FORM NO. 3311-880

TORO®

TRACTION UNIT MODEL:
30790 — 20001 & UP

OPERATOR'S MANUAL

GROUNDSMASTER® 62 TWIN

TORO®
THIS UNIT CONFORMS TO ANSI B71.4 - 1980

To assure maximum safety, optimum performance, and to gain knowledge of the product, it is essential that you or any other operator of the mower read and understand the contents of this manual before the engine is ever started. Pay particular attention to the SAFETY INSTRUCTIONS highlighted by this symbol —

The safety alert symbol means CAUTION, WARNING or DANGER — personal safety instruction. Failure to comply with the instruction may result in personal injury.

PRICE $3.00

FOREWORD

The GROUNDSMASTER® 62 was developed to satisfy the demand for a maneuverable, intermediate size, turf maintenance rotary mower. The machine has advanced concepts in engineering, design and safety; and if maintained properly, it will give excellent service.

Since the GROUNDSMASTER® 62 is a high-quality product, Toro is concerned about the future use of the machine and safety of the user. Therefore, read this manual to familiarize yourself with proper set-up, operation and maintenance instructions. The major sections of the manual are:

1. Safety Instructions
2. Set-Up Instructions
3. Before Operating
4. Operating Instructions
5. Maintenance

The hydrostatic transmission and axle are not covered in great detail in this manual. However, service manuals are available from the respective manufacturers.

A hydrostatic axle service manual (bulletin no. 5323) can be obtained from:

Dana Corporation
Spicer Clutch Division
Diversified Products
P.O. Box 191
Auburn, Indiana 46706

And a hydrostatic transmission service manual (bulletin no. 9646) and a repair manual (bulletin no. 9659) can be obtained from:

Sundstrand Corporation
2800 East 13th Street
Ames, Iowa 50010

Certain information in this manual is emphasized. DANGER, WARNING and CAUTION identify personal safety-related information. IMPORTANT identifies mechanical information demanding special attention. Be sure to read the directive because it deals with the possibility of damaging a part or parts of the machine. NOTE identifies general information worthy of special attention.

OPTIONAL SPARK ARRESTER MUFFLER

In some areas there are local, state or federal regulations requiring that a spark arrester muffler be used on the engine of this mower. If a spark arrester muffler is required, order the following parts from your local Authorized TORO Distributor.

(1) 46-2390 Spark Arrester Muffler Assembly

These parts are approved by the United States Department of Agriculture and Forestry. The approval number for the exhaust system is 18731.

When mower is used or operated on any California forest, brush or grass covered land, a working order spark arrester muffler must be used. If not, the operator is violating state law, Section 4442 Public Resources Code.

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.

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SAFETY INSTRUCTIONS

This safety alert symbol means CAUTION, WARNING or DANGER – "personal safety instruction". Read and understand the instruction because it has to do with safety. Failure to comply with the instruction may result in personal injury.

The GROUNDSMASTER® 62 TWIN has been tested and verified for compliance with the B71.4 - 1980 specifications of the American National Standards Institute. However, improper use or maintenance by the owner or operator of the machine can result in injury. To reduce the potential for injury, follow these safety instructions.

BEFORE OPERATING

1. Read and understand the contents of this Operator's Manual before starting and operating the machine. Become familiar with all controls and how to stop quickly. A replacement manual is available by sending complete Model and Serial Number to:

   The Toro Company
   8111 Lyndale Avenue South
   Minneapolis, Minnestoa 55420

2. Never allow children or adults unfamiliar with it's operation to operate the machine, and keep everyone, especially children and pets, away from the area of operation.

3. Remove sticks, stones, wire and any other debris or objects that might be picked up and thrown by the cutter blades.

4. Keep all shields and safety devices in place. If a shield, safety device or decal is defective or damaged, repair or replace it before operation is commenced. Also, tighten any loose nuts, bolts and screws to make sure machine is in safe operating condition.

5. Do not operate machine while wearing sandals, tennis shoes, sneakers or shorts. Also, do not wear loose fitting clothing because it 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.

6. Be sure interlock switches are adjusted correctly so engine cannot be started unless traction pedal is released – neutral position – and PTO lever is in DISENGAGE position.

7. Fill fuel tank with gasoline before starting the engine. Avoid spilling any gasoline. Since gasoline is highly flammable, handle it carefully – DO NOT SMOKE.

   A. Use an approved gasoline container.
   B. Do not fill tank while engine is hot or running.
   C. Do not smoke while handling gasoline.
   D. Fill fuel tank outdoors and up to about one inch (25 mm) from top of the tank, not the filler neck.
   E. Wipe up any spilled gasoline. Install gasoline container cap and machine fuel tank cap securely before starting the engine.

WHILE OPERATING

8. Do not run the engine in a confined area without adequate ventilation. Exhaust fumes are hazardous and could possibly be deadly.

9. Maximum seating capacity is one person. Never carry passengers.

10. Sit on the seat when starting the engine and operating the machine.

11. When starting the engine:

   A. Engage parking brake.
   B. Be sure traction pedal is in neutral and PTO is in disengage position.
   C. After engine is started, release parking brake and keep foot off traction pedal. Machine must not move. If movement is evident, the neutral return mechanism is adjusted incorrectly; therefore, shut engine off and adjust until machine does not move when traction pedal is released.

12. Using the machine demands attention, and to prevent loss of control:

   A. Mow only in daylight or when there is good artificial light.
   B. Watch for holes or other hidden hazards.
   C. Do not drive close to a sand trap, ditch, creek or other hazard.
   D. Reduce speed when making sharp turns and when turning on hillsides.
   E. Avoid sudden stops and starts.
   F. Before backing up, look to the rear to be sure no one is behind the machine.
   G. Watch out for traffic when near or crossing roads. Always yield the right-of-way.

SAFETY INSTRUCTIONS

13. The grass deflector must always be installed on the cutting unit. If the cutting unit discharge area ever plugs, disengage PTO and shut engine off. Use a stick to remove the obstruction.

14. Never raise the cutting unit while the blades are rotating.

15. If the cutting blades strike a solid object or the machine vibrates abnormally, disengage PTO, move throttle to SLOW, set parking brake and shut engine off. Remove key from switch and disconnect high tension wires from spark plugs to prevent possibility of accidental starting. Check cutting unit and traction unit for damage and defective parts. Make all repairs before restarting the engine and operating the cutting unit. Make sure blades are in good condition and blade bolts are tight.

16. Cut grass slopes carefully. When going uphill or downhill do not start or stop suddenly.

17. Do not touch engine, muffler or its adjacent shroud while engine is running or soon after it is stopped because these areas could be hot enough to cause a burn.

18. Lower the cutting unit or other attached implement to the ground and remove key from switch whenever machine is left unattended.

19. Before getting off the seat:

A. Move traction pedal to neutral position and remove foot from pedal.

B. Set the parking brake and disengage the PTO.

C. Shut the engine off and remove key from ignition switch. Wait for all movement to stop before getting off the seat.

MAINTENANCE

20. Remove key from ignition switch and disconnect high tension wires from spark plugs to prevent accidental starting of the engine when servicing, adjusting or storing the machine.

21. Perform only those maintenance instructions described in this manual. If major repairs are ever needed or assistance is desired, contact an Authorized TORO Distributor.

22. To reduce potential fire hazard, keep the engine free of excessive grease, grass, leaves and accumulations of dirt.

23. Be sure machine is in safe operating condition by keeping nuts, bolts and screws tight. Check the blade mounting bolts frequently to be sure they are tight (75 to 100 ft-lb) (102 to 136 N·m).

24. If the engine must be running to perform a maintenance adjustment, keep hands, feet, clothing and other parts of the body away from the PTO shaft, cutting unit blades and other moving parts.

25. Do not overspeed the engine by changing governor settings. Maximum engine speed (with engine coupled to transmission) is 3200-3300 rpm. To ensure safety and accuracy, have an Authorized TORO Distributor check maximum engine speed with a tachometer.

26. Engine must be shut off before checking oil or adding oil to the crankcase.

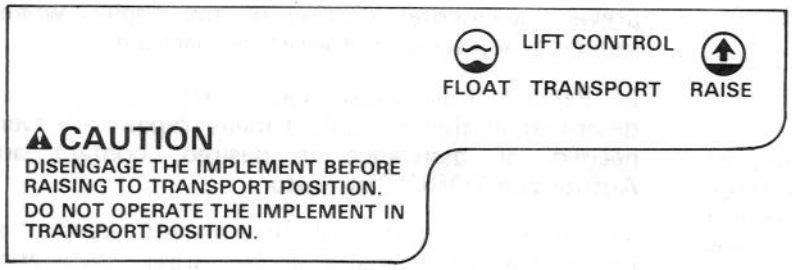
27. At the time of manufacture the GROUNDSMASTER® 62 TWIN conformed to safety standards in effect for riding mowers. Therefore, to ensure optimum performance and safety, always purchase genuine TORO® replacement parts and accessories. NEVER USE "WILL-FIT" REPLACEMENT PARTS AND ACCESSORIES MADE BY OTHER MANUFACTURERS. Using unapproved replacement parts and accessories could void the warranty of The Toro Company.

⚠ CAUTION

1. **KEEP ALL SHIELDS IN PLACE.**
2. **BEFORE LEAVING OPERATOR'S POSITION.**
   - **A. MOVE TRANSMISSION TO NEUTRAL.**
   - **B. SET PARKING BRAKE.**
   - **C. DISENGAGE ATTACHMENT CLUTCH.**
   - **D. SHUT OFF ENGINE.**
   - **E. REMOVE IGNITION KEY.**
3. **WAIT FOR ALL MOVEMENT TO STOP BEFORE SERVICING MACHINE.**
4. **KEEP BYSTANDERS FROM AREAS BEING MOWED.**

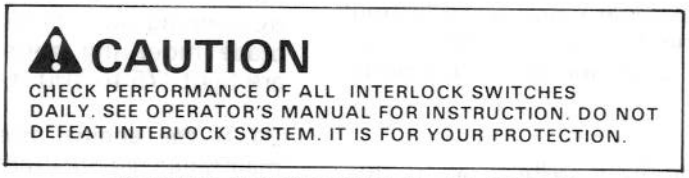
SAFETY AND INSTRUCTION DECALS

The following decals are installed on the machine. If any become damaged or illegible, replace it. The decal part number is listed below and in your parts catalog. Replacement can be ordered from your Authorized Toro Distributor.

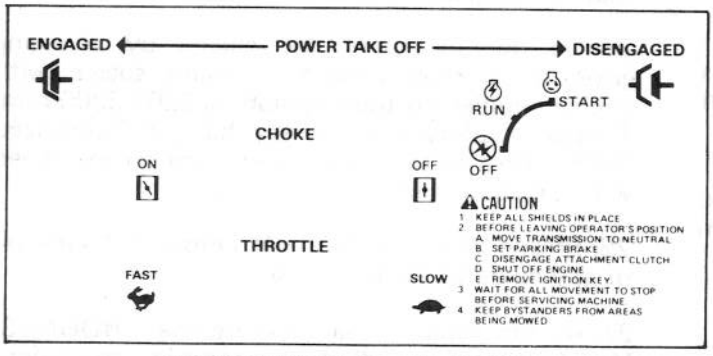


AROUND LIFT CONTROL LEVER (Part No. 27-4390)

ALONGSIDE FUEL TANK (Part No. 27-7310)

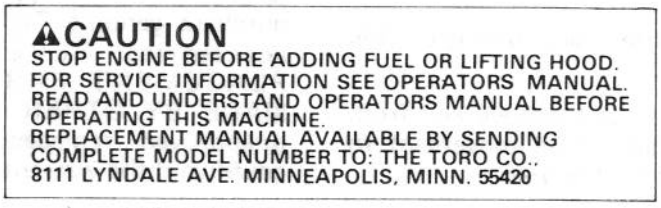


FORWARD OF LIFT LEVER (Part No. 28-3290)

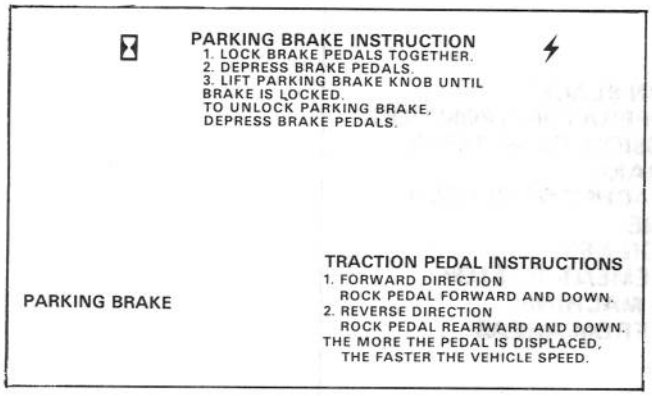


CONTROL PANEL (Part No. 44-9370)

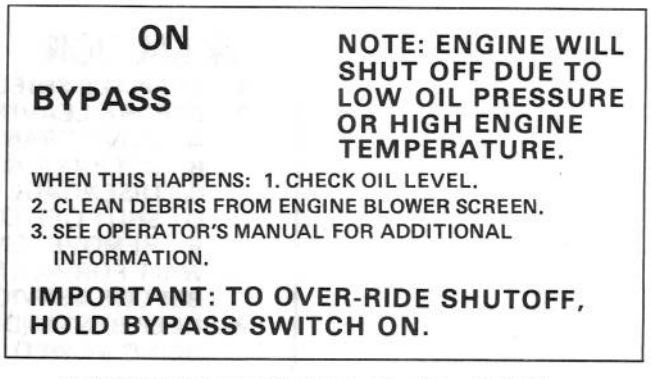
ON GAS TANK (Part No. 43-8480)



LEFT SIDE OF SEAT (Part No. 27-4620)



AROUND STEERING COLUMN (Part No. 41-8910)



FRONT OF CONTROL PANEL (Part No. 46-3460)

SPECIFICATIONS

Engine:
Manufacturer – Onan
Model – B48G-GA020 Type – 4051C
Horsepower – 20 (14.9 kw) @ 3600 RPM.
Torque – 32 lb-ft (43.3 N·m) @ 2700 RPM.
Displacement – 47.7 cu. in. (782 cc).
Crankcase Capacity – 1.8 qt (1.7 L).
Governor – Mechanical.
Governor Limit – 3100-3300 RPM.
Idle Speed – 1500 RPM.
Spark Plug – Champion RBN-13Y
Air Gap – 0.025 in. (0.64 mm).

Air Cleaner: Donaldson heavy duty with pre-cleaner. Remote mounted.

Fuel Tank Capacity: 6 gal (22.7 L).

Electrical:
Battery – 12 volt, 42 plate. 15 amp alternator with regulator/rectifier.

Drive Coupling: Transmission driven by steel shaft with flexible rubber couplings at each end.

Transmission:
Manufacturer & Type – Sundstrand hydrostatic, Type U.
Normal Charge Pressure – 70-150 psi (483-1034 kPa).
Implement Relief Setting – 700-800 psi (4 826 - 5 516 kPa).

Hydraulic Filter: 25 micron mounted directly to transmission. Replaceable (Toro Part No. 23-2300).

Drive Axle: Manufacturer – Dana Corp., Model GT-20. Used as hydraulic reservoir with approx. 5 qt. (4.7 L) capacity. Mates directly with transmission.

Brakes: Mechanical drum type, 7 in. (17.8 cm) dia. x 1-3/4 in. (45 mm) wide. Individually controlled by two pedals connected by cable and conduit for steering assist. Pedals may be latched together for two wheel braking. Lever provided for parking brake.

Tires, Wheels, Pressure:
Wheels – demountable type.
Front Tires – 20 x 8.00 x 10.
Rear Tires – 15 x 6.00 x 6.
All tires 4 ply rating, tubeless type.
(Pressure – 10-15 psi (69-103 kPa).

Steering: 15 in. (38 cm) steering wheel. Saginaw Automotive steering gear assembly.

Main Frame: Frame is welded, formed steel, reinforced with square tubing.

Gauges: Hour meter and ammeter are mounted on steering tower console.

Controls: Throttle, choke, PTO lever, parking brake, implement lift, ignition switch, and low oil pressure or high cylinder head temperature by-pass switch are all hand-operated. Traction pedal and brakes are foot operated.

PTO Drive: 1 in. (25 mm) diameter, splined PTO shaft is driven by HA Section Torque Team tight-slack V-belt directly from engine output shaft. PTO shaft clutched by pivoting PTO shaft support with spring loaded, over-center hand operated lever. PTO speed – 2269 RPM @ 3300 RPM engine speed.

Implement connection – Weasler universal joint and telescoping shaft assembly.

Lift Cylinders: Two, with 1-1/2 in. (38 mm) bore, 4 in. (102 mm) stroke.

Control Valve: Equipped with load check valves to prevent settling of implement.

Interlock Switches: Prevents engine starting if traction pedal or PTO levers are engaged. Stops engine if operator leaves seat with either traction pedal or PTO levers engaged.

Dimensions and Weight (approx):

Traction Unit w/Standard Seat	Length:	78 in. (1.96 m)
	Width:	42 in. (1.067 m)
	Height:	48 in. (1.22 m)
	Weight:	810 lb (367.4 kg)

OPTIONAL EQUIPMENT:

52" Cutting Unit – Model No. 30560
52" Cutting Unit – Model No. 30545
52" Cutting Unit – Model No. 30555
62" Cutting Unit – Model No. 30562
V-Plow – Model No. 30750.

V-Plow Mounting Kit – Model No. 30755 (Required for mounting V-Plow). Consists of push arm, attaching brackets and tire chains.

Wheel Weights – Model No. 30762. 100 lb (45.4 kg).

Rear Weight Kit – Part No. 24-5780. 70 lb (31.8 kg).

Tire Chains – Part No. 28-5470. 20 lb (9.07 kg).

Standard Seat Kit – Model No. 30765.

Deluxe Seat Kit – Model No. 30766.

SPECIFICATIONS

48 in. (1.219 m) Snowthrower – Model No. 30570.

48 in. (1.219 m) Snowthrower Adapter Kit – Model No. 30572.

Note: The following parts are required to mount a snowthrower, V-Plow or broom to a Model 30790 traction unit. The lift arm is not required to install the V-Plow.

Part No.	Description	Qty
27-4270	Lift Arm	1
27-5270	Brake Spring Strap	2
3272-12	Cotter Pin	2

LOOSE PARTS

Note: Use this chart as a checklist to make sure all parts have been received. Without these parts, total set-up cannot be completed.

DESCRIPTION	QTY.	USE
Dust Cover	1	Install on steering column.
Steering Wheel	1	Mount on steering shaft.
Cap-steering wheel	1	Install in wheel.
Roll Pin 1/4 x 2-1/2 in. (64 mm)	1	Secure steering wheel.
Cylinder Pin	2	Secure frame to lift cylinders.
Cotter Pin 3/16 x 1-1/2 in. (38 mm)	4	Secure cylinder pins.
Brake Springs	2	Use to mount cutting unit.
Operator's Manual	1	
Parts Catalog	1	
Engine Manual	1	
Registration Card	1	
Set-Up Report Card	1	

SET-UP INSTRUCTIONS

INSTALL STEERING WHEEL

1. Move rear wheels so they point straight ahead.

2. Slide dust cover and steering wheel onto steering shaft and assure small cutout in hub, which accommodates the tab on the steering cap, points toward the seat.

3. Secure steering wheel in place with roll pin (Fig. 1).

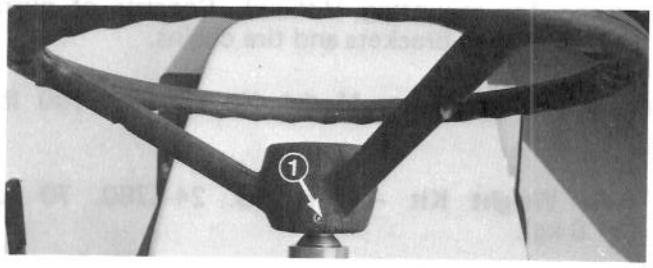


Figure 1

1. Roll pin

4. Insert tab of steering cap into cutout in steering wheel hub. Then continue to press cap into groove in the hub.

INSTALL STANDARD SEAT

1. Loosely secure seat springs to seat with (4) capscrews and lockwashers (Fig. 2).

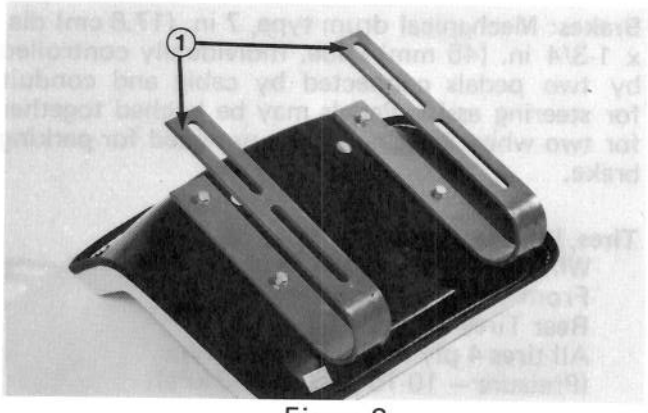


Figure 2

1. Seat springs

2. Mount seat and springs to rear holes in mount plate with (2) shoulder bolts, flatwashers and locknuts (Fig. 3).

3. Secure front slots of seat springs to mount plate with adjustment handles and flatwashers (Fig. 3).

4. When seat is adjusted to desirable position, tighten all fasteners.

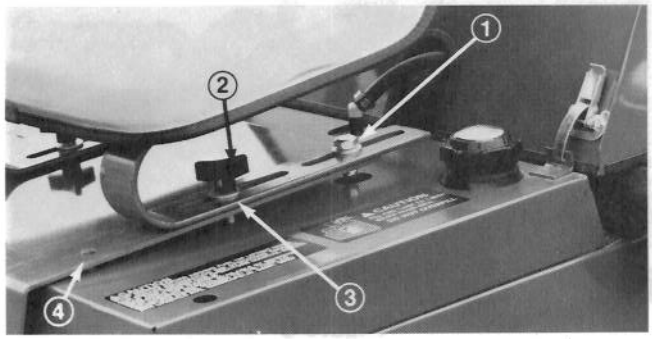


Figure 3

1. Shoulder bolt, flatwasher, locknut
2. Adjustment handle
3. Flatwasher
4. Mount plate

INSTALL SUSPENSION SEAT

1. Tip seat mount forward.

2. Disengage hood latches and open the hood.

3. Remove knob from lift lever.

4. Remove capscrews, lockwashers and flatwashers securing seat support cover to frame. Lift seat support cover off frame.

5. Unplug seat switch. Remove capscrews, lockwashers and flatwashers securing seat support to top of frame.

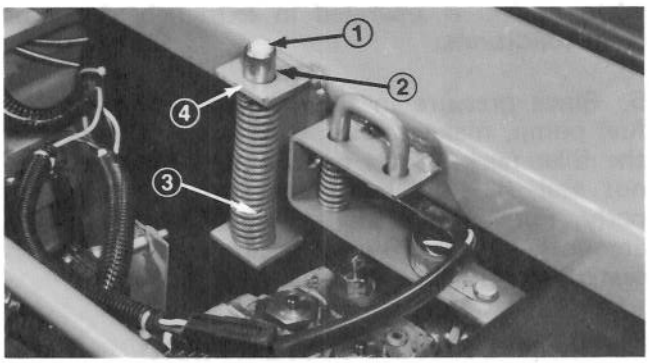


Figure 4

1. Plastic pin
2. Pin
3. Spring
4. Roll pin (not shown)

6. Insert plastic pin into end of seat pin (Fig. 4).

7. Secure spring and pin to seat support bracket by compressing spring and inserting roll pin through pin (Fig. 4).

8. Reinstall seat support with capscrews, lockwashers and flatwashers. Connect seat switch.

9. Slide seat support cover onto the lift lever and position the cover on the frame. Secure seat support cover in place with capscrews, lockwashers and flatwashers.

10. Install knob onto lift lever.

11. Unsnap rubber bellows and mount seat suspension to seat mount with (4) capscrews, lockwashers and nuts (Fig. 5).

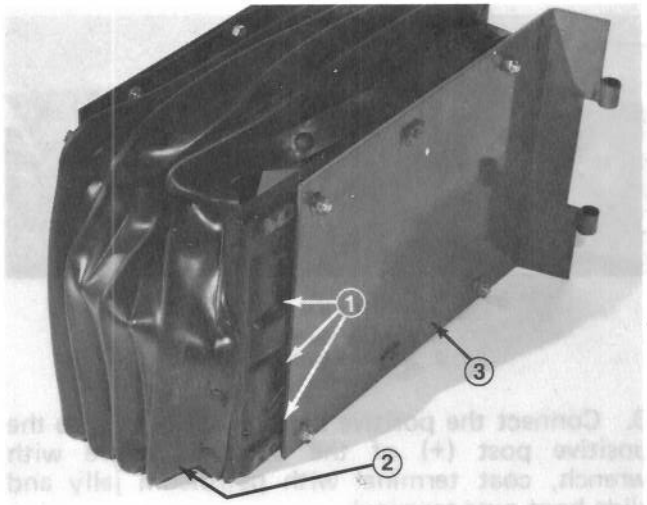


Figure 5

1. Snaps
2. Bellows
3. Seat mount

12. Resnap bellows in place.

13. Slide seat onto track of suspension by releasing track latch.

CHECK TIRE PRESSURE

The tires are over-inflated for shipping. Therefore, release some of the air to reduce the pressure. Correct air pressure in front and rear tires is 10 to 15 psi (68.9 to 103.4 Kpa).

