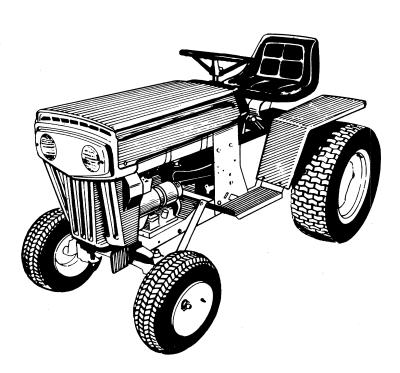
OWNER'S GUIDE

.. CENTS

Model No. 141-990 14 H.P. Hydrostatic Drive

GARDEN TRACTOR



212-321 Porpos

WARRANTY

For one year from date of purchase, MTD Products Inc will replace for the original purchaser, free of charge, F.O.B. factory or authorized service firm, any part or parts found to be defective in material or workmanship. All transportation charges on parts submitted for replacement under this warranty must be paid by the purchaser. This warranty does not include replacement of parts which become inoperative through misuse, excessive use, accident, neglect, improper maintenance or alterations by unauthorized persons. This warranty does not include the engine, motor, battery, battery charger or any component parts thereof. For service on these units refer to the applicable manufacturer's warranty.

The above warranty will apply only to the original owner and will be effective only if the warranty card has been properly processed. It will not apply where the unit has been used commercially.

Warranty service is available through your local authorized service dealer or distributor. UNDER NO CIRCUM-STANCES WILL THE RETURN OF A COMPLETE UNIT BE ACCEPTED BY THE FACTORY UNLESS PRIOR WRITTEN PERMISSION HAS BEEN EXTENDED.

BE A PRO I KNOW YOUR MACHINE -

HOW TO CONTROL IT SMOOTHLY, AND HOW TO STOP IT QUICKLY! AND-

READ THE OWNERS MANUAL

SAFETY TIPS FOR GARDEN TRACTORS AND ATTACHMENTS

Improper use of riding lawn mowers, garden tractors and attachments on the part of the operator can result in injury. To reduce this possibility, give complete and undivided attention to the job at hand.

- 1. Know the controls and how to stop quickly READ THE OWNER'S MANUAL.
- 2. Do not allow children to operate machine; nor adults to operate it without proper instruction.
- 3. Clear work area of objects which might be picked up and thrown.
- 4. Disengage all clutches and shift into neutral before starting motor. Keep hands, feet and clothing away from power driven parts.
- 5. Do not carry passengers. Keep children and pets a safe distance away.
- 6. Never direct discharge of any material toward by-standers nor allow anyone near machine while in operation.
- 7. Disengage power to any attachment and stop motor before leaving operator position.
- 8. Take precautions when leaving machine unattended (to avoid accidental starting, rolling away, accidental dropping of any attachment, etc.)
- 9. Disengage power to any attachment whenever it is not in use or when traveling from one work area to another.
- 10. Stay alert for holes and other hidden hazards.
- 11. Know what is behind you before backing up.
- 12. Beware of steep slopes; reduce speed on all side slopes and sharp turns to prevent tipping or losing control.
- 13. Don't stop or start suddenly when going uphill or downhill.
- 14. Use extra care when pulling loads or using heavy equipment. (Refer to your owner's manual)
- 15. Watch out for traffic when near roadways.
- 16. Handle gasoline with care it is highly flammable.
 - A. Use approved gasoline container.
 - B. Never add gasoline to running motor fill tank out of doors and wipe up spilled gasoline.
 - C. Replace gasoline cap securely.
 - D. Open doors if motor is run in garage exhaust gases are dangerous.
- 17. Keep machine in good operating condition and keep safety devices in place. Use guards as instructed in owner's manual.
- 18. Disengage power to any attachment and stop motor before making repairs or adjustments.
- 19. While operating the mower, if any foreign object is struck, stop the mower and inspect for damage. Do not restart or operate the mower until all damage has been repaired.

