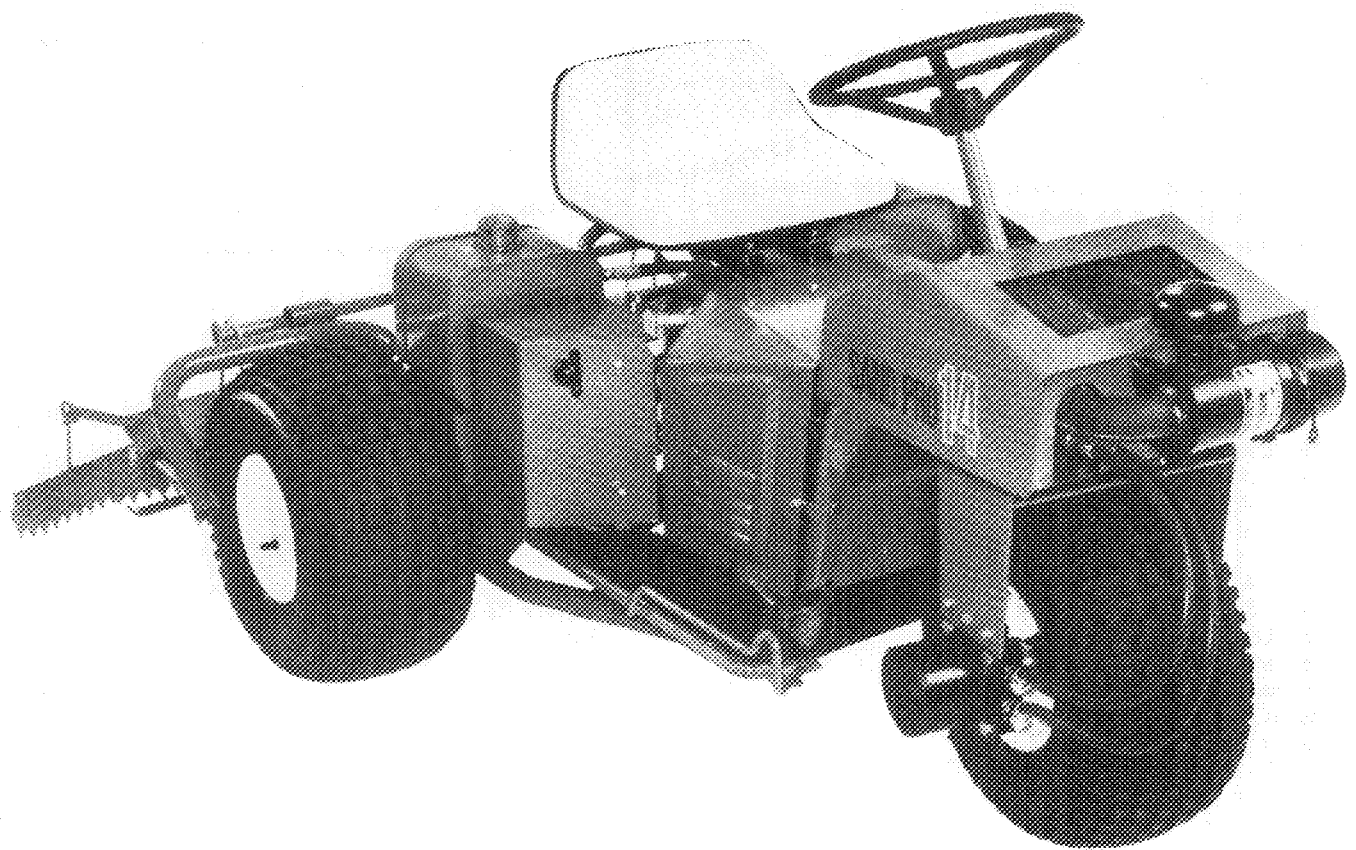




MODEL NO. 08880 — 10001
THRU 20001 & UP

**OPERATOR'S
MANUAL**

SAND PRO® 14



FOREWORD

TO THE TORO OWNER . . .

The correct piece of equipment for fast, effective, and economical care of sand traps and other maintenance was the basis for the development of this new SAND PRO.

We know that you will find this machine a high quality, precise and exacting tool. It utilizes the most advanced concepts in engineering and design and with proper care will give years of trouble-free service.

Please take the time to read this Operator's Manual before operating your new SAND PRO. The better you understand the operation of the machine . . . the better the job it will do for you.

While reading the manual, compare the illustrations with the actual machine . . . this should familiarize you with the location of controls, adjustments, and operation.

A study of the operating instructions will insure proper function of the unit and will help promote safe operation. Please save this manual for future reference and information.

If additional assistance is needed, your local authorized Toro Distributor will be glad to help. Be sure to give him the model and serial number of your machine.

IMPORTANT: Make sure your distributor has filled out the Toro Registration Card supplied with your machine, and that you have received your copy. This card validates the date of purchase, date of warranty, and will ensure proper post-sale service.

OPTIONAL SPARK ARRESTER

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

(1) 51-0990 Spark Arrester Assembly

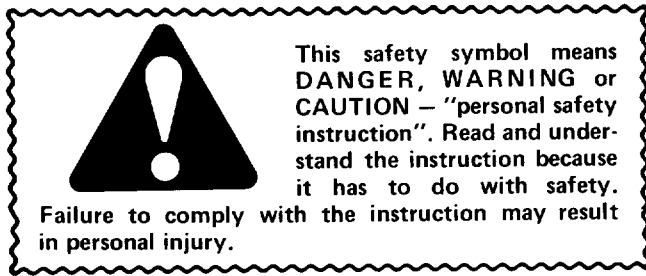
These parts are approved by the United States Department of Agriculture and the United States Forest Service.

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

TABLE OF CONTENTS

	Page		Page
FOREWORD	2	Using the Sand Pro	9
SAFETY INSTRUCTIONS	3	Pushing Sand Pro	9
SPECIFICATIONS	4	MAINTENANCE	9-23
LOOSE PARTS CHART	4	Lubrication	9
ASSEMBLY INSTRUCTIONS	5-6	Servicing Air Cleaner	9-11
Install Wheels	5	Fuel Filter	11
Install Steering Wheel	5	Battery Care	11
Push Unit Off Pallet	5	Battery Storage	11
Activate Battery	5	Changing Hydraulic Oil	11
To Open Carton Containing Battery Acid	6	Hydraulic Schematics	12-14
Install Battery	6	Removing Wheel Motors	14-17
Refuse Container	6	Removing Hydraulic Pump	17
PREPARATION BEFORE STARTING	7-8	Removing Lift Valve	18
Check Engine Oil	7	Removing Lift Cylinder	18
Fill Fuel Tank	7	Hydraulic Hose Ties	19
Hydraulic System	7	Charging Hydraulic System	19
Check Tire Pressure	7	Steering Chain & Sprocket	19
Check Hoses Near Front Wheel	7	Front Spindle Bearings	20
CONTROLS	8	Adjusting for Neutral	21
Ignition Switch	8	Adjusting Traction Interlock Switch	21
Ammeter	8	Adjusting Pedal for Reverse	21
Hour Meter	8	Removing Engine	21
Throttle Control	8	Tank Supports	22
Choke Button	8	Choke Cable	22
Forward-Reverse Pedal	8	Throttle Cable	22
Lift Lever	8	Changing Tires	22
STARTING INSTRUCTIONS	9	Electrical Schematic	23
Break-in Period	9	IDENTIFICATION AND ORDERING	23
OPERATING INSTRUCTIONS	9	THE TORO PROMISE	24

SAFETY INSTRUCTIONS



The SAND PRO is designed and tested to offer safe service when operated and properly maintained. Failure to operate the machine in accordance with these Safety Instructions MAY RESULT IN PERSONAL INJURY.

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 know how to stop quickly. Replacement manual is available by sending complete Model and Serial Number to: The Toro Company, 8111 Lyndale Avenue South, Minneapolis, Minnesota 55420.
2. Never allow children to operate the machine. Do not allow adults to operate machine without proper instruction.
3. Keep all shields and safety devices in place. If a shield or safety device 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.
4. Ensure traction interlock switch is adjusted correctly so engine cannot be started unless accelerator pedal is released — neutral position.
5. Wear long pants and substantial shoes. Do not operate machine while wearing sandals, tennis shoes, sneakers or shorts. Do not wear loose fitting clothing that could get caught in moving parts.
6. Wearing safety glasses, safety shoes and a helmet is advisable and required by some local ordinances and insurance regulations.
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. Fill fuel tank outdoors and only when engine is not running. Engine must be cool to prevent a potential fire hazard.
 - C. Wipe up any gasoline that spilled, and install gasoline container cap and machine fuel tank cap securely before starting the engine.
8. Check operation of interlock system at the beginning of each day.

WHILE OPERATING

9. Do not run the engine in a confined area without adequate ventilation. Exhaust fumes are hazardous and could possibly be deadly.
10. Sit on the seat when operating the machine.
11. Never carry passengers.
12. When starting the engine:
 - A. Make sure accelerator pedal is released.

- B. After engine is started, keep foot off accelerator pedal. Machine must not move. If movement is evident, the neutral return bracket is adjusted incorrectly; therefore, shut engine off and readjust bracket so machine does not move when in neutral position. If engine does not start, check interlock switch for proper adjustment.

13. Using the machine demands attention. To prevent tipping or loss of control:

- A. Use care while entering and leaving sand traps. Use extreme caution around ditches, creeks or other hazards.
 - B. Watch for holes or other hidden hazards.
 - C. Reduce speed when making sharp turns and when turning on hillsides.
 - D. Avoid sudden stops and starts.
 - E. Before backing up, look to the rear and assure no one is behind the machine.
 - F. Watch out for traffic when near or crossing roads. Always yield the right-of-way.

14. If the machine ever vibrates abnormally, shut engine off and inspect for possible damage. Repair all damage before commencing operation.

15. To prevent burns, do not touch the muffler or engine while it is running or soon after it is stopped.

16. Before getting off the seat:

- A. Stop movement of the machine. Take precautions to prevent accidental starts, rolling away, etc.
 - B. Shut engine off and wait for all movement to stop.

17. Lower implement and remove key from ignition switch whenever machine is left unattended.

MAINTAINING SAND PRO

18. Remove key from ignition switch and pull high tension wire off spark plug to prevent accidental starting of the engine when servicing or making adjustments.

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

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

21. If the engine must be running to perform a maintenance adjustment, keep hands, feet, clothing and other parts of the body away from power driven and other moving parts.

22. Do not overspeed the engine by changing governor settings. Recommended engine speed is 3400 rpm. To ensure safety and accuracy, have an Authorized TORO Service Dealer check maximum engine speed (3400 rpm) with a tachometer.

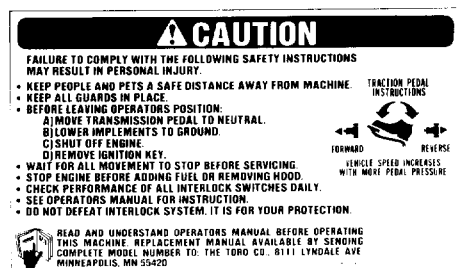
23. Be sure engine is shut off before checking oil or adding oil to the crankcase.

24. To assure optimum performance and safety, purchase genuine TORO replacement parts and accessories to keep the Toro all TORO. **NEVER USE WILL-FIT REPLACEMENT PARTS AND ACCESSORIES MADE BY OTHER MANUFACTURERS.** The Toro logo assures genuineness. Using unapproved replacement parts and accessories could void the product warranty of The Toro Company.

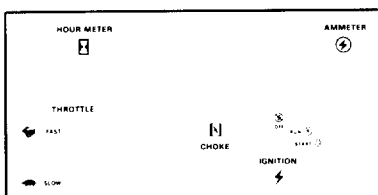


INSTRUCTION DECALS

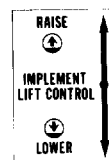
The following instruction decals are installed on the unit. If any become damaged or illegible, replace them. Decal part numbers are listed below and in your Parts Catalog. Order replacements from your Authorized Toro Distributor.



ON ENGINE SHIELD
(Part No. 80-1900)



ON DASH PANEL
(Part No. 51-0730)



ON VALVE SHROUD
(Part No. 80-1910)



ON FUEL TANK
(Part No. 53-4420)



ON HYDRAULIC RESERVOIR
(Part No. 53-4430)

SPECIFICATIONS

CONFIGURATION: Short wheel base tricycle vehicle with midship engine placement. All wheels powered. Front wheel steering. Operator positioned centrally.

POWER: Gasoline engine; Kohler, 14 H.P. (10.4 Kw) at 3600 R.P.M. 4-cycle engine; electric start.

INSTRUMENTATION: Ammeter, hour meter.

CONTROLS: Throttle, Choke.

GAS TANK: 3.4 Gallon (13 l) capacity.

BATTERY: 12 Volt, lead acid, 32 amp-hour.

DRIVE: Hydraulic. Coupling driven variable displacement piston pump with integral auxiliary charge pump to geroller motors which directly drive wheels. See hydraulic circuit diagram.

HYDRAULIC OIL FILTER: 25 Micron, spin on type.

HYDRAULIC OIL RESERVOIR: 2.5 Gallon (9.5 l) capacity.

ENGINE OIL CAPACITY: 4 Pints (1.9 l).

AIR CLEANER: Donaldson heavy duty, with pre-cleaner. Remote mounted.

VALVE: Single section for raising and lowering of implement.

CYLINDER: Double acting.

WHEEL BEARINGS: Needle provided in wheel motor.

TIRES: (3) 21 x 11.00-8 two ply pneumatic tubeless demountable & interchangeable.

TIRE PRESSURE: 4 PSI (27.6 Kpa) — Front & rear.

SPEEDS (at 3400 RPM engine setting): Variable between 0 and 8.5 MPH (0 and 13.7 Km/hr) forward and 0 and 4 (0 and 6.4 Km/hr) reverse.

