator, find a clear area to practice using the machine. Operate the tractor at recommended gear setting and PTO speed and become thoroughly familiar with machine handling. Practice stopping and starting, raising and lowering the aerator, disengaging the PTO and aligning the machine with previous passes. A practice session assures confidence in the performance of the aerator and helps ensure use of proper operating techniques wherever the machine is operated.

To prevent turf damage, always make sure tractor is moving and PTO is engaged when raising or lowering the aerator.

When aerating, three point lift system to be in "FLOAT" position.

⚠ CAUTION

To avoid personal injury, never leave the tractor seat without first setting the parking brake and disengaging the PTO. Nver perform aerator repairs without first lowering the aerator onto transport/safety stops. Be sure all safety devices are secured in the correct place before resuming operation.

BEFORE AERATING

Make sure the hydraulic hose is clear of tractor and machine components to avoid damage, and all safety shields are secured in place. Inspect the area of operation for hazards that could damage the machine and remove them, if possible, or plan how to avoid them. Carry replacement tines and tools to effect repairs should tines contact foreign materials.

CAUTION: Do not leave machine unattended and to avoid personal injury do not work on machine while it is running.

VERIFY TIMING BETWEEN THE TRACTOR AND AERATOR

1. Raise aerator, set parking brake, stop engine and lower safety/transport stops.

2. With transmission in correct gear selection, lower and operate the aerator a short distance, then raise aerator, disengage PTO and stop tractor. Set parking brake.

   IMPORTANT: Never operate the tractor PTO in excess of 540 rpm or damage to the aerator could occur.

3. In direction of machine travel, measure the distance between tine holes (one tine penetration stroke to another). Depending on tine selection, the distance should be:
   2.2 cm tines–14.6 to 15.2 cm.
   7.3 cm tines–7.3 to 7.62 cm

   Note: Condition of the turf around the holes can also indicate how well the tractor speed is matched to the aerator. If the rear of the tine holes are torn, the tractor speed is too slow. If the front of the tine holes are torn, the tractor speed is too fast.

4. If the spacing is too short (coring speed too fast), increase the hole spacing; substitute the driver gear with a gear having less teeth and the driven gear with one having more teeth. If hole spacing is too long (coring speed too slow), dri-

ver gear teeth quantity should be increased and driven gear teeth decreased; see gear selection chart.

5. Operate the machine again and repeat steps 1–4**.**

IMPORTANT: Timing can sometimes be fine tuned by gradually regulating tractor tire pressure. Lowering tire pressure will provide closer spacing and raising tire pressure will increase the spacing.

CAUTION: Do not exceed the maximum or minimum inflation pressures as recommended by tire manufacturer.

AERATING PROCEDURES

When the tractor reaches proper ground speed, lower the aerator. The aerator can be operated in slight curves, but for best results operate in a straight line. If the machine must be turned sharply, raise the aerator and disengage the PTO. Otherwise, severe turf damage will result and the machine may also be damaged.

Look behind frequently to ensure the machine is operating properly and alignment is maintained with previous passes.

Should the driveline ratchet during operation:

1. Raise the aerator, disengage the PTO and stop immediately.

2. Set the parking brake, lower aerator onto safety/transport stops.

3. Inspect the turf to determine the reason for the ratcheting or tine breakage. Locate where the problem occurred and insert a non-conductive probe into the aerator holes. If foreign material beneath the turf caused the damage, mark the location so the material can be either removed or avoided in future. If the ratcheting occurred because turf was too hard to penetrate, raise depth of penetration and try aerating the area again. Be sure all machine damage has been corrected before resuming operation; refer to step 5**.**

4. Always clear the area of all damaged machine parts, such as broken tines, etc., to prevent their being picked up by mowers or other turf maintenance equipment.

5. Replace broken tines, and inspect and correct damage to those still useable. Repair any other machine damage before commencing operation.

TRANSPORT OPERATION

To begin transport operation, raise the aerator, disengage the PTO and set the parking brake. Raise safety/transport stops and lower aerator onto stops. To avoid loss of control, traverse steep inclines slowly, approach rough areas at reduced speed and cross severe undulations carefully.

Important: Do not exceed transport speeds of 24 kmh on smooth level terrain. use slower speed for more adverse conditions.