KNOW YOUR TRACTOR

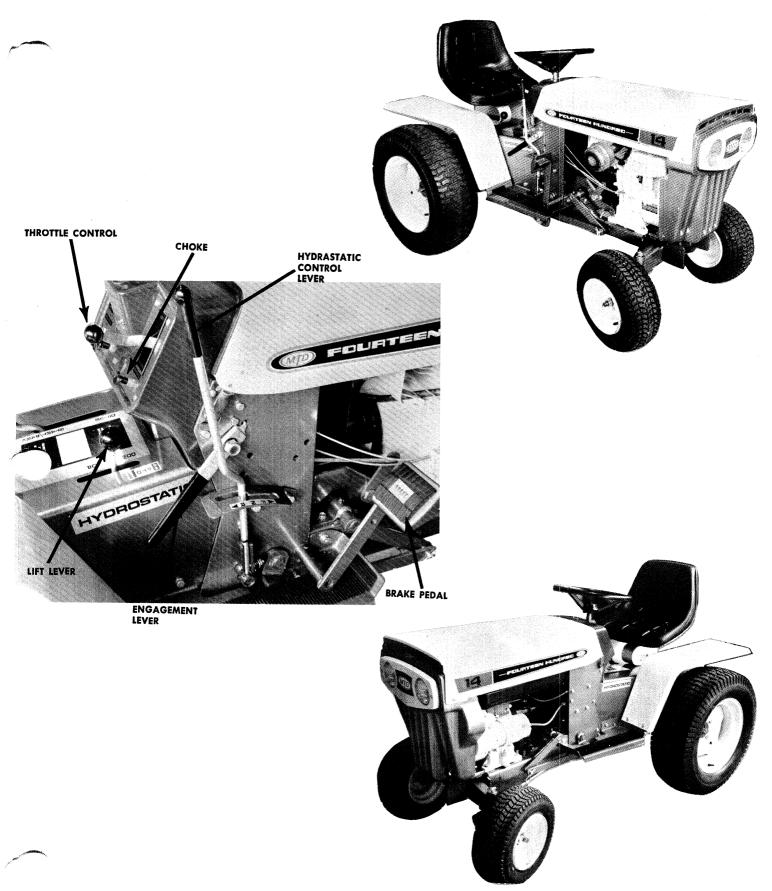


FIGURE 1. 14 HP HYDROSTATIC TRACTOR

ASSEMBLY INSTRUCTIONS

ACTIVATING THE BATTERY

Step 9. Tighten the wing nuts finger tight.

WARNING

ELECTROLYTE IS A MIXTURE OF SUL-PHURIC ACID AND WATER. AVOID CONTACT WITH SKIN, EYES, AND CLOTHING. IF ELECTROLYTE IS SPILLED FLUSH AREA WITH CLEAR WATER AND NEUTRALIZE WITH SOLUTION OF WA-TER AND BAKING SODA OR WATER AND AMMONIA.

See the instructions packed with the battery for activating.

INSTALLING THE BATTERY.

- Step 1. Place the battery in the tractor with the Negative terminal towards the front of the tractor.

 Do not push the battery all the way in.
- Step 2. Attach the positive cable to the positive battery terminal.

NOTE

The positive cable is marked (P +).

Step 3. Attach the negative cable to the negative battery terminal.

NOTE

The negative cable is marked (N-).

- Step 4. Hook the rear hold down rod in the hole in the bottom of the battery box.
- Step 5. Slide the battery in place.
- Step 6. Place the cross rod over the rear hold down and place a flat washer and wing nut on the rear hold down rod.

NOTE

Do not tighten.

- Step 7. Hook the front hold down rod in the hole in the bottom of the battery box.
- Step 8. Place the cross rod over the front hold down rod and place a flat washer and wing nut on the front hold down rod.

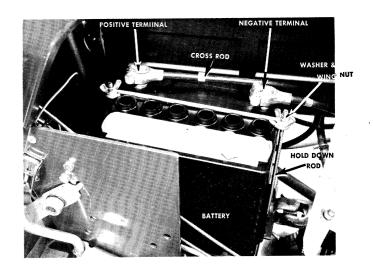


FIGURE 2. BATTERY INSTALLATION

ASSEMBLING THE THREE POINT HITCH

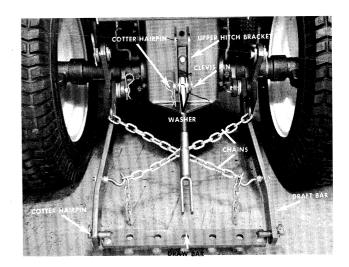


FIGURE 3. THREE POINT HITCH

Step 1. Adjust the clevis end on both the right and left sides of the tractor so that 3½ inches of threads show. See Figure 4.

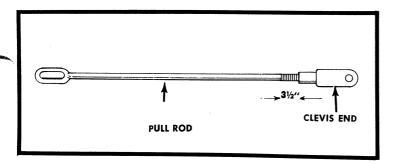


FIGURE 4. PULL RODS

Step 2. Assemble the right hand draft bar assembly to the axle bracket using the longest clevis pin, two large washers and a cotter hairpin. See Figure 5.

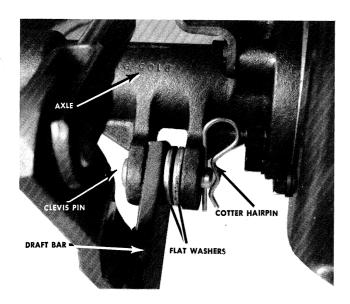


FIGURE 5. DRAFT BAR ASSEMBLY

Step 3. Assemble the left hand draft bar the same way.

Step 4. Assemble the clevis end of the pull rods to the top hole in the draft bars using the short clevis pins and secure with cotter hairpins.

See Figure 6.

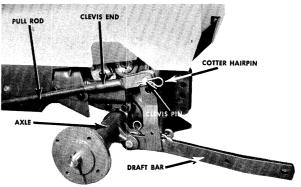


FIGURE 6. PULL ROD ASSEMBLY

- Step 5. Assemble the draw bar to the draft bars and secure with cotter hairpins. See Figure 3.
- Step 6. Screw one hex nut all the way on each of the hook bolts. See Figure 7.