SEAT ADJUSTMENT: 4 inches (10.2 cm) — fore and aft. Additional 1.75 inches (4.4 cm) forward adjustment available by using front mounting holes.

GENERAL SPECIFICATIONS:

Wheel Tread: 57.5 inches (146 cm) — outside to outside

Wheel Base: 40.0 inches (102 cm)

Overall Length: 75.8 inches (192.5 cm)

Overall Width: 75.0 inches (190.5 cm)

Overall Height: 44.0 inches (112 cm)

Net Weight (wet): 680 lb (308.4 Kg)

OPTIONAL EQUIPMENT: Drag Mat, Model 08844 — Used with Hitch Kit. Hitch Kit, Model 20-3900 — Used to tow implements up to 1000 lb (453.6 kg). Edger, Model 08822 — Used to edge sand traps on golf courses. Rake — Model 08811 — 75 in. (190.5 cm) width w/4 forward conditioning sections, 9 finishing w/adjustable weights. Conditioning sections adjustable for penetration. Prong Rake Attachment, Model 42-3960 — Option for rake. Finish Grader, Model 08867 — Used for light ground maintenance and grooming. Spiker, Model 08855 (w/o hydraulic cylinder) — Two units, each w/12 spiker blades and 11 fold down fingers.

LOOSE PARTS CHART

LOOSE PARTS	QTY.	DESCRIPTION	WHERE USED
Steering Wheel	1		
Roll Pin	1	1/4 x 2-1/2 in. (64 mm)	Secures steering wheel.
Cap	1		Install in steering wheel.
Capscrew	2	5/16 - 18 x 3/4 in.	
Locknut	2	5/16 - 18	
Tire & Wheel Assembly	2		Install on rear motors.
Wheel Nuts	8		
Keys	2		Insert into key switch.
Capscrew	4	1/2 - 13 x 1-1/4 in. (32 mm)	
Lockwasher	4	1/2	Attach implements to frame.
Washer	4	1/2	
Cylinder Pin	1		
Cotter Pin	1		Attach cylinder to implement.
Hair Pin Cotter	1		
Engine Manual	1		
Parts Catalog	1		
Operator's Manual	2		
Registration Card	1		

ASSEMBLY INSTRUCTIONS

IMPORTANT: Read this Operator's manual thoroughly for uncrating and setting up instructions. Failure to do so may result in damage, faulty operation, or unnecessary disassembly and reassembly.

INSTALL WHEELS

1. Remove rear wheels, cartons, loose parts bag, and remaining components from the pallet.
2. Install the rear wheels while the unit is still on the blocks. The wheels are symmetrical and interchangeable, so be sure to install them with the valve stems to the outside. Tighten the lug nuts evenly and gradually in a crisscross manner to 65-90 ft-lb (88-122 N-m).
3. Remove the banding securing the SAND PRO to the pallet.
4. Place a jack under the tubular frame (Fig. 1).

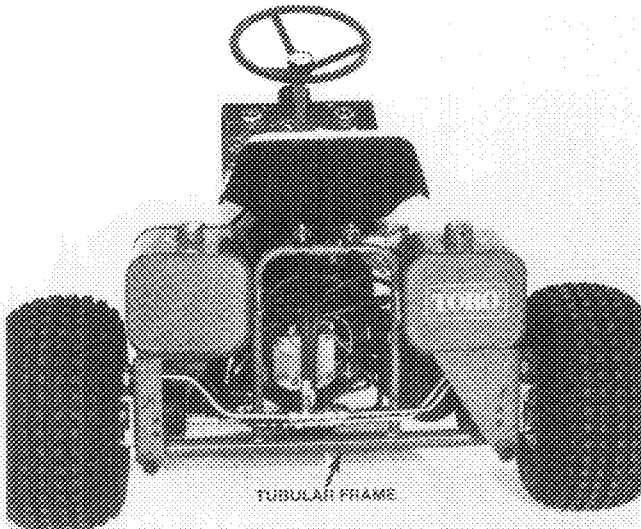


Figure 1

NOTE: For removal of the blocks, place the jack only under the tubular frame. Do not place it under the wheel motors, or damage could result.

5. Jack up the SAND PRO, remove the blocks, and lower the unit onto the rear wheels.

NOTE: We suggest saving the shipping blocks. They are just the right height for use when changing tires, servicing wheel motors, or performing other service work.

INSTALL STEERING WHEEL

1. The steering wheel is shipped in the inverted position. Remove the steering wheel from the shaft.
2. Place the steering wheel in the normal position and secure with the roll pin. Support the opposite side of the shaft while driving in the pin to avoid damage to the shaft bushings. Install the dust cap (Fig. 2).

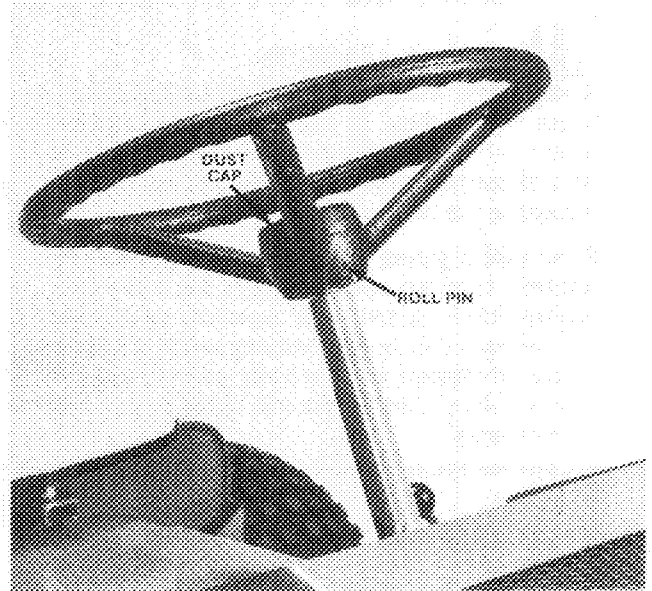


Figure 2

PUSH UNIT OFF PALLET

1. Rotate by-pass valve 1/2 turn counterclockwise (Fig. 3).

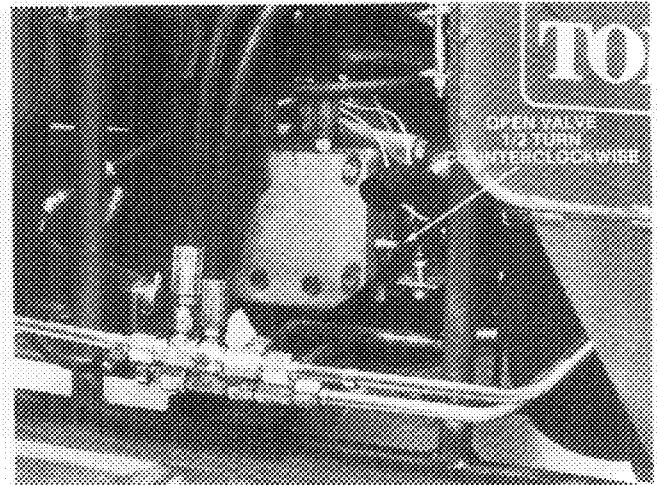


Figure 3

2. Make sure wheel is straight ahead; then push unit off pallet.
3. Close by-pass valve securely. Do not exceed 5-8 ft-lb (6.8-11 N-m) torque.

ACTIVATE BATTERY

NOTE: Battery acid must be purchased at a service station or auto supply store.

Since the battery is not activated, remove the battery from the Sand Pro. Study all the instructions on the acid container until the instructions are clearly understood.

ASSEMBLY INSTRUCTIONS (Continued)



CAUTION

Battery acid should be added to the battery in a place where there is ample light and sufficient water for flushing purposes. The area should be free of sparks or open flames. Do not smoke when activating the battery.

Wear rubber gloves, and handle acid with extreme caution to avoid spilling. It can burn the skin, damage clothing and other materials on contact. We strongly recommend wearing safety glasses to avoid eye damage when actually pouring acid into battery. Avoid inhaling the acid fumes as they may cause nausea.

TO OPEN CARTON CONTAINING BATTERY ACID

Do not remove acid bag from carton. Using scissors only, snip off a small corner of bag to form pencil size opening for pouring. Fill each cell to the split ring.

The levels may drop after filling (wait at least 20 minutes). Then inspect each cell after completing the filling operation, and add acid as required. There will be no difficulty in properly apportioning the acid if care is exercised in filling each cell to the proper level. **DO NOT OVERFILL.**

Flush off any electrolyte which may have spilled on the battery.

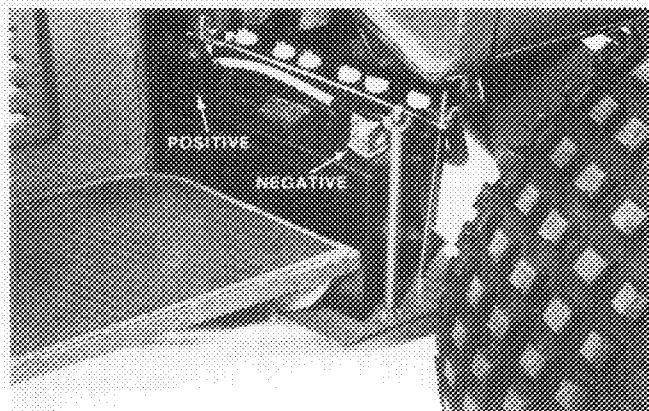


Figure 4

INSTALL BATTERY

1. Set the battery in place, with the negative (—) terminal to the outside (Fig. 4).
2. Secure the red battery cable, which is attached to the solenoid under the front shroud, to the positive (+) terminal with a capscrew and locknut.
3. Secure the ground cable (green), which is the wire attached to the frame, to the negative (—) post of the battery, with a capscrew and locknut.
4. Coat the terminals and mounting fasteners with petroleum jelly to prevent corrosion. Slide the boots down over the terminals.
5. Install the battery clamp and secure with the rods and wing nuts (Fig. 4).

REFUSE CONTAINER

1. Snap the refuse container (Fig. 5) onto the frame (Fig. 4) over the battery.

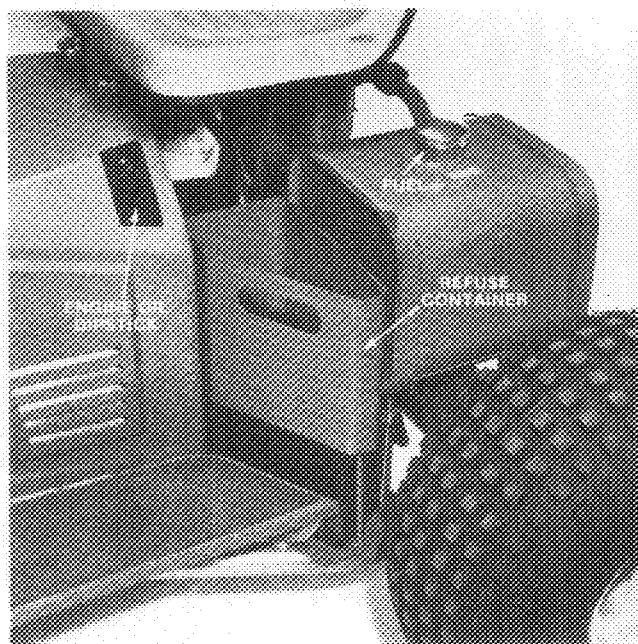


Figure 5

PREPARATION BEFORE STARTING

CHECK ENGINE OIL

1. Place the SAND PRO on a level surface.
2. The engine is shipped with oil in the crankcase. Check the oil and replenish if necessary to bring the level to the "FULL" (F) mark on the dipstick. **DO NOT OVERFILL** (Fig. 5).
3. Use the following:

OIL CHART API Service MS

Air Temperature	Single Viscosity Oil	Multiple Viscosity Oil
Above 30° F (-1° C)	SAE 30	
30° - 0° F (-1° - 18° C)	SAE 10	SAE 10W-30
Below 0° F (-18° C)		SAE 5W-20

4. Install dipstick.

NOTE: For frequency of changing oil and checking the oil level, refer to the Kohler Engine Manual. Wipe up any spilled oil.

FILL FUEL TANK



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 filling 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, 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.

THE TORO COMPANY STRONGLY RECOMMENDS THE USE OF CLEAN, FRESH **UNLEADED** REGULAR GASOLINE IN TORO GASOLINE POWERED PRODUCTS. UNLEADED GASOLINE BURNS CLEANER, EXTENDS ENGINE LIFE, AND PROMOTES GOOD STARTING BY REDUCING THE BUILD-UP OF COMBUSTION CHAMBER DEPOSITS. LEADED GASOLINE CAN BE USED IF UNLEADED IS NOT AVAILABLE.

NOTE: NEVER USE METHANOL, GASOLINE CONTAINING METHANOL, GASOLINE CONTAINING MORE THAN 10% ETHANOL, GASOLINE ADDI-

TIVES, PREMIUM GASOLINE, OR WHITE GAS BECAUSE ENGINE FUEL SYSTEM DAMAGE COULD RESULT.

1. Fill gasoline tank with a fresh supply of unleaded gasoline (Fig. 5).
2. Wipe up gasoline that spilled to prevent a fire hazard.

HYDRAULIC SYSTEM

The hydraulic system reservoir holds 2½ gallons (9.5 l) of SAE 10W-30 or 10W-40 SD or SE type motor oil utilized in the hydraulic system. **THE HYDRAULIC RESERVOIR HAS BEEN FILLED AT THE FACTORY.** However, the fluid level should be checked before starting, and periodically thereafter. Check as follows:

1. Remove reservoir breather cap (Fig. 6).
2. Fill reservoir until oil level is between the cross wires — when oil is cold.
3. The oil level should not be above the top cross wire if checked when it is still hot after operation.