INSPECTION AND CLEAN-UP AFTER USE

After each use, thoroughly wash the machine with a garden hose without a nozzle so contamination and seal and bearing damage due to excessive water pressure will be avoided. A brush may be used to remove caked—on material. Use a mild detergent soap to clean the cover. After cleaning, inspect for machine damage, gear oil leakage, component and tine wear.

CHANGING TINES

1. Raise aerator, disengage the PTO and set the parking brake. Raise safety/transport stops and lower aerator onto stops.

2. Loosen locknuts securing tines and remove tines (Fig.4).

3. Install replacement tines and tighten the locknuts to secure the tines in position.

4. If slotted tines are used, slots should face forward for front row of tines and rearward for rear row of tines. The cores from these tines are ejected thru the slots, not thru the holes in the tine holders

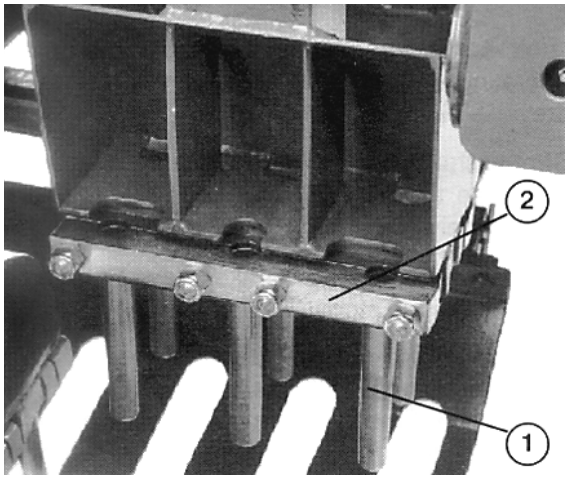


Figure 4

1. Tine block
2. Time

STOMPER ASSEMBLIES

IMPORTANT: Within the first five hours of initial machine operation and every 25 hours operation thereafter, all stomper assemblies must be checked for excessive lateral play. This must be done or major machine component failure may result. Refer to *Checking Stomper Assemblies.*

OPERATING TIPS

1. Gradually engage PTO at low engine speed and throttle up to 540 PTO RPM before lowering aerator.

2. Make very gradual turns when aerating. Never make sharp turns.

3. If tractor "bogs" down when operating on hard ground or going uphill, raise aerator slightly until speed is regained, then lower again.

4. Do not aerate if ground is too hard or dry. Best results are obtained after a rain or when turf has been watered the previous day.

5. Raise coring head penetration, if ground is hard packed. Clean-up cores and re-aerate at deeper penetration, preferably after watering.

6. Store aerator on stand provided whenever it is removed from tractor.

Lubrication

GREASING BEARINGS AND BUSHINGS

The HC 4000 Aerator has grease fittings that must be lubricated regularly with No. 2 General Purpose Lithium Base Grease. If machine is operated under normal conditions, lubricate bearings and bushings after every 25 hours of operation or prior to storage. Grease stomper arm bearings daily.

The lubrication points are: Cylinder pivot-upper (2) (Fig. 5); Cylinder pivot-lower (2), stabilizer bar (4), trailing arm (4), finger plate pivot linkage (4) (Fig. 6); Gear box support tube (1), stomper assy. (4), gear box couplings (2) (Fig. 7); castor wheel bearings and pivot shaft mount (4), trailing arm (2), roller (2) (Fig. 8); Trunnion adjuster (2) (Fig. 9) and Drive line (5) (Fig. 10).