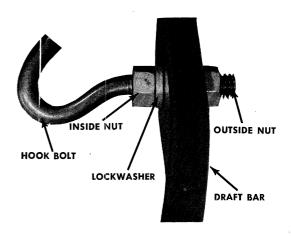


FIGURE 7. HOOK BOLT ASSEMBLY

Step 7. Place a lockwasher on the hook bolt and place the hook bolt through the draft bar so it is on the inside. Do this on both draft bars. See Figures 3 and 7.

NOTE

Only screw the outside nut on a few threads so it can be adjusted to take up the slack in the chain.

Step 8. Fasten the chains to the rear hook welded on the draft bar and cross over to the hook bolt. Do both chains this way. See Figure 3.

NOTE

Pull the chains to make as tight as possible.

Step 9. Tighten the outside nuts on the hook bolt until there is only about ½" slack in the center of the chain. See Figure 3 and 7.

Step 12. Assemble the flat end of the Center Adjustment Arm to the bottom hole in the Upper Hitch Bracket with two flat washers, a clevis pin and a cotter hairpin. See Figure 3.

Step 10. Tighten the inside nut. See Figure 7.

Step 11. Assemble the two halves of the center adjustment arm together until there is 1" of thread showing. See Figure 8.

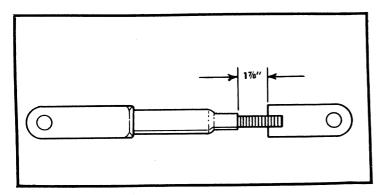


FIGURE 8. CENTER ADJUSTMENT ARM.

BEFORE STARTING

FILL FUEL TANK

Use clean fresh "regular" grade gasoline. Fill tank completely. Gasoline tank capacity is 4½ gallons.

DO NOT FILL GASOLINE TANK WHILE ENGINE IS RUNNING. Avoid spilling gasoline on a hot engine—this may cause an explosion and serious injury.

DO NOT MIX OIL WITH GASOLINE

OIL RECOMMENDATIONS

WINTER (Below 40° F.) Use SAE 5W-20 SUMMER (Above 40° F.) Use SAE 30

Any high quality detergent oil having the American Petroleum Institute classification "For Service MS" can be used in your Briggs & Stratton engine. Detergent oils keep the engine cleaner and retard the formation of gum and varnish deposits.

The above oil recommendations are the result of extensive testing. No special additives should be used.

FILL CRANKCASE WITH OIL

Remove the oil filler plug. Place the engine level. Fill the crankcase to overflowing. POUR SLOWLY. CAPACITY 4 PINTS. Replace the filler plug.

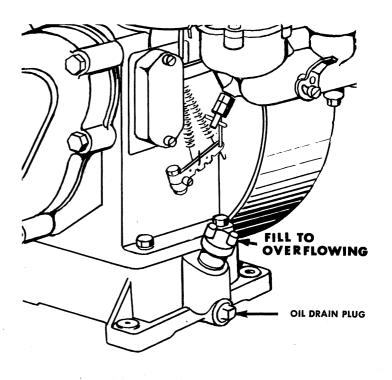


FIGURE 9. OIL FILL AND DRAIN

GENERAL INFORMATION

ENGINE AND DRIVE TRAIN

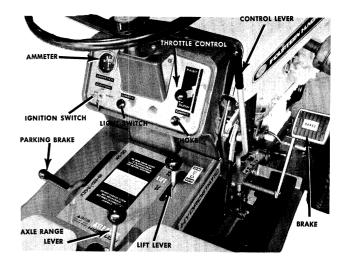
ENGINE—14 HP synchro-balanced Briggs and Stratton cast iron block with a 12-volt electric system.

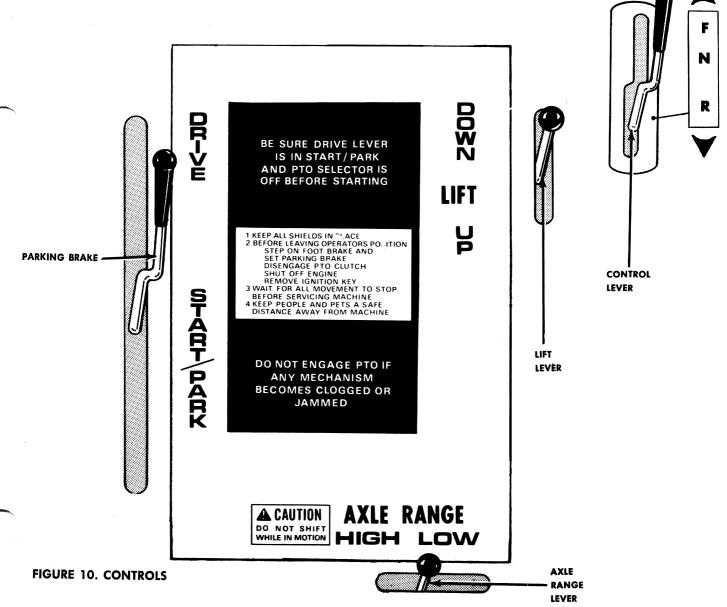
HYDROSTATIC TRANSMISSION—Marshallmatic Model 10 Hydrostatic. Driven by a universal shaft from the engine.