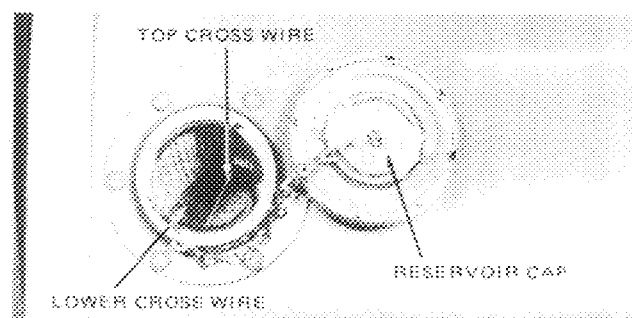


Figure 6

IMPORTANT: Do not allow the hydraulic fluid to drop below the level of the lower cross wire in the reservoir (Fig. 6). Make certain the reservoir cap is screwed on securely.

CHECK TIRE PRESSURE

The tires for the SAND PRO are over-inflated for shipping. Therefore, deflate all tires to 4 PSI (27.6 Kpa).

If the tires are allowed to remain over-inflated, a loss of traction and an increase in sand compaction will result.

CHECK HOSES NEAR FRONT WHEEL

1. With the foot control in neutral, turn the front wheel fully to the right. The hoses **MUST NOT** contact the front wheel in a full turn. If they do, refer to **MAINTENANCE**, page 16.
2. With the foot control still in neutral, turn the steering wheel fully to the left. The hoses must not kink at either the upper or lower end. If they do, refer to **MAINTENANCE**, page 16.

CONTROLS

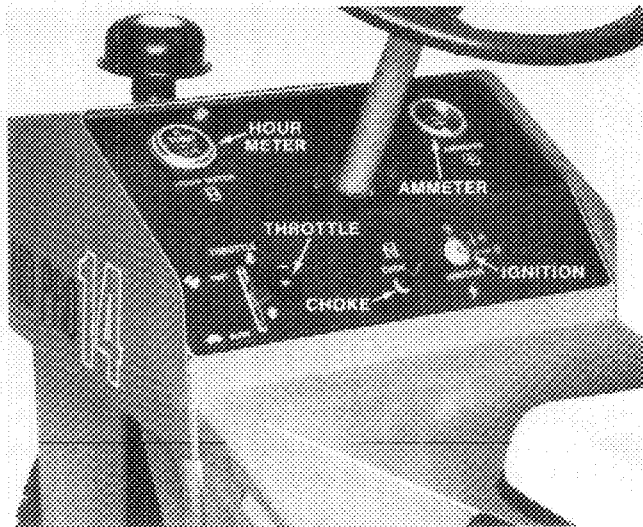


Figure 7

IGNITION SWITCH — Insert key into the switch; turn clockwise as far as possible to start engine. As soon as engine starts, release key. Remove the key when the SAND PRO is not in use, to prevent use by unauthorized persons (Fig. 7).

AMMETER — The ammeter indicates the rate of battery charge or discharge (Fig. 7).

During **NORMAL** operation, there will usually be slight ammeter needle movement to positive side.

HOUR METER — Indicates the total hours the engine has been operated (Fig. 7).

THROTTLE CONTROL

The throttle control ranges from "SLOW" to "FAST" position. Moving the throttle lever forward into the "FAST" position will increase engine RPM; moving the lever toward the operator will decrease engine RPM. The throttle control, in conjunction with the foot pedal, determines the actual ground speed.

NOTE: The engine **CANNOT** be stopped by the use of the throttle control.

CHOKE BUTTON

If the engine fails to start, pull the choke button out until the engine starts. When engine has started, push choke button **FULLY** inward.

FORWARD-REVERSE PEDAL

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, 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 or when ascending a hill, have throttle in FAST position while

depressing pedal slightly to keep engine rpm high. When engine rpm begins to decrease, release pedal slightly to allow rpm to increase.



CAUTION

Use the maximum ground speed **ONLY** when driving from one area to another. Maximum speed is not recommended when using an attached or towed implement.

IMPORTANT: For maximum pulling power, hand throttle should be in "Fast" position, and foot pedal just barely depressed.

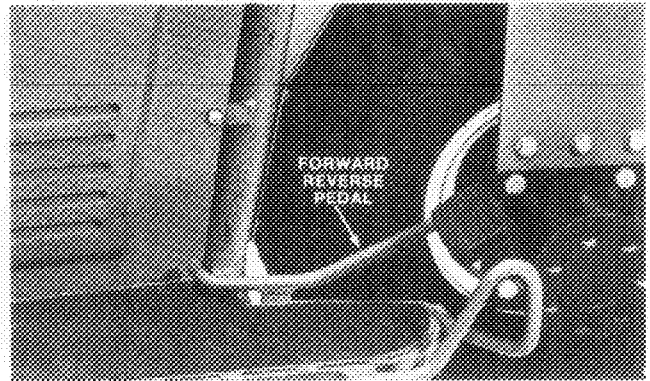


Figure 8

IMPORTANT: The SAND PRO must not be operated in reverse with the implement in the down (operating) position, or the implement could be severely damaged.

To stop machine, remove foot from Forward-Reverse pedal. Gradually reversing the pedal will make the machine stop quicker.

LIFT LEVER

To raise the implement, pull the lever up; to lower, push the lever down (Fig. 9). When the desired position is attained, release the lever and it will return to neutral.

NOTE: The SAND PRO has a double-acting lift cylinder. Down pressure can be applied to the implement for certain operating conditions.

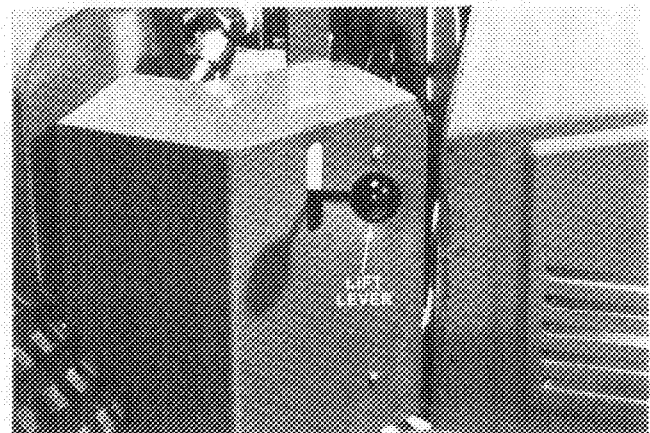


Figure 9

STARTING INSTRUCTIONS

BREAK-IN PERIOD

1. See your Kohler Engine Manual for changing oil and maintenance during the break-in period.
2. Only 8 hours operating time is required for the SAND PRO break-in period.

STARTING INSTRUCTIONS

1. Remove foot from forward-reverse pedal and make sure pedal is in neutral position.
2. Move the throttle control to the closed or idle position and pull the choke knob out.

NOTE: When engine is warm, choking is not normally necessary.

3. Insert and turn ignition key clockwise until the engine starts. When engine has started push choke button FULLY inward.
4. After the engine has started the following procedures should be followed.
 - a. Raise and lower implement several times to check response of hydraulic lift.
 - b. Raise the implement and operate the SAND PRO both in forward and reverse for several minutes.
 - c. After operating the SAND PRO for several minutes, turn off the engine and check for oil leaks. If oil leaks appear, contact your local TORO distributor for correction.

OPERATING INSTRUCTIONS

USING THE SAND PRO

Practice driving the SAND PRO because its operating characteristics are different than some utility vehicles. Two points to consider when operating the vehicle are transmission and engine speed.

To maintain somewhat constant engine rpm, depress accelerator pedal slowly. This allows the engine to keep up with ground speed of the vehicle. By contrast, pushing down quickly on accelerator pedal will reduce engine rpm and, as a result, there will not be enough torque — power — to move the vehicle. Therefore, to transfer maximum power to the rear wheels, move throttle to FAST position and slightly depress accelerator pedal. By comparison, maximum ground speed with no load results when throttle is in FAST position and accelerator pedal is slowly but fully depressed. In summary, always keep engine rpm high enough to deliver maximum torque — power — to the rear wheels.

PUSHING SAND PRO

In case of an emergency, the SAND PRO can be pushed for a short distance. However, Toro does not recommend this as standard procedure.

IMPORTANT: Do not push the vehicle faster than 2-3 mph (3.2 - 4.8 Km/hr) because drive system may be damaged. If vehicle must be moved a considerable distance, transport it on a truck or trailer. Whenever vehicle is pushed, open by-pass valve located on the side of the pump.

1. Reach under vehicle and rotate by-pass valve counter-clockwise until it is fully open (Fig. 31). Opening the valve opens an internal passage in the pump, thus, bypassing transmission fluid. Because fluid is by-passed, vehicle can be moved without cavitating the pump.
2. Before starting engine, close by-pass valve securely by rotating it clockwise (Fig. 31). Do not exceed 5-8 ft-lb (6.8 - 11 N·m) torque. Do not start engine when valve is open.

MAINTENANCE

LUBRICATION

Steering Chain

We do not recommend lubricating the steering chain (Fig. 10) unless it becomes stiff because of rust. If the chain rusts, it may be lubricated lightly with a DRY-TYPE LUBRICANT.

SERVICING AIR CLEANER

General Maintenance Practices

Inspect air cleaner filter element and hose monthly to maintain maximum engine protection and to be sure of maximum service life.

1. Make sure hose between air cleaner and carburetor is clamped securely in place. Replace the hose if it is cracked or punctured (Fig. 11).

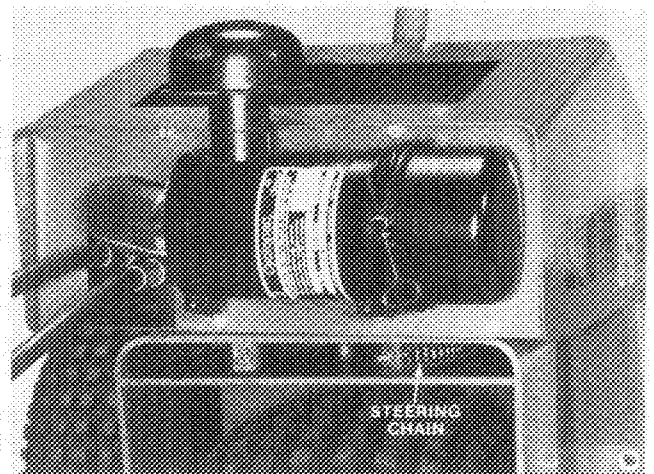


Figure 10

MAINTENANCE (Continued)

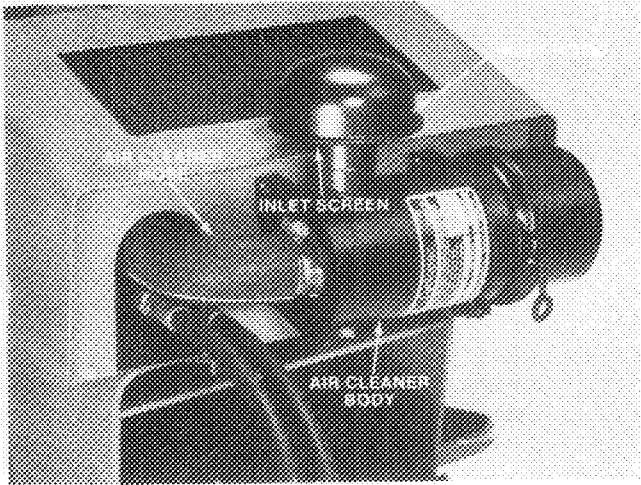


Figure 11

2. Check air cleaner body for dents and other damage which could possibly cause an air leak. Replace a damaged air cleaner body (Fig. 11).
3. Be sure inlet hood is sealing around bottom of assembly (Fig. 11).
4. Mounting screws and nuts holding air cleaner in place must be tight.
5. Inlet hood must be free of obstructions.

Servicing Inlet Hood

Visually inspect the inlet hood once a week; however, daily inspection is required when operating conditions are extremely dusty and dirty. Never allow dust to build up in screen in hood (Fig. 11).

1. Lift inlet hood off air cleaner assembly. Visually inspect and dump out any dust or contaminants. Clean screen with compressed air and replace on air cleaner assembly.

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. Loosen mounting band and remove cap and baffle (Fig. 12). Remove baffle from cap, clean dirt from cap and re-install baffle (Fig. 12).
2. Remove wing nut w/gasket and slide filter element out of air cleaner body (Fig. 12).
3. Clean 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

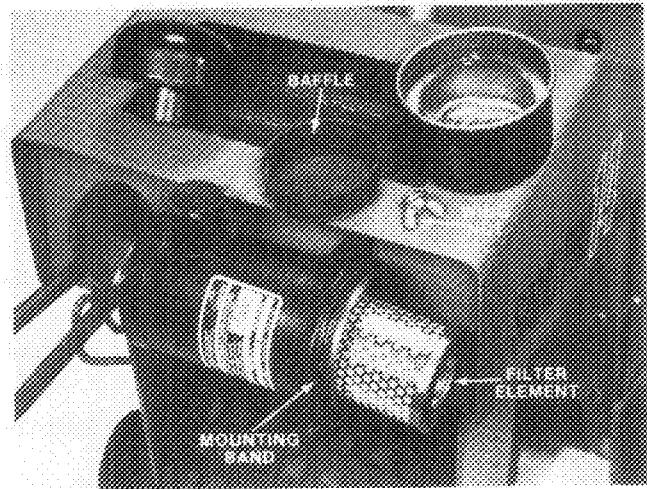


Figure 12

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.
 - 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 when dust and dirt are removed; refer to Inspecting Filter Element.
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 baffle and cap. Move mounting band behind air cleaner body and tighten it securely. Insure cap is correctly positioned as instructed on cap.

MAINTENANCE (Continued)

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.

FUEL FILTER

Replace the filter every 2000 hours or sooner if fuel flow is restricted. Be sure the arrow on the filter is pointing towards the engine (Fig. 13).