BEFORE OPERATING

CONNECT BATTERY

1. Loosen capscrew securing battery cover and open cover (Fig. 6).

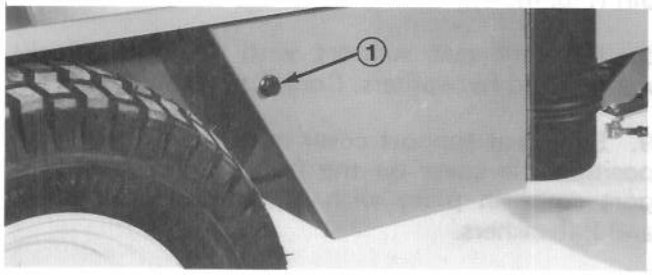


Figure 6

1. Battery cover capscrew

2. Slide battery partially out of battery compartment until terminals are accessible (Fig. 7).

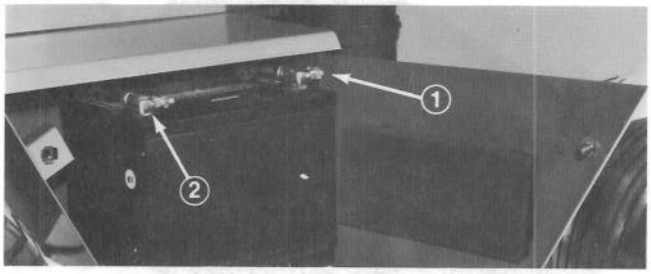


Figure 7

1. Positive battery cable
2. Negative battery cable

3. Connect the positive battery cable (red) to the positive post (+) of the battery. Secure with wrench, coat terminal with petroleum jelly and slide boot over terminal.

4. Connect the black ground cable to the negative (–) post of battery. Secure with wrench, coat terminal with petroleum jelly.

5. Slide battery back into battery compartment and secure cover.

CHECK CRANKCASE OIL

The Onan engine is shipped with 1.8 qts. (1.70 L) of oil in the crankcase; however, level of oil must be checked before and after the engine is first started.

1. Position machine on a level surface.

2. Disengage hood latches and open the hood.

3. Unscrew dipstick and wipe it with a clean rag. Screw dipstick into the filler neck and make sure it is seated fully. Unscrew dipstick out of filler neck and check level of oil (Fig. 8). If oil level is low, add enough oil to raise level to FULL mark on dipstick.

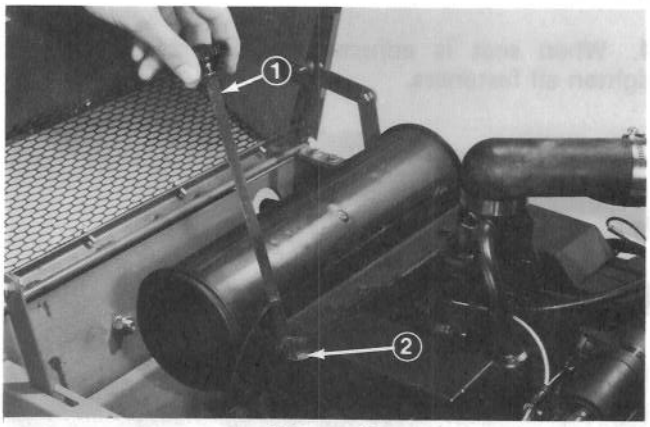


Figure 8

1. Dipstick 2. Filler neck

Note: If level of oil is at the ADD mark on the dipstick, add 1 pint (0.47 L) of oil to raise level to FULL. Do not overfill.

4. Pour oil into filler neck until level is at the FULL mark on dipstick. The Onan engine uses any high-quality detergent oil having the American Petroleum Institute – API – "service classification" SF, or SF/CC. Oil viscosity – weight – must be selected according to anticipated ambient temperature. Refer to temperature/viscosity recommendations in engine operators manual.

IMPORTANT: Check level of oil every 8 operating hours or daily. Initially, change oil after the first 25 hours of operation; thereafter, under normal conditions, change oil after every 50 hours of operation. However, change oil more frequently when engine is operated in extremely dusty or dirty conditions.

5. Since pressure in the crankcase operates the fuel pump, make sure dipstick is seated tightly in the filler neck. If the dipstick and filler neck do not seal, the fuel pump may not function properly. Furthermore, the engine will use excessive amounts of oil. Therefore, be sure dipstick is seated in oil filler neck.

CHECK HYDRAULIC SYSTEM FLUID

The hydraulic system is designed to operate on SAE 10W-30 engine oil or, as a substitute, SAE 5W-20, SAE 10W-40 engine oil or type A automatic transmission fluid. The axle housing acts as the reservoir for the system. The machine's transmission and axle housing is filled at the factory with approximately 5 quarts (4.73 L) of SAE 10W-30 engine oil. However, check level of transmission fluid before engine is first started and daily thereafter. If oil is required, use the following:

Above 32°F(0°C) – Use SAE 10W-30 engine oil. SAE 10W-40 engine oil or type A automatic transmission fluid may be used as a substitute.

Below 32°F (0°C) – Use type A automatic transmission fluid. SAE 5W-20 engine oil may be used as a substitute.

IMPORTANT: DO NOT intermix automatic transmission fluid with engine oil. DO NOT USE DEXTRON II ATF.

1. Position machine on a level surface, raise the cutting unit and stop the engine.

2. Remove dipstick cap (Fig. 9) from filler neck and wipe it with a clean rag. Screw dipstick cap finger-tight onto filler neck; then remove it and check level of fluid. If level is not within 1/2 inch (13 mm) from the groove in the dipstick (Fig. 9), add SAE 10W-30 engine oil, or, if used, automatic transmission fluid to raise level to groove mark. Do not overfill.

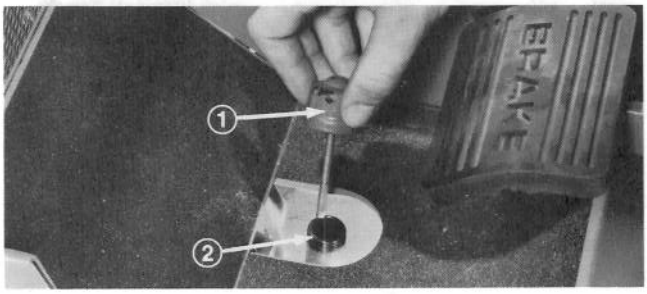


Figure 9

1. Dipstick 2. Filler neck

IMPORTANT: When adding transmission fluid to the hydraulic system, use a funnel with a fine wire screen – 200 mesh or finer – and make sure funnel and transmission fluid are immaculately clean. This procedure prevents accidental contamination of the hydraulic system.

3. Thread dipstick filler cap finger-tight onto filler neck. It is not necessary to tighten cap with a wrench.

FILL FUEL TANK WITH GASOLINE

The Onan engine runs on either leaded regular or low lead gasoline. Do not mix oil with gasoline because engine damage and poor performance will likely result. The use of premium gasoline, white gas and gasoline additives is not recommended.

Note: The Toro Company recommends the use of unleaded gasoline for the GROUNDSMASTER 62 engine for the following reasons:

A. Reduced combustion chamber deposits.
B. Cooler engine operating temperatures.
C. Longer engine life.

DANGER

Because gasoline is flammable, caution must be used when storing or handling it. Do not fill fuel tank while engine is running, hot or when machine is in an enclosed area. Vapors may build up and be ignited by a spark or flame source many feet away. DO NOT SMOKE while filing the fuel tank to prevent the possibility of an explosion. Always fill fuel tank outside and wipe up any spilled gasoline before starting engine. Use a funnel or spout to prevent spilling gasoline before starting engine and fill tank to about 1 inch (25 mm) below the filler neck. Store gasoline in a clean safety-approved container and keep the cap in place on the container. Keep gasoline in a cool, well-ventilated place; never in an enclosed area such as a hot storage shed. To assure volatility, do not buy more than a 30 day supply of gasoline. Gasoline is a fuel for internal combustion engines; therefore, do not use it for any other purpose. Since many children like the smell of gas, keep it out of their reach because the fumes are explosive and dangerous to inhale.

1. Tip seat forward and prop it so it cannot fall accidentally. Using a clean rag, clean area around fuel tank cap (Fig. 10).

2. Remove cap from the fuel tank and fill the 6 gallon (22.7 L) tank to within 1 inch (25 mm) from the top with leaded regular or low lead gasoline. Install fuel tank cap tightly.

3. Wipe up gasoline that may have spilled to prevent a fire hazard. Remove support from under seat and allow seat to pivot back to its normal position.

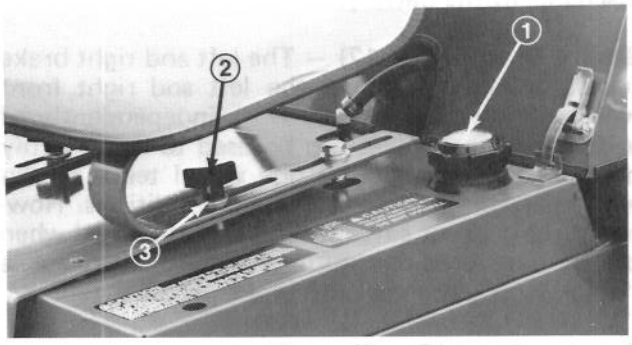


Figure 10

1. Fuel tank cap 2. Adjustment handle 3. Washer

CONTROLS

Parking Brake (Fig. 11) – Whenever the engine is shut off, the parking brake must be engaged to prevent accidental movement of the machine. To engage the parking brake, push lock arm (Fig. 12) on right brake pedal between the left brake and its lock tab. Next, push down fully on both pedals and pull parking brake knob out; then release the pedals. To release parking brake, depress both pedals until parking brake knob retracts. Before starting the engine, however, lock arm may be disengaged from left brake pedal so both pedals work independently with each front wheel.

Hour Meter (Fig. 11) – The hourmeter registers accumulated hours of engine operation. Use the hourmeter to determine intervals for service maintenance and lubrication.

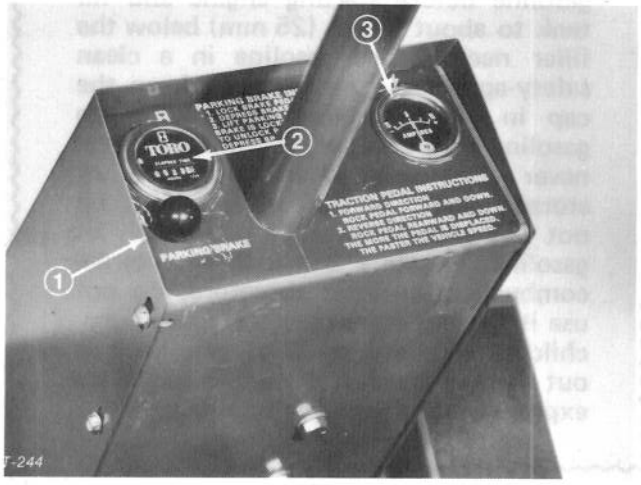


Figure 11

1. *Parking brake*
2. *Hour meter*
3. *Ammeter*

Ammeter (Fig. 11) – Ammeter shows charge rate of the battery by the alternator. When engine is running, there must always be a slight charge, unless engine is idling slowly. Needle will point to 0 when battery is fully charged. By contrast, alternator is not charging the battery when needle points to (–) negative side of ammeter, and if this happens, repair the charging system to prevent discharge of the battery.

Service Brakes (Fig. 12) – The left and right brake pedals are connected to the left and right front wheels. Since both brakes work independently of each other, the brakes can be used to turn sharply or to increase traction if one wheel tends to slip while operating on certain slope conditions. However, wet grass or soft turf could be damaged when brakes are used to turn sharply. To make a "quick-stop", depress both brake pedals together.

Traction Pedal (Fig. 12) – Traction pedal has two functions: one is to make the machine move forward, the other is to make it move rearward. Using the heel and toe of the right foot, depress top of pedal to move forward and bottom of pedal to move rearward. Ground speed is proportionate to how far pedal is depressed. For maximum ground speed with no load, traction pedal must be fully depressed while throttle is in FAST position. Maximum speed forward is 8.5 mph (13.7 Km/hr) (approx), 4 mph (6.4 Km/hr (approx) in reverse. To get maximum power under heavy load or when ascending a hill, have throttle in FAST position while depressing traction pedal slightly to keep engine rpm high. When engine rpm begins to decrease, release traction pedal slightly to allow rpm to increase.

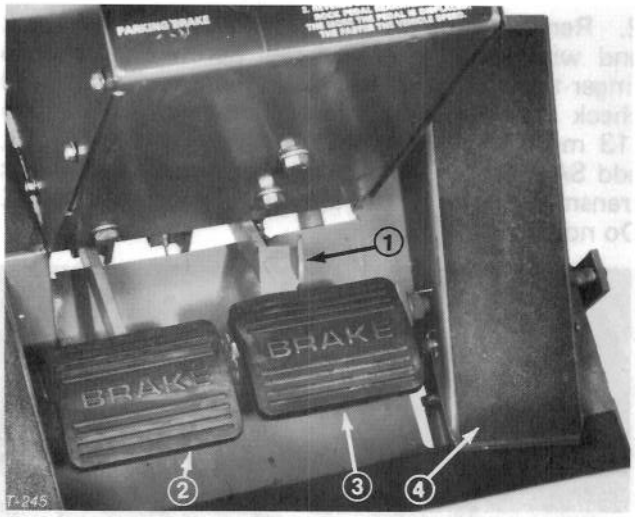


Figure 12

1. *Lock arm*
2. *Left brake*
3. *Right brake*
4. *Traction pedal*

PTO Lever (Fig. 13) – The PTO lever has two positions: ENGAGE and DISENGAGE. Push PTO lever fully forward to ENGAGE position to start the cutting unit blades. Pull lever rearward to DISENGAGE position to stop the blades. The only time PTO lever should be in the ENGAGE position is when cutting unit is on the turf and grass is actually being mowed.

Ignition Switch (Fig. 13) – The ignition switch, which is used to start and stop the engine, has three positions: OFF, RUN and START. Rotate key clockwise – START position – to engage starter motor. Release key when engine starts. The key will move automatically to the ON position. To shut engine off, rotate key counterclockwise to the OFF position.

Low Oil Pressure or High Cylinder Head Temperature By-Pass Switch (Fig. 13) – Overrides engine Low Oil Pressure or High Cylinder Head Temperature shut off switches and allows engine to be operated when switch is held in on position. Avoid prolonged operation of engine using by-pass switch as engine damage may occur.

CONTROLS

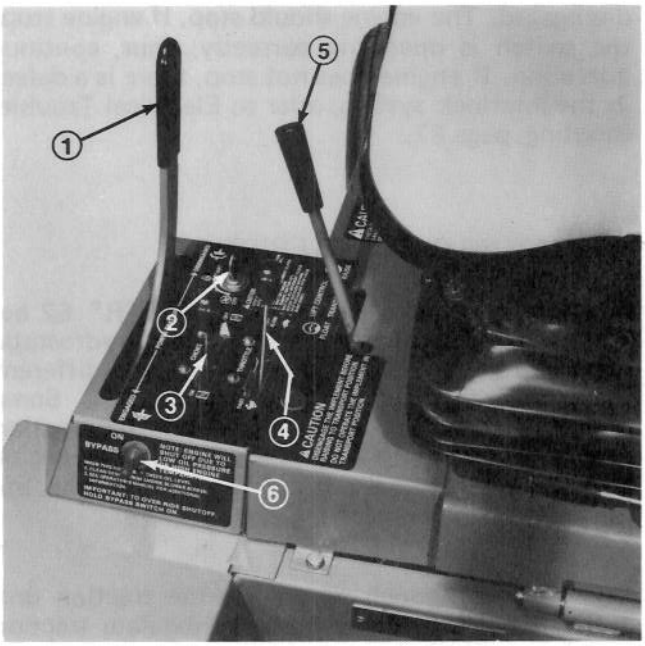


Figure 13

1. PTO lever
2. Ignition switch
3. Choke
4. Throttle
5. Lift lever
6. By pass switch

Choke (Fig. 13) – To start a cold engine, close carburetor choke by moving choke control forward to the ON position. After engine starts, regulate choke to keep engine running smoothly. As soon as possible, open the choke by pulling it rearward to the OFF position. A warm engine requires little or no choking.

Throttle (Fig. 13) – Throttle is used to operate engine at various speeds. Moving throttle forward increases engine speed – FAST; rearward decreases engine speed – SLOW. The throttle controls the speed of the cutter blades and, in conjunction with traction pedal, controls ground speed of the engine.

Hydraulic Lift Lever (Fig. 13) – The hydraulic lift lever has three positions: FLOAT, TRANSPORT and RAISE. To lower cutting unit to the ground, move lift lever forward into notch in seat cover – FLOAT. The FLOAT position is used for mowing and when machine is not in operation. To raise cutting unit, pull lift lever rearward to the RAISE position. After cutting unit is raised, allow lift lever to move to the TRANSPORT position. Cutting unit must be raised when driving from one work area to another.

CAUTION

Never raise cutting unit while blades are rotating because it is hazardous.

Seat Adjusting Handle – Standard Seat (Fig. 10) – To adjust seat, loosen adjusting handle and slide seat to desired position. Tighten handle to lock seat in place.

Seat Adjusting Handle – Deluxe Seat (Not Shown) – To adjust seat, move lever on right side outward, slide seat to desired position and release lever so it will lock in track.

OPERATING INSTRUCTIONS

STARTING/STOPPING ENGINE

1. Be sure parking brake is set, PTO lever is in DISENGAGE position and lift lever is in TRANSPORT position.

2. Remove foot from traction pedal and make sure pedal is in neutral position.

3. Move choke lever to ON position – when starting a cold engine – and throttle lever to half throttle position.

4. Insert key into ignition switch and rotate it clockwise to start the engine. Release key when engine starts. Regulate the choke to keep engine running smoothly.

IMPORTANT: To prevent overheating of the starter motor, do not engage starter longer than 30 seconds. After 30 seconds of continuous cranking, wait 2 minutes before engaging starter motor again.

5. When engine is started for the first time, or after overhaul of the engine, transmission or axle, operate the machine in forward and reverse for one to two minutes. Also operate the lift lever and PTO lever to be sure of proper operation of all parts.

Turn steering wheel to the left and right to check steering response. Then shut engine off and check for oil leaks, loose parts and any other noticeable defects.

OPERATING INSTRUCTIONS

CAUTION

Shut engine off and wait for all moving parts to stop before checking for oil leaks, loose parts and other defects.

6. To stop the engine, move throttle control rearward to SLOW position, move PTO lever to DISENGAGE and rotate ignition key to OFF. Remove key from switch to prevent accidental starting.

CHECKING OPERATION OF INTERLOCK SWITCHES

The purpose of the safety interlock system is to prevent the engine from cranking or starting unless the operator is on the seat, the traction pedal is in neutral and the PTO control lever is in the DISENGAGE position. In addition, the engine will stop if the operator gets off the seat when the PTO control is engaged or traction pedal is depressed.

CAUTION

Do not disconnect the safety switches because they are for the operator's protection. Check operation of the switches daily to be sure the interlock system is operating correctly. If a switch is defective, replace it before operating the machine. Replace the switches every 2 years to be sure of maximum safety.

1. Move PTO lever to disengage position and remove foot from traction pedal so it is fully released.

2. Rotate the ignition key to START. Engine should crank. If engine cranks, proceed to step 3. If engine does not crank, there may be a defect in the interlock system; refer to Electrical Troubleshooting, page 33.

3. Raise off the seat and engage the PTO lever while the engine is running. The engine should stop. If engine stops, the switch is operating correctly; thus, proceed to step 4. If engine does not stop, there is a defect in the interlock system; refer to Electrical Troubleshooting, page 37.

4. Raise off the seat and depress the traction pedal while engine is running and PTO lever is disengaged. The engine should stop. If engine stops the switch is operating correctly; thus, continue operation. If engine does not stop, there is a defect in the interlock system; refer to Electrical Troubleshooting, page 37.

OPERATING CHARACTERISTICS

Practice driving the GROUNDSMASTER® 62 before initial operation because it has a hydrostatic transmission and its characteristics are different than some turf maintenance machines. Some points to consider when operating the traction unit and cutting unit are the transmission, engine speed, load on the cutting blades, and the importance of the brakes.

To maintain enough power for the traction unit and cutting unit while mowing, regulate traction pedal to keep engine rpm high and somewhat constant. A good rule to follow is: decrease ground speed as the load on the cutting blades increases; and increase ground speed as load on the blades decreases. This allows the engine, working with the transmission, to sense the proper ground speed while maintaining high blade tip speed, necessary for good quality-of-cut. Therefore, allow traction pedal to move upward as engine rpm decrease, and depress pedal slowly as rpm increase. By comparison, when driving from one work area to another -- with no load and cutting unit raised -- have throttle in FAST position and depress traction pedal slowly but fully to attain maximum ground speed.

Another characteristic to consider is the operation of the brakes. The brakes can be used to assist in turning the machine; however, use them carefully, especially on soft or wet grass because the turf may be torn accidentally. The brakes can also be used for control of the cutting unit. The brakes can be used to great advantage to control the direction of the cutting unit when trimming along fences or similar objects. The other benefit of the brakes is to maintain traction. For example: in some slope conditions, the uphill wheel slips and loses traction. If this situation occurs, depress uphill brake pedal gradually and intermittently until the uphill wheel stops slipping; thus, increasing traction on the downhill wheel. If independent braking is not desired, engage the lever on right brake pedal with left pedal. This provides simultaneous braking at both wheels.

Before stopping the engine, disengage all controls and move throttle to SLOW. Moving throttle to SLOW reduces high engine rpm, noise, vibration and the possibility of backfiring by the engine. Turn key to OFF to stop engine.

OPERATING INSTRUCTIONS

PUSHING OR TOWING TRACTION UNIT

In an emergency, the traction unit can be pushed or towed for a very short distance. However, Toro does not recommend this as standard procedure.

IMPORTANT: Do not push or tow the traction unit faster than 2 to 3 mph (3.2 to 4.8 Km/hr) because transmission may be damaged. If traction unit must be moved a considerable distance, transport it on a truck or trailer. Whenever traction unit is pushed or towed, by-pass valve must be open.

1. Unlatch and raise hood, remove knob from lift lever.

2. Remove capscrews, lockwashers and flatwashers securing seat support cover to frame.

3. Pivot seat forward and support it to prevent it from falling accidentally. Lift seat support cover off frame.

4. Depress and hold the pins located in the center of the two (2) check valve assemblies in the top of the transmission (Fig. 14) while pushing or towing the machine.

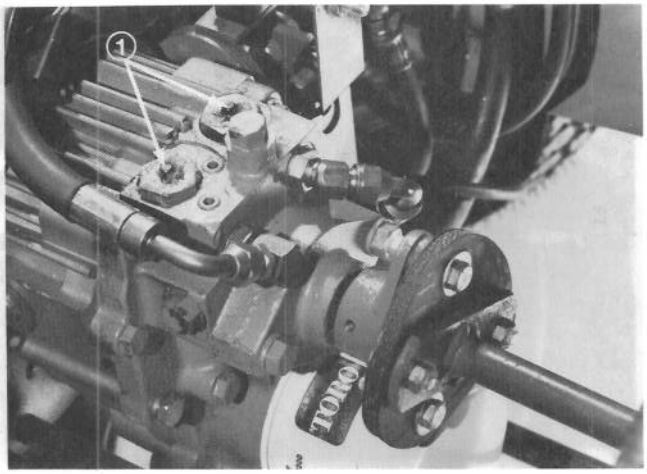


Figure 14

1. Check valve pins

5. Start engine momentarily after repairs are completed and make sure the pins are in the full disengaged (fully up) position.

IMPORTANT: Running the machine with by-pass valve open will cause the transmission to overheat.

LUBRICATION MAINTENANCE

GREASING BEARINGS AND BUSHINGS

The traction unit has grease fittings that must be lubricated regularly with No. 2 General Purpose Lithium Base Grease. If machine is operated under normal conditions, lubricate all bearings and bushings after every 25 hours of operation. Bearings and bushings must be lubricated daily when operating conditions are extremely dusty and dirty. Dusty and dirty operating conditions could cause dirt to get into the bearings and bushings, resulting in accelerated wear.