REAR AXLE—Peerless two speed axle driven by a gear on the hydrostatic.

ORIENTATION

Your tractor is right hand (R.H.) or left hand (L.H.) as you operate it.





BRAKE PEDAL

This pedal is operated with your right foot. Depress the pedal to stop the tractor. See Figure 1.

NOTE

Depressing the brake pedal moves the control lever for the hydrostatic into neutral position.

PARKING BRAKE

The parking brake is located on the left side of the tractor.

To operate, depress the brake pedal with your foot and pull the parking brake back into the START/PARK position.

NOTE

The tractor will only start when the parking brake is in the START/PARK position.

To release, place your foot on the brake pedal and move the parking brake into the DRIVE position.

NOTE

To free wheel the tractor with the engine off, place the parking brake in the DRIVE position.

HYDROSTATIC CONTROL LEVER (Control Lever)

The Control Lever is used to regulate the ground speed of the tractor. Moving the Control Lever forward (F) makes the tractor travel faster, moving the Control Lever backwards (R) moves the tractor in reverse.

NOTE

To increase rear wheel torque (pulling power) move control lever towards the NEUTRAL position. The tractor responds similar to shifting to a lower gear with a gear type transmission.

The control lever can be used for dynamic braking (to hold back the unit) when going down hill or when using rotary tiller by moving the lever towards NEUTRAL position. Additional braking can be obtained by moving control lever gradually into the direction opposite of your direction of travel. When you depress the brake pedal, the Control Lever moves into Neutral (N).

AXLE RANGE LEVER

Your tractor is equipped with a two speed rear axle to make your tractor more versatile.

The LOW range is used for operating the rotary tiller, mold board plow and should be used anytime the engine is laboring hard.

Use the HIGH range for regular work.

LOW RANGE 0-4 mph

HIGH RANGE 0-8 mph

NOTE

The Axle Range Lever must be in either the HIGH or LOW range position. The tractor will not move if it is in the center position.

LIFT LEVER

The Lift Lever is located on the right hand side of the tractor and is used to raise and lower the attachments. The lift is hydraulic and will only operate when the engine is running, however, you can move the lift lever to the DOWN position and lower any attachment if the engine is not running.

The lift lever is spring loaded and will always return to the CENTER position.

The three point hitch is operated off the lift lever and does not have to be disconnected when attaching the cutting deck or snow blade.

POWER TAKE OFF (PTO) FRONT AND REAR

There are two PTO's on your tractor. The front PTO (see Figure 11) is located behind the grille and is used to operate the snow thrower. This PTO is attached directly to the engine and runs whenever the engine is running.

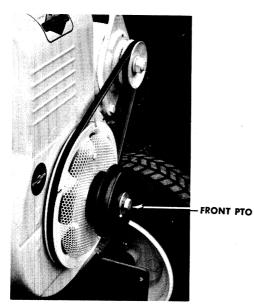


FIGURE 11. FRONT PTO SHOWN WITH GRILLE REMOVED

The rear PTO can be shut off while the engine is running by moving the PTO lever, located on the right hand side of the tractor, into the OFF position. See Figures 10 and 13.

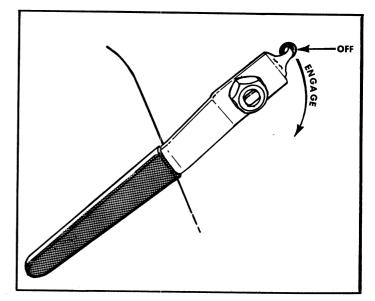


FIGURE 13. PTO LEVER

The rear PTO (see Figure 12) is located under the tractor and is used to operate the grass cutting deck and the rotary tiller.

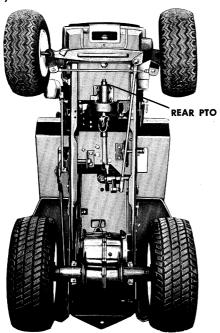


FIGURE 12. REAR PTO SHOWN WITH DRIVE SHAFT ATTACHED

IGNITION SWITCH

Turn the key to the right to engage the starting motor on the engine. To shut off the engine turn the key to the left to the OFF position. See Figure 10.

WARNING

Remove the key from the switch when the tractor is not in use.

THROTTLE CONTROL

The throttle is used to regulate the engine speed. Move the throttle control up to the FAST position and down to the SLOW position. See Figure 10.

CHOKE

Before starting the engine, pull the choke knob all the way out. After engine starts, move the choke knob in gradually until it is completely in.

When the engine is hot the choke may not be needed to start. See Figure 10.

LIGHTS

Pull the light switch out to turn on the headlights. See Figure 10.

The rear hubs are extended to give greater stability when operating on hilly terrain.

To adjust, loosen the hex bolt and slide the rear hubs out.

WHEELS

Front	16 x 6.50— 8"	High Floation
Rear	27 x 9.50—15"	High Floation

Tire pressure is from 7 to 10 psi.