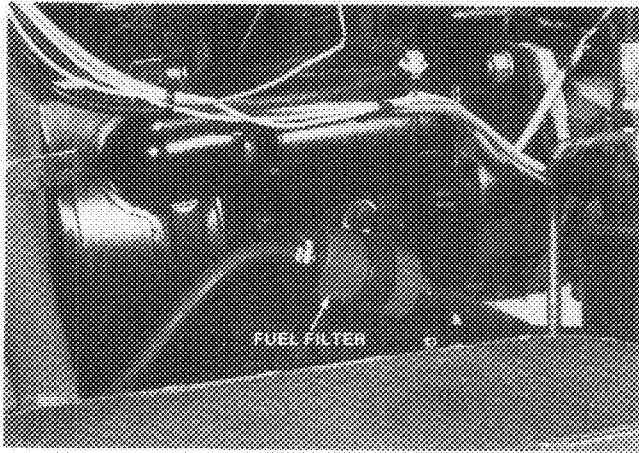


Figure 13

BATTERY CARE

1. Battery water level must be properly maintained and the top of the battery must be kept clean. If the battery is in a very hot place between periods of engine operation, it will run down more rapidly than if stored in a cool location.
2. Check the electrolyte every 25 operating hours or once per week.
3. Maintain cell level with distilled or demineralized water. Avoid overfilling.
4. Keep top of battery clean by periodically washing with a brush dipped in ammonia or bicarbonate of soda, followed by flushing with clean water.
5. Battery cables must be tight on terminals to provide good electrical contact.
6. If corrosion occurs at terminals, disconnect cables and scrape cable ends and terminals separately. Coat terminals with petroleum jelly and connect cables.

BATTERY STORAGE

If the SAND PRO is to be stored for over 30 days, the battery should be removed. Charge the battery and store in a cool place, but not where it will be subject to freezing. Storage at 20° F. to 50° F. (-7° C to 10° C) is ideal. Charge battery occasionally to maintain fully charged condition.

CHANGING HYDRAULIC OIL

1. Remove the lift handle knob and screws; then remove the valve shroud.
2. The hydraulic oil is drained by removing the drain plug on the bottom of the hydraulic reservoir (Fig. 14).

Do not operate the SAND PRO while the fluid is being drained: damage to the hydraulic system may result.

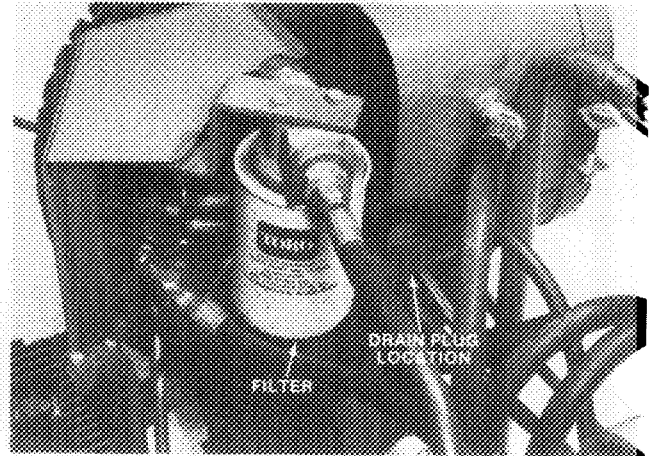


Figure 14

3. The hydraulic fluid should be drained and replaced once a year or every 500 operating hours, whichever comes first. Refill the hydraulic system with a good grade of SAE 10W-30 or 10W-40 SD or SE type motor oil.
4. A 25 micron spin on type oil filter is located in front of the hydraulic reservoir under the right hand shroud (Fig. 14). The filter should be replaced after the first 10 hours and every time oil is changed. Fill the filter with the recommended oil before installing.
5. Inspect the element in the reservoir breather cap whenever oil is changed. Clean element if it is dirty. Remove the cap assembly by uncoiling the retaining spring in the filler tube. Wash the element in kerosene or solvent. Blow compressed air through the center vent hole to clean the element from the inside out (Fig. 15).

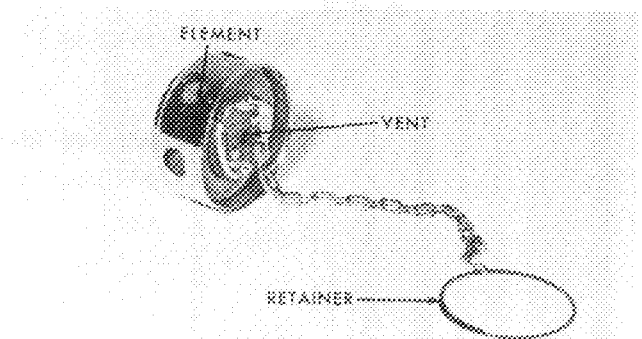


Figure 15

The maximum hydraulic pressure in the lift system is controlled at 700-800 PSI (4825-5515 Kpa) by a relief valve in the front section of the pump.

MAINTENANCE (Continued)

OIL CONTAMINATION DUE TO COMPONENT FAILURE

Failure of the pump or motor will contaminate the hydraulic oil with wear particles that may damage other components. Therefore, it is important to drain the contaminated oil from the reservoir. Flush the reservoir with No. 2 fuel oil and install a new filter in addition to replacing the faulty pump or motor.

Before operating machine, run the engine with all controls in neutral for 5 minutes; replace the hydraulic filter after 10 hours service.

IMPORTANT: If the hydraulic system is contaminated by dirt or water, the hydraulic oil and filter should be changed immediately.

The hydraulic system is self-purging. If air enters the system when replacing a component, it is not necessary to loosen a line to purge the air.

IMPORTANT: THE TORO COMPANY STRONGLY recommends that you take your SAND PRO to an authorized TORO Distributor for any hydraulic repairs that require removing hoses, motors, the pump, valve, or loosening any lines.

If it is not possible or practical to take the SAND PRO to a TORO Service Location, use the utmost care when disassembling. Plug or cap each opening after it is opened to prevent the entrance of foreign material into the system. Be especially careful of paint flakes or lint from shop rags. Even a very small foreign particle could cause a malfunction of the finely machined pump, motors or valve.

THE IMPORTANCE OF CLEANLINESS CANNOT BE OVER-EMPHASIZED.

When assembling hydraulic hoses or tubing start the connectors by hand. Make certain they are threaded correctly before applying a wrench. Do not over-tighten.

NOTE: Do not use tape to cover hydraulic ports or hoses. The hydraulic fluid could dissolve the adhesive on the tape, and this gummy mixture could cause serious damage to the system.

If a hydraulic leak should appear after replacement of a hydraulic component, check to insure the line or fitting is tight. If line or fitting continues to leak, replace the fitting or line that is leaking.

SCHEMATIC OF HYDRAULIC SYSTEM DURING FORWARD OPERATION

This schematic shows the hydraulic fluid flow during forward operation. The front of the foot pedal is depressed and the lift lever is in neutral.

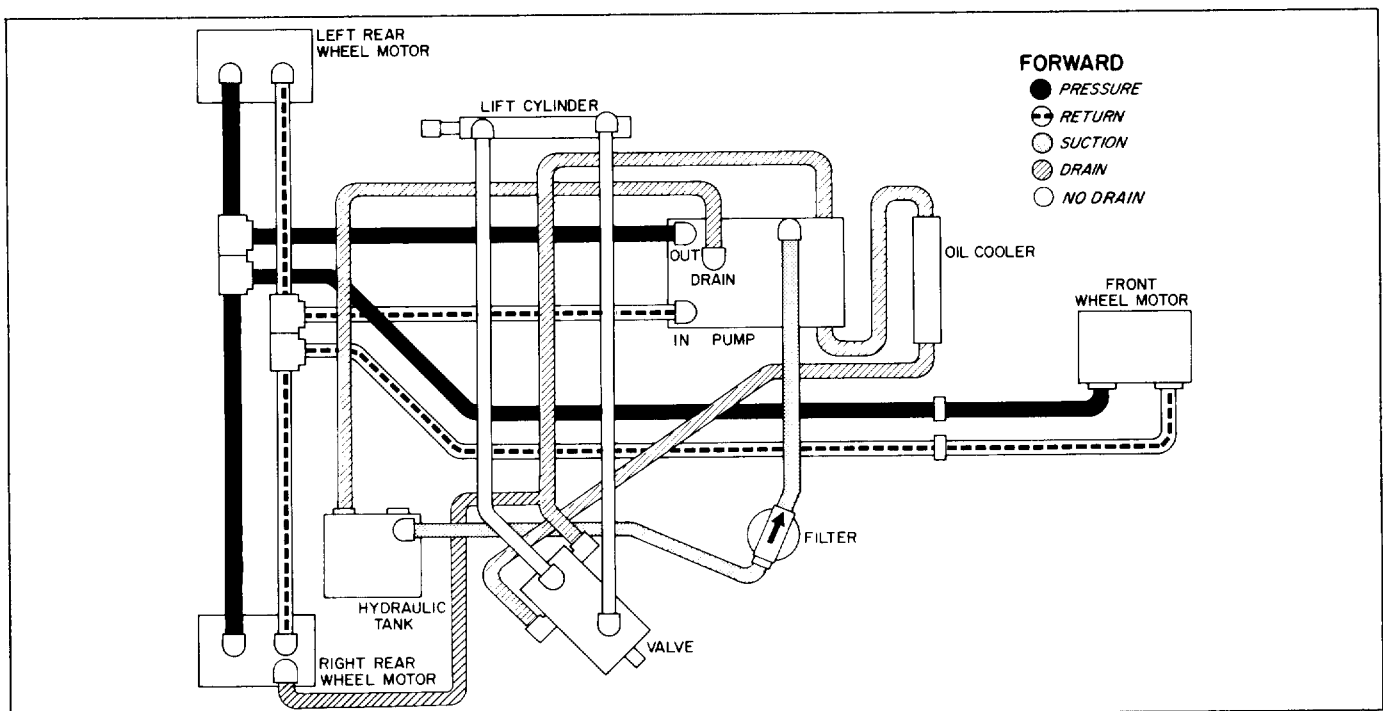


Figure 16

MAINTENANCE (Continued)

SCHEMATIC OF HYDRAULIC SYSTEM DURING REVERSE OPERATION

This schematic shows the hydraulic fluid flow during reverse operation. The rear of the foot pedal is depressed and the lift lever is in neutral.

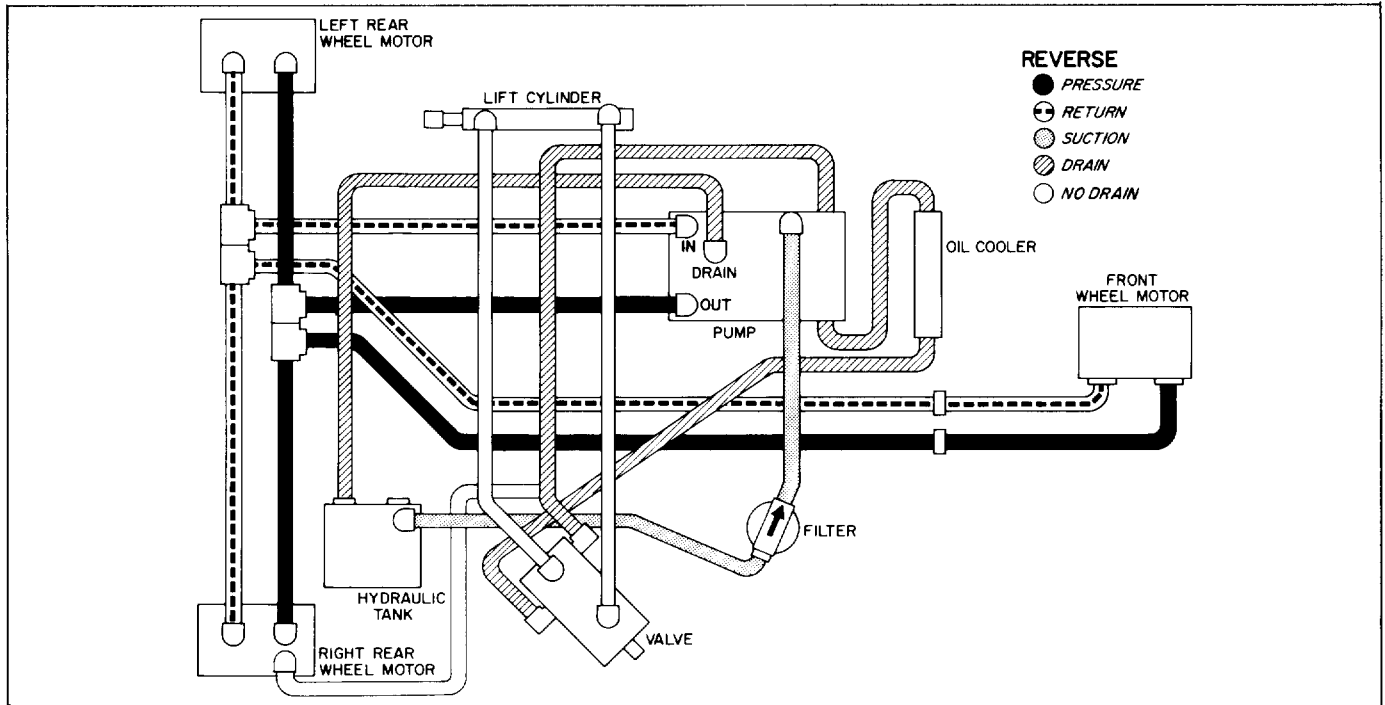


Figure 17

SCHEMATIC OF HYDRAULIC SYSTEM WHEN RAISING

This schematic shows the hydraulic fluid flow when raising the implement. The lift lever is up and the foot pedal is in neutral. The cylinder contracts to raise the implement.