Apply a liberal coating of grease to the check valve pins once each year (Fig. 14). Also grease the bearings in the Dana axle every 500 hours, or yearly, whichever comes first (not shown). The traction unit has bearings and bushings that must be lubricated, and these lubrication points are: PTO shaft (Fig. 15); lift arm pivot bushings (Fig. 16); intermediate steering arm pivot bearings (Fig. 17); brake pivot bushings (Fig. 17); PTO shaft engaging lever bearings (Fig. 18); rear wheel spindle bushings (Fig. 20); steering plate bushings (Fig. 19); axle pin bushing (Fig. 19); and PTO idler assembly bearings (Fig. 21). Also apply grease to both brake cables at the drive wheel and brake pedal ends (Fig. 17).

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.

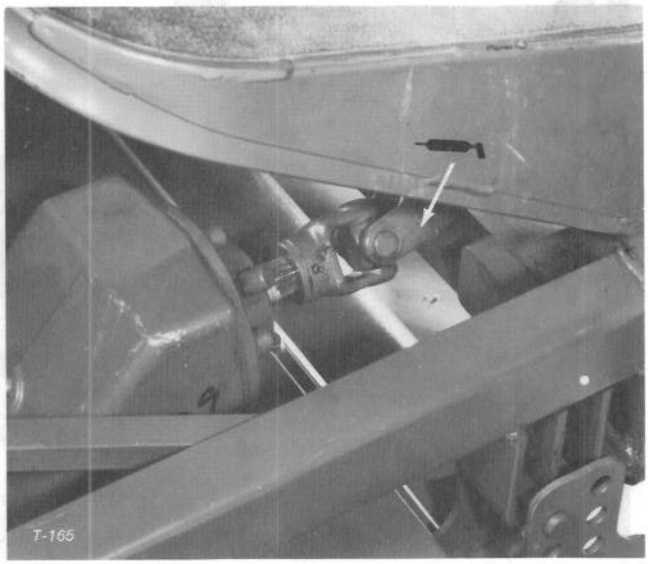


Figure 15

LUBRICATION MAINTENANCE

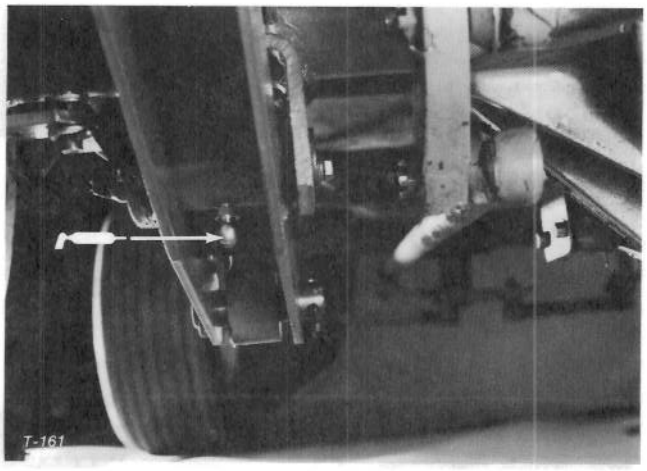


Figure 16

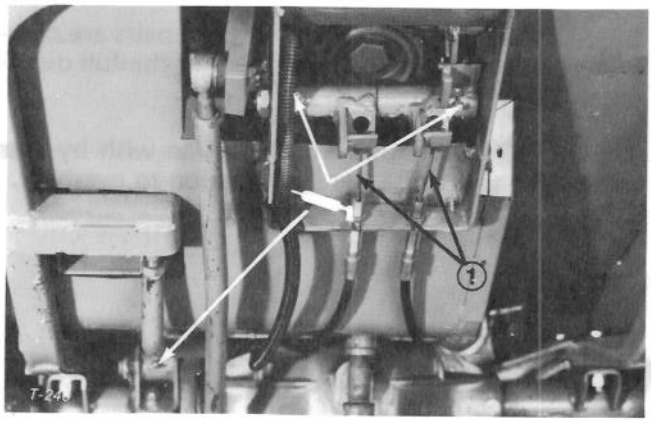


Figure 17

1. Apply grease to cable ends

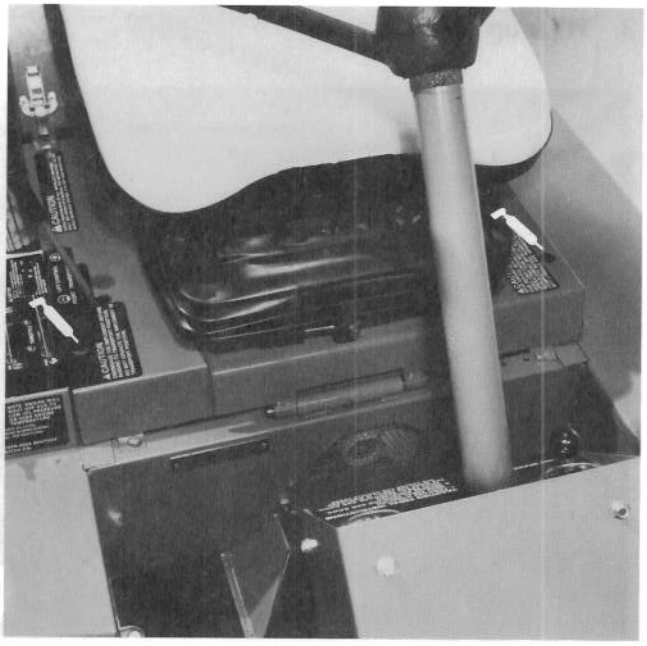


Figure 18

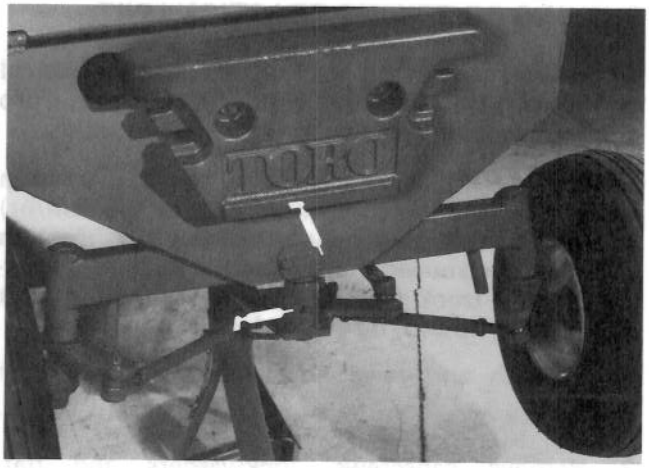


Figure 19

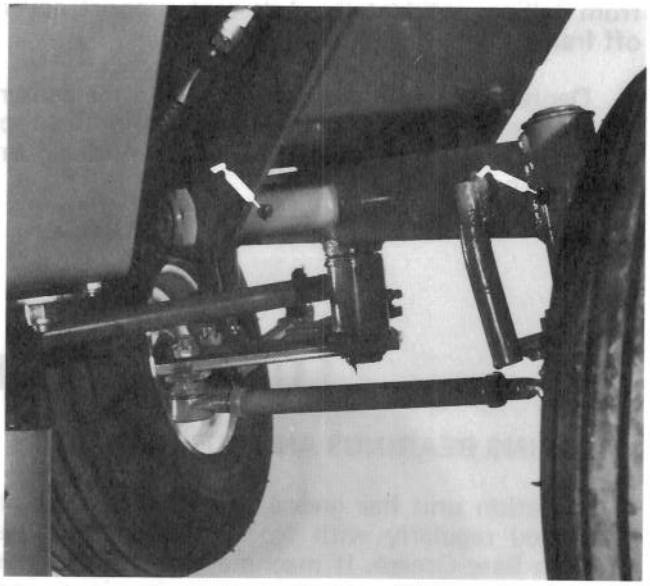


Figure 20

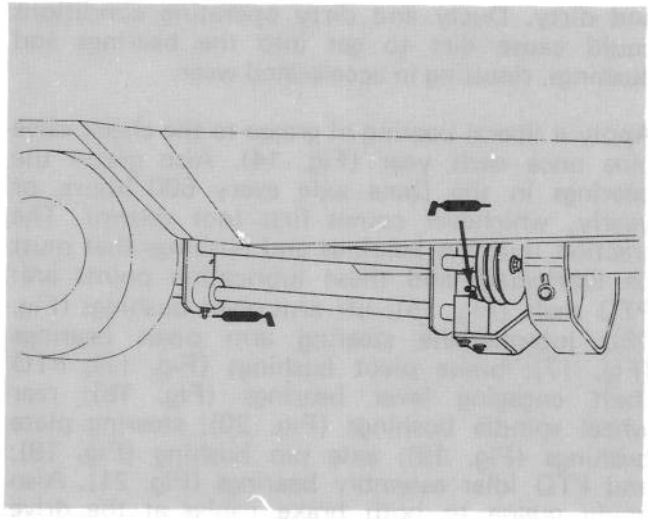


Figure 21

BRAKE MAINTENANCE

ADJUSTING SERVICE BRAKES

Adjust the service brakes when there is more than one inch (25 mm) of "free travel" of the brake pedals, or when the brakes do not work effectively. Free travel is the distance the brake pedal moves before braking resistance is felt.

The brakes should be checked for adjustment after the first 25 hours operation and should only need adjusting after considerable use thereafter. These periodic adjustments can be performed where the brake cables connect to the bottom of the brake pedals. When the cable is no longer adjustable, the star nut on inside of the brake drum must be adjusted to move the brake shoes outward. However, the brake cables must be adjusted again to compensate for this adjustment.

1. Disengage lock arm from left brake pedal so both pedals work independently of each other.

2. To reduce free travel of brake pedals – tighten the brakes – loosen front nut on threaded end of brake cable (Fig. 22). Then tighten rear nut to move cable backward until brake pedals have 1/2 to 1 inch (13 mm to 25 mm) of free travel. Tighten front nut after brakes are adjusted correctly.

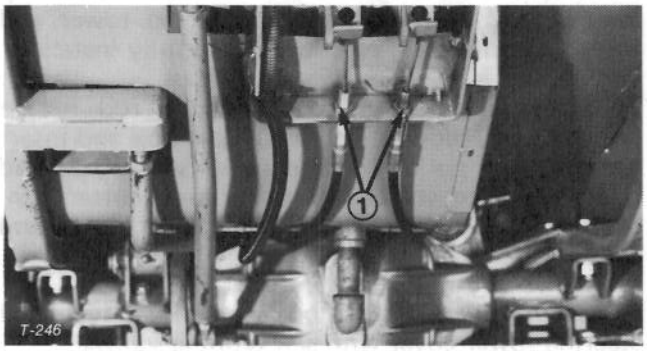


Figure 22

1. Jam nuts

3. When adjustment of brake cables cannot get free travel within 1/2 to 1 inch (13 mm to 25 mm), the star-nut inside the brake drum must be adjusted. However, before adjusting the star-nut, loosen brake cable nuts to prevent unnecessary strain on the cables.

4. Loosen five wheel nuts holding wheel and tire assembly on wheel studs.

5. Jack up machine until front wheel is off the shop floor. Use jack stands or block the machine to prevent it from falling accidentally.

6. Remove wheel nuts and slide wheel and tire assembly off studs. Rotate brake drum until adjusting slot is at top and centered over star-nut that adjusts brake shoes (Fig. 23).

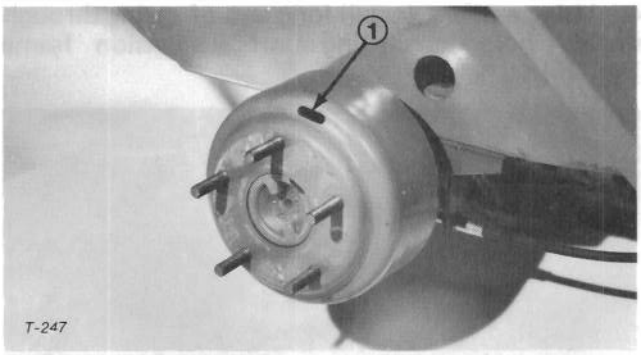


Figure 23

1. Brake adjusting slot

7. Using a brake adjusting tool or screwdriver rotate star-nut (Fig. 24) until brake drum (Fig. 23) locks because of outward pressure of brake shoes (Fig. 24).

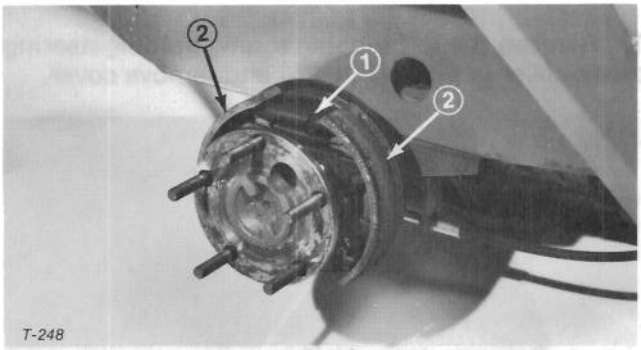


Figure 24

1. Star nut 2. Brake shoe

8. Loosen star-nut about 12 to 15 notches or until brake drum rotates freely.

9. Install wheel and tire assembly on studs with five wheel nuts. Tighten nuts to 60-80 ft-lb (81-109N·m).

10. Remove jack stands or blocking and lower machine to the shop floor.

11. Adjust the brake cables; use step 2.

REPLACING BRAKE RETURN SPRING

1. Disengage spring from slotted hole on lift arm (Fig. 25). Since spring is tensioned, retract it carefully.

2. Remove end of spring from clevis pin retaining brake strut and brake cable yoke together (Fig. 25).

3. To install new spring, slide clevis pin through yoke and strut with hole end of clevis pin facing upward. Install short end of spring into hole in clevis pin.

4. Using a pliers, install long end of spring through slotted hole in cutting unit suspension frame (Fig. 25).

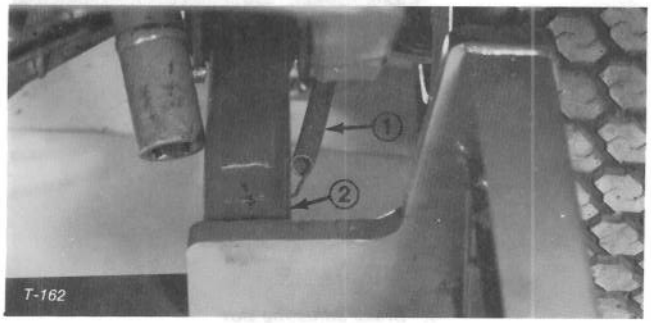


Figure 25

1. Brake return spring
2. Slotted hole

REPLACING PARKING BRAKE ROD SPRING

1. Remove the self tapping screws holding steering tower cover in place (Fig. 26) and remove cover.

Figure 26

1. Cover

2. Screw knob and locknut off top end of the parking brake rod (Fig. 27).

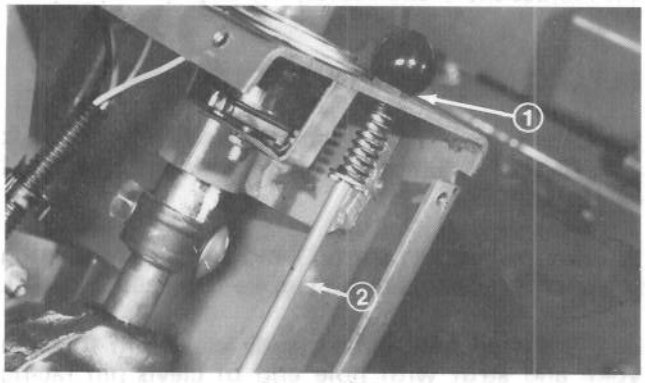


Figure 27

1. Locknut 2. Parking brake rod

3. Remove capscrews securing steering gear to the tower.

4. Remove cotter pin and flatwasher from bottom end of parking brake rod (Fig. 28) and cotter pin and flatwasher holding rack (Fig. 29). Lift up on gear box and remove brake rod from rack. Remove the other flatwasher from the rod and slide rod out of hole in the steering tower.

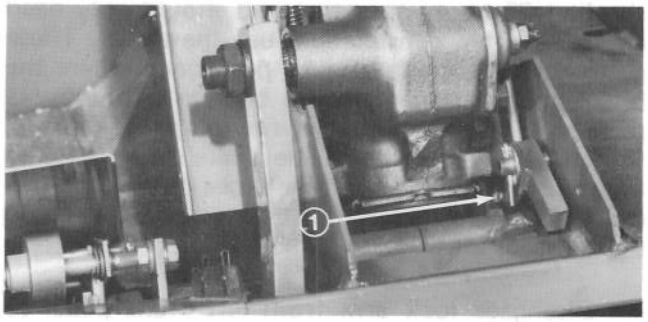


Figure 28

1. Cotter pin and flatwasher

5. Slide defective spring off top end of parking brake rod.

6. Install new spring on parking brake rod and make sure it seats against the flatwasher. Slide top end of rod through hole in steering tower and thread locknut onto rod until nut is fully installed.

7. Slide flatwasher on bottom end of rod, lift up on gear box, slide rack towards gear box and insert rod through parking brake rack. Secure rod and rack together with flatwasher and cotter pin. Secure rack with remaining cotter pin and flatwasher.

8. Secure steering gear box to tower and install steering tower cover with self tapping screws.

REPLACING PARKING BRAKE RACK

1. Remove self tapping screws holding steering tower cover in place and remove cover. Remove capscrews securing steering gear to the tower.

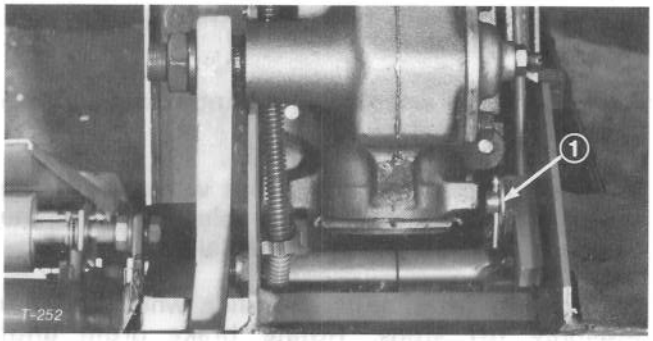


Figure 29

1. Cotter pin and flatwasher

2. Remove cotter pin and flatwasher securing lower end of parking brake rod (Fig. 28) and cotter pin and flatwasher securing rack (Fig. 29). Lift up on gear box, slide rack outward towards gear box off the pivot pin (Fig. 29). Slide rod out of rack.

3. Lift up on gear box, slide new rack onto pivot pin, slip lower end of brake rod with flatwasher into rack and secure rack and rod with flatwashers and cotter pins.

4. Secure steering gear box to tower and install steering tower cover with self tapping screws.

REPLACING BRAKE PEDAL PIVOT BUSHINGS

The brake pedals must be held in place snugly by the brake pivot pin. Excessive movement of the brake pedal, other than brake pedal free travel, usually indicates worn bushings. To correct problem, replace the bushings.

1. Loosen brake cable jam nuts and disengage brake cables from brake pedals (Fig. 30).

2. Remove locknut from brake pivot pin (Fig. 30). Slide pivot pin out to the side so pedal can be removed.

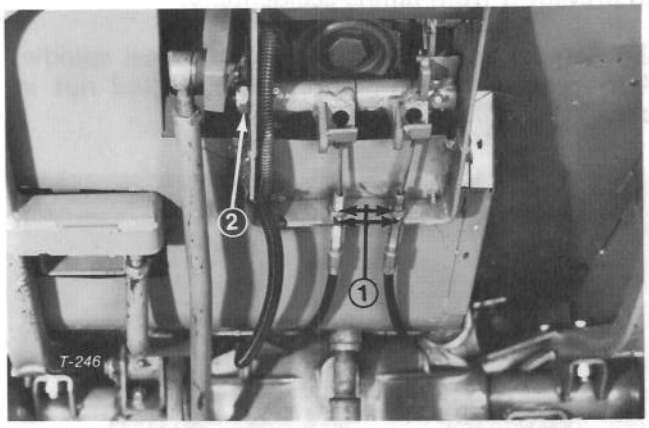


Figure 30

1. Jam nuts
2. Locknut

3. Slide brake pedals backward and remove them through the slot in bottom of steering tower.

4. Using pin punch and hammer, drive both bushings out of brake pivot (Fig. 31). Clean inside of brake pivot to remove dirt and foreign matter.

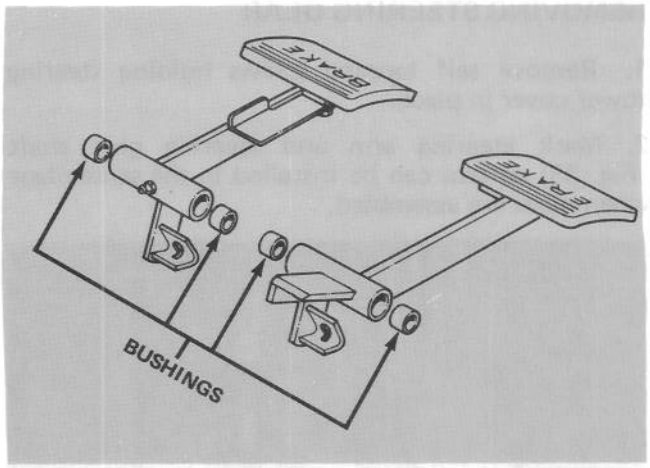


Figure 31

5. Apply grease to the inside and outside of the new bushings. Use an arbor press to drive new bushings into both ends of the brake pivot. Bushings must be flush with ends of brake pivot.

6. Wipe brake pivot pin with a rag to remove dirt and grease. Hold left brake pedal, which can be identified by an additional welded bracket, in position and install pivot pin through side plate and brake pivot. Hold right brake pedal in position and push the pin through the brake pivot and opposite side plate. Tab end of pin (Fig. 32) must engage bottom edge of side plate to prevent pivot pin from rotating and causing wear. Install locknut on end of pivot pin to hold all parts in place.

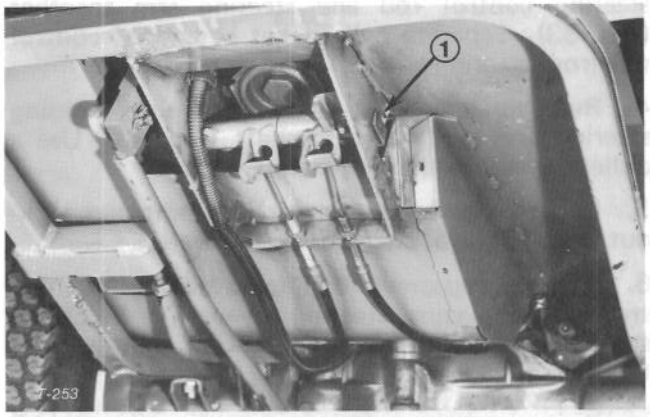


Figure 32

1. Tab end of pin

7. Connect brake cables to brake pedals. Adjust the brakes; refer to Adjusting Service Brakes, page 17.

8. Lubricate brake pivot bushings through the grease fittings, using no. 2 grease.

STEERING MAINTENANCE

REMOVING STEERING GEAR

1. Remove self tapping screws holding steering tower cover in place.

2. Mark steering arm and steering gear shaft (Fig. 33) so arm can be installed in the same place when parts are assembled.

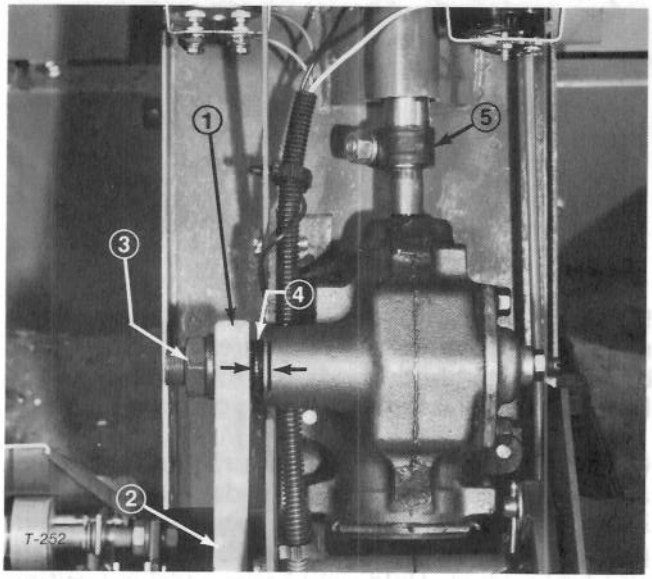


Figure 33

1. Steering arm
2. Cotter pin and slotted nut (lower end of arm)
3. Nut and lockwasher
4. 5/8 in. (16 mm)
5. Steering clamp

3. Remove cotter pin and slotted nut holding steering control rod and steering arm together (Fig. 33). Separate ball socket at end of control rod from steering arm.

4. Remove large nut and lockwasher holding steering arm on gear box shaft (Fig. 33). Use a puller to remove the arm from the shaft.

5. Loosen steering-clamp carriage bolt and locknut (Fig. 33) until clamp can be moved.

6. Remove capscrews and lockwashers retaining steering gear against steering tower (Fig. 34). Slide steering gear down off steering tube and away from the tower.