NOTE

Tires are overinflated for shipment. Reduce tire pressure to 7 to 10 psi before using.

One hundred pounds (two 50 pound weights) can be attached to the rear wheels to increase rear traction for attachments such as the plow, snow blade, snow blower and rotary tiller.

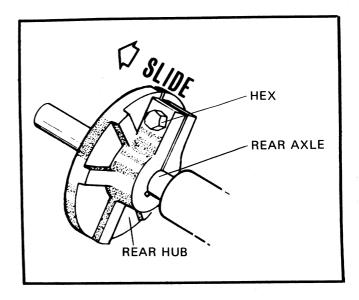


FIGURE 14. REAR HUBS

HOOD

Hood pivoted at the front for easy access to engine and clutch. To open, release latches on each side of the hood. See Page 3.

AMMETER

The ammeter registers the rate of battery charge or discharge. The ammeter should register on the plus (+) side when the engine is running in the "Fast" position until the battery is completely charged. With a fully charged battery or with the engine idling the ammeter will not show a charge. See Figure 1.)

STEERING ASSEMBLY

Segmen't and pinion with 6:1 ratio for easy steering. Automotive type adjustable tie rods for toe-in adjustment. Cast iron pivoted front end.

SEAT

The seat is adjustable forward or backward by loosening the nut under the seat.

REAR WHEEL ADJUSTMENT

Each rear wheel is adjustable out 2¾ inches on the axle. See Figure 14.

NOTE

Do not over extend the hubs.

OPERATING INSTRUCTIONS

STARTING YOUR ENGINE

To get the feel of your tractor, operate it in a large open space until you become familiar with the controls.

- Be sure you have read the manual to acquaint yourself with the controls.
- 2. Fill engine with oil and gasoline as outlined on page 6 of this manual.
- 3. Open fuel shut-off valve located under the gasoline tank. See Figure 15.

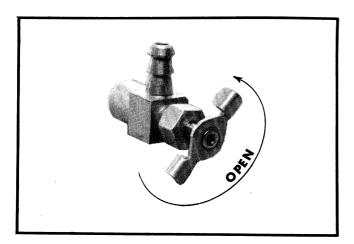


FIGURE 15. FUEL SHUT OFF VALVE

- 4. Attach the spark plug wire.
- Place the Parking Brake in the START/PARK position. See Figure 10.
- Be sure the Control Lever is in the NEUTRAL (N) position. See Figure 10.
- 7. Place the PTO Lever in the OFF position. See Figure 13.

NOTE

The engine will not start unless the PTO Lever is in the OFF position.

8. Place the Axle Range Lever in either the HIGH or LOW range.

- 9. Pull the choke knob all the way out.
- Place the throttle control lever halfway between FAST and SLOW.
- 11. Turn the ignition key to the right to engage the starter. When the engine starts, move the choke knob in half way. After the engine warms up, push the choke knob in gradually until completely in.

NOTE

When the engine is hot, the choke may not be needed to start the engine.

CAUTION

Do NOT run starter for more than 30 seconds at a time. If engine does not start after several trys, place throttle control in FAST position, wait several minutes and try again without moving the throttle lever from the FAST position.

STOPPING YOUR ENGINE

To stop the engine, turn the ignition key to the left.

WARNING

Never leave the ignition key in the tractor when not in use to prevent accidental starting.

Remove the spark plug wire from the spark plug when tractor is not in use to prevent accidental starting.

OPERATING THE TRACTOR

1. Place the throttle control in the FAST position.

NOTE

The engine should be run in the FAST position to obtain the maximum efficiency from your tractor.

- While holding the brake pedal down with your right foot, move the parking brake into the DRIVE position.
- 3. Release the brake and move the control lever into either the FORWARD (F) or REVERSE (R) position.

NOTE

To increase rear wheel torque (pulling power) move control lever towards the NEUTRAL position. The tractor responds similar to shifting to a lower gear with a gear type transmission.

The control lever can be used for dynamic braking (to hold back the unit) when going down hill or when using rotary tiller by moving the lever towards NEUTRAL position. Additional braking can be obtained by moving control lever gradually into the direction opposite of your direction of travel.

MAINTENANCE-

HYDROSTATIC

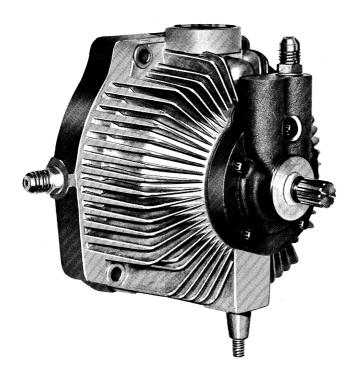


FIGURE 16. HYDROSTATIC

OIL LEVEL — The oil level should be checked after every eight (8) hours of operation.

NOTE: CLEAN THE AREA AROUND THE OIL FILL CLEAN.

TYPE OIL—Use Type F Automatic Transmission oil. Capacity five (5) quarts.

NOTE

Only check the oil level when the transmission is cold.

See the Lubrication Section of this manual on page 17 for instructions on how to check the hydrostatic oil level.