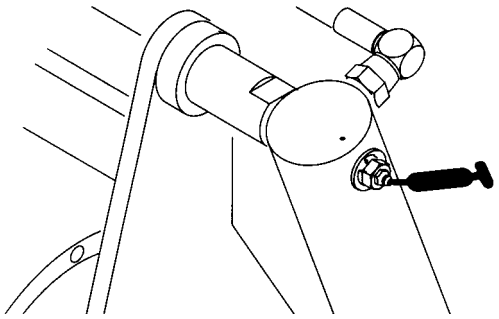


Figure 5

1. Wipe grease fitting clean so foreign matter cannot be forced into the bearing or bushing.

2. Pump grease into the bearing or bushing.

3. Wipe up excess grease.

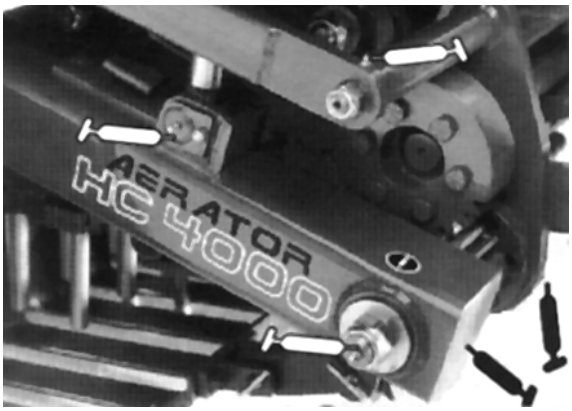


Figure 6

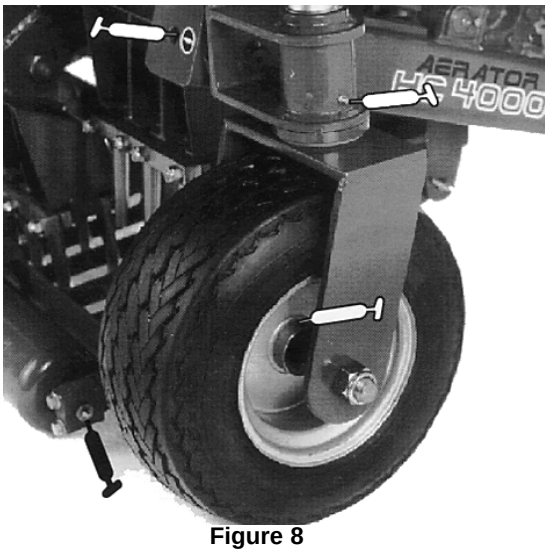


Figure 8

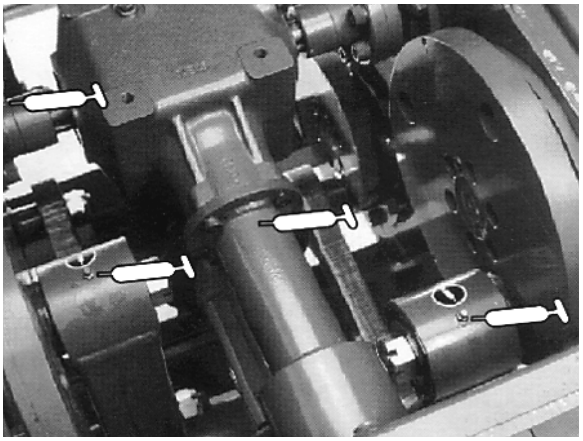


Figure 7

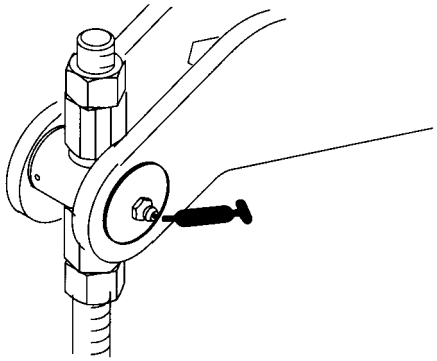


Figure 9

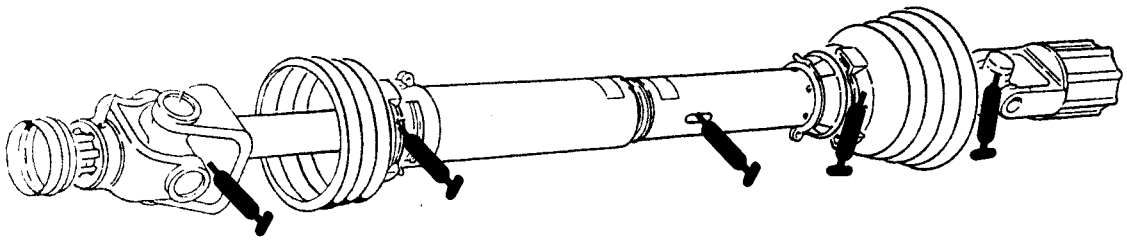


Figure 10

Note: It is a good practice to lubricate grease fittings after washing machine.