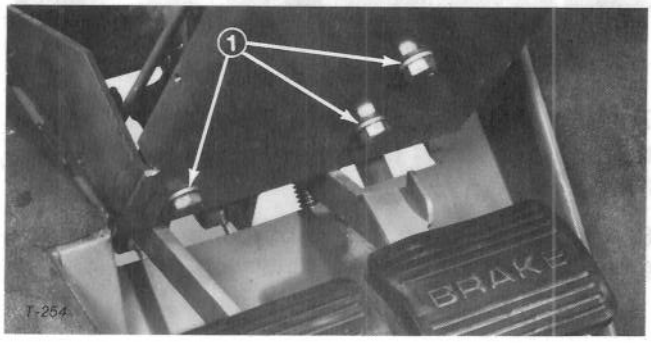


Figure 34

1. Capscrews and lockwashers

INSTALLING STEERING GEAR

1. Slide steering clamp onto input shaft of steering gear.

2. Insert input shaft of steering gear into steering tube and hold gear against steering tower. Secure gear in place with three capscrews and lockwashers (Fig. 34). Lock steering gear and tube together by tightening steering clamp locknut and carriage bolt.

3. Slide steering arm onto steering shaft and ensure the alignment marks – made when parts were removed – are in line. Secure arm on shaft with lockwasher and large nut (Fig. 33). Tighten nut until inside of arm is 5/8 in. (16 mm) from the steering gear, which should allow clearance for the steering linkage.

4. Slide ball socket at end of steering control rod through steering arm. Secure parts together with slotted nut and cotter pin (Fig. 33).

5. Install steering tower with self tapping screws.

ADJUSTING REAR WHEEL BEARINGS

1. Jack up rear of machine until wheel is off shop floor. Use jack stands or block the machine to prevent it from falling accidentally.

2. Remove dust cap from end of wheel spindle. Also remove cotter pin retaining slotted nut in place (Fig. 35).

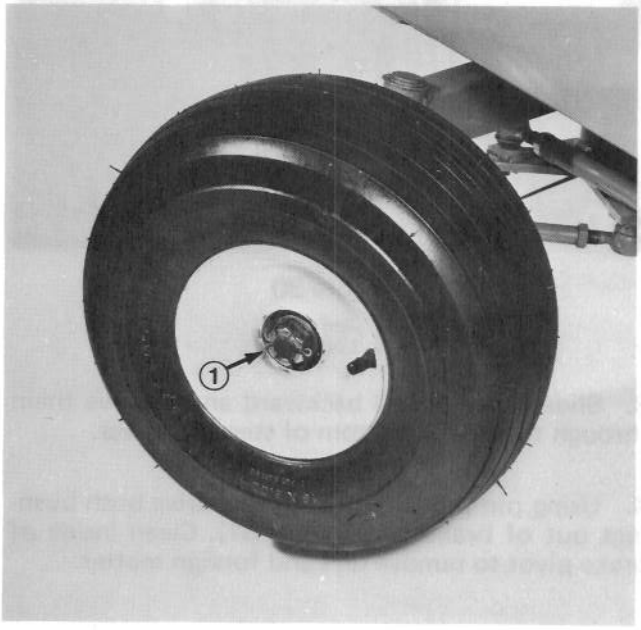


Figure 35

1. Cotter pin

3. Rotate the wheel by hand and tighten the slotted nut (Fig. 36) until the bearing binds slightly. Then, loosen nut until the nearest slot and hole in spindle line up. Reinstall the cotter pin to retain the slotted nut in place.

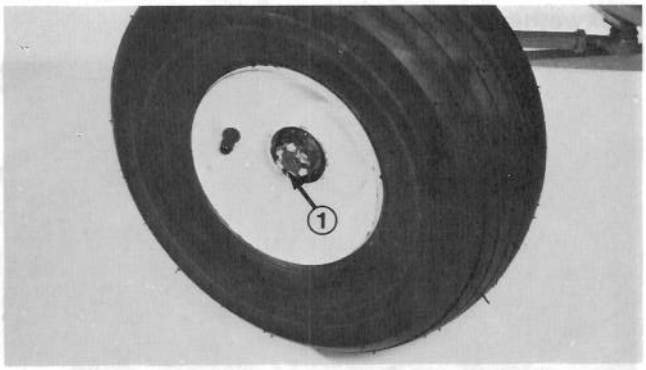


Figure 36
1. Slotted nut

4. Remove jack stands and lower machine to shop floor.

5. Install dust cap on end of the wheel spindle (Fig. 37).

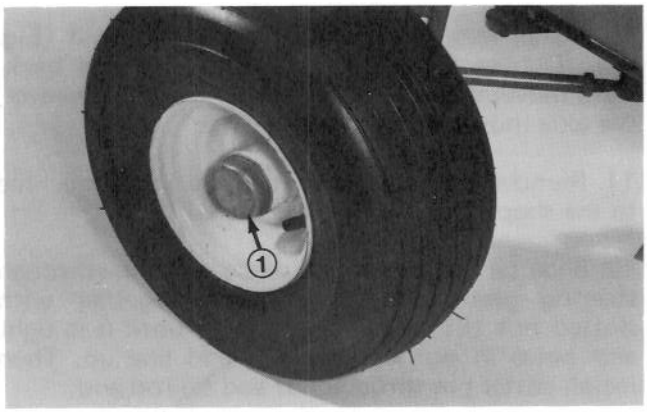


Figure 37
1. Dust cap

ADJUSTING REAR WHEEL TOE-IN

The rear wheels should have 0 to 1/8 of an inch (3 mm) toe-in when they are straight ahead. To check toe-in, measure the center-to-center distance, at wheel hub height, in front and in back of the rear tires. If toe-in is not 0 to 1/8 of an inch (3 mm), an adjustment is required.

1. Rotate the steering wheel so rear wheels are straight ahead.

2. Loosen the jam nuts on both tie rods (Fig. 38). Adjust both tie rods until center-to-center distance (Fig. 38) at front of rear wheel is 1/8 of an inch (3 mm) less than that at back of rear wheel.

3. When toe-in of rear wheels is set correctly, tighten jam nuts against tie rods (Fig. 38).

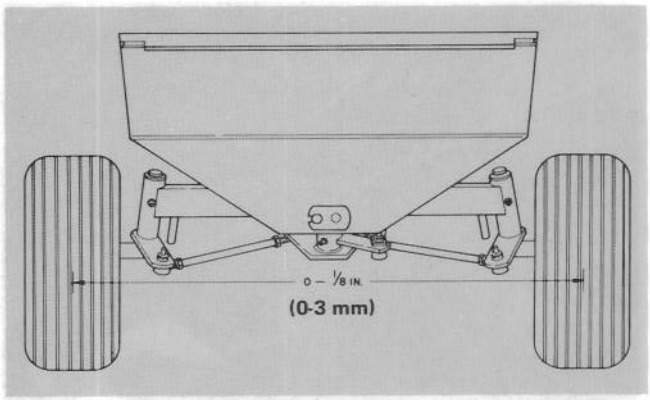


Figure 38

SERVICING AXLE BUSHINGS

The rear axle must be held in place snugly by the axle pin. Excessive movement of the axle, which is characterized by erratic steering, usually indicates worn bushings. To correct the problem, replace the bushings.

1. Remove cotter pin and slotted nut from tie rod end that connects steering tube to steering plate (Fig. 39). Separate tie rod end from plate.

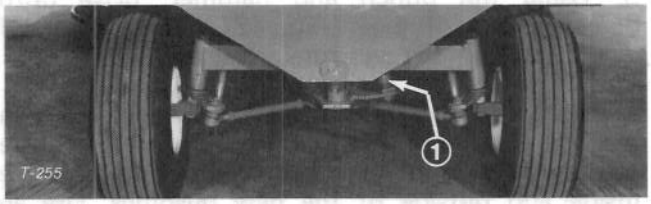


Figure 39
1. Steering tube

2. Remove large locknut from end of rear axle pin (Fig. 40).

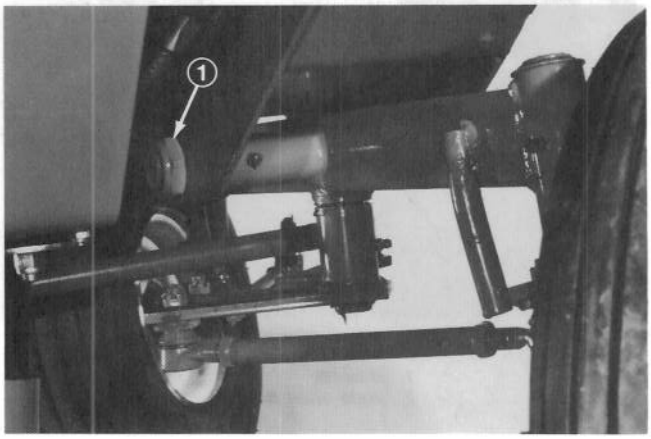


Figure 40
1. Locknut

3. Remove capscrew, lockwasher and flatwasher holding outside of axle pin to chassis (Fig. 41).

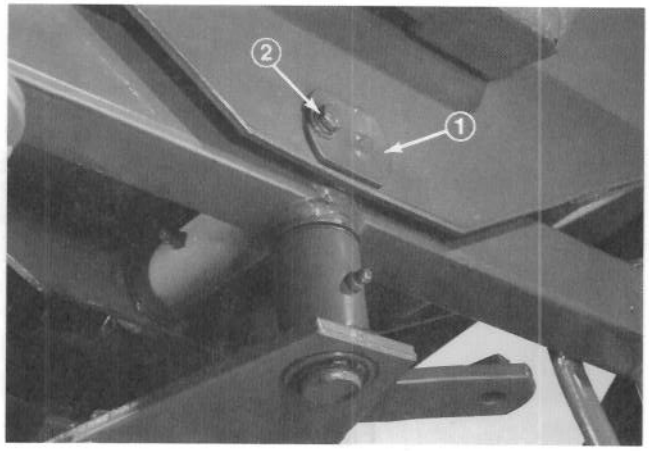


Figure 41

1. Rear axle pin
2. Capscrew, lockwasher and flatwasher

4. Jack up frame – just ahead of the rear wheels – until pressure is taken off the axle pin. Pull axle pin out which will release the rear axle and thrust washers from the frame.

5. Carefully roll the entire rear axle and wheel assembly out from under the machine. Set axle assembly onto the work bench.

6. Using pin punch and hammer, drive both bushings out of axle (Fig. 42). Clean inside of axle to remove dirt and foreign matter.

7. Notice groove on inside of new bushing. When it is installed, open end of groove must be to the outside of axle pivot tube. Apply grease to the inside and outside of the new bushings. Use an arbor press to drive bushings into the top and bottom of the axle pivot tube. Bushings must be flush with axle tube (Fig. 42).

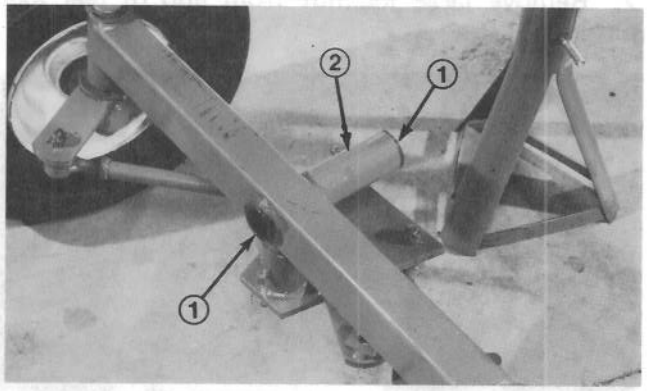


Figure 42

1. Bushing
2. Axle pivot tube

8. Wipe rear axle pin with a rag to remove dirt and grease.

9. Move rear axle into position at rear of machine. Mount axle between two sections of frame with axle pin and two thrust washers (Fig. 43). The thrust washers must be positioned at ends of the axle pivot tube and between both sections of the frame. Secure axle pin in place with capscrew, lockwasher and flatwasher (Fig. 41).

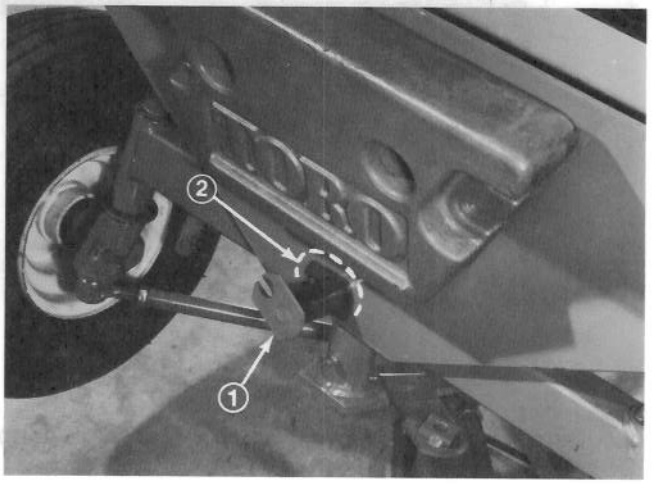


Figure 43

1. Rear axle pin
2. Washer

10. Install large locknut on end of axle pin (Fig. 40). Tighten locknut until all forward and backward movement of the axle is eliminated. However, the axle must still pivot freely.

11. Remove the jack stands and lower the machine to the shop floor.

12. Slide tie rod end at end of steering tube through steering plate, and secure parts together with slotted nut (Fig. 39). Tighten nut until it is tight and holes in nut and tie rod end line up. Then install cotter pin through nut and tie rod end.

13. Lubricate rear axle bushings through the grease fitting on rear axle (Fig. 19).

SERVICING STEERING PLATE BUSHINGS

The steering plate must fit snugly on the mounting pin. Excessive movement of the steering plate usually indicates worn bushings. To correct the problem, replace the bushings.

1. Remove cotter pin and slotted nut from tie rod end connecting steering tube to steering plate. Separate tie rod end from steering plate bracket (Fig. 44).

2. Remove cotter pins and slotted nuts from tie rod ends connecting tie rods to wheel spindle brackets. Separate tie rod ends from both spindle brackets (Fig. 44).

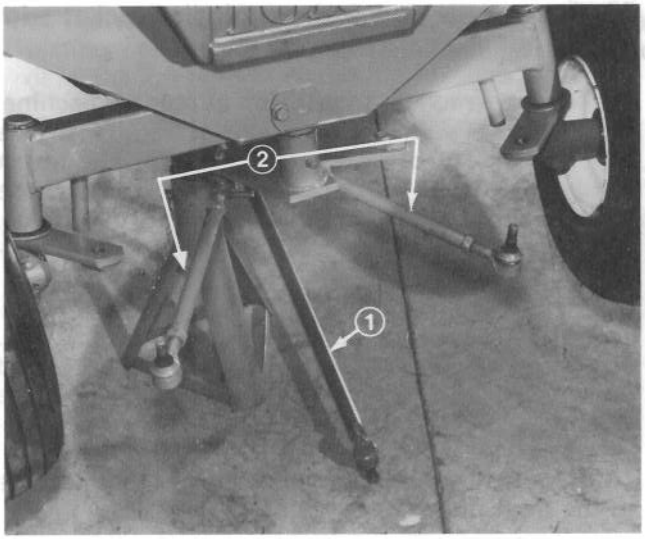


Figure 44

1. Steering tube
2. Wheel spindle tie rods

3. Remove snap ring and flatwasher and slide steering plate off mounting pin on bottom of axle (Fig. 45).

Figure 45

1. Snap ring and flatwasher

4. Using pin punch and hammer, drive both bushings out of steering plate (Fig. 46). Clean inside of steering plate to remove dirt and foreign matter. Also clean mounting pin on bottom of rear axle.

5. Notice groove on inside of new bushing. When it is installed, open end of groove must be to the outside of the steering plate tube. Apply grease to the inside and outside of the new bushings. Use an arbor press to drive bushings into top and bottom of the steering plate tube. Bushings must be flush with end of tube (Fig. 46).

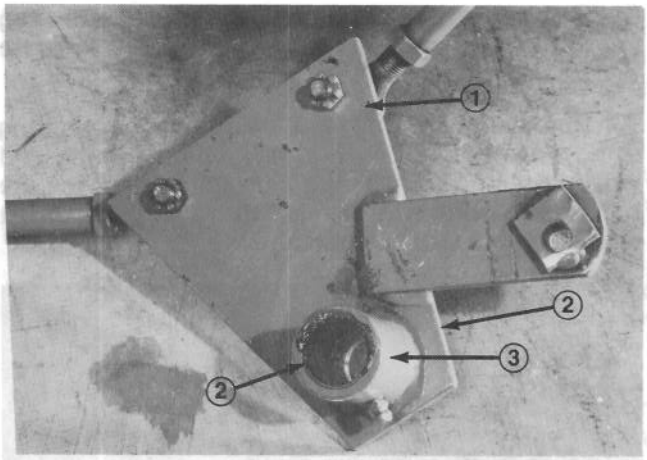


Figure 46

1. Steering plate
2. Bushing
3. Steering plate tube

6. Slide steering plate onto mounting pin on bottom of rear axle. Secure plate in place with flatwasher and snap ring (Fig. 45).

7. Slide tie rod ends through appropriate holes in the steering plate, and secure parts together with slotted nuts. Tighten nuts until they are tight and holes in nuts and tie rod ends line up. Install cotter pins through nuts and tie rod ends.

8. Lubricate bushings through the grease fitting on the steering plate.

SERVICING REAR WHEEL SPINDLE BUSHINGS

The rear wheel spindles must fit snugly in the rear axle. Excessive movement of the spindle in the axle indicates the bushings are probably worn and must be replaced.

1. Remove cotter pin and slotted nut from tie rod end that connects steering tube to steering plate (Fig. 39). Separate tie rod end from plate.

2. Remove large locknut from end of rear axle pin (Fig. 40).

3. Remove capscrew, lockwasher and flatwasher holding outside of axle pin to chassis (Fig. 41).

4. Jack up frame – just ahead of the rear wheels – until pressure is taken off the axle pin. Support machine with jack stands to prevent it from falling. Pull axle pin out to release the rear axle and thrust washers from the frame.

5. Carefully roll the entire rear axle and wheel assembly out from under the machine. Set axle assembly onto the work bench.

6. Remove cotter pin and slotted nut connecting tie rod end to spindle bracket (Fig. 47). Separate tie rod end from spindle bracket.

7. Remove snap ring and thrust washer holding spindle in axle tube (Fig. 47). Slide spindle and wheel assembly out of the axle tube to expose the bushings. Make sure to account for the thrust washer on bottom of axle tube.

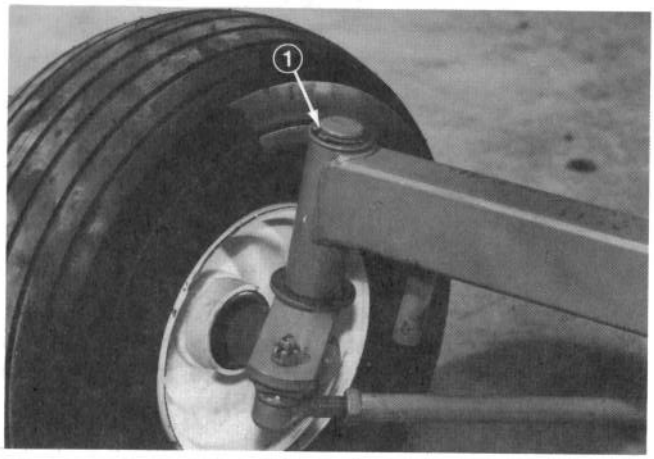


Figure 47

1. Snap ring and flatwasher

8. Using pin punch and hammer, drive both bushings out of axle tube (Fig. 48). Clean inside of axle tube to remove dirt and foreign matter.

9. Notice groove on inside of new bushing. When it is installed, open end of groove must face to the outside of rear axle tube. Apply grease to inside and outside of the new bushings. Using an arbor press, drive bushings into the top and bottom of the axle tube. Bushings must be flush with axle tube (Fig. 48).

10. Wipe spindle shaft with a rag to remove dirt and grease. Slide thrust washer onto shaft and push shaft through axle tube. Hold wheel and spindle shaft assembly in place and install thrust washer and snap ring onto end of spindle shaft.

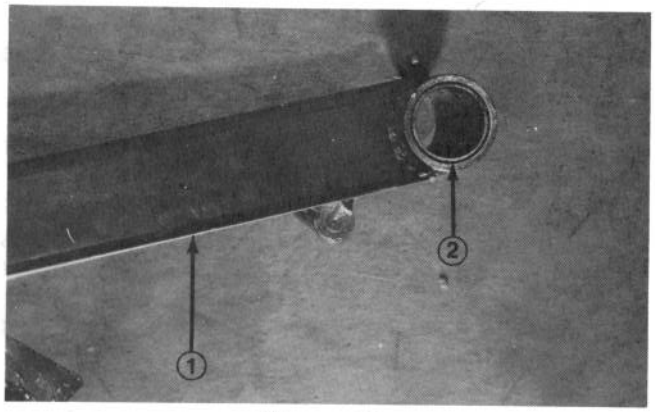


Figure 48

1. Rear axle
2. Bushing

11. Connect tie rod end to spindle bracket with slotted nut and cotter pin.

12. Move rear axle into position at rear of machine. Mount axle between two sections of frame with axle pin and two thrust washers (Fig. 43). The thrust washers must be positioned at ends of the axle pivot tube and between both sections of the frame. Secure axle pin in place with capscrew and lockwasher (Fig. 41).

13. Install large locknut on end of axle pin (Fig. 40). tighten locknut until all forward and backward movement of the axle is eliminated. However, the axle must still pivot freely.

14. Remove the jack stands and lower the machine to the shop floor.

15. Connect tie rod end at end of steering tube to steering plate with slotted nut and cotter pin.

16. Lubricate wheel spindle bushings through the grease fitting on axle tube (Fig. 20).

REPLACING AND PACKING REAR WHEEL BEARINGS

Pack the rear wheel bearings with no. 2 general purpose grease after every 500 hours of operation or once a year. If operating conditions are extremely dusty and dirty, it may be necessary to pack the bearings more often.

1. Jack up rear of machine until tire is off shop floor. Support machine with jack stands to prevent it from falling.

2. Remove dust cap from end of wheel spindle. Remove cotter pin, slotted nut, and washer, and slide wheel off spindle shaft. Pull seal out of wheel hub (Fig. 49).

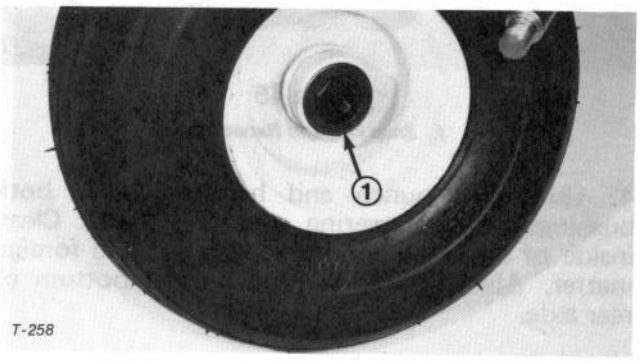


Figure 49

1. Seal and bearings

3. Remove bearings from wheel hub (Fig. 50). Clean the bearings in solvent and make sure they are in good operating condition. Also clean the inside

STEERING MAINTENANCE

of the wheel hub. Check the bearing cups for wear, pitting or other noticeable damage. Replace defective parts.

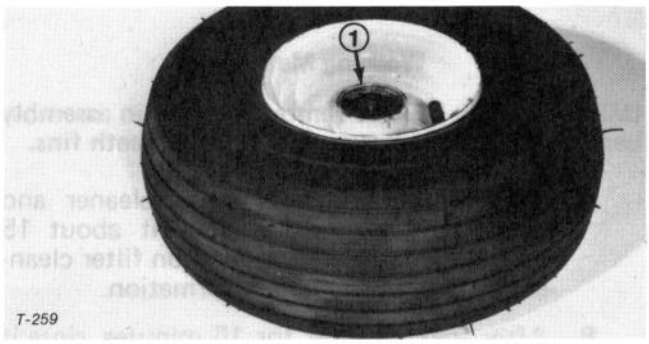


Figure 50

1. Seal and bearings

4. If bearing cups were removed from the wheel hub, press them into the hub until they seat against the shoulder (Fig. 51).

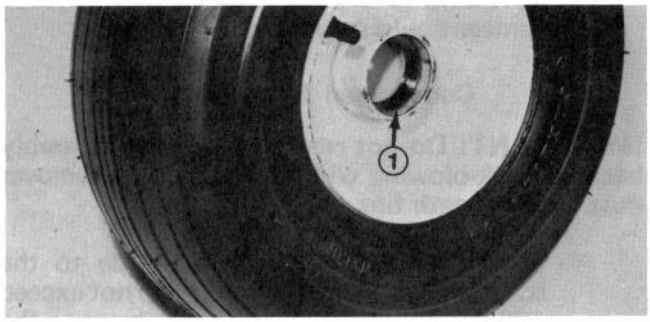


Figure 51

1. Bearing cup

5. Pack both bearings with grease. Install bearing into cup on inboard side of wheel hub. Lubricate inside of new lip seal and press it into the wheel hub (Fig. 49).