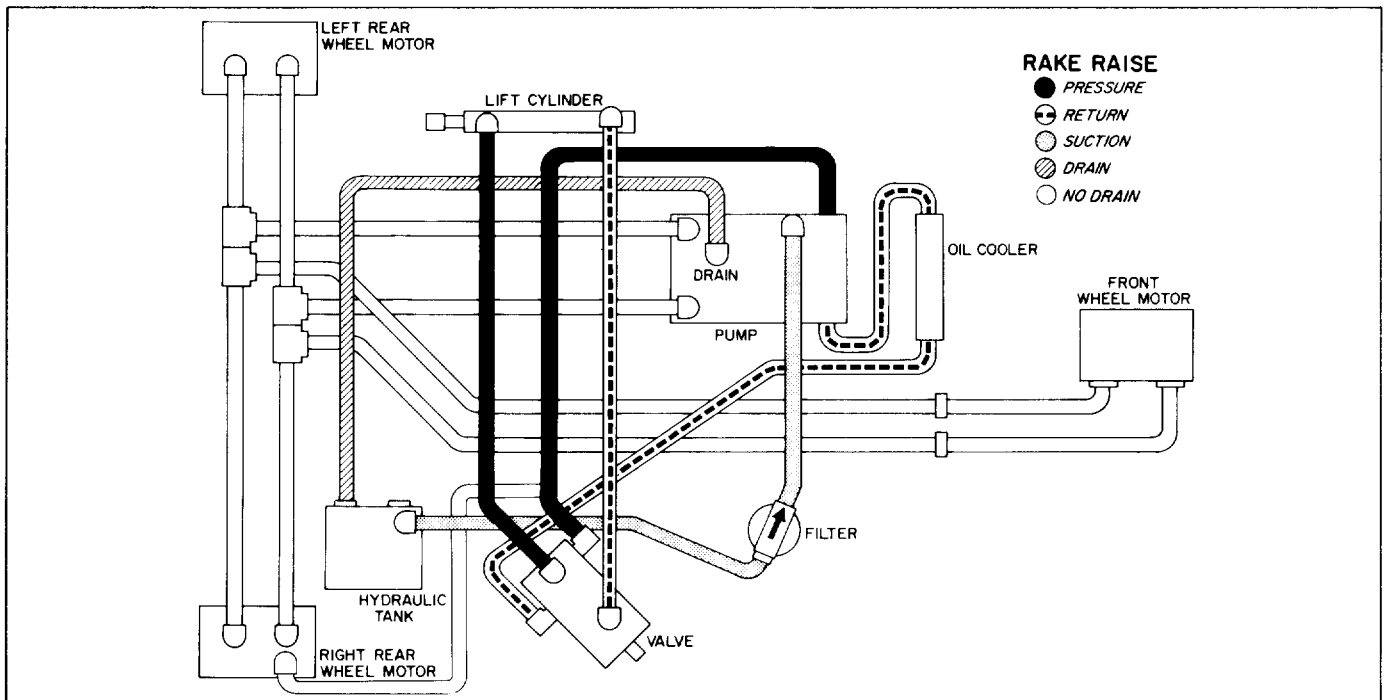


Figure 18

MAINTENANCE (Continued)

SCHEMATIC OF HYDRAULIC SYSTEM WHEN LOWERING

This schematic shows the hydraulic fluid flow when lowering the implement. The lift lever is down and the foot pedal is in neutral. The cylinder extends to lower the implement.

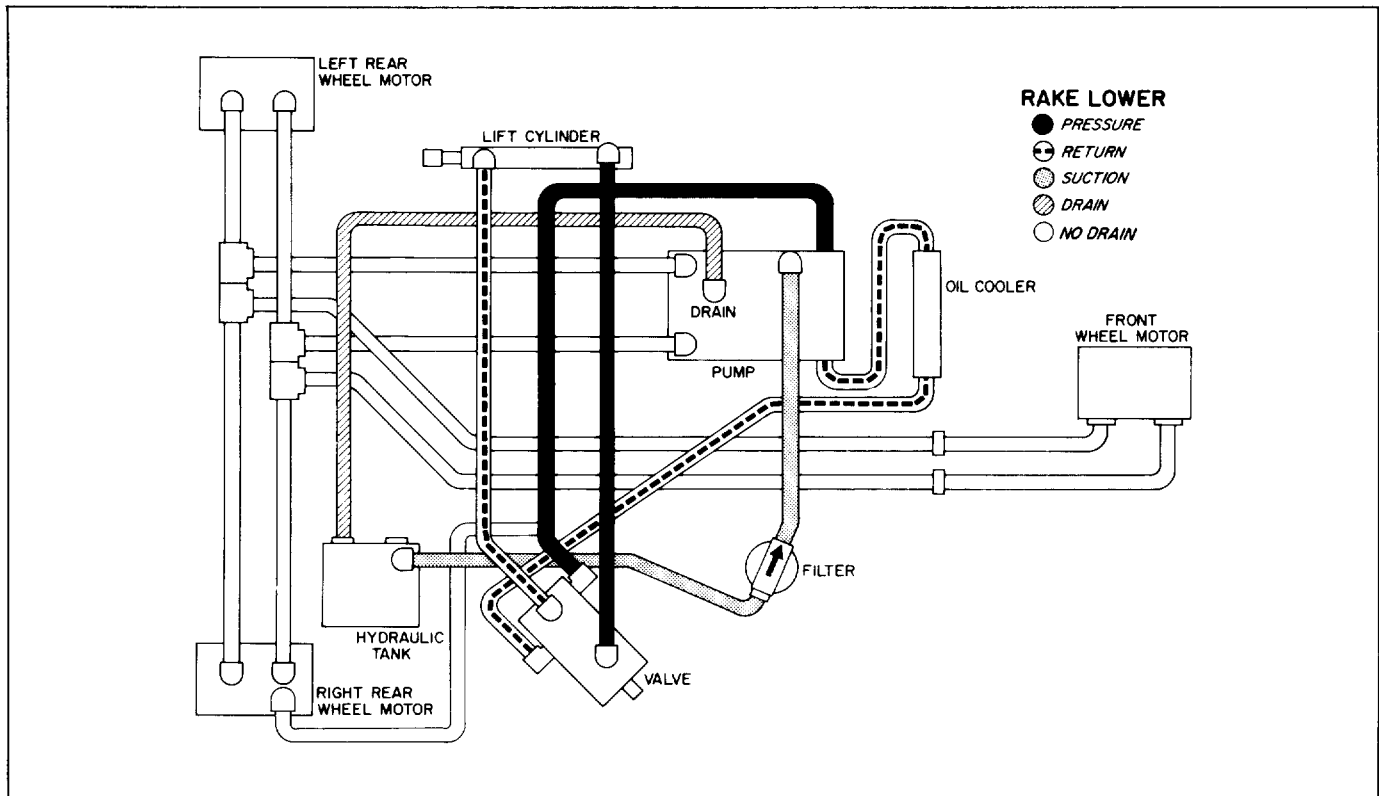


Figure 19

REMOVING WHEEL MOTORS

REAR WHEEL MOTOR:

To remove a rear motor, proceed as follows:

1. Drain and flush the hydraulic reservoir: refer to Oil Contamination Due to Component Failure, page 12.
2. Place a jack (or one of the shipping blocks) under the tubular frame (Fig. 20).
3. Remove the two capscrews holding the wheel hoop to the frame, and move the hoop to the rear. It is not necessary to disconnect the tie rods (Fig. 20).
4. Remove the lug nuts and wheel.
5. Remove the nut from the motor shaft (Fig. 20).
6. The wheel hub fits on a tapered shaft and is secured by a key. **DO NOT ATTEMPT TO DRIVE THE HUB OFF THE SHAFT.** Use a heavy duty wheel puller.
7. Place a drain pan under the motor and disconnect the tubing. Allow the oil to drain out of the tubing (Fig. 21).
8. Remove the four capscrews. (The two lower capscrews screw into weldnuts) (Fig. 21).
9. Slide the motor carefully out of the frame. Drain the oil out of the motor. Cap or plug the hydraulic lines.
10. Remove the elbows from the faulty motor. **USE NEW O-RINGS ON THE ELBOWS.** Coat the O-rings with hydraulic fluid and install on the elbows, making sure the O-rings are not twisted. Rotate the elbows to their original position and secure with the lock nuts.

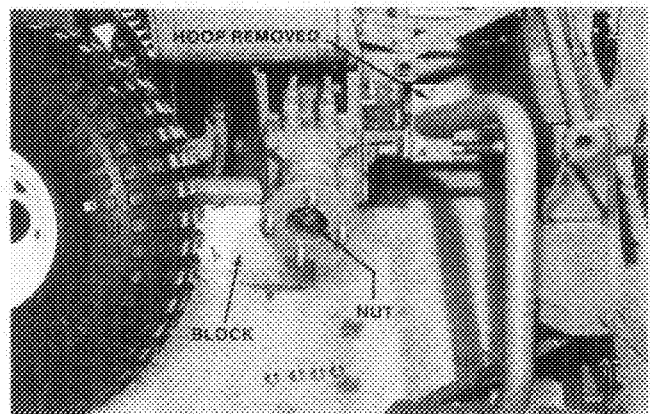


Figure 20

MAINTENANCE (Continued)

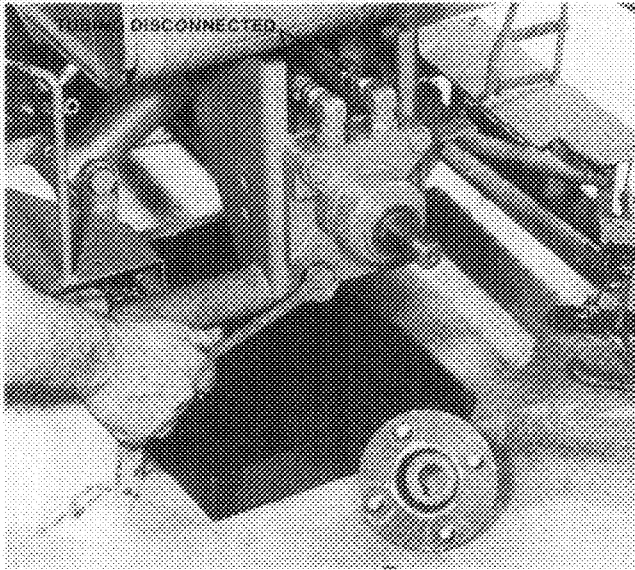


Figure 21

IMPORTANT: Do not attempt to reposition the elbows without first loosening the lock nuts. Rotating the elbows without loosening the nuts could damage the O-rings and result in a leak.

11. Prime the new motor with fresh hydraulic oil, install and connect the hydraulic lines. Use extreme care to prevent the entrance of foreign material into the system.
12. Tighten the nut to 200-400 ft-lb (272-544 N-m).
13. Install the rear wheel and tighten the lug nuts evenly and gradually in a crisscross manner to 65-90 ft-lb (88-122 N-m).
14. Fill the hydraulic reservoir with fresh fluid: refer to Changing Hydraulic Oil, page 11. Operate the SAND PRO for several minutes and check for proper operation and leaks. Make any necessary corrections. Recheck the level of the hydraulic fluid and replenish as necessary.

FRONT WHEEL MOTOR:

To remove the front motor, proceed as follows:

1. Drain and flush the hydraulic reservoir: refer to Oil Contamination Due to Component Failure, page 12.
2. Jack up the SAND PRO until the front tire is a few inches off the floor.

NOTE: The blocks removed from the crate and a 2 x 4 can be used to block up the unit for service work.

3. Use emery cloth to remove paint and to smooth the protruding portion of the stub shaft.
4. Remove the lock collar on the left side of the fork. Loosen the allen screw, then use a hammer and punch to tap the collar clockwise to loosen (Fig. 22).



Figure 22

5. Remove the flange bearing. Remove the three cap-screws holding the wheel motor bracket to the right side of the fork (Fig. 23).

IMPORTANT: Support the wheel when removing the cap-screws to prevent the wheel from dropping out of the fork.

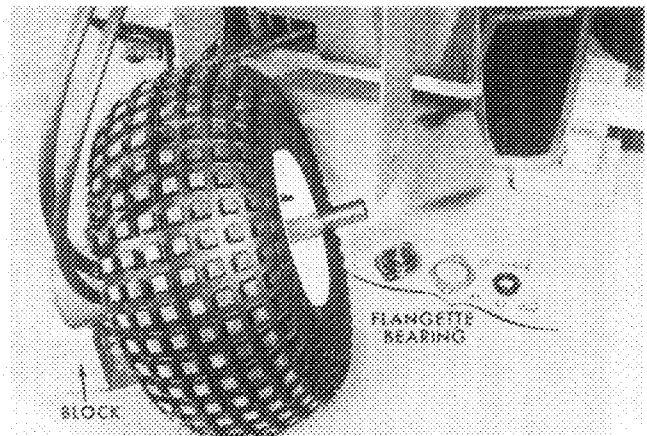


Figure 23

6. Remove the lug nuts and remove the stub shaft and wheel (Fig. 24).

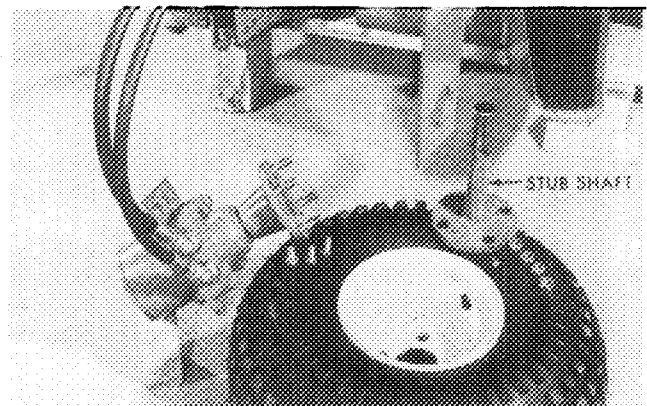


Figure 24

7. The wheel hub fits on a tapered shaft and is secured by a key. Remove the nut from end of motor shaft. DO NOT ATTEMPT TO DRIVE THE HUB OFF THE SHAFT. USE A WHEEL PULLER TO REMOVE THE HUB.