4. To lubricate the center grease fitting on drive shaft assembly, the aerator must be in the raised (transport) position, to gain access thru slots in shields.

CHECK GEAR CASE OIL LEVEL

Every 25 hours operation, or seasonally, whichever comes first, check oil level in each gear case.

1. At front of aerator, remove (2) plugs from gear case ports (Fig. 11).

2. Oil level should be to the top of each port. If oil is required, add SAE 80-90 (ISO 150/220) gear oil.

Note: Under normal conditions the gear case oil level should not drop. If oil level is low, check for signs of leakage and correct, as necessary. Should major failure of gearbox components occur, drain the gear oil, flush the gear cases and install fresh oil. The oil drain plug is located on bottom of each gear case.

3. Make sure end of gear case vent tube is open and clean (Fig. 12).

CHECK 90° GEAR CASE OIL LEVEL

1. With the machine on a level surface, remove the oil fill/dipstick plug (Fig. 13).

2. Add SAE 80-90 (ISO 150/220) gear oil, if needed, and install the fill plug.

Note: Under normal conditions the gear case oil level should not drop. If oil level is low, check for signs of leakage and correct, as necessary. Should major failure of gearbox components occur, drain the gear oil, flush the gear case and install fresh oil. The oil drain plug is located on bottom of gear case (Fig. 14).

3. Make sure vent hole in oil fill/dipstick plug is open and clean.

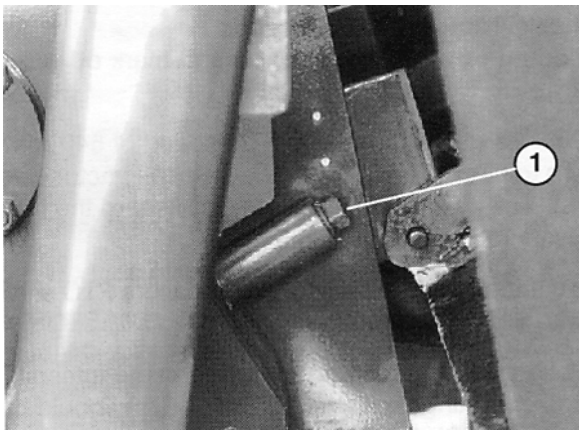


Figure 11

1. Reservoir fill plug (2)

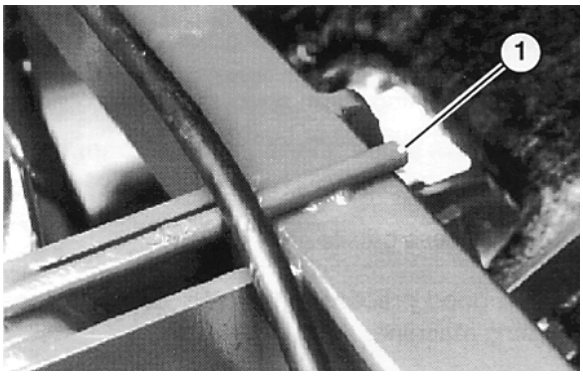


Figure 12

1. Vent tube

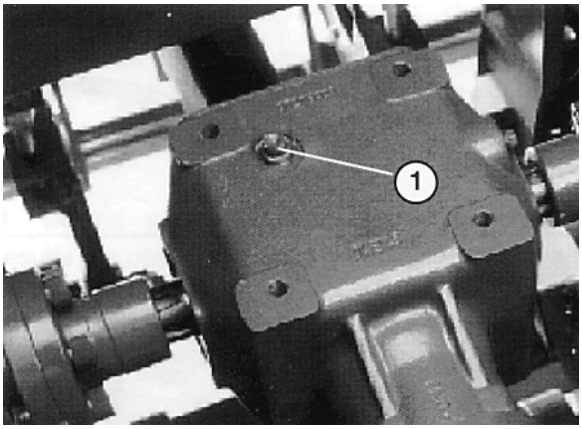


Figure 13

1. Oil fill/dipstick

CHECK PICK-OFF GEAR CASE OIL LEVEL

Every 25 hours operation, or seasonally, whichever comes first, check oil level in the pick-off gear case.

1. With the machine on a level surface, remove the gear case cover (Fig. 15).

2. The oil level should be to the center of the lower gear shaft. If the level is low, add SAE 80–90 (ISO 150/220) gear oil and install the cover.