Note: Lip seal must be pressed in so it is flush with the end of the hub, and the lip of the seal must be toward the bearing.

6. Pack inside of wheel hub with some grease, but not full. Install remaining bearing into the bearing cup.

7. Slide wheel assembly onto spindle shaft and secure it in place with flatwasher and slotted nut (Fig. 52). Do not tighten the nut and do not install the cotter pin.

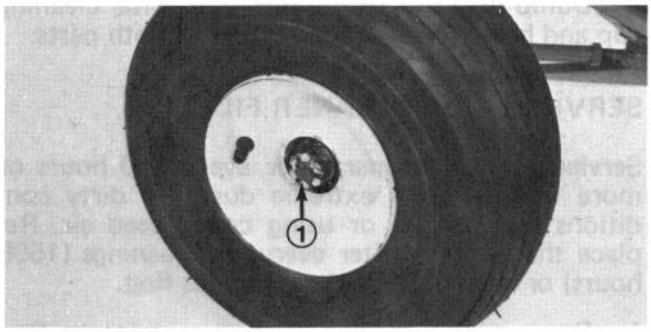


Figure 52

1. Slotted nut

8. Adjust preload on the wheel bearings; refer to Adjusting Rear Wheel Bearings, steps 3-5, page 20.

AIR CLEANER MAINTENANCE

GENERAL MAINTENANCE PRACTICES

Inspect air cleaner and hose periodically to maintain maximum engine protection and to ensure maximum service life.

1. Assure hose between air cleaner and carburetor is clamped securely in place. Replace the hose if it is cracked or punctured.

2. Check air cleaner body for dents and other damage which could possibly cause an air leak. Replace a damaged air cleaner body.

3. Insure dust cap is sealing around bottom of air cleaner body.

4. Mounting screws and nuts holding air cleaner in place must be tight.

5. Inlet cap must be free of obstructions.

SERVICING DUST CUP AND BAFFLE

Inspect the dust cup and rubber baffle once a week or every 50 hours operation; however, daily or more frequent inspection is required when operating conditions are extremely dusty and dirty. Never allow dust to build up closer than one inch (25 mm) from the rubber baffle.

Note: If conditions are extremely dusty and dirty, begin by checking dust cup and baffle after each day's operation to establish approximately how long an interval passes before dust cup should be emptied. Base further maintenance requirements on this figure. These conditions may be particularly prevalent if the rear discharge cutting unit is attached.

AIR CLEANER MAINTENANCE

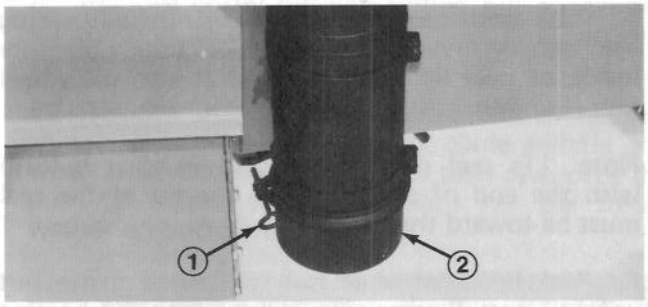


Figure 53

1. Thumb screw 2. Dust cup

1. Loosen thumb screw until dust cup and baffle can be removed (Fig. 53). Separate dust cup and baffle (Fig. 53).

2. Dump dust out of the dust cup. After cleaning cup and baffle, assemble and reinstall both parts.

SERVICING AIR CLEANER FILTER

Service the air cleaner filter every 250 hours or more frequently in extreme dusty or dirty conditions by washing or using compressed air. Replace the element after every six cleanings (1500 hours) or annually, whichever comes first.

1. Remove and service dust cup; refer to Servicing Dust Cup and Baffle, page 25.

2. Remove wing nut w/gasket and slide filter element out of air cleaner body (Fig. 54).

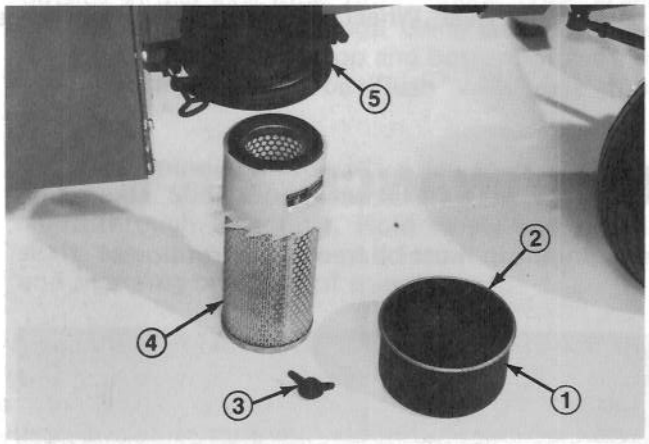


Figure 54

1. Dust cup
2. Baffle
3. Wing nut with gasket
4. Filter element
5. Air cleaner body

3. Clean the element by washing it in a solution of filter cleaner (Part No. 27-7220, available from Toro) and water, or blow dirt out of filter by using compressed air.

Note: Compressed air is recommended when element must be used immediately after servicing because a washed element must be dried before it is used. By comparison, washing the element cleans better than blowing dirt out with compressed air. Remember though, filter must be washed when exhaust soot is lodged in the filter pores.

Washing Method

IMPORTANT: Do not remove plastic fin assembly because washing removes dust from beneath fins.

A. Prepare a solution of filter cleaner and water and soak filter element about 15 minutes. Refer to directions on filter cleaner carton for complete information.

B. After soaking filter for 15 minutes, rinse it with clear water. Maximum water pressure must not exceed 40 psi (276 kPa) to prevent damage to the filter element.

C. Dry filter element using warm, flowing air (160°F (71°C) max). or allow element to air-dry. Do not use compressed air or a light bulb to dry the filter element because damage could result.

Compressed Air Method

IMPORTANT: Do not remove plastic fin assembly because back-blowing with compressed air removes dust from beneath fins.

A. Blow compressed air from inside to the outside of dry filter element. Do not exceed 100 psi (689 kPa) to prevent damage to the element.

B. Keep air hose nozzle at least one inch (25 mm) from pleated paper, and move nozzle up and down while rotating the filter element. Inspect element when dust and dirt are removed; refer to Inspecting Filter Element, page 26.

4. Wipe inside of air cleaner body with a damp cloth to remove excess dust. Slide filter into air cleaner body and secure it in place with wing nut and gasket.

5. Reinstall dust cup and baffle. Move thumb screw behind air cleaner body and tighten it securely.

INSPECTING FILTER ELEMENT

1. Place bright light inside filter.

2. Rotate filter slowly while checking for cleanliness, ruptures, holes and tears. Replace defective filter element.

3. Check fin assembly, gasket and screen for damage. Replace filter if damage is evident.

ENGINE MAINTENANCE

CHANGING CRANKCASE OIL AND FILTER

Check oil level after each days operation or each time machine is used. Change oil and oil filter after every 50 hours of operation. However, change oil more frequently when engine is operated in dusty or sandy conditions. If possible, run engine just before changing oil because warm oil flows better and carries more contaminants than cold oil.

1. Position machine on a level surface.

2. Disengage hood latch and open the hood. Set drain pan under the housing and in line with drain plug (Fig. 55).

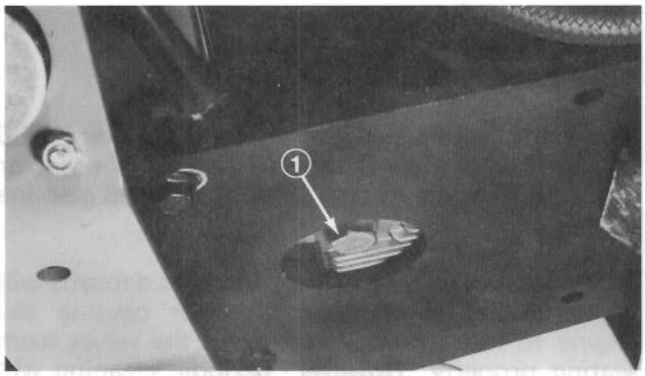


Figure 55

1. Oil drain plug

3. Clean area around drain plug.

4. Remove oil drain plug and allow oil to flow into drain pan. Remove and replace oil filter (Fig. 56); refer to parts catalog for part number.

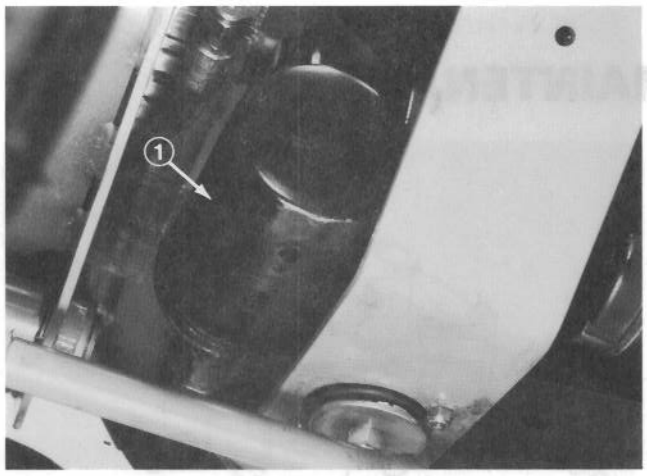


Figure 56

1. Engine oil filter

5. After oil is drained, reinstall drain plug and filter and wipe up any oil that spilled.

6. Fill crankcase with oil; refer to Check Crankcase Oil, page 10.

CLEANING CYLINDER HEAD FINS

To avoid overheating and possible engine damage, clean cooling fins on cylinder head after every 50 hours of operation if necessary.

1. Open the hood. Pull high tension wires off spark plugs.

2. Remove self tapping screw retaining top of right engine housing (Fig. 57).

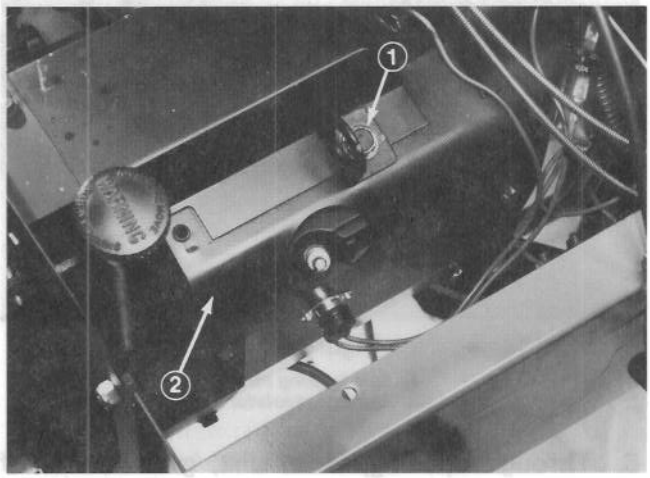


Figure 57

1. Self tapping screw
2. Right engine housing

3. Prying housing away from engine, clean dirt, grass and chaff from outside of cylinder and cylinder head fins (Fig. 58).

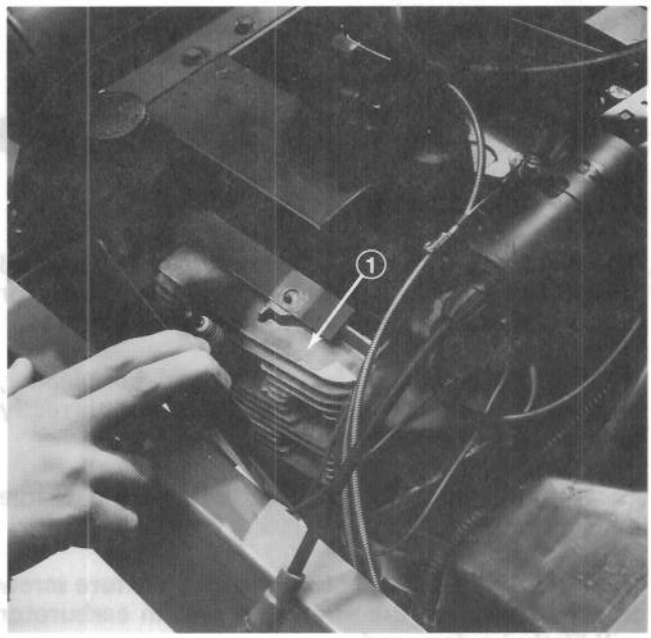


Figure 58

1. Cylinder fins

4. Reinstall engine housing with self tapping screw.

ENGINE MAINTENANCE

5. Remove self tapping screw securing voltage regulator to left engine housing (Fig. 59).

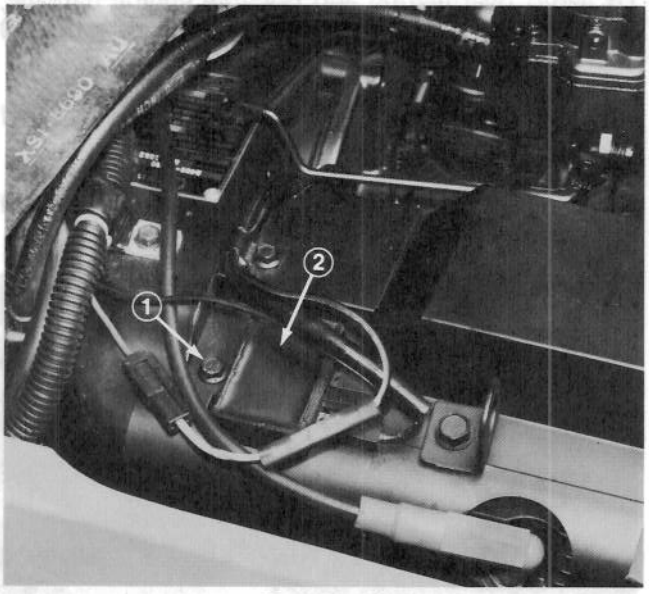


Figure 59

1. Self tapping screw
2. Voltage regulator

6. Through opening, clean dirt, grass and chaff from outside of cylinder and cylinder head fins (Fig. 60).

7. Reinstall voltage regulator with self tapping screw.

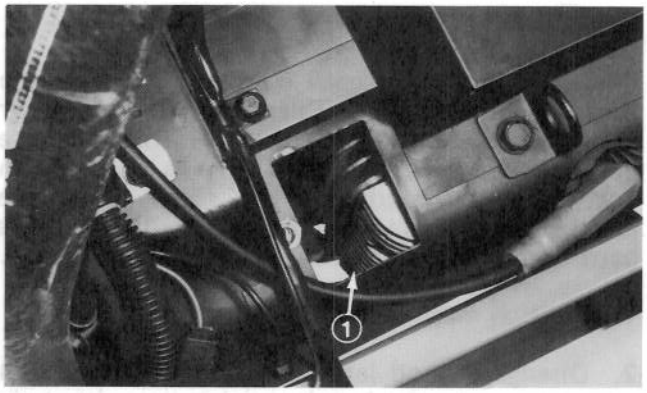


Figure 60

1. Cylinder fins

CLEANING COMBUSTION CHAMBER

Clean the combustion chamber after every 250 hours of operation if regular gasoline is used, or every 1000 hours of operation if unleaded gasoline is used.

A gradual buildup of carbon and lead deposits will form in the combustion chamber causing the engine to lose power and prevent the valves from seating properly. However, periodic cleaning will prolong valve life and make sure the engine is reliable. Refer to Onan Service Manual for Toro Engine or contact an Authorized TORO Service Distributor.

FUEL SYSTEM MAINTENANCE

ADJUSTING CARBURETOR

The carburetor has been adjusted at the factory and should not have to be reset. Should the carburetor require adjustment, use the following procedure:

IMPORTANT: Check fuel filter and air cleaner, and make sure the choke is operating correctly before the carburetor is adjusted.

1. Idle Mixture Screw (Fig. 61) – Close idle mixture screw by gently rotating it clockwise.

IMPORTANT: Do not close the idle mixture screw too tight because the screw and seat in carburetor will likely be damaged.

2. Rotate – open – the idle mixture screw 1-1/8 turns counterclockwise.

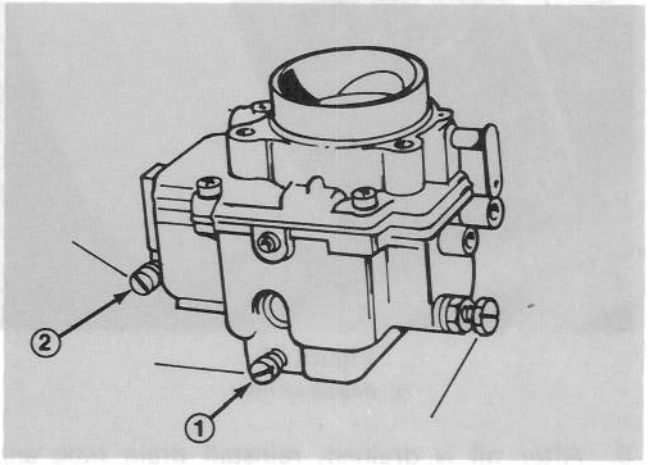


Figure 61

1. Idle mixture screw
2. Throttle stop screw

WARNING

Engine must be running so final adjustment of the carburetor can be performed. To guard against possible personal injury, keep hands, feet, face and other parts of the body away from the muffler, other hot parts of the engine, and other moving or rotating parts of the engine. Assure PTO lever is in DISENGAGE position and cutting unit is on the shop floor. Also engage parking brake.

3. Start engine and let it warm up for approximately ten minutes. When engine is at normal operating temperature, proceed with adjustments.

4. Move the throttle control to the slow position. Back out the low speed screw on the governor so that the throttle stop screw on the carburetor controls engine speed. Adjust the throttle stop screw for 1000 rpm idle.

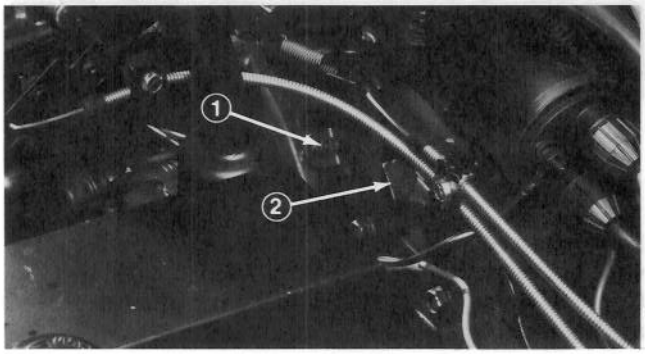


Figure 62

1. Low speed screw
2. High idle tab

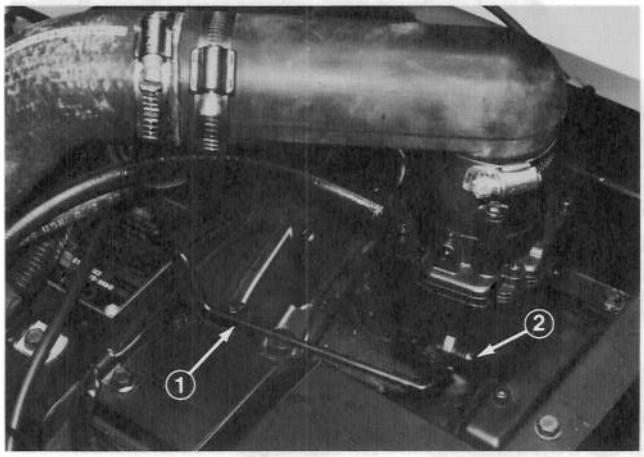


Figure 63

1. Idle control rod
2. Idle stop screw

5. Determine the best idle mixture setting by first turning the idle adjustment screw in until the engine speed drops and then outward until engine speed drops again. Over a narrow range between these two settings engine speed remains at its highest. Set the idle adjustment screw about 1/8 turn outward (rich) from the midpoint of this range.

6. Adjust low and high idles. Refer to Adjusting Low Speed Idle, page 29 and Adjusting High Speed Idle, page 29.

7. Check carburetor adjustment by moving throttle control quickly from SLOW to FAST. Engine speed should increase without hesitation. If engine tends to stall or die out, turn the main adjustment screw out 1/8 turn until engine accelerates smoothly, but do not turn it out more than 1/2 turn beyond the original setting.

ADJUSTING LOW SPEED IDLE

1. Open the hood, start the engine, and move the throttle control to the SLOW position.

2. Check engine rpm. Correct setting should be 1500 rpm.

3. If adjustment is necessary, adjust low speed screw, located on governor control arm, to 1500 rpm.

4. Holding idle control rod against throttle stop screw on carburetor, adjust throttle stop screw 100 rpm lower than setting on low speed screw (1400 rpm).

5. Stop the engine and close the hood.

ADJUSTING HIGH SPEED IDLE

1. Open the hood, start the engine, and move the throttle control to the FAST position.

2. Check engine rpm. The correct setting should be 3200 rpm.

3. If adjustment is necessary, bend high idle tab to correct setting.

4. Stop the engine and close the hood.

REPLACING FUEL FILTER

Replace the fuel filter after every 250 hours or yearly, whichever comes first.

1. Clamp both fuel lines that connect to the fuel filter (Fig. 64) so gasoline cannot drain when lines are removed.

2. Loosen the hose clamps (Fig. 64) at both ends of the filter and pull fuel lines off filter.

3. Remove capscrew and lockwasher holding filter clamp to engine (Fig. 64). Slide filter out of clamp.

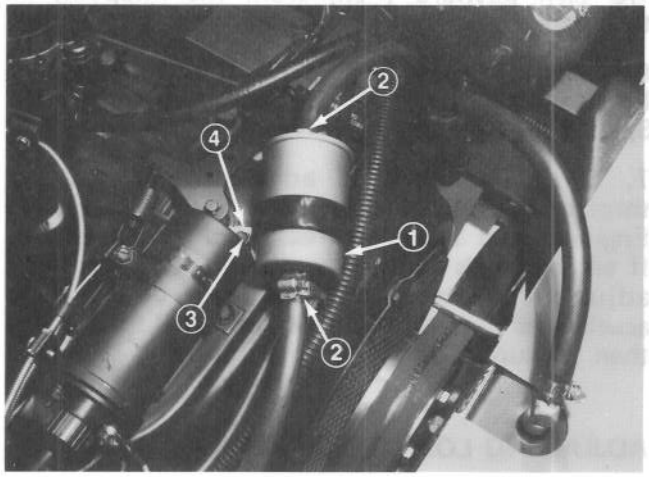


Figure 64

1. Fuel filter
2. Hose clamp
3. Capscrew and lockwasher
4. Clamp

4. Slide new filter into clamp and mount it in place with capscrew and lockwasher. Be sure arrow on side of filter points toward the fuel pump.

5. Slide hose clamps onto ends of fuel lines. Push fuel lines onto fuel filter and secure them with hose clamps.

LUBRICATE STARTER MOTOR SHAFT

Under normal conditions, after 100 hours of operation, lubricate starter motor armature shaft with a silicon spray lubricant. However, when operating in dusty or dirty conditions lubricate shaft more often.

Note: To reach starter motor shaft a spray can with a nozzle extension will be needed and a narrow blade screwdriver to slide starter drive forward.

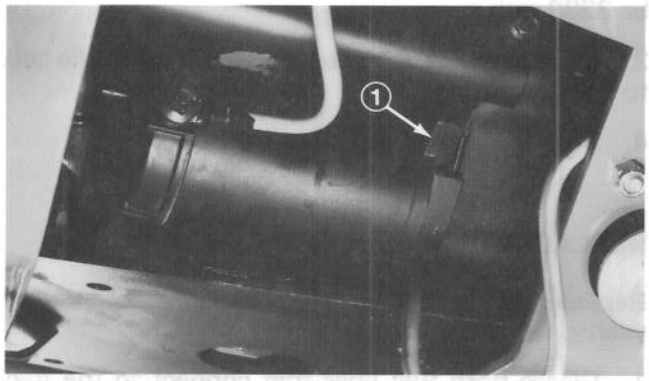


Figure 65

1. Starter motor armature shaft (not shown)

REMOVING FUEL TANK FROM CHASSIS

1. Remove knob from lift lever.

2. Remove capscrews, lockwashers and flatwashers securing seat support cover to frame.

3. Pivot seat forward and support it to prevent it from falling accidentally. Lift seat support cover off frame.

4. Unplug seat switch. Remove capscrews, lockwashers and flatwashers securing seat support to top of frame (Fig. 66). Set seat support aside.

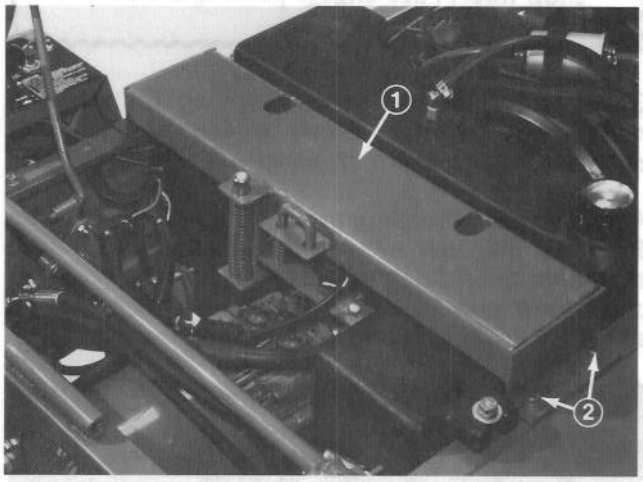


Figure 66

1. Seat support
2. Capscrew, lockwasher and flatwasher

5. Remove capscrews, lockwashers and flatwashers securing fuel tank to top of frame (Fig. 67). However, do not lift fuel tank out of chassis at this time.