MAINTENANCE (Continued)

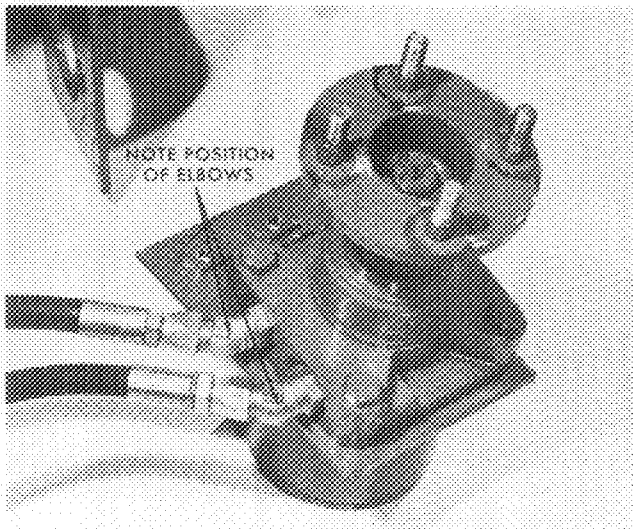


Figure 25

IMPORTANT: Note the position of the elbows in the wheel motor (Fig. 25). The angle of these elbows determines the location of the hoses. The hoses must be free from twists, must clear the tire on a full right turn, and must not kink on a full left turn. See Figs. 26, 27 and 28. The elbows have O-ring seals, and once the motor and wheel are installed, it is difficult to reposition the elbows without damaging the O-rings.

8. Tag the hoses so they can be reinstalled in the original position, and remove them from the elbows. Cap the hoses.
9. Remove the fittings and O-rings from the faulty motor. **USE NEW O-RINGS WHEN INSTALLING THE FITTINGS ON THE NEW MOTOR. COAT THE O-RINGS WITH THE OIL TO BE SEALED,** and install them on the elbows, making sure the O-rings are not twisted. Rotate the elbows to the original position and secure with the lock nuts. Pour fresh oil into the new motor before installation.

IMPORTANT: Do not attempt to reposition the elbows without first loosening the lock nuts. Rotating the elbows without loosening the lock nuts could damage the O-rings and result in a leak.

10. Install the key in the shaft of the new motor and install the hub. Tighten the nut to 200-400 ft-lb (272-544 N·m).
11. Reassemble in reverse order of disassembly. Tighten lug nuts to 65-90 ft-lb (88-122 N·m). Be sure the hoses are installed correctly as tagged in Step 8. If the hoses are reversed, the wheel rotation will be reversed.

IMPORTANT: The front hoses must be positioned so 1) they are not twisted; 2) must not contact the tire in a full right turn; 3) and must not kink in a full left turn. When adjusting for one of these conditions, keep the others in mind.

12. To remove a twist from the hose, hold the female connector with a wrench, loosen the swivel, and straighten

the hose. Keep the wrench on the female connector and retighten the swivel (Fig. 26).

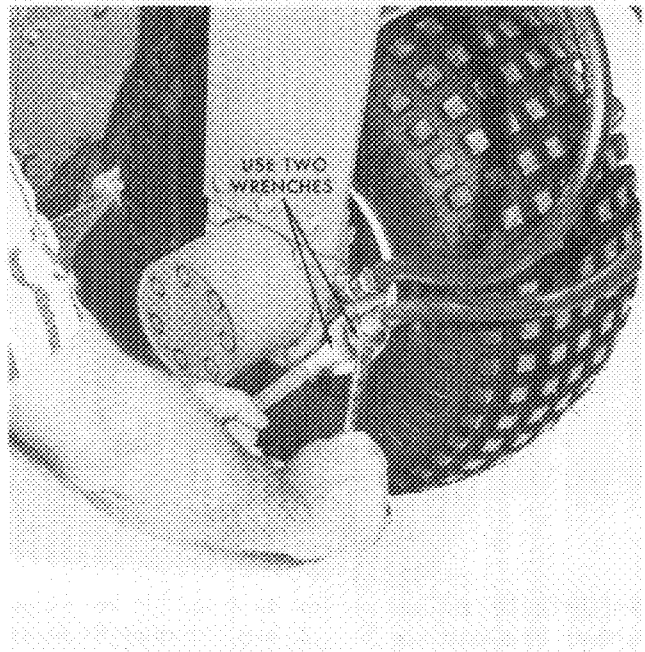


Figure 26

13. Turn the front wheel to full right turn position. There must be approximately 1" (25 mm) clearance between the hoses and the tire. (Too much clearance here may result in a kink in the hoses during a full left turn). To adjust, loosen the lock nut on the elbow, rotate the elbow to reposition the hose, and retighten the lock nut (Fig. 27).

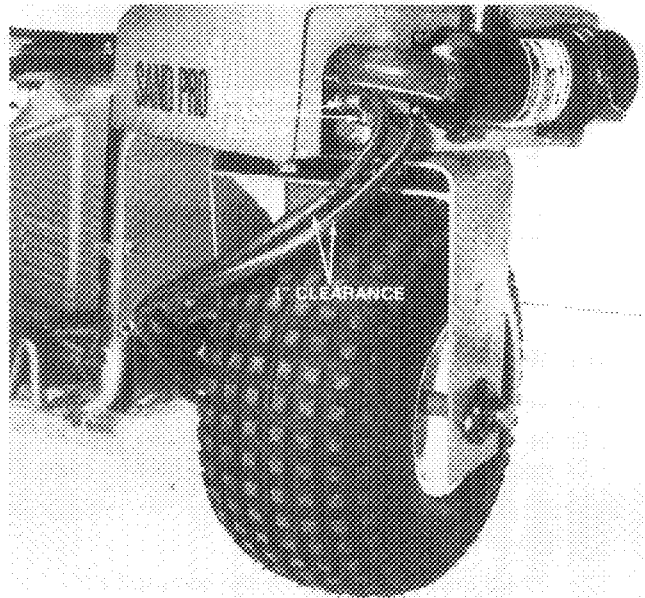


Figure 27

14. Turn front wheel to full left turn position (Fig. 28). The hoses must not kink at either the upper or lower ends. If necessary, loosen lock nuts and reposition the elbows.

MAINTENANCE (Continued)

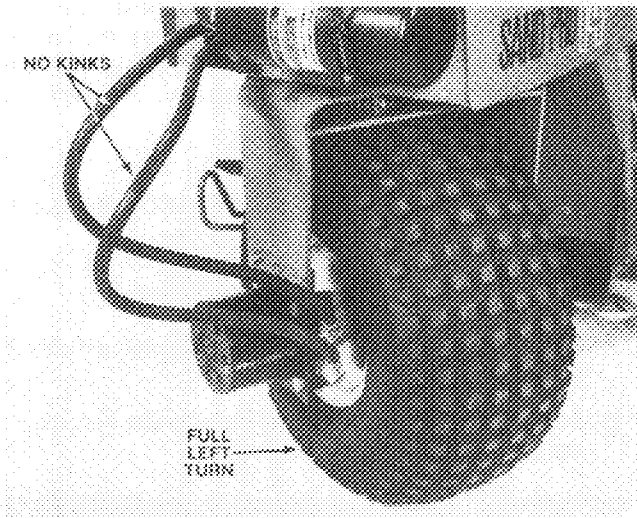


Figure 28

15. Fill the hydraulic reservoir with fresh hydraulic fluid: refer to Changing Hydraulic Oil, page 11.
16. Operate the SAND PRO for several minutes and check for proper operation and leaks. Make any corrections necessary. Recheck the level of the hydraulic fluid and replenish as necessary.

REMOVAL AND REPLACEMENT OF HYDRAULIC PUMP

The hydraulic pump is replaced as follows:

1. Remove the shroud over the engine and remove the seat.
2. Tag all the lines to the pump so they can be reassembled properly (Fig. 29).

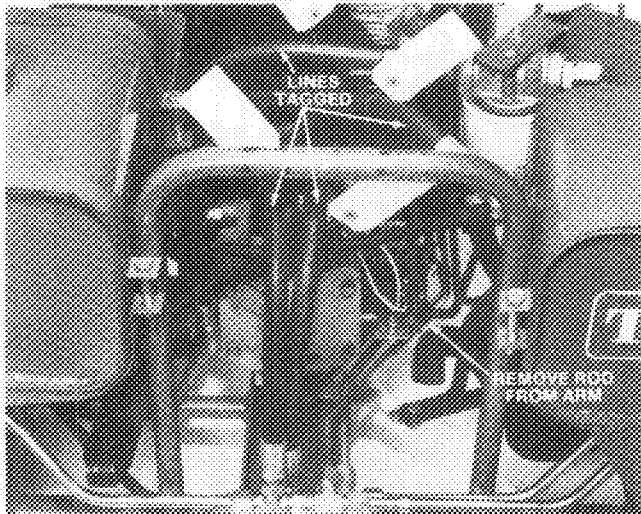


Figure 29

3. Disconnect and plug hoses and ports.

NOTE: Remember position of elbows on pump so parts can be installed in same position on new pump.

4. Remove the cotter pin and remove the end of the pump control rod from the lever arm (Fig. 29).

5. Remove cap screws securing pump flange to engine (Fig. 30).

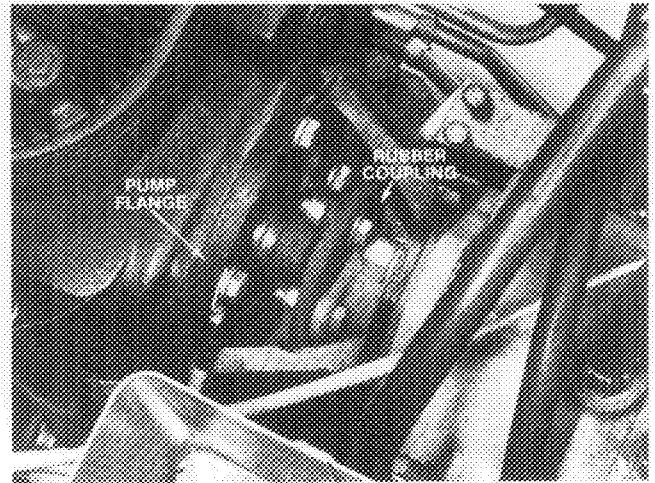


Figure 30

6. Remove capscrews, spacers, washers and locknuts securing rubber coupling between engine coupling and pump hub (Fig. 30). Remove pump.
7. Use the new O-rings when installing the fittings on the new pump. Dip the O-rings in hydraulic fluid, install them on the fittings, making sure the O-rings are not twisted. Secure the fittings at the original angle with the locknuts.

IMPORTANT: Do not attempt to reposition the elbows without first loosening the locknuts. Rotating the elbows without loosening the nuts could damage the O-rings and result in a leak.

8. Install complete pump assembly in position so engine coupling and pump hub align (Fig. 30). Secure pump assembly, by means of the mount, to the engine with four capscrews (Fig. 30).

IMPORTANT: Make sure all mounting surfaces are clean to prevent misalignment between pump and engine.

9. Install rubber coupling between engine coupling and pump hub and secure with capscrews, spacers, washers and locknuts.
10. Install and connect the hoses in their original positions. The location of most of the hoses is obvious, but the two rear hoses **could** be reversed if the tags were lost. If they are reversed, the rotation of the wheels will also be reversed. The hose from the right hand port on top of the pump must be connected to the front tee (Fig. 31).
11. Connect the control rod to the pump lever and secure with the cotter pin.

IMPORTANT: The leaf spring on the pump plate determines the neutral position of the traction drive system. After installing a new pump, it may be necessary to adjust the leaf spring slightly to adapt to the new components. Use care when starting the engine for the first time in case the SAND PRO creeps slightly. Refer to Adjusting for

MAINTENANCE (Continued)

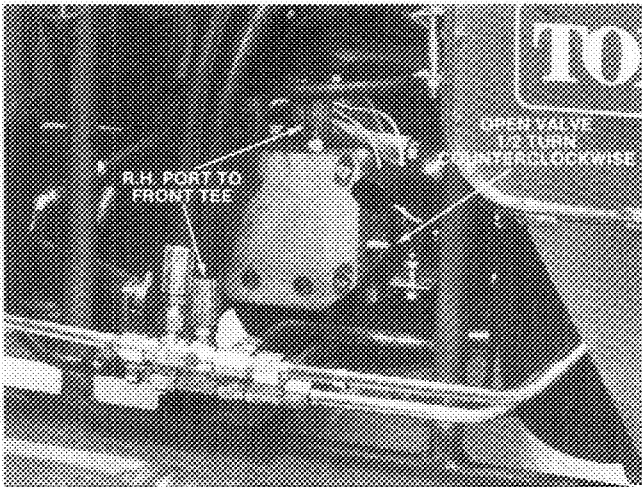


Figure 31

Neutral Position in Traction Drive, page 21 for instructions on the NEUTRAL ADJUSTMENT.

12. Whenever a part in the hydraulic system is repaired or replaced, remove the hydraulic filter and install a new one. Refer to charging Hydraulic System, page 19, for proper installation procedures and to charge the complete hydraulic system.
13. Operate the SAND PRO for several minutes, both forward and reverse, and check for proper operation. Stop the engine. Check for leaks and make any necessary corrections.

REMOVAL AND REPLACEMENT OF LIFT CONTROL VALVE

To remove the lift control valve, proceed as follows:

1. Remove the knob from the lift lever and remove the shroud.
2. Drain the hydraulic reservoir; refer to Changing Hydraulic Oil, page 11.
3. Tag and disconnect the hoses and cap them with cap plugs.
4. Remove the valve from the bracket (Fig. 32).