Note: Should major failure of pick-off gear case components occur, the gear oil will be contaminated and should be drained. Flush the gear case and add fresh oil. The gear case oil drain plug is located below cover on front of case (Fig. 16).

3. Make sure end of gear case vent tube is open and clean (Fig. 17).

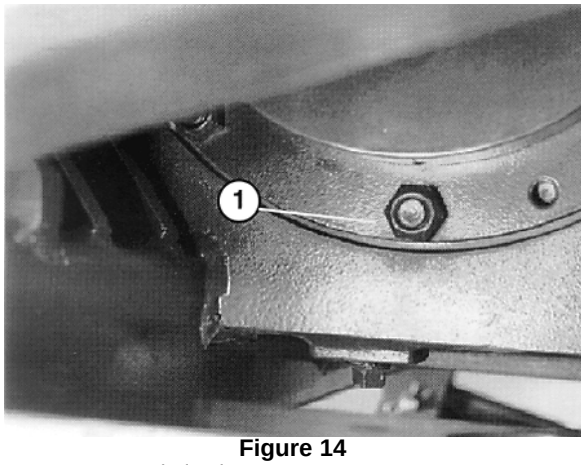


Figure 14
1. Gear case drain plug

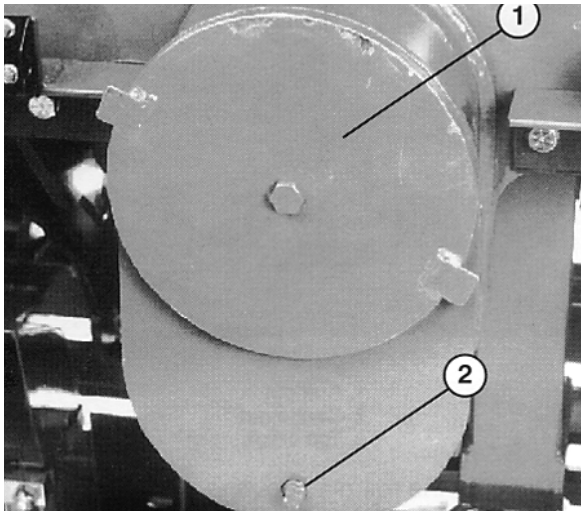


Figure 15
1. Gear case cover
2. Gear case drain plug

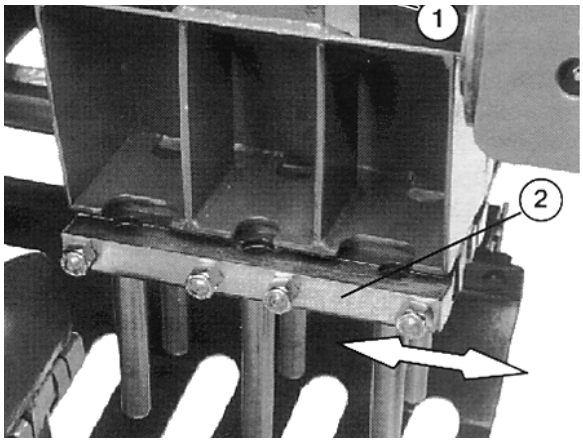


Figure 16
1. Stomper assembly
2. Move laterally—both directions

Maintenance

CHECKING STOMPER ASSEMBLIES

Within the first five hours of initial machine operation and after every 25 hours of operation thereafter, all stomper assemblies must be checked for excessive lateral play. This must be done or major machine component failure may result.

1. Grasp each stomper assembly at the bottom and try to move the assembly laterally in each direction (Fig. 16). Do not move fore and aft. There should be little or no movement of the assembly. If there is movement, proceed to step 2. If there is little or no movement, proceed to check the next assembly.

2. Remove the roll pin securing the castle nut to the top crankshaft (Fig. 17). Check the castle nut for tightness with fingers. If the nut is very loose, rotate it clockwise until it is flush against the outer spacer and resistance is felt.

3. Using a torque wrench, rotate the nut clockwise (tighten) until a slot in the nut aligns with the shaft hole. Do not exceed 54 Nm (40 ft—lb.). Re-install the roll pin.

Note: The shaft is cross drilled, therefore only 1⁄12 turn (max) should be required to align roll pin hole.