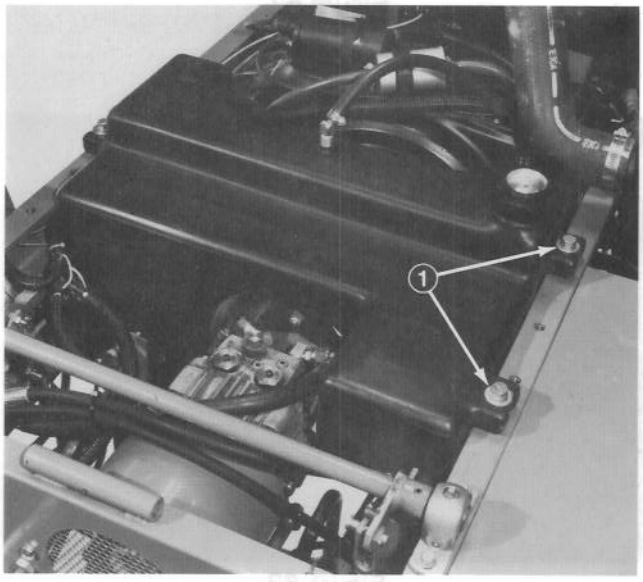


Figure 67

1. Capscrew, lockwasher and flatwasher

FUEL SYSTEM MAINTENANCE

6. Place drain pan below fittings on bottom of fuel tank.

DANGER

Since gasoline is highly flammable, drain it outdoors and make sure engine is cool to prevent a potential fire hazard. Wipe up any gasoline that may have spilled. Do not drain gasoline near any open flame or where gasoline fumes may be ignited by a spark. Do not smoke a cigar, cigarette, or a pipe when handling gasoline.

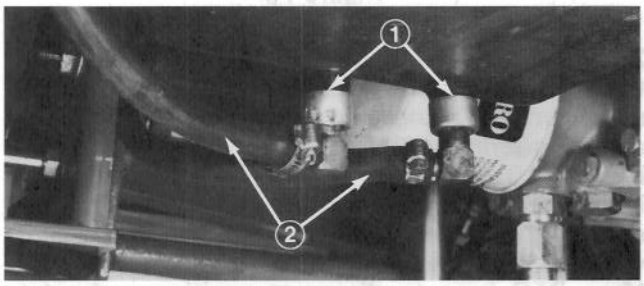


Figure 68

1. Fuel tank fittings
2. Fuel line

7. Loosen clamps holding both fuel lines on fuel tank fittings. Pull lines off fittings and allow gasoline to flow into large gas can (Fig. 68).

8. Lift fuel tank up and remove it from the chassis.

INSTALLING FUEL TANK

1. Set fuel tank into position and secure it in place with capscrews, lockwashers and flatwashers (Fig. 67).

2. Push fuel lines onto fuel tank fittings (Fig. 68). Tighten clamps to secure the lines on the fittings.

WARNING

Make sure fuel lines do not make contact with any moving parts.

3. Install seat support with capscrews, lockwashers and flatwashers. Connect seat switch (Fig. 66).

4. Slide seat support cover onto the lift lever and position the cover on the frame. Secure seat support cover in place with capscrews, lockwashers and flatwashers.

5. Install knob onto lift lever.

6. Fill fuel tank with gasoline.

7. Check for leaks.

ELECTRICAL MAINTENANCE

CHECKING AND REPLACING SPARK PLUGS

Since air gap between center and side electrodes increases gradually during normal engine operation, check condition of electrode at 100 hour intervals. The correct spark plugs to use in the engine are Champion RBN-13Y or equivalent. Set air gap at 0.025 in. (0.64 mm).

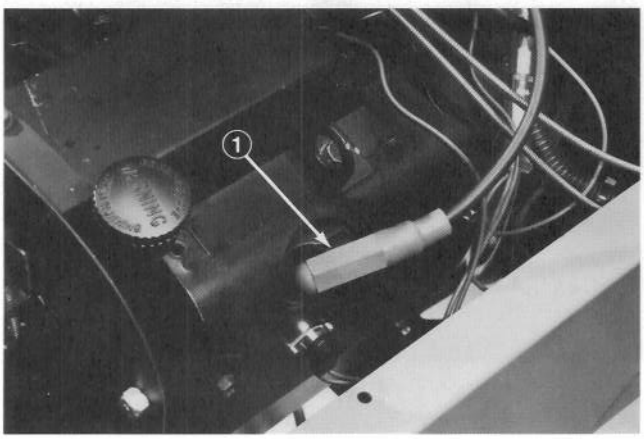


Figure 69

1. High tension wire (right side)

1. Clean area around spark plugs so dirt does not fall into cylinder when plugs are removed.

2. Pull high tension wires off spark plugs and remove plugs from cylinder head (Fig. 69).

3. Check condition of center and side electrodes to determine operating temperature of engine.

A. Light brown insulator tip indicates correct spark plug and heat range.

B. Black or oily insulator tip indicates an excessively rich fuel mixture, possibly caused by a dirty air cleaner element or a carburetor that is set too rich.

C. Light gray or blistered-white insulator indicates overheating caused by a lean carburetor setting or incorrect spark plug (heat range too high).

IMPORTANT: A cracked, fouled or dirty spark plug must be replaced. Do not sandblast, scrape or clean electrodes by using a wire brush because grit may release from the plug and enter combustion chamber resulting in engine damage.

4. After setting air gap at 0.025 in. (0.64 mm), install spark plugs in cylinder head. Tighten the plug to 22 ft-lb (30 N·m). Push high tension wires onto spark plugs.

SERVICING BREAKER POINTS

Inspect and service breaker points after 200 hours of engine operation. Since breaker point gap governs ignition timing, set gap at 0.020 in. (0.508 mm) whenever points are replaced or serviced. Clean points with a carborundum contact point stone. Insert a hard finished card or piece of paper between the points. Close and open the points so paper absorbs any dirt or filings on the points. Replace points that are burned or excessively pitted. Refer to Breaker Points Adjustment, Engine Operators Manual.

SERVICING BATTERY

IMPORTANT: Before welding on the machine, disconnect ground cable from the battery to prevent damage to the electrical system.

Note: Check battery condition weekly or after every 50 hours of operation. Keep terminals and entire battery case clean because a dirty battery will discharge slowly. To clean the battery, wash the entire case with solution of baking soda and water. Rinse with clear water. Coat the battery posts and cable connectors with Grafo 112X (Skin-over) grease, Toro Part No. 505-47 or petroleum jelly to prevent corrosion.

WIRING HARNESS SERVICE

Prevent corrosion of wiring terminals by applying Grafo 112X (Skin-over) grease, Toro Part No. 505-47, to the inside of all harness connectors whenever the harness is replaced.

Always disconnect battery cables, ground cable (–) first, to prevent possible wiring damage from short-outs whenever working with the electrical system.

ADJUSTING PTO LEVER

1. Visually check PTO lever to be sure it deflects switch arm when lever is in the disengaged position (Fig. 70). Back surface of PTO lever must be within 1/4 to 3/8 in. (6 mm to 10 mm) from end of the slot (Fig. 70). If PTO lever does not deflect switch arm, proceed to step 2.

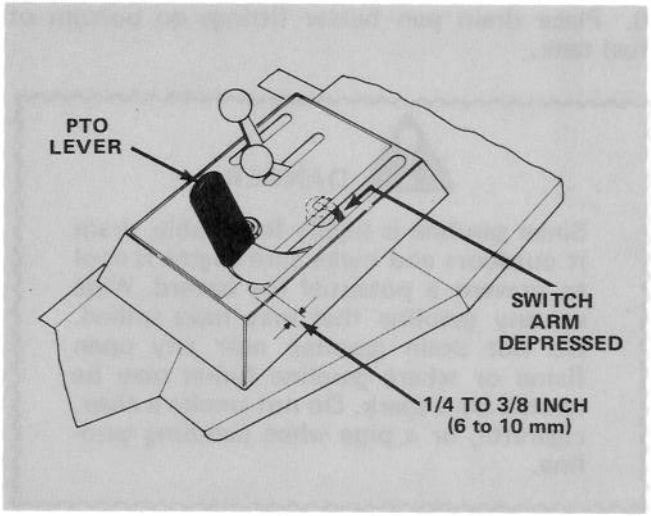


Figure 70

2. Pull high tension wire off spark plug. To adjust the PTO lever, remove the seat cover. Loosen jam nut from PTO engaging yoke (Fig. 71). Loosen adjusting screw until PTO lever is within 1/4 - 3/8 in. (6 - 10 mm) from end of the slot, when lever is in the disengage position (Fig. 70). This will deflect the switch arm. Tighten jam nut against yoke to lock the adjustment in place (Fig. 71). Move PTO lever to disengage position and rotate locknut at top of spring until the dimension of spring, between the top and bottom flatwasher, is 3-9/16 in. (9.0 cm) (Fig. 71). Repeat step 1.

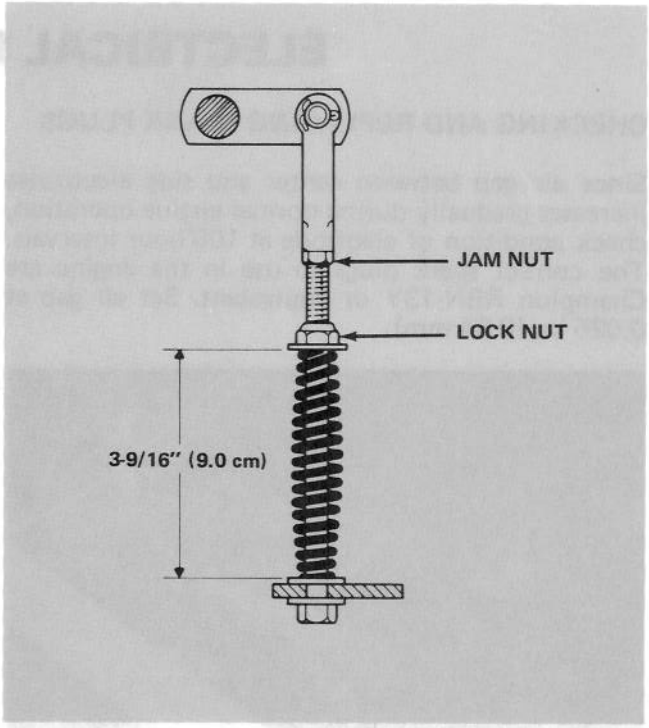
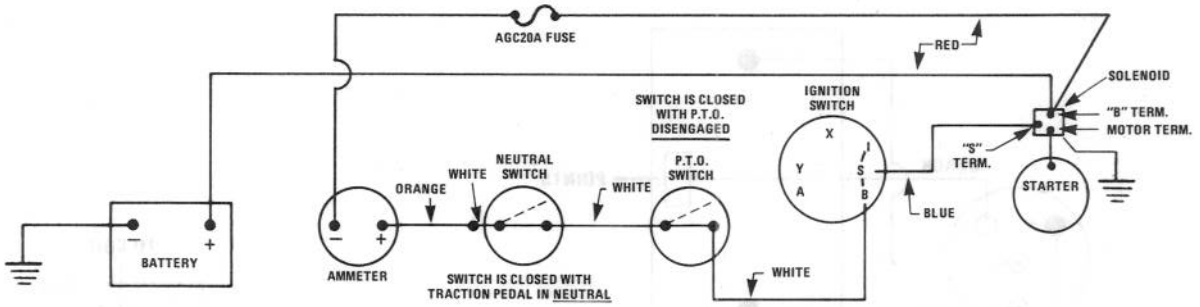


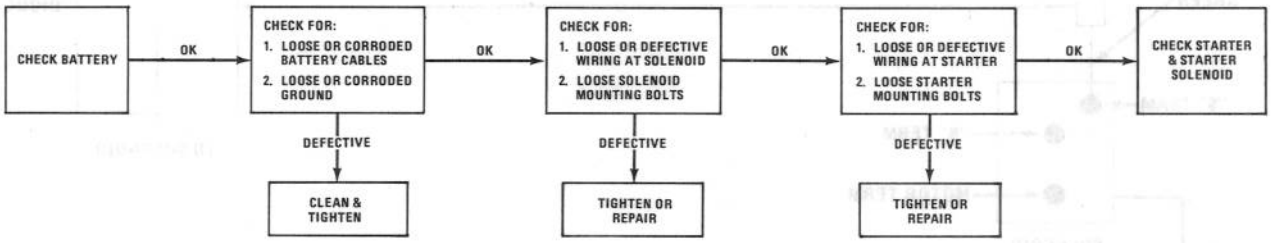
Figure 71

ELECTRICAL MAINTENANCE TROUBLESHOOTING

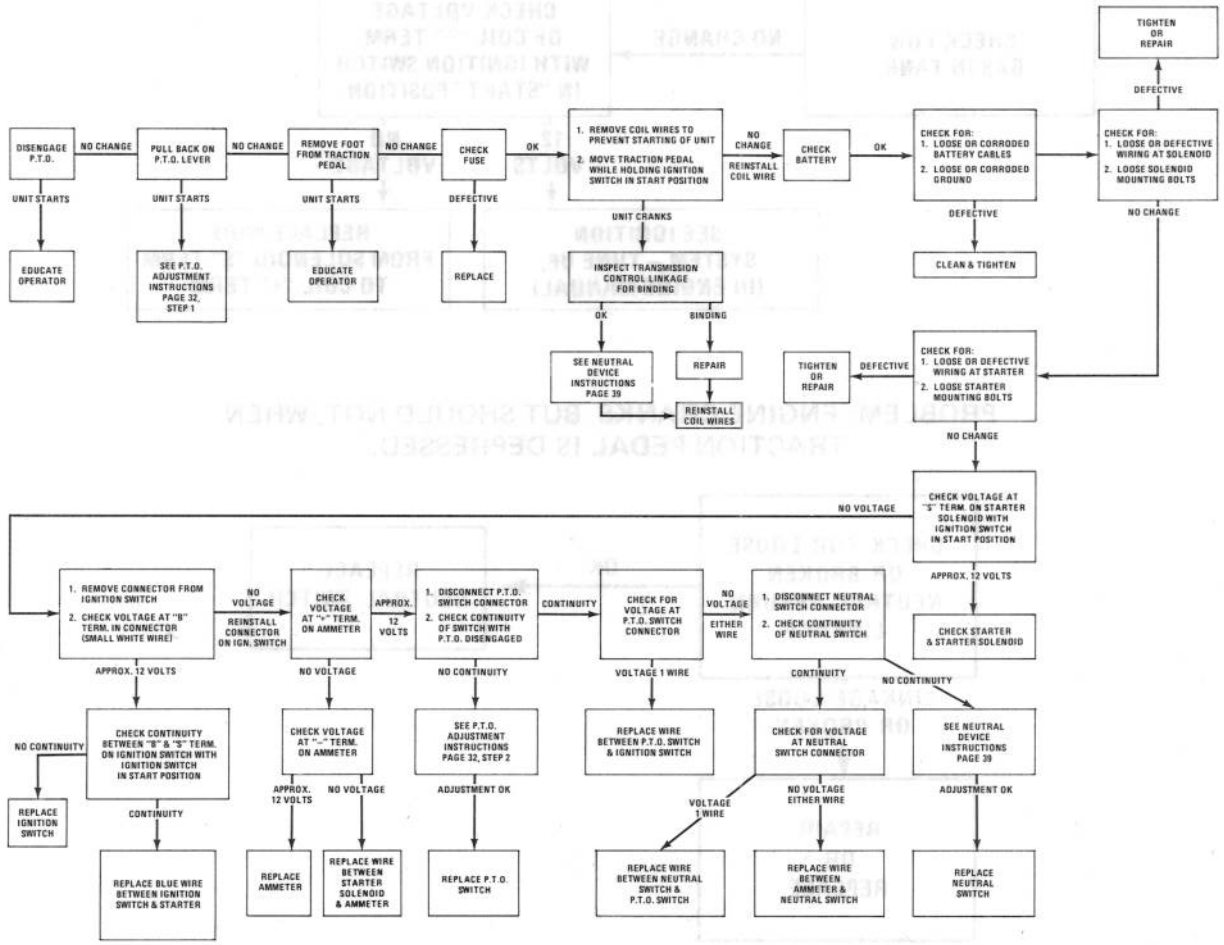
PROBLEM: STARTER SOLENOID CLICKS, BUT STARTER WILL NOT CRANK. (IF SOLENOID CLICKS INTERLOCK SYSTEM IS NOT AT FAULT)



CIRCUIT INVOLVED WITH CRANKING ENGINE

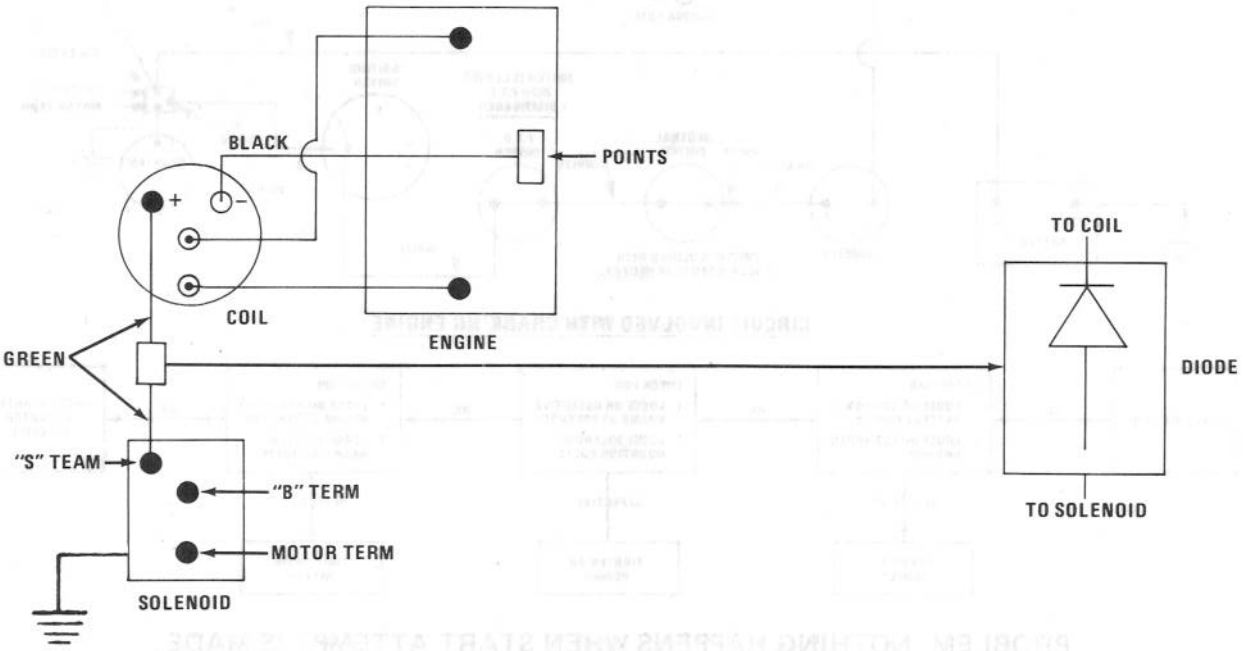


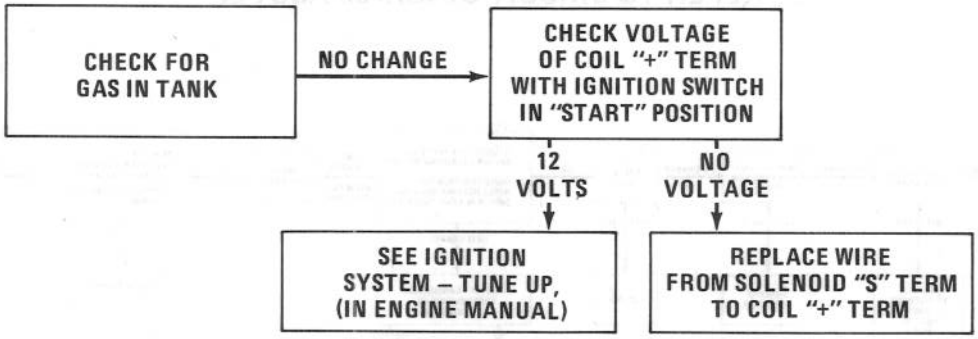
PROBLEM: NOTHING HAPPENS WHEN START ATTEMPT IS MADE. REFER TO CIRCUIT DIAGRAM ABOVE.



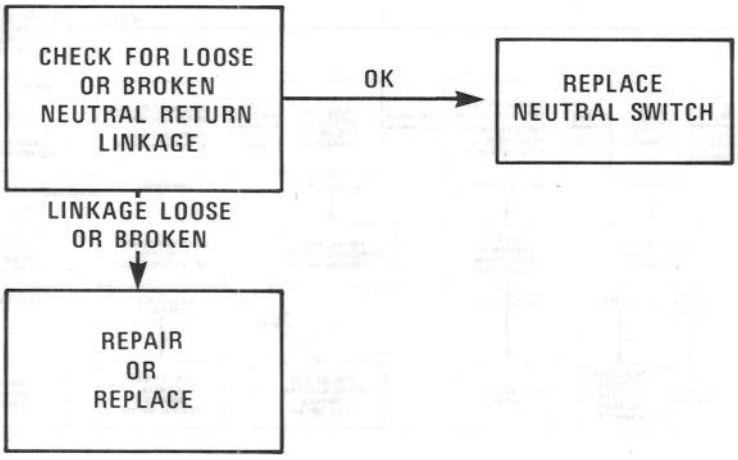
ELECTRICAL MAINTENANCE TROUBLESHOOTING

PROBLEM: ENGINE CRANKS, BUT WILL NOT START (IF ENGINE CRANKS, INTERLOCK CIRCUIT IS NOT AT FAULT).





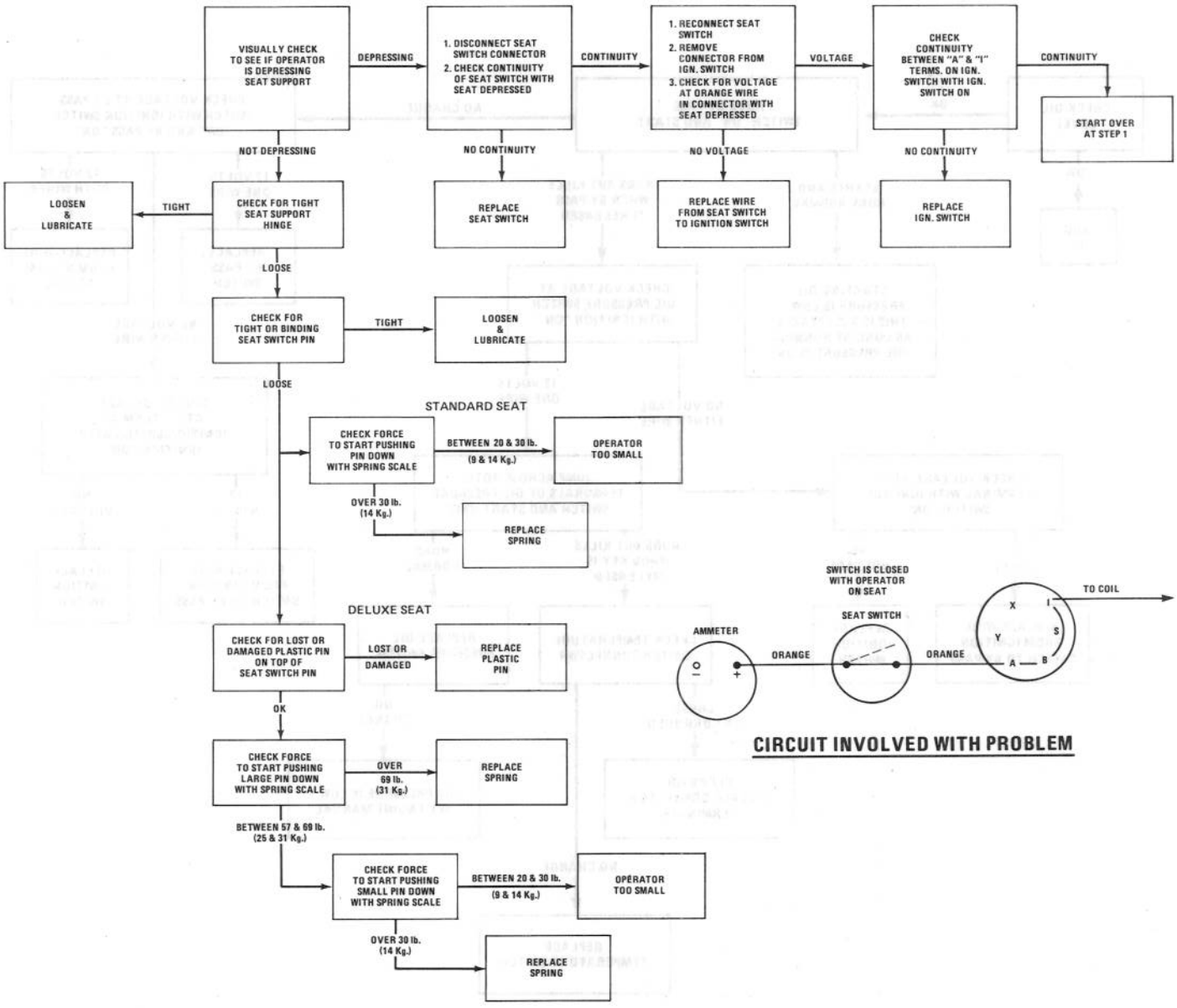
PROBLEM: ENGINE CRANKS, BUT SHOULD NOT, WHEN TRACTION PEDAL IS DEPRESSED.