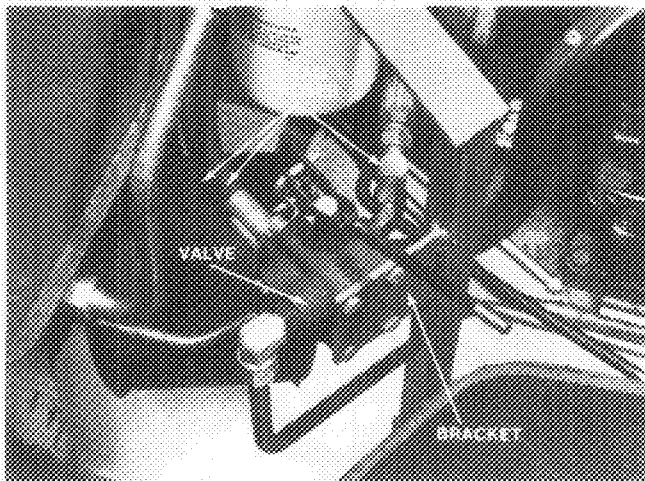


Figure 32

5. Install the new valve and connect the hoses. Fill the hydraulic reservoir with fresh fluid. Start the engine and cycle the lift several times to circulate the new fluid. Replenish the fluid as necessary. Reinstall the shroud.

REMOVAL AND REPLACEMENT OF LIFT CYLINDER

To remove the lift cylinder, proceed as follows:

1. Lower any attached implement to the floor.
2. Drain the hydraulic system; refer to Changing Hydraulic Oil, page 11.
3. Remove the two hoses from the cylinder and plug or cap the hoses (Fig. 33).

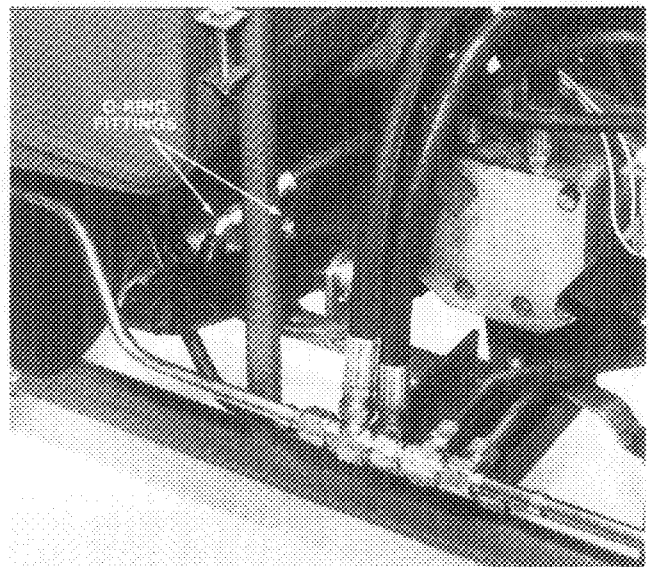


Figure 33

4. Remove the pins at both ends of the cylinder and remove the cylinder.
5. Note the angle of the elbows and remove them from the faulty cylinder.
6. Use new O-rings on the elbows when installing the elbows in the new cylinder (Fig. 33). Dip the O-rings in hydraulic fluid and install them on the elbows. Make sure they are not twisted. Rotate the elbows to their original position and secure with lock nuts. Coat lift cylinder mounting pin with "NEVER-SEEZ" or grease.

IMPORTANT: DO NOT ATTEMPT TO REPOSITION THE ELBOWS WITHOUT LOOSENING THE LOCKNUT OR THE O-RING COULD BE DAMAGED, AND RESULT IN A LEAK.

7. Install the new cylinder and connect the hoses.
8. Fill the hydraulic reservoir with fresh hydraulic fluid. Start the engine and cycle the lift several times to circulate the new fluid and fill the new cylinder and lines. Check for leaks and make any necessary corrections. Replenish the hydraulic fluid as necessary.

MAINTENANCE (Continued)

HYDRAULIC HOSE TIES

After performing hydraulic service work, be sure the hoses are secured with ties and bumpers, so the hoses do not rub or chafe during operation. Do not secure the fuel line so tightly as to shut off the flow of fuel.

CHARGING HYDRAULIC SYSTEM

IMPORTANT: Be sure hydraulic reservoir is filled with oil at all times when charging the hydraulic system.

1. Fill oil reservoir with 10W-30 or 10W-40 oil. Fill new oil filter with 10W-30 or 10W-40 oil. Also lubricate filter gasket with oil. Install oil filter on filter head. Tighten the filter 1/2 turn past first sign of gasket contact.
2. Lift seat and loosen two (2) capscrews and nuts securing leaf springs to pump plate until bearing drops away from cam on lever allowing pump shaft freedom to rotate during start-up (Fig. 34).

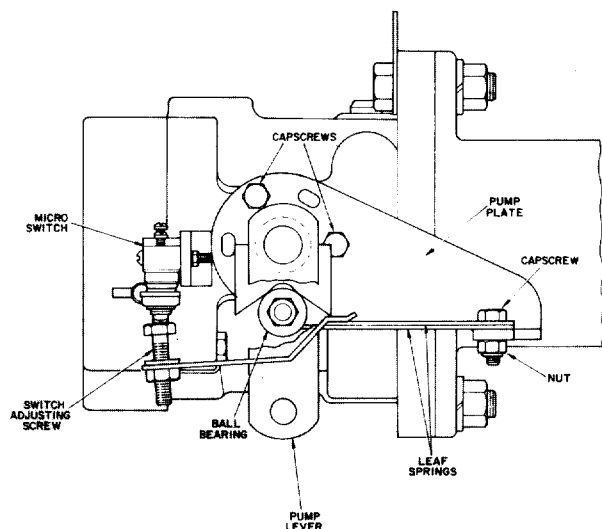


Figure 34

3. Raise one wheel off floor and place support blocks under frame.
4. Start engine and set throttle to allow engine to operate at approximately 1500 rpm.
5. Actuate the lift valve lever until the lift cylinder rod moves in and out several times. If cylinder rod does not move after 10-15 seconds or pump emits abnormal sounds, shut the engine off immediately and determine cause or problem. Inspect for the following:
 - A. Loose filter or suction lines.
 - B. Loose or faulty clutch on pump shaft.
 - C. Blockage in suction line. Refer to page 13-14, Figure 18-19.
 - D. Faulty charge relief valve.
 - E. Faulty charge pump.

NOTE: 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

If cylinder moves in 10-15 seconds, proceed to Step 6.

6. Operate the traction pedal in forward and reverse directions. Wheel off floor should rotate in the proper direction. If wheel rotates in wrong direction, stop engine, remove lines from rear of pump and reverse their locations. Refer to page 17, item 11 under Removal and Replacement of Hydraulic Pump. Also refer to Figure 31. If wheel rotates in proper direction, stop engine and tighten capscrews and nuts securing leaf springs (Fig. 34). Adjust traction neutral position: refer to Adjusting For Neutral Position in Traction Drive, page 21.
7. Check adjustment of traction interlock switch. Refer to Adjusting Traction Interlock Switch, page 21.
8. Check machine out for proper performance.

STEERING CHAIN AND SPROCKET

1. Place the front wheel in the straight ahead position.
2. Adjust the locknuts until the chain is snug on both sides of the sprocket (Fig. 35).
3. Turn the wheel full left and full right to be sure the chain does not bind or hang up in either direction. Readjust as necessary.

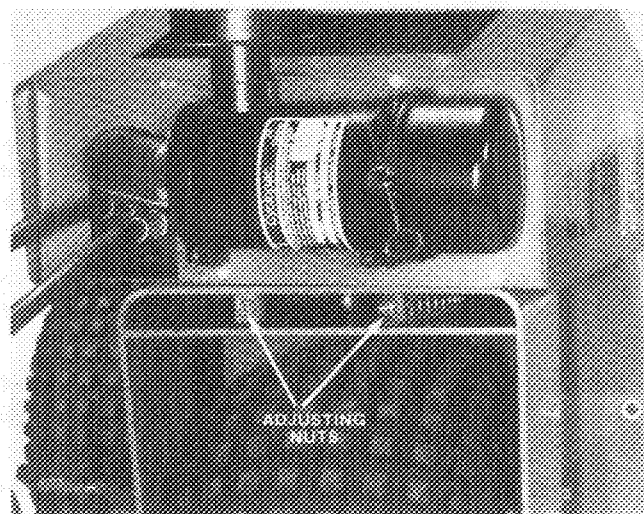


Figure 35

Since the chain and sprocket are subjected to sand thrown up by the front tire, inspect them frequently for wear. If either the chain or sprocket is worn beyond acceptable limits, BOTH should be replaced.

4. To remove the chain, remove the two adjusting nuts (Fig. 35).
5. Remove the fasteners and lift the front shroud and dash assembly to expose the U-joint (Fig. 36). To completely remove the shroud, tag and disconnect the

MAINTENANCE (Continued)

cables and wires. Remove the steering wheel and lift the shroud off the shaft.

6. To remove the sprocket, drive out the roll pin (Fig. 36). Remove the sprocket and shaft assembly from the bottom.

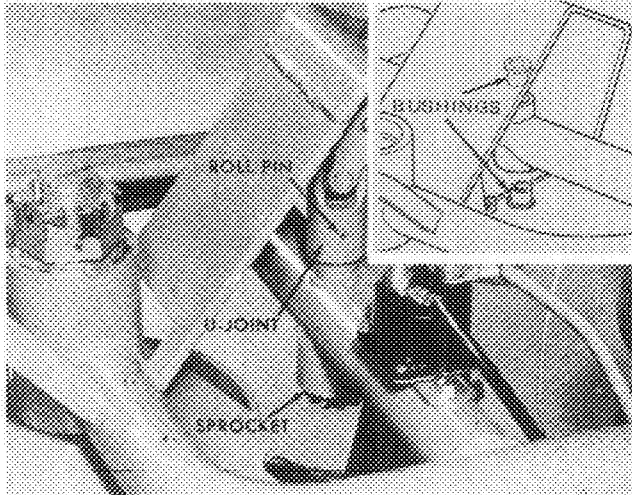


Figure 36

7. Insert the new sprocket assembly from the bottom. Check the condition of the bushings in the housing by moving the new shaft back and forth. If there is excessive play, the old bushings must be removed and new ones installed (Fig. 36).
8. To replace the bushings, swing the lower half of the U-joint 90° from the upper half.
9. Remove the worn bushings with a bushing extractor or drive them out with a long punch.
10. Clean the housing thoroughly and install the new bushings until the flanges are flush with the housing. (These are oil impregnated bushings, and require no lubrication.)
11. Swing the U-joint back into position, install the new shaft and sprocket. Line up the holes with a drift pin and drive in the roll pin (Fig. 36).

NOTE: SUPPORT THE BACK SIDE OF THE U-JOINT FIRMLY WHEN DRIVING IN THE PIN, TO AVOID DAMAGING THE BUSHINGS.

12. Install the new chain and adjust; refer to paragraphs 1, 2 & 3.

FRONT SPINDLE BEARINGS

If the front wheel fork develops excessive play or looseness, the bearings must be replaced. Proceed as follows:

1. Block up the SAND PRO high enough so there is approximately 6" (15 cm) clearance under the front tire.
2. Remove the fasteners from the front shroud and raise the shroud high enough to expose the large castellated nut (Fig. 37). Block the shroud up securely.

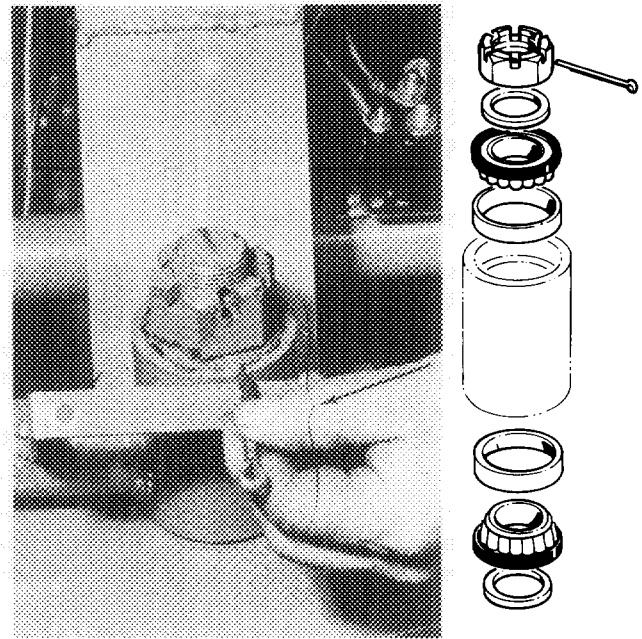


Figure 37

NOTE: It is not necessary to disconnect the electrical wires on control cables. Use care to avoid kinking the cables or tearing off wires.

3. Remove the steering chain.
4. Remove the cotter pin and castellated nut (Fig. 37). Support the wheel assembly so it will not drop and damage the wheel motor or hoses.
5. Use a soft-faced hammer and drive the spindle down out of the housing.
6. The lower bearing cone and washer will remain on the spindle. Remove the upper washer and cone. Tap the bearing cups out of the housing.
7. Remove the lower bearing cone from the spindle with a puller. Remove the washer.
8. Clean the housing and spindle thoroughly. Use a solvent to remove the old grease.
9. Press the new bearing cups into the housing. Make certain they are fully seated against the shoulders in the housing.
10. Pack the new bearings with a high-quality wheel bearing grease.

NOTE: A grease seal is permanently attached to the bearing cone. Apply grease to the sealing edge of the seal for ease of installation.

11. Place the washer on the spindle and press the new lower bearing cone onto the spindle and down against the washer.
12. Insert the spindle into the housing from the bottom. Pack the housing with a high-quality wheel bearing grease.
13. Press the new upper bearing cone onto the spindle. Install the washer and nut.

14. Tighten the nut while rotating the wheel fork until you can feel a slight drag on the fork. Be sure the bearings are seated. Secure the nut with the cotter pin. If the notches do not line up with the hole in the shaft, back off the nut to the closest notch (Fig. 37).