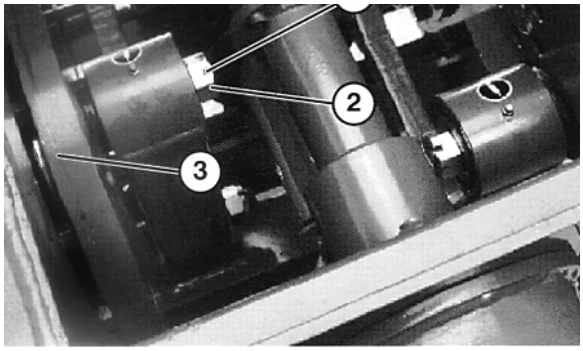


Figure 17

1. Roll pin
2. Castle nut
3. Top crank

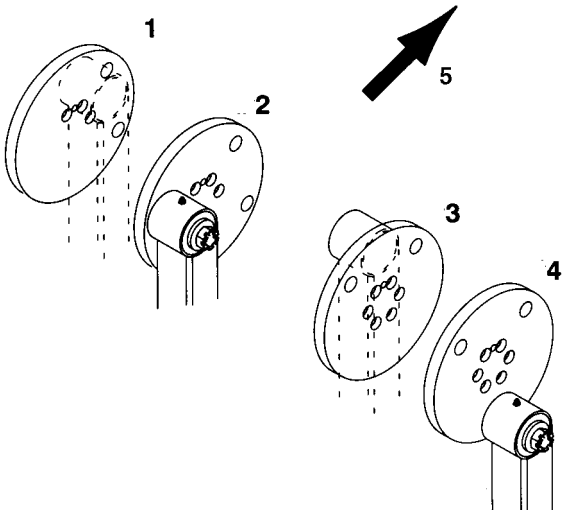


Figure 18

1. 3 o'clock position
2. 9 o'clock position
3. 12 o'clock position
4. 6 o'clock position
5. Front

GENERAL MAINTENANCE

After each use of the machine and when clean-up is completed, perform the following:

Examine tines for damage and sharpness and repair or replace, as necessary.

1. Inspect closely for signs of leakage, excessive component wear or component damage. Repair or replace, as necessary.

2. Thoroughly wash the machine with a garden hose without a nozzle so contamination and seal and bearing damage due to excessive water pressure will be avoided. A brush may be used to remove caked—on material. Use a mild detergent soap to clean the cover. After cleaning, inspect for machine damage, gear oil leakage, component and tine wear.

AERATOR GEAR CASE TIMING TIPS

If disassembly of the Aerator drive system is required for mainte-

nance, the unit will need to be re-timed to ensure machine balance, equal loading of tine arms and optimum hole quality. There are two separate procedures to properly time the aerator gear cases. Use the following tips for each procedure when reassembling gear case.

A. Timing upper and lower crank shafts on each individual gear case

1. The upper and lower crankshaft flywheels for each Tine arm must be assembled so the offset shafts are located in the same “clock” position. If upper offset shaft is positioned at 12 o’clock, then lower offset shaft must be at 12 o’clock position.

2. To achieve the proper “clock” position for each gear case, install Timing Bar (supplied with machine) to the upper and lower crankshaft by aligning each roll pin and securing with socket head capscrew.

B. Synchronizing gear cases

1. The tine arms are numbered 1 to 4 from left to right, as viewed from rear of machine. Each of the two gear cases must be connected to each other in a proper phase to ensure only one set of tines will enter the turf at a time.

2. Rotate the number 1 tine arm to the 3 o’clock lowest position as a starting point (Fig.). When viewed from the left side of the aerator, the remaining tine arms should be in the 9 o’clock, 12 o’clock and 6 o’clock positions respectively.

IDENTIFICATION AND ORDERING

MODEL AND SERIAL NUMBERS

The HC 4000 aerator has two identification numbers: a model number and a serial number. The two numbers are stamped into a plate which is located on the upper rear frame channel. In any correspondence concerning the mower, supply the model and serial numbers to assure that correct information and replacement parts are obtained.

To order repIacement parts from an authorized TORO Distributor, supply the foIlowing information:

1. Model and serial numbers of the machine.

2. Part number, description and quantity of parts desired.

Note: Do not order by reference number if a parts cataIog is being used; use the part number.