ELECTRICAL MAINTENANCE TROUBLESHOOTING

PROBLEM: ENGINE CRANKS, BUT SHOULD NOT, WHEN P.T.O. IS ENGAGED.

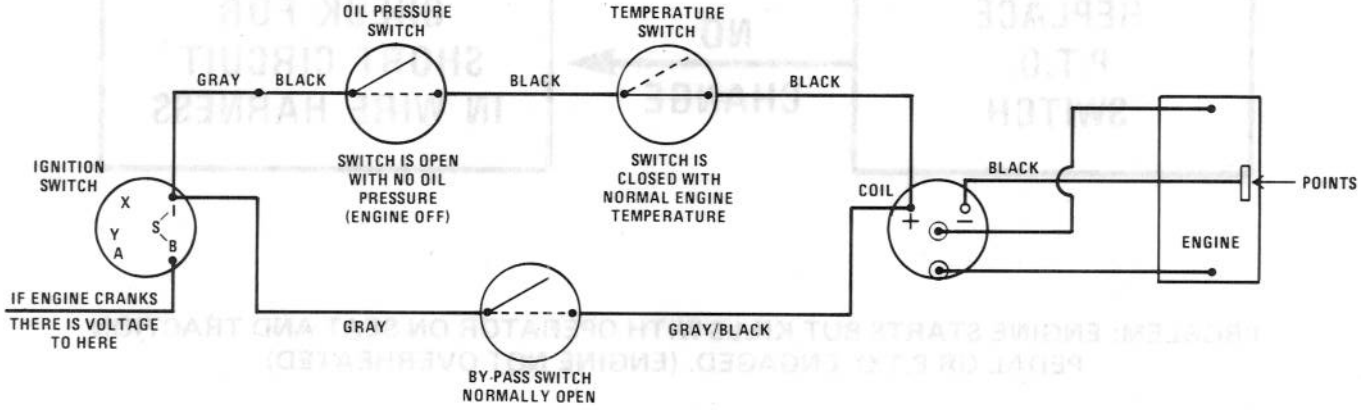
PROBLEM: ENGINE STARTS BUT KILLS WITH OPERATOR ON SEAT AND TRACTION PEDAL OR P.T.O. ENGAGED. (ENGINE NOT OVERHEATED)

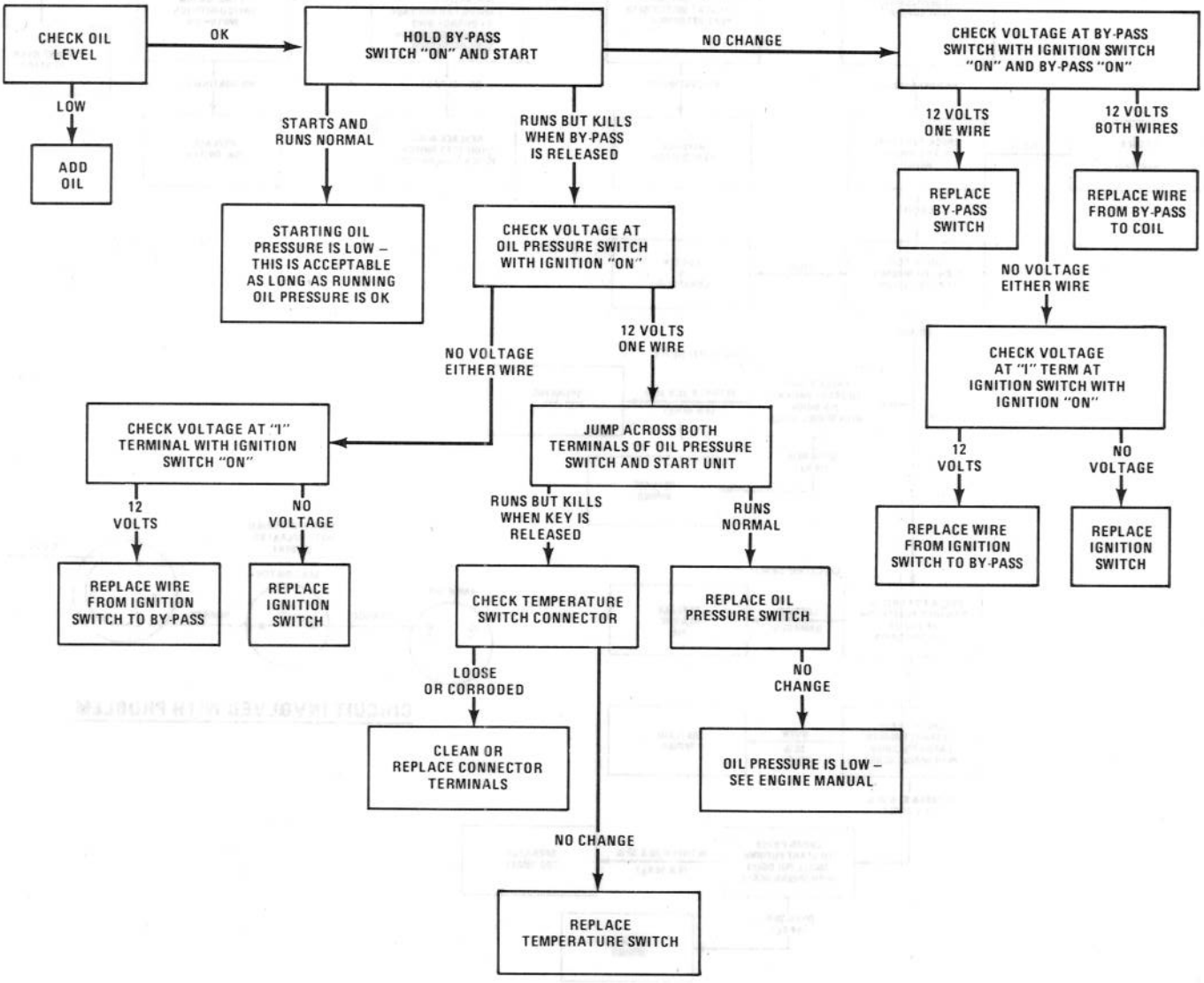


CIRCUIT INVOLVED WITH PROBLEM

ELECTRICAL MAINTENANCE TROUBLESHOOTING

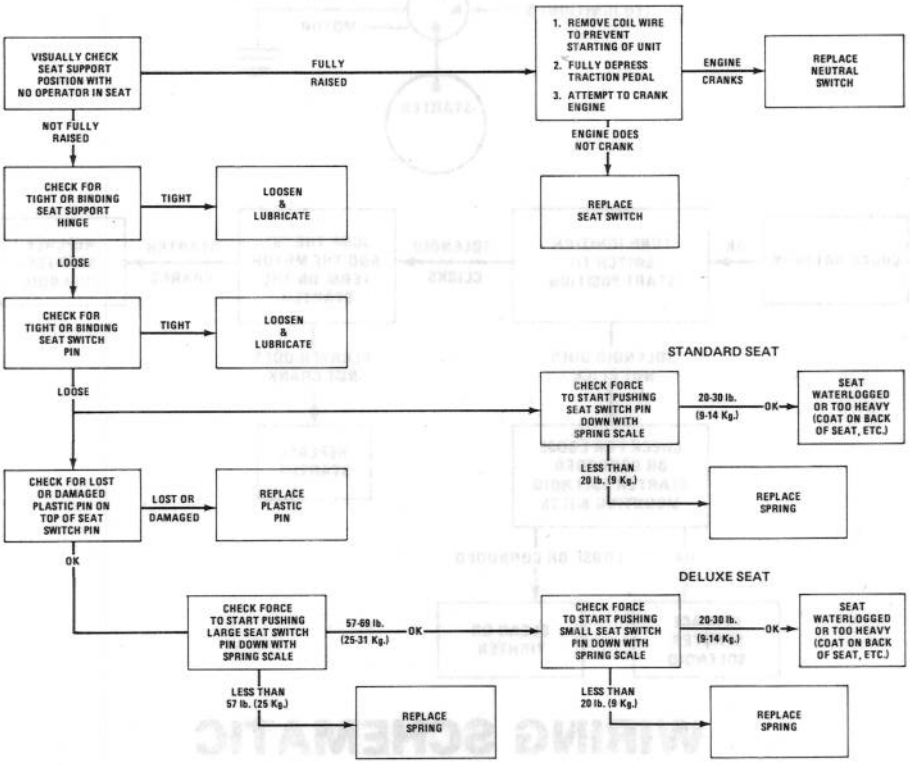
PROBLEM: ENGINE CRANKS, BUT KILLS WHEN KEY IS RELEASED (ENGINE NOT OVERHEATED) (IF ENGINE CRANKS, INTERLOCK CIRCUIT IS NOT AT FAULT)



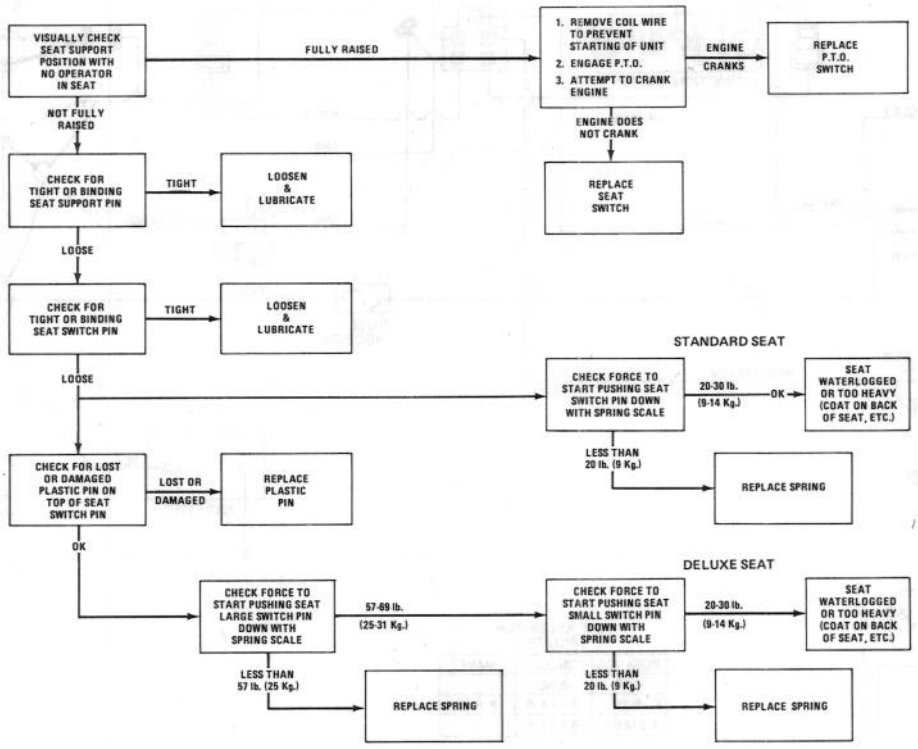


ELECTRICAL MAINTENANCE TROUBLESHOOTING

PROBLEM: ENGINE CONTINUES TO RUN, BUT SHOULD NOT, WHEN TRACTION PEDAL IS ENGAGED WITH NO OPERATOR ON SEAT. (NEUTRAL RETURN DEVICE WORKING PROPERLY)

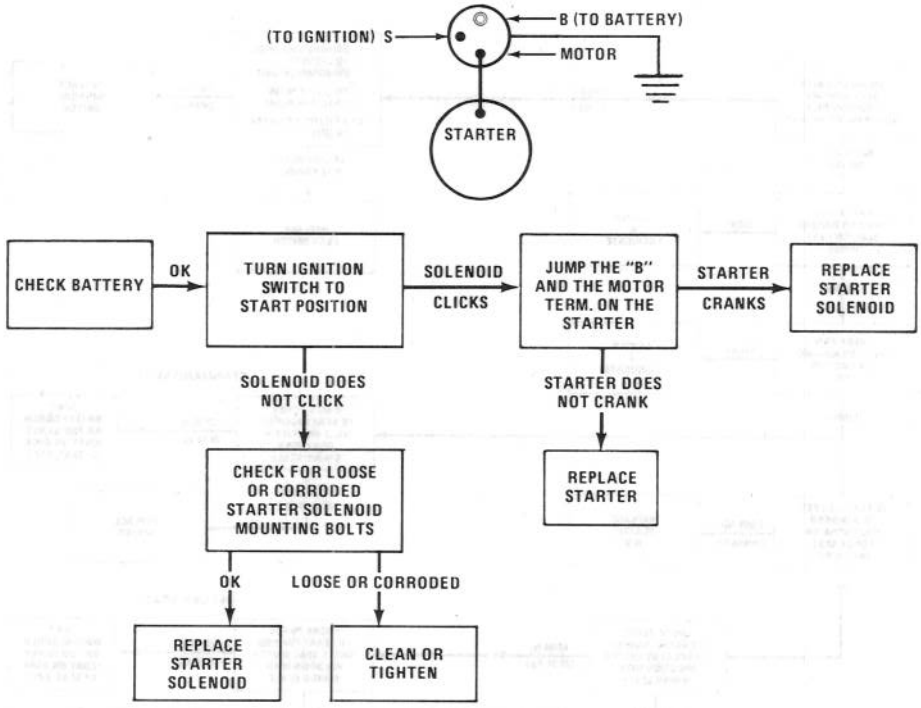


PROBLEM: ENGINE CONTINUES TO RUN, BUT SHOULD NOT, WHEN P.T.O. IS ENGAGED WITH NO OPERATOR ON SEAT. (ENGINE CAN BE SHUT OFF WITH IGNITION SWITCH)

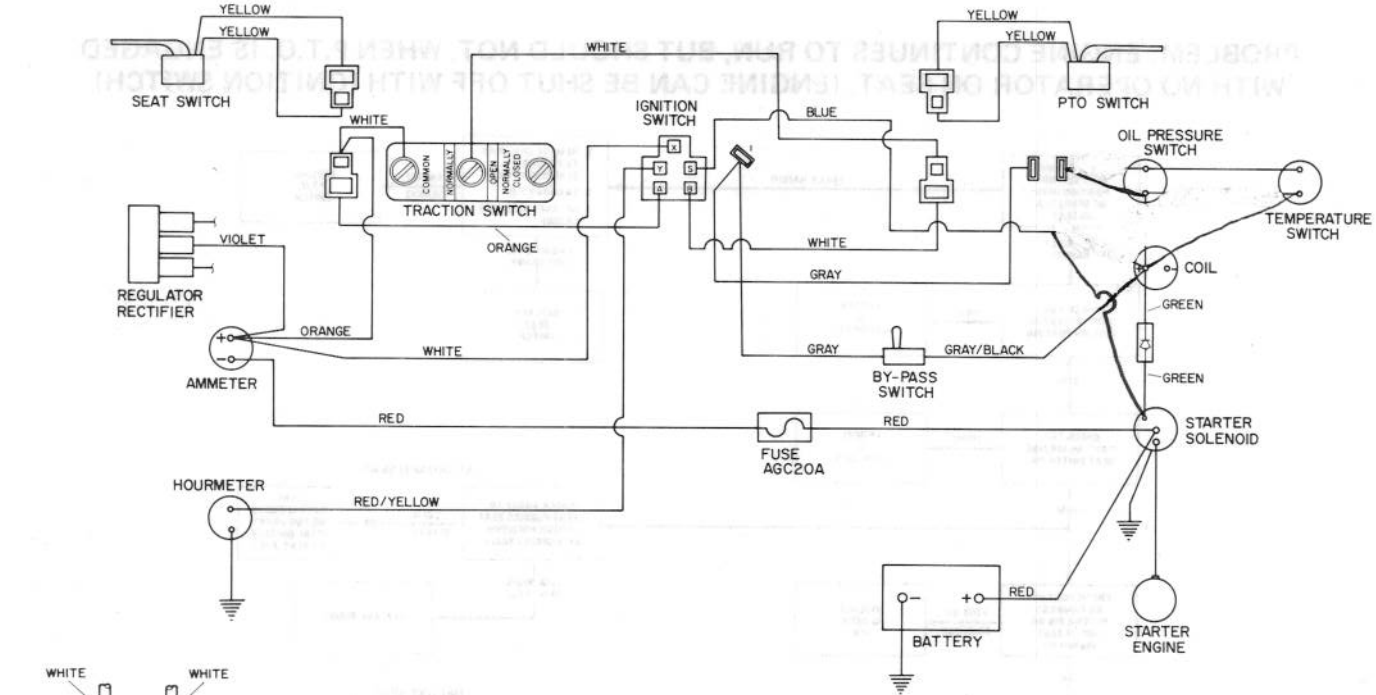


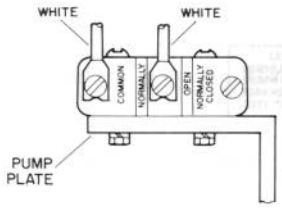
ELECTRICAL MAINTENANCE TROUBLESHOOTING

PROBLEM: THERE IS VOLTAGE AT "S" TERM. ON STARTER BUT STARTER WILL NOT CRANK.



WIRING SCHEMATIC





IGNITION SWITCH CIRCUITRY

POSITION	CIRCUIT	"MAKE"
I. OFF	NONE	
2. RUN	B+I+A	X + Y
3.START	B+I+S	

HYDRAULIC SYSTEM MAINTENANCE

ADJUSTING TRANSMISSION FOR NEUTRAL

The machine must not creep when traction pedal is released. If it does creep, an adjustment is required.

1. Park machine on a level surface and shut engine off. Depress only the left brake pedal and engage the parking brake.

2. Jack up right front side of machine until tire is off shop floor. Support machine with jack stands to prevent it from falling accidentally.

3. Visually inspect traction linkage for possible binding condition, correct if necessary and check machine operation. If condition still exists, repeat steps 1 and 2 and proceed to step 4.

4. Loosen two locknuts securing pump plate so plate is free to move (Fig. 72).

5. Start engine and rotate pump plate (Fig. 72) in either direction until wheel ceases rotation.

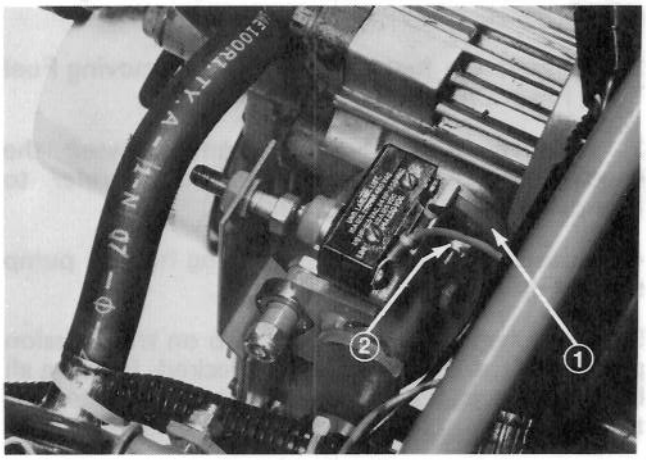


Figure 72

1. Pump plate 2. Locknut (2)

6. Stop engine and tighten locknuts to secure pump plate (Fig. 72).

7. Start engine and check adjustment. Repeat adjustment, if necessary.

8. Stop the engine and release left parking brake. Remove jack stands and lower machine to the shop floor. Test drive the machine to be sure it does not creep.

CHANGING HYDRAULIC OIL FILTER

The hydraulic oil filter keeps the hydraulic system relatively free of contaminants. However, the hydraulic oil filter must be serviced at regular intervals. The intervals are: initially, after the first five hours of operation, and thereafter, every 250 hours of operation or yearly, whichever comes first. Use a genuine TORO oil filter for replacement.

1. Remove hydraulic oil filter from mounting head (Fig. 73). Dispose of the filter properly.

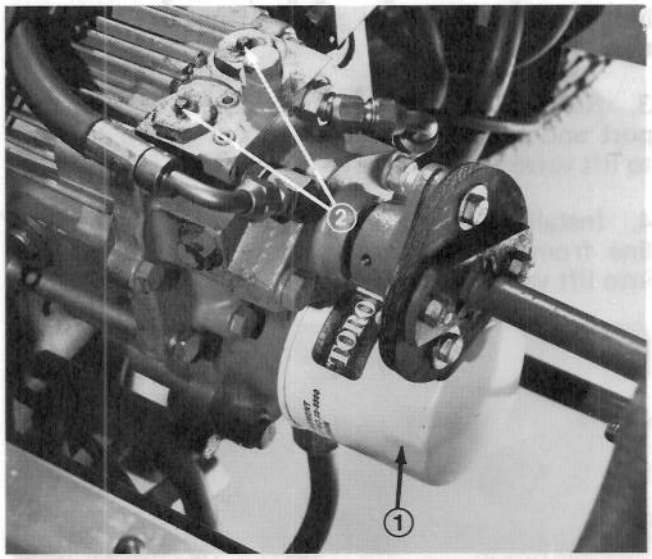


Figure 73

1. Filter 2. By-pass valve pins

2. Apply a film of fluid on the gasket. Install filter by hand until gasket contacts mounting head; then tighten filter an additional three-fourths turn.

3. Start engine and check for oil leaks. Allow engine to run for about two minutes so any air in the system is purged. Then shut engine off.

4. Check level of transmission fluid; refer to Check Hydraulic System Fluid, page 10.

TESTING CHARGE PUMP FLOW, IMPLEMENT RELIEF AND CHARGE RELIEF SETTING

An in-line hydraulic tester equipped with load valve, pressure gauge and flow gauge is required. Lines and fittings for tapping into the transmission to lift valve line will also be required.

1. Before testing, check and inspect the following:

   A. Check level of oil in axle housing; refer to Check Hydraulic System Fluid, page 10.

   B. Inspect control rod from traction pedal to control lever on side of transmission. Assure control rod and neutral assembly parts are not bent, binding, adjusted incorrectly or defective in any way. Repair, replace and adjust parts as conditions dictate.

C. Check hydraulic oil filter to be sure it is tight. A loose filter allows air to enter the system, resulting in foaming of the oil and excessively high operating temperature.

2. To begin testing, engage parking brake and block front wheels to prevent movement of the machine.

3. Remove seat, seat support cover and seat support and remove line from top of pump housing to lift valve from lift valve fitting (Fig. 74).

4. Install hydraulic inlet hose of test gauge into line from transmission and test gauge return line into lift valve fitting (Fig. 74).

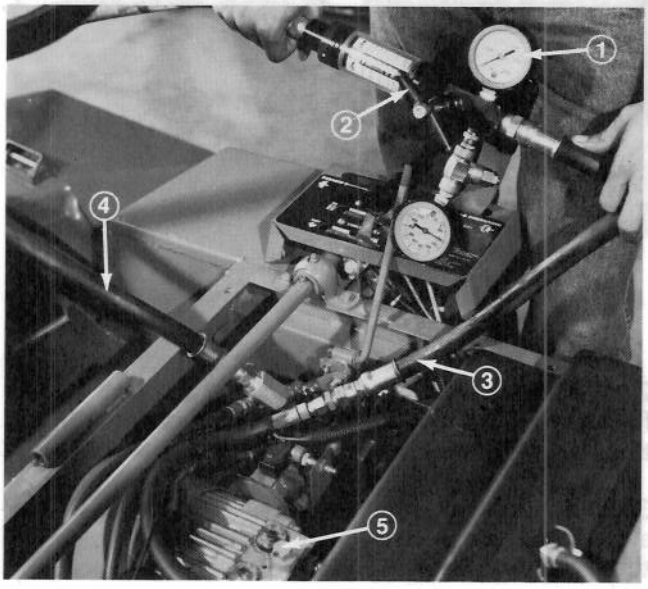


Figure 74

1. Tester
2. Load valve
3. Inlet line to tester
4. Return line from tester
5. Implement relief valve

5. Insure tester load valve is open, start engine and move throttle to SLOW so engine idles. Using a tachometer, verify engine is running at 1500 rpm. Adjust carburetor if engine is not idling at 1500 rpm.