ADJUSTING FOR NEUTRAL POSITION IN TRACTION DRIVE

If the SAND PRO "creeps" when the control pedal is in the neutral position, the spring leaf assembly must be adjusted.

1. Block up under the frame so one of the wheels is off the floor. The blocks from the crate can be used under the tubular frame.
2. Start engine, move throttle to SLOW and check rear wheel that is off shop floor; it must not be rotating. If wheel is rotating forward, loosen capscrews and lightly tap bottom of pump plate counterclockwise (Fig. 38). By contrast, tap pump plate clockwise if wheel is rotating backward (Fig. 38). When wheel stops rotating, tighten capscrews holding pump plate against side of pump. Verify the adjustment with throttle in SLOW and FAST position.
3. Should the wheel continue to rotate, check for the following:
 - A. Ball bearing is loose or worn out (Fig. 38).
 - B. Plunger on interlock switch is sticking.
 - C. Loose or missing fasteners.
 - D. Worn mounting roll pin for pump lever to pump shaft.
 - E. Pump lever loose on control shaft. (Correct by applying Loc-tite 271 or 601 to shaft).
 - F. Weak or damaged leaf springs (Fig. 38). Replace.
 - G. Internal pump component malfunction.

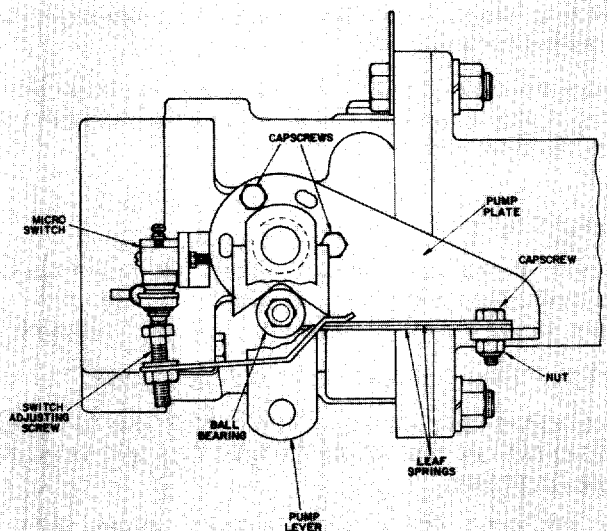


Figure 38

ADJUSTING TRACTION INTERLOCK SWITCH

1. Adjust transmission for neutral; refer to Adjusting Traction Drive for Neutral, page 21).
2. Actuate the pump lever (Fig. 38) to assure all parts are operating freely and seated properly.
3. Rotate switch adjusting screw (Fig. 38) until there is a gap between head of screw and switch button.
4. Rotate adjusting screw until it contacts the switch button. Continue to rotate the screw until the circuit is completed (switch "clicks"). After the switch clicks, rotate the adjusting screw an additional 1/2 turn.
5. Check for proper operation.

ADJUSTING PEDAL FOR REVERSE

The pedal must be adjusted for reverse if jam nuts on control rod are loosened or if pedal is removed.

1. Make sure pump is in neutral.
2. Loosen jam nuts on control rod (Fig. 39).
3. Press down on rear of pedal until there is 5/16" (.31) between pedal and foot rest (Fig. 39).
4. Tighten jam nuts.

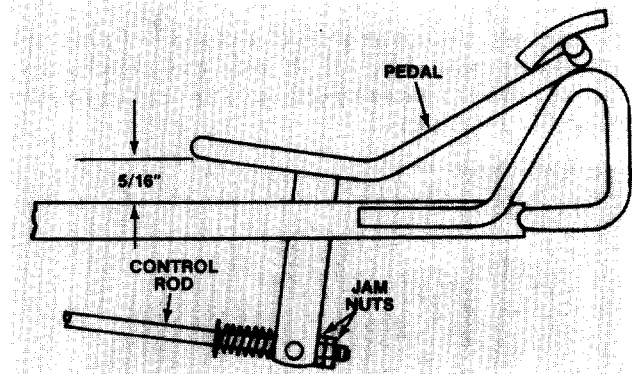


Figure 39

REMOVING ENGINE

1. Remove shroud over engine.
2. Disconnect battery cables, choke cable, throttle cable, and electrical wires.
3. Close gasoline shut-off and remove fuel line from carburetor. Drain the fuel in the line into a container.



CAUTION: DO NOT ALLOW THE GASOLINE TO DRAIN ON THE FLOOR.

4. Remove the two capscrews securing the exhaust pipe to the manifold (Fig. 40).
5. Disconnect air cleaner hose from carburetor.
6. Remove the four capscrews from the engine base and the pump mount (Fig. 40).

MAINTENANCE (Continued)

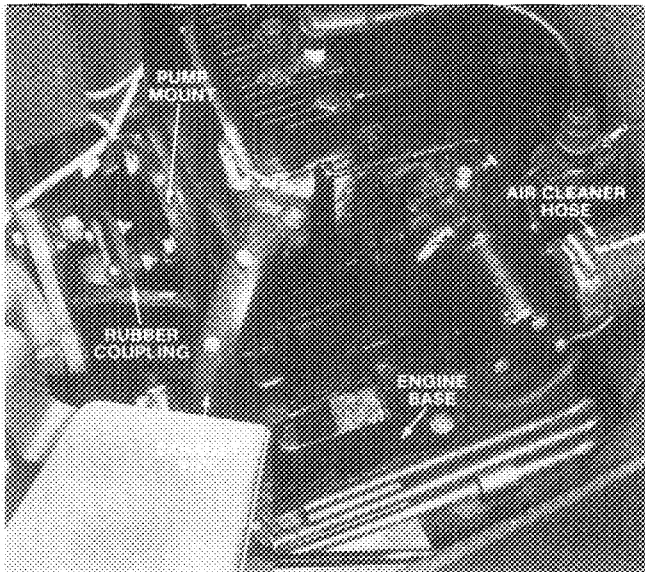


Figure 40

7. Remove capscrews, spacers, washers and locknuts securing rubber coupling between engine coupling and pump hub. Remove rubber coupling (Fig. 40).
8. Lift out engine.

TANK SUPPORTS

Check the felt strips under the fuel tank and hydraulic tank straps occasionally (Fig. 41). If they have deteriorated, install new strips to prevent metal-to-metal contact, possible leaks and/or a fire hazard.

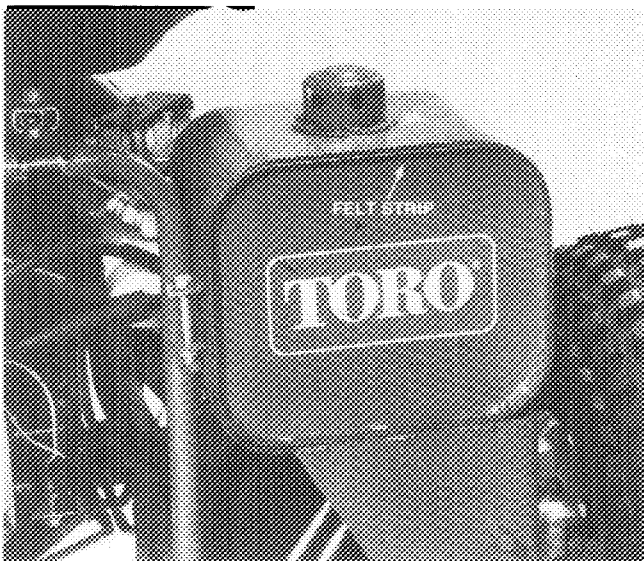


Figure 41

CHOKE CABLE

If the choke cable has been disconnected, or there is evidence that the butterfly valve is not opening completely when the choke button is all the way in, proceed as follows:

1. Release the snap-type clamp (Fig. 42).

2. Hold the butterfly shaft arm in the fully open position. Be sure the choke button is all the way in.
3. Insert the Z shaped end of the wire into the arm and snap the clamp to the bracket to hold the cable in this position.

THROTTLE CABLE

If the throttle cable has been disconnected, reinstall as follows:

1. Place the throttle control lever into the slow position.
2. Secure the cable in the clamp such that the butterfly is just on the verge of opening (Fig. 42).

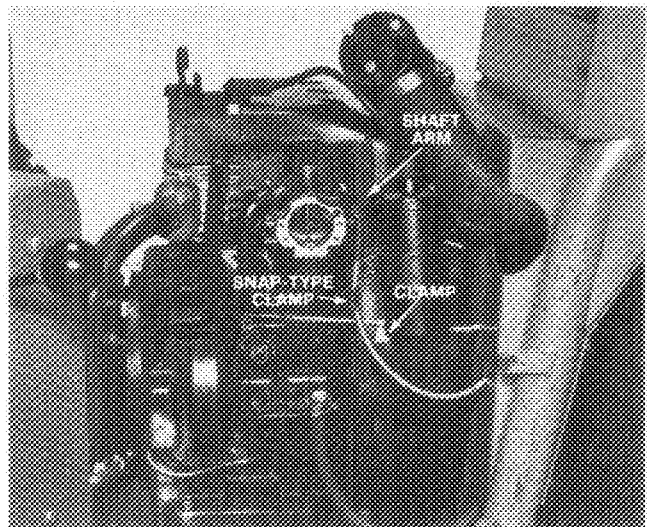


Figure 42

3. Recommended engine speed is 3400 rpm.

CHANGING TIRES

To repair or replace a rear tire, refer to Rear Wheel Motor, page 14.

Refer to Front Wheel Motor, page 15 for procedures for removing the front wheel.

Use a vulcanized "boot" to repair a puncture, rather than a plug. A plug may not seal because of the low pressure in the tire. An inner tube can also be used.

ELECTRICAL

If any of the electrical components fail they must be replaced. The gauges and solenoid are located under the front shroud. Fig. 43 is a diagram of the electrical system.

DO NOT REVERSE BATTERY CONNECTIONS.

DISCONNECT REGULATOR (RECTIFIER) WHEN WELDING ON THE SAND PRO OR QUICK CHARGING THE BATTERY.

IF STARTER DOES NOT ENGAGE WHEN KEY IS TURNED, DO NOT STRIKE STARTING MOTOR HOUSING, OR INTERNAL DAMAGE MAY RESULT.

MAINTENANCE (Continued)

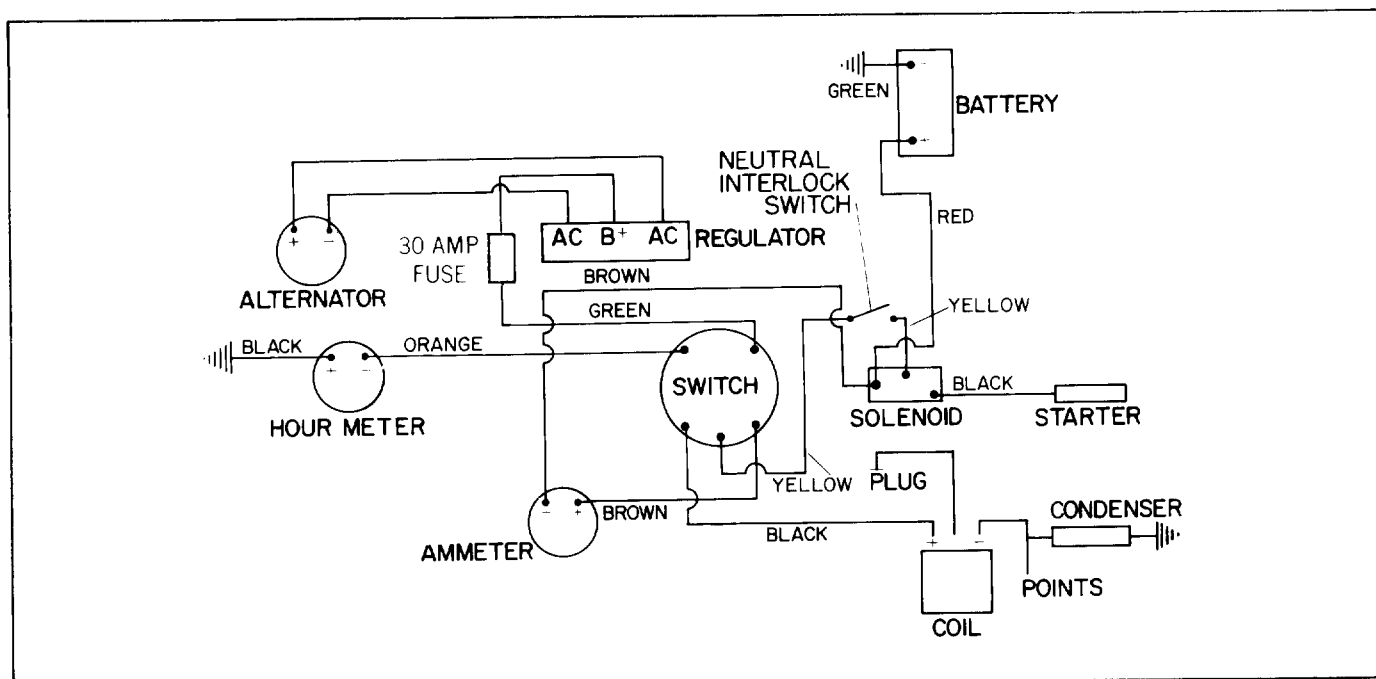


Figure 43

IDENTIFICATION AND ORDERING

Model and Serial Numbers

The Sand Pro has two identification numbers: a model number and a serial number. The two numbers are stamped on a plate which is located on the left fender. In any correspondence concerning the product, supply model and serial numbers to assure that correct information and replacement parts are obtained.

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

1. Model and serial number of the product.
2. Part number, description, and quantity of part(s) desired.

NOTE: Do not order by reference number if a parts catalog is being used; use the PART NUMBER.

The Toro Promise

A ONE YEAR LIMITED WARRANTY

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

The costs of parts and labor are included, but the customer pays the transportation costs on walk rotary mowers with cutting unit widths of less than 25".

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.