OIL FILTER—A replaceable oil filter is located under the left hand side of the frame.

It can be removed by turning it counter-clockwise by hand. Use Fram filter number PH-16 or order through your dealer under part number 727-162.

OIL FILTER CHANGING:

Homeowners—once a year or 200 operating hours. Industrial or Commercial—once every two months.

COOLING

Proper fan cooling is essential to both performance and life of the transmission. The transaxle exterior should be free of dirt, oil and grass, particularly the finned area behind the fan.

TROUBLESHOOTING

NOTE

Normal repairs, such as replacing hoses, fittings, lift valves, etc., can be repaired the same as normal hydraulic systems.

After carefully checking the tractor, using the following troubleshooting section of this manual, it is determined that the hydrostatic is defective, order a new unit which will be charged to you. Return the defective unit. It will be tested at the factory to verify its failure. If the unit is proved to be defective, credit for the returned unit will be issued.

To perform a temporary power check, carefully "square off" or align both front wheels against a solid wall. With both front tires firmly against this wall place the throttle control in the FAST position and gradually move the Control Lever forward slowly until the tires spin.

This is only a temporary procedure to aid in quickly checking out general engine and axle performance. However, a few tries are usually adequate to allow an experienced mechanic to observe general engine performance, such as engine miss, carburetor adjustment, etc.

If the engine performance appears to be normal, a thorough inspection should be made of the transmission, axle range selector lever, input drive line and control linkage components.

Proceed as follows:

AXLE—Determine if axle is in satisfactory working condition. Determine if range selector is in full engaged position. (HIGH or LOW range.)

CONTROL LINKAGES—Adjust and secure linkages leading from transmission to control lever. Replace worn parts to minimize free movement of linkages. Do not overstroke. The maximum movement of the control linkage in either direction is set at the factory. Any modifications to overstroke the control linkage will eventually result in permanent damage to the transmission.

If the oil level in the reservoir is below normal level, inspect the entire transmission and axle for oil leaks and isolate.

CAUTION

If inspection is made while the tractor is blocked up and the engine is running, BEWARE OF THE SPINNING FAN.

LOSS OF POWER OUTPUT

- 1) Input power supply inadequate
- 2) Control linkages out of adjustment

- 3) Oil level in reservoir below normal continuously (see loss of oil paragraph)
- 4) Intake oil line fittings loose (at axle and at charge pump intake)
- 5) Output pinion gear defective or missing
- 6) Axle—defective range selector lever not properly engaged (high or low range)
- 7) Transmission—defective

FRANSMISSION OVERHEATING

- 1) Finned area of transmission clogged with grass and dirt
- 2) Defective cooling fan
 - a) Fan blade missing
 - b) Loose fan
 - c) Improper fan blade pitch angle (due to damage)
- 3) Oil level in rear axle below normal
- 4) Working loads beyond capabilities of transmission (improper selection of axle range)
- 5) Transmission defective

LOSS OF OIL (ISOLATE)

- 1) Loose oil lines or defective oil lines
- 2) Loose oil filter
- 3) Input shaft oil seal (oil leak visible)
- 4) Control shaft oil seal (oil leak visible)
- 5) Defective or missing "O" ring on oil inlet adapter of transmission (oil leak visible)
- 7) Leakng lift valve
- 8) Leaking lift cylinder
- 9) Loose hydraulic fittings

AUXILIARY LIFT VALVE AND CYLINDER WILL NOT LIFT OR HOLD

- 1) Defective or leaking lift valve
- 2) Leaking cylinder
- 3) Defective hydraulic hoses
- 4) Loose hydraulic fittings

one sure to remove the plastice
plus on the near of the hydroctate
unit if it is replaced

CONTROL LEVER ADJUSTMENT

If the tractor has a tendency to creep when the control lever is in neutral (N), an adjustment should be made. See Figure 17.

- Step 1. Loosen the four jam nuts on the control rod and back them off about ¼ in. on each side of the ferrule.
- Step 2. Depress the brake pedal and pull the parking brake into the START/PARK position.
- Step 3. Be sure the control lever is in the neutral posi-
- Step 4. Tighten the four jam nuts and test the tractor.

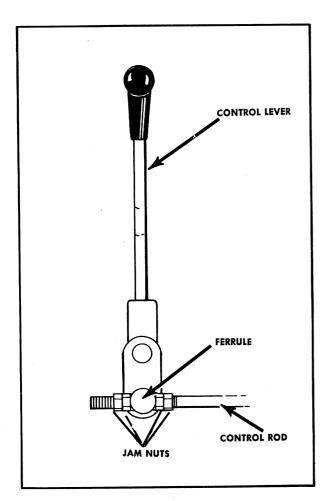


FIGURE 17. CONTROL LEVER ADJUSTMENT

REAR PTO BELT REMOVAL

- Step 1. Place the PTO Lever in the OFF position. See Figure 13.
- Step 2. Remove the lower belt guard. See Figure 18.
- Step 3. Loosen the set screw in the universal joint where it attaches to the crankshaft of the engine.

- Step 4. Drive out the roll pin in the universal joint.
- Step 5. Slide the universal joint back towards the rear of the tractor.
- Step 6. Remove the PTO belts from the two pulleys and idler.
- Step 7. Reassemble with new belts.

NOTE

Always replace with matched belts.

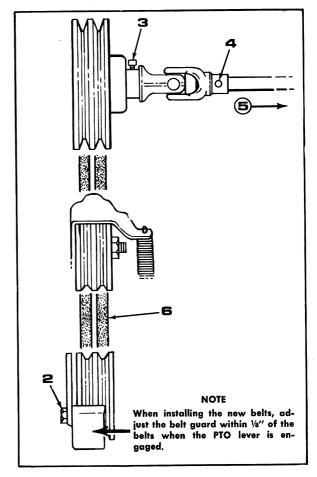


FIGURE 18. PTO BELT REMOVE

REAR POWER TAKE OFF ADJUSTMENT

If the PTO creeps when it is in the disengaged position the belt should be adjusted. To adjust:

- Step 1. Set the engagement lever in the ENGAGED position.
- Step 2. Remove the cotter-pin on the PTO adjusting rod.
- Step 3. Remove the rod from the bracket and unscrew it 3 complete turns and insert back into the bracket.
- Step 4. Replace the cotter-pin. See Figure 19.

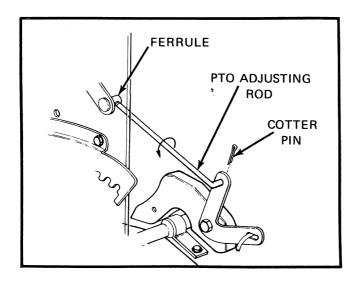


FIGURE 19. REAR PTO ADJUSTMENT

TIE ROD ADJUSTMENT (TOE-IN)

The front wheels should be approximately parallel. See Figure 20.

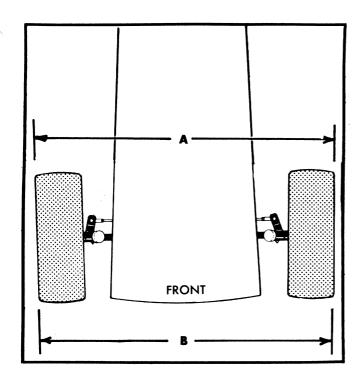


FIGURE 20. TOE-IN ADJUSTMENT

To adjust the toe-in, loosen the hex jam nut, remove the elastic locknut, lift the tie rod end out of the hole in the steering arm and screw the tie-rod end in or out to make your adjustment. See Figure 21.

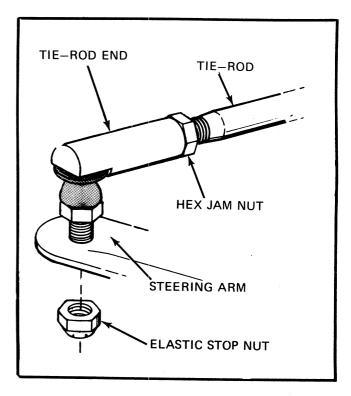


FIGURE 21. TIE ROD END

Use a tape measure or a yard stick and measure the distance A and B on the front wheels.

The difference between A and B should be less than 1/8 of an inch.

BRAKE ADJUSTMENT

Step 1. With the Clutch-Brake Pedal released, the pins on the disc brake should be in the bottom of the "V" on the cam arm as shown in Figure 22.

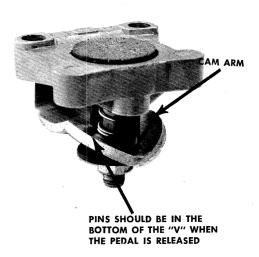


FIGURE 22. PEDAL ADJUSTMENT

Step 2. Adjust the pedal adjustment nut in Figure 23 if necessary.

NOTE

Once the pedal adjustment is made it is not necessary to adjust it every time you adjust the brake.

PEDAL ADJUSTMENT NUT

CASTLE NUT

FIGURE 23. BRAKE ADJUSTMENT

- Step 3. Remove the cotter pin from the castle nut. See Figure 23.
- Step 4. Tighten the castle nut ¼ turn and test the brakes. Repeat if necessary.

BATTERY CARE

BATTERY FAILURE—Many times new batteries are returned for charging within a few days or a week after sale. Before returning the battery to the dealer who sold you the tractor, make these following checks:

- 1. Was the battery fully charged when installed? The dry-pack battery should have been placed on a charger and the specific gravity of the battery should read 1.265 to 1.275 before it was installed in the tractor.
- 2. Were the battery terminals clean, greased and properly tightened when the battery was installed?

 Batteries are usually involved in ANY starting failure, however, insufficient hours of driving, worn cables, trouble in the electrical system, corroded connections, slipping drive belt can cause a battery to become discharged without the battery being a fault.

SERVICING YOUR BATTERY

It is alright to use drinking water in your battery, excluding mineral water.

Adding water to a battery cell will lower the specific gravity of the electrolyte. Water should not be added unless the tractor is going to be run immediately during freezing weather.

Maintain electrolyte level in the battery to the level indicated on the top of the battery.

Keep the terminals clean and coated with grease.

BATTERY STORAGE

If your tractor is to be stored during an off-season, the battery should be removed from the tractor, placed in a charger until the specific gravity reads 1.265 to 1.275 and stored at approximately 72°F. Batteries should not be placed directly on cement as this will drain the battery. Recharge to bring the specific gravity to normal before placing it in the tractor after storage.

BATTERY REPLACEMENT

Your battery is a standard automotive type battery and replacements can be purchased locally through your local dealer under part number 725-130.

SPECIFICATIONS

45 Amp. Hours at 20 hours. 9 plates per cell. Splash Proof Vents Round automotive type terminals. Size: 9 X 6¾ X 7½ inches.

NOTE

Size may vary slightly between different makes of batteries. Be sure it will fit in the tractor battery case.

Your tractor has been engineered to give you years of trouble-free service, however, by following these simple lubrication procedures, you can greatly extend the life of your tractor. (Refer to Figure 27)

1 ENGINE LUBRICATION

DO NOT MIX OIL WITH GASOLINE

OIL RECOMMENDATIONS

WINTER (Below 40° F.)

SUMMER (Above 40° F.)

Use SAE 5W-20

Use SAE 30

Any high quality detergent oil having the American Petroleum Institute classification "For Service MS" can be used in your Briggs & Stratton engine. Detergent oils keep the engine cleaner and retard the formation of gum and varnish deposits.

Check before starting and after every 5 hours of operation. BE SURE OIL LEVEL IS MAINTAINED.

Change oil after first 5 hours of operation. Thereafter change oil every 25 hours of operation. Remove the oil drain plug. Drain oil while engine is warm. Remove oil filler cap or plug and refill with new oil. Replace oil filler cap or plug. Add oil regularly after each 5 hours of operation.

The above oil recommendations are the result of extensive testing. No special additives should be used.

2 HYDROSTATIC

The hydrostatic oil level is checked by the dipstick located on the rear axle. To check the oil level, remove the tool box (see Figure 24) and remove the square head plug that has the dipstick attached to it (see Figure 25).

NOTE: CLEAN THE AREA AROUND THE OIL FILL CLEAN.

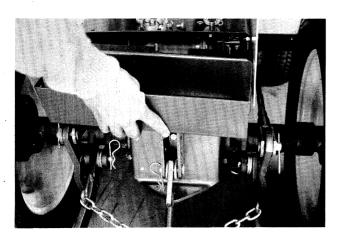


FIGURE 24, TOOL BOX

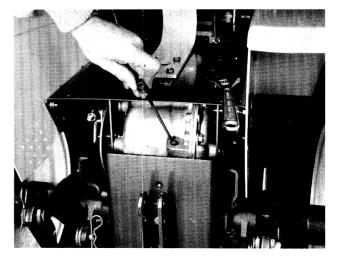


FIGURE 25. OIL DIPSTICK

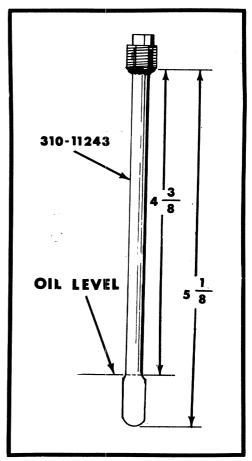


FIGURE 26. OIL DIPSTICK

The oil level should be maintained between the oil level mark and the bottom of the dipstick. See Figure 26.

OIL LEVEL — The oil level should be checked after every eight (8) hours of operation. Change oil every 200 hours or once a season.

TYPE OIL—Use Type F Automatic Transmission oil. Capacity five (5) quarts.

NOTE

Only check the oil level when the transmission is cold.

The following grease fittings should be lubricated every 25 hours with an automotive multi-purpose grease:

3 POWER TAKE OFF (REAR)

1 fitting—center of tractor

4 DECK PIVOT BAR

2 fittings—one each side of the tractor

5 STEERING GEAR

1 fitting-center of tractor

6 AXLE PIVOT

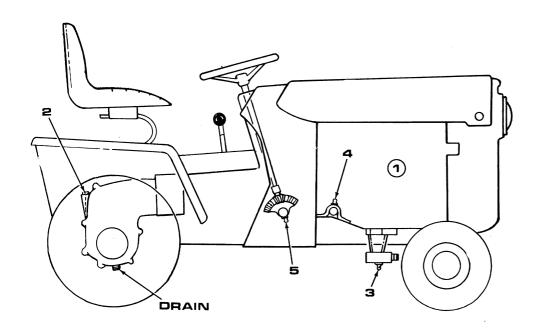
1 fitting—center of tractor

7 KING PIN

2 fittings—one each side of the tractor

8 WHEEL BEARINGS

2 fittings—one each side of the tractor



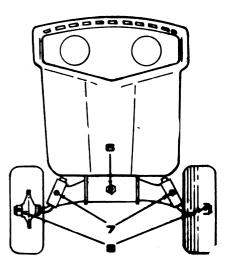