6. Allow engine to idle for about 10 minutes so oil reaches normal operating temperature.

7. Increase engine speed to 3200 rpm - full throttle and watch flow and pressure gauges. Slowly close load valve until flow gauge reads one (1) GPM (0.063 L/s). Pressure reading at one (1) GPM (0.063 L/s) should not be lower than 500 psi (3447.5 kPa). If one (1) GPM or a minimum of 500 psi (3447.5 kPa) cannot be achieved, remove implement relief valve and examine for contamination or broken parts (Fig. 74). If no contamination or damage is evident, add one shim to assembly and repeat test.

Note: If standard gauge is used relief pressure should be 700-800 psi and charge pressure should be 70-150 psi.

If pressure and flow readings improve, add shims as necessary until reading meets specification. Add shims one at a time and check pressure after each shim is installed. Do not exceed 800 psi (5516 kPa).

If pressure remains unchanged, remove the shim and remove and inspect charge pump assembly. Refer to Servicing Charge Pump, Rotor, Bearing And Lip Seal, page 40.

8. If charge pump assembly is not defective, remove the transmission from the axle, disassemble it and repair it per instructions in the Sundstrand Service Manual. Refer to page 2 for Sundstrand Manual numbers and how to obtain them.

SERVICING CHARGE PUMP, ROTOR, BEARING AND LIP SEAL

1. Lower cutting unit to the shop floor, be sure engine is shut off and remove key from ignition switch.

2. Remove the fuel tank; refer to Removing Fuel Tank From Chassis, page 30.

3. Remove drive coupling from between the engine pulley and transmission hub; refer to Removing Drive Coupling, page 41.

4. Loosen two set screws retaining hub on pump shaft (Fig. 75). Slide hub off shaft.

5. Since two set screws hold hub on transmission pump shaft, the shaft must be checked. Remove all burrs, sharp edges and residue to prevent damage to the lip seal.

6. Set drain pan below front of transmission. Remove two capscrews and flatwashers securing charge pump housing to center section (Fig. 75). Using a seal protector, slide charge pump housing and rotor assembly off pump shaft. O-ring will probably stay in groove on inside of charge pump housing.

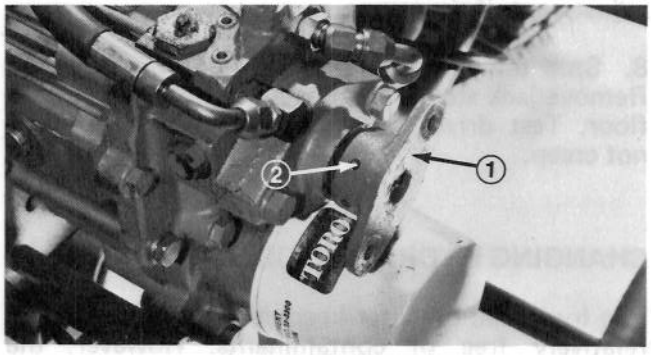


Figure 75

1. Transmission hub
2. Set screw

HYDRAULIC SYSTEM MAINTENANCE

Note: If seal protector is not used, wrap pump shaft with wax paper or cellophane to protect the lip seal. When sliding housing and rotor assembly off pump shaft, drive pin may drop out of the pump shaft. Do not lose the pin because it is the only part that drives the rotor. Without the pin, the rotor will not rotate; thus, no "charge pressure".

7. Examine rotor assembly and inside of charge pump housing for excessive wear patterns, scratches or score marks. If a part is damaged, replace it. The two rotor parts are replaceable as an assembly only.

IMPORTANT: If the rotor assembly or charge pump housing is damaged, replace all parts. Never replace only one part because charge pump housing and rotor assembly have a definite wear-in characteristic.

8. Examine bearing in charge pump housing for damage and free rotation. If bearing is damaged, replace bearing and oil seal.

A. If bearing is defective, pull lip seal out of housing, using an oil puller.

B. Press needle bearing out of charge pump housing.

C. Lubricate new bearing and lip seal with transmission oil before installation. Press needle bearing and lip seal into charge pump housing.

9. Install new O-ring into groove in charge pump housing.

10. Apply transmission oil on rotor assembly, inside of charge pump housing and face of center section.

11. Slide rotor assembly into charge pump housing. Using a seal protector for the lip seal, slide charge pump housing onto the pump shaft. Insert drive pin through hole in shaft and slide rotor onto pin so positive engagement results. Align flat side of charge pump housing with flat side of center section.

Note: In place of a seal protector, use wax paper, cellophane or similar material to wrap pump shaft. This protects lip seal from possible damage when sliding it onto the shaft.

IMPORTANT: If rounded side of charge pump is lined up with flat side of center section, the chargepump will not generate charge pressure.

12. Secure charge pump housing to center section with two capscrews and flatwashers. Tighten capscrews to 12 to 15 ft-lb (16 to 20 N·m).

13. Slide hub onto transmission shaft and retain it in place by tightening two set screws.

14. Install drive coupling between the engine pulley and transmission hub; refer to Installing Drive Coupling, page 42.

15. Install fuel tank; refer to Installing Fuel Tank, page 31.

16. Start the engine and allow it to idle for one to two minutes. Then stop the engine and check level of transmission fluid; refer to Check Hydraulic System Fluid, page 10.

OFF SEASON STORAGE

Apply a liberal amount of No. 2 General Purpose Lithium Base Grease to the two by-pass valve pins located on top of the transmission to prevent corrosion build-up which could lock the pins into the by-pass position and cause internal transmission failure (Fig. 73).

DRIVE SYSTEM MAINTENANCE

REMOVING DRIVE COUPLING

The drive coupling must be removed whenever the transmission or the engine will be removed from the chassis.

1. Remove the fuel tank; refer to Removing Fuel Tank From Chassis, page 30.

2. Remove capscrews, locknuts and spacers securing drive coupling assembly between engine pulley and transmission hub (Fig. 76). Slide drive coupling assembly from between the hub and pulley.

3. Examine the rubber coupling. Replace the coupling if it is defective.

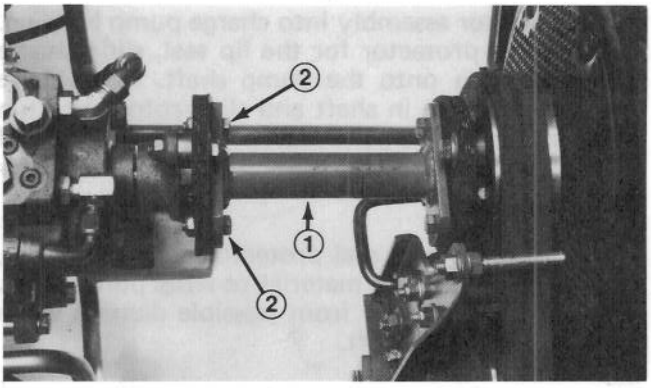


Figure 76

1. Drive coupling
2. Capscrews, locknuts and spacers

INSTALLING DRIVE COUPLING

1. Insert small end of spacers into holes in rubber couplings. Slide two capscrews through one rubber coupling and spacers.

2. Slide two capscrews through transmission hub and install locknuts onto the capscrews (Fig. 76). Tighten capscrews and locknuts.

3. Secure other end of rubber coupling to engine pulley with capscrews, lockwashers and flatwashers (Fig. 76).

4. Install fuel tank; refer to Installing Fuel Tank, page 31.

REPLACING PTO DRIVE BELT

1. Remove the fuel tank; refer to Removing Fuel Tank From Chassis, page 30.

2. Remove the drive coupling; refer to Removing Drive Coupling, page 41.

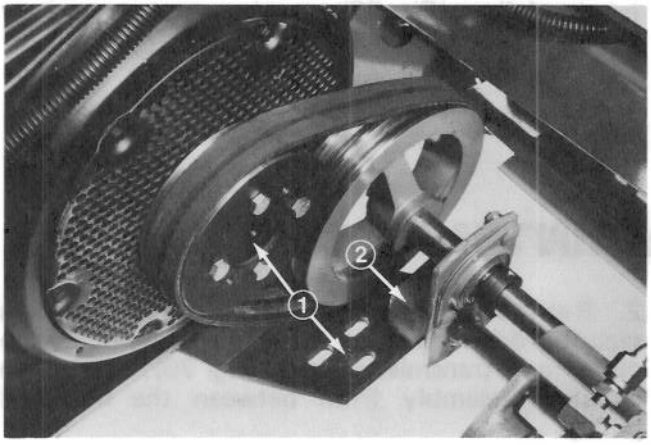


Figure 77

1. PTO brake bracket and drive coupling removed
2. Bearing hub

3. Remove three capscrews, flatwashers, lockwashers and nuts securing PTO brake bracket to mounting flange on engine plate (Fig. 77).

4. Remove two capscrews, and lockwashers securing bearing hub to bracket (Fig. 77).

5. Move the PTO assembly until the belt can be removed from the pulleys.

6. Install new belts around the PTO shaft pulley and engine pulley (Fig. 77), engage the PTO lever to tension belt and lay a straight edge along the bottom face of the engine and PTO pulleys to check alignment (Fig. 77). If pulleys are aligned within 1/16 inch (1.6 mm), proceed to step 6. If they are not aligned within 1/16 inch (1.6 mm) loosen locking collars on PTO shaft and shift shaft and pulley until proper alignment is achieved (Fig. 78). Relock collars.

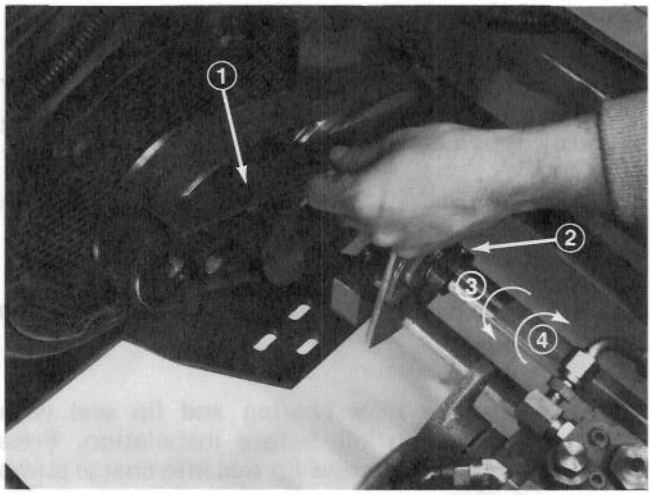


Figure 78

1. Straight edge
2. Locking collar
3. Loosen
4. Tighten

7. Install drive coupling between the engine and transmission pulleys; refer to Installing Drive Coupling, page 42.

8. Reinstall bearing hub to bracket.

9. Install PTO brake assembly and check spring tension. Refer to servicing PTO Brake Assembly, page 42.

10. Install the fuel tank; refer to Installing Fuel Tank, page 31.

SERVICING PTO BRAKE ASSEMBLY

1. Remove capscrews, lockwashers, flatwashers, spacers and nuts securing assembly and remove assembly.

DRIVE SYSTEM MAINTENANCE

2. Inspect brake pad and lining assembly for excessive wear or damage (Fig. 79) and replace if necessary. Remove assembly by removing capscrews and flangenuts. (Fig. 79).

3. Reinstall brake pad and lining onto PTO brake assembly with capscrews and flangenuts and mount PTO brake assembly (Fig. 79). Install all mounting components in same location from which they were removed.

4. Align PTO brake assembly with pulleys and belts and tighten mounting fasteners. Visually inspect alignment of brake lining with pulley. Lining should be parallel to pulley and centered over pulley grooves. Loosen and remove PTO brake bracket fasteners and add or remove spacers between the bracket and mounting plate to achieve a parallel adjustment. Adjust the capscrews & flangenuts to center the lining assembly (Fig. 79).

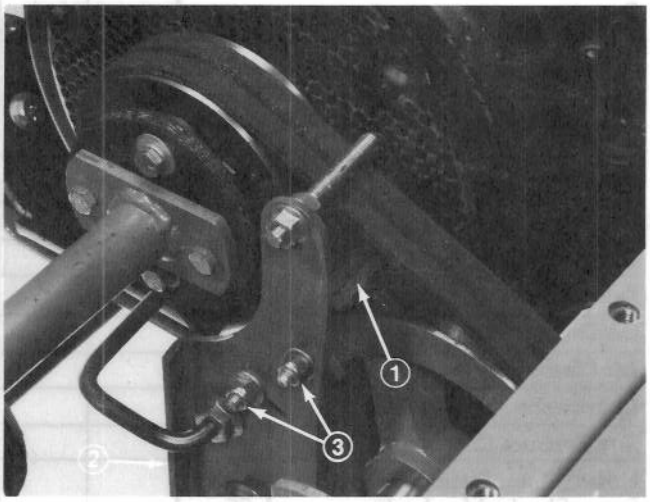


Figure 79

1. *Brake pad & lining assembly*
2. *PTO brake assembly*
3. *Capscrews & flangenuts*

PRODUCT IDENTIFICATION

The traction unit has two identification numbers: a model number and a serial number that are stampeded into a plate. The identification plate is located near the right end of the seat hinge (Fig. 80). In any correspondence concerning the traction unit, supply the model and serial numbers to ensure correct information and replacement parts are obtained.

To order replacement parts from an Authorized TORO Distributor supply the following information:

1. Model and serial numbers of the traction unit.

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

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

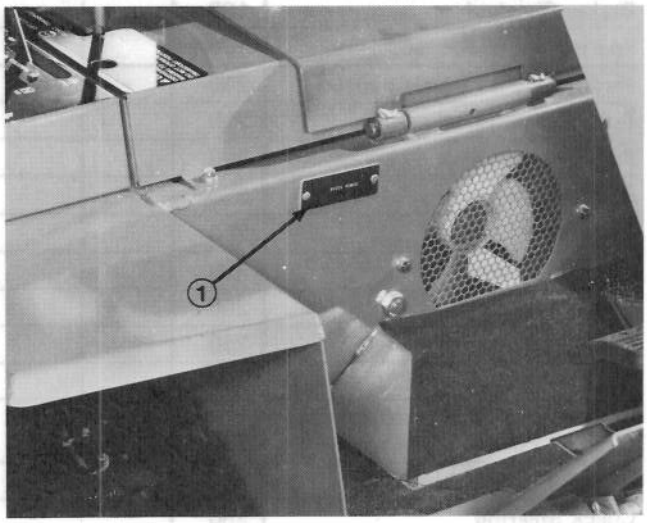


Figure 80

1. *Model and serial number*

SERVICE INTERVAL CHART

Date											
Hour Meter Reading											
Service Interval ↓		Daily	5	25	50	75	100	125	150	175	200
Clean Blower Screen	Daily										
Oil Level Check, Engine	Daily										
Oil Level Check, Hyd.	Daily										
Safety Interlock Check	Daily										
Oil Change, Initial	25										
Air Cleaner Cleaned	25										
Lubrication, Grease/Oil	25										
Tire Pressure Checked (12 psi)	25										
Hoses, Lines, Fittings & Pump Checked for Leaks	25										
Oil Change, Routine	50										
Engine Oil Filter	50										
Check Battery	50										
PTO Belt Tension Check	50										
Air Cleaner (Dust Cap & Baffle)	50										
Cooling Fins Cleaned	50										
Brakes Checked	100										
Spark Plug, Check	100										
Hydraulic Oil Filter, Changed	250										
Fuel System Checked	250										
Fuel Filter Change	250										
Points Changed	250										
Condenser Changed	250										
Timing Checked	250										
Valves Adjusted	250										
Engine rpm Checked	250										
Service Air Cleaner (Filter)	250										
Combustion Chamber Clean (Leaded Fuel)	250										
Clean Breather Valve	250										
Check Steering	250										
Check Rear Wheel Toe-in	250										
Hydraulic Oil, Changed	500										
Dana Axle Bearings, Grease	500										
Transmission By-Pass Pins, Grease	500										
Combustion Chamber Clean (Unleaded Fuel)	1000										
Replace all Interlock Switches (2 years)	1000										

SERVICE SPECIFICATIONS

Engine Oil: Above +40°F (4°C) — Use SAE 30, 10W-30 or 10W-40
From +40°F to 0°F (4°C to -18°C) — Use SAE 5W-20, 5W-30, 10W-30 or SAE 10
Below 0°F (-18°C) — SAE 5W20 or 5W-20

Spark Plug — RBN-13Y Gap is 0.025 of an inch (0.64 mm)

Hydraulic System Fluid — 5 quarts (4.73 L) of SAE 10W-30 engine oil

Hydraulic Oil Filter — Toro part no. 23-2300

SERVICE INTERVAL CHART

Date											
Hour Meter Reading											
Service Interval ↓		225	250	275	300	325	350	375	400	425	450
Clean Blower Screen	Daily										
Oil Level Check, Engine	Daily										
Oil Level Check, Hyd.	Daily										
Safety Interlock Check	Daily										
Oil Change, Initial	25										
Air Cleaner Cleaned	25										
Lubrication, Grease/Oil	25										
Tire Pressure Checked (12 psi)	25										
Hoses, Lines, Fittings & Pump Checked for Leaks	25										
Oil Change, Routine	50										
Engine Oil Filter	50										
Check Battery	50										
PTO Belt Tension Check	50										
Air Cleaner (Dust Cap & Baffle)	50										
Cooling Fins Cleaned	50										
Brakes Checked	100										
Spark Plug, Check	100										
Hydraulic Oil Filter, Changed	250										
Fuel System Checked	250										
Fuel Filter Change	250										
Points Changed	250										
Condenser Changed	250										
Timing Checked	250										
Valves Adjusted	250										
Engine rpm Checked	250										
Service Air Cleaner (Filter)	250										
Combustion Chamber Clean (Leaded Fuel)	250										
Clean Breather Valve	250										
Check Steering	250										
Check Rear Wheel Toe-in	250										
Hydraulic Oil, Changed	500										
Dana Axle Bearings, Grease	500										
Transmission By-Pass Pins, Grease	500										
Combustion Chamber Clean (Unleaded Fuel)	1000										
Replace all Interlock Switches (2 years)	1000										

SERVICE SPECIFICATIONS

Engine Oil: Above +40° F (4° C) – Use SAE 30, 10W-30 or 10W-40
From +40° F to 0° F (4° C to -18° C) – Use SAE 5W-20, 5W-30, 10W-30 or SAE 10
Below 0° F (-18° C) – SAE 5W20 or 5W-20

Spark Plug – RBN-13Y Gap is 0.025 of an inch (0.64 mm)

Hydraulic System Fluid – 5 quarts (4.73 L) of SAE 10W-30 engine oil

Hydraulic Oil Filter – Toro part no. 23-2300

SERVICE INTERVAL CHART

Date											
Hour Meter Reading											
Service Interval ↓		475	500	525	550	575	600	625	650	675	700
Clean Blower Screen	Daily										
Oil Level Check, Engine	Daily										
Oil Level Check, Hyd.	Daily										
Safety Interlock Check	Daily										
Oil Change, Initial	25										
Air Cleaner Cleaned	25										
Lubrication, Grease/Oil	25										
Tire Pressure Checked (12 psi)	25										
Hoses, Lines, Fittings & Pump Checked for Leaks	25										
Oil Change, Routine	50										
Engine Oil Filter	50										
Check Battery	50										
PTO Belt Tension Check	50										
Air Cleaner (Dust Cap & Baffle)	50										
Cooling Fins Cleaned	50										
Brakes Checked	100										
Spark Plug, Check	100										
Hydraulic Oil Filter, Changed	250										
Fuel System Checked	250										
Fuel Filter Change	250										
Points Changed	250										
Condenser Changed	250										
Timing Checked	250										
Valves Adjusted	250										
Engine rpm Checked	250										
Service Air Cleaner (Filter)	250										
Combustion Chamber Clean (Leaded Fuel)	250										
Clean Breather Valve	250										
Check Steering	250										
Check Rear Wheel Toe-in	250										
Hydraulic Oil, Changed	500										
Dana Axle Bearings, Grease	500										
Transmission By-Pass Pins, Grease	500										
Combustion Chamber Clean (Unleaded Fuel)	1000										
Replace all Interlock Switches (2 years)	1000										

SERVICE SPECIFICATIONS

Engine Oil: Above +40° F (4° C) — Use SAE 30, 10W-30 or 10W-40
From +40° F to 0° F (4° C to -18° C) — Use SAE 5W-20, 5W-30, 10W-30 or SAE 10
Below 0° F (-18° C) — SAE 5W20 or 5W-20

Spark Plug — RBN-13Y Gap is 0.025 of an inch (0.64 mm)

Hydraulic System Fluid — 5 quarts (4.73 L) of SAE 10W-30 engine oil

Hydraulic Oil Filter — Toro part no. 23-2300

SERVICE INTERVAL CHART

Date											
Hour Meter Reading											
Service Interval	▼	725	750	775	800	825	850	875	900	925	950
Clean Blower Screen	Daily										
Oil Level Check, Engine	Daily										
Oil Level Check, Hyd.	Daily										
Safety Interlock Check	Daily										
Oil Change, Initial	25										
Air Cleaner Cleaned	25										
Lubrication, Grease/Oil	25										
Tire Pressure Checked (12 psi)	25										
Hoses, Lines, Fittings & Pump Checked for Leaks	25										
Oil Change, Routine	50										
Engine Oil Filter	50										
Check Battery	50										
PTO Belt Tension Check	50										
Air Cleaner (Dust Cap & Baffle)	50										
Cooling Fins Cleaned	50										
Brakes Checked	100										
Spark Plug, Check	100										
Hydraulic Oil Filter, Changed	250										
Fuel System Checked	250										
Fuel Filter Change	250										
Points Changed	250										
Condenser Changed	250										
Timing Checked	250										
Valves Adjusted	250										
Engine rpm Checked	250										
Service Air Cleaner (Filter)	250										
Combustion Chamber Clean (Leaded Fuel)	250										
Clean Breather Valve	250										
Check Steering	250										
Check Rear Wheel Toe-in	250										
Hydraulic Oil, Changed	500										
Dana Axle Bearings, Grease	500										
Transmission By-Pass Pins, Grease	500										
Combustion Chamber Clean (Unleaded Fuel)	1000										
Replace all Interlock Switches (2 years)	1000										

SERVICE SPECIFICATIONS

Engine Oil: Above +40° F (4° C) — Use SAE 30, 10W-30 or 10W-40
From +40° F to 0° F (4° C to -18° C) — Use SAE 5W-20, 5W-30, 10W-30 or SAE 10
Below 0° F (-18° C) — SAE 5W20 or 5W-20

Spark Plug — RBN-13Y Gap is 0.025 of an inch (0.64 mm)

Hydraulic System Fluid — 5 quarts (4.73 L) of SAE 10W-30 engine oil

Hydraulic Oil Filter — Toro part no. 23-2300

The Toro Promise

A ONE YEAR LIMITED WARRANTY ON COMMERCIAL PRODUCTS OTHER THAN WALK ROTARY MOWERS, TRIMMERS AND BLOWERS.

The Toro Company promises to repair your TORO Product if defective in materials or workmanship. The following time periods from the date of purchase apply:

Commercial Products	1 Year
Hevi-Duty Walk Rotary Mowers	90 Days

The costs of parts and labor are included, but the customer pays the transportation costs on walk rotary mowers, trimmers and blowers.

If you feel your TORO product is defective and wish to rely on The Toro Promise, the following procedure is recommended:

1. Contact your Authorized TORO Distributor or Commercial Dealer (the Yellow Pages of your telephone directory is a good reference source).
2. The TORO Distributor or Commercial Dealer will advise you on the arrangements that can be made to inspect and repair your product.
3. The TORO Distributor or Commercial Dealer will inspect the product and advise you whether the product is defective and, if so, make all repairs necessary to correct the defect without an extra charge to you.

If for any reason you are dissatisfied with the distributor's analysis of the defect or the service performed, you may contact us.

Write:

TORO Commercial Products Service Department
8111 Lyndale Avenue South
Minneapolis, Minnesota 55420

The above remedy of product defects through repair by an Authorized TORO Distributor or Commercial Dealer is the purchaser's sole remedy for any defect.

THERE IS NO OTHER EXPRESS WARRANTY. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE ARE LIMITED TO THE DURATION OF THE EXPRESS WARRANTY.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

This Warranty applies only to parts or components which are defective and does not cover repairs necessary due to normal wear, misuse, accidents, or lack of proper maintenance. Regular, routine maintenance of the unit to keep it in proper condition is the responsibility of the owner.

All warranty repairs reimbursable under the Toro Promise must be performed by an Authorized TORO Commercial Dealer or Distributor using Toro approved replacement parts.

Repairs or attempted repairs by anyone other than an Authorized TORO Distributor or Commercial Dealer are not reimbursable under the Toro Promise. In addition, these unauthorized repair attempts may result in additional malfunctions, the correction of which is not covered by warranty.

THE TORO COMPANY IS NOT LIABLE FOR INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE USE OF THE PRODUCT INCLUDING ANY COST OR EXPENSE OF PROVIDING SUBSTITUTE EQUIPMENT OR SERVICE DURING PERIODS OF MALFUNCTION OR NON-USE.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion 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.

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 The Toro Company.

Compliance with Radio Interference Regulations Certified.
Certifie Conforme au Reglement sur le Brouillage Radioelectrique.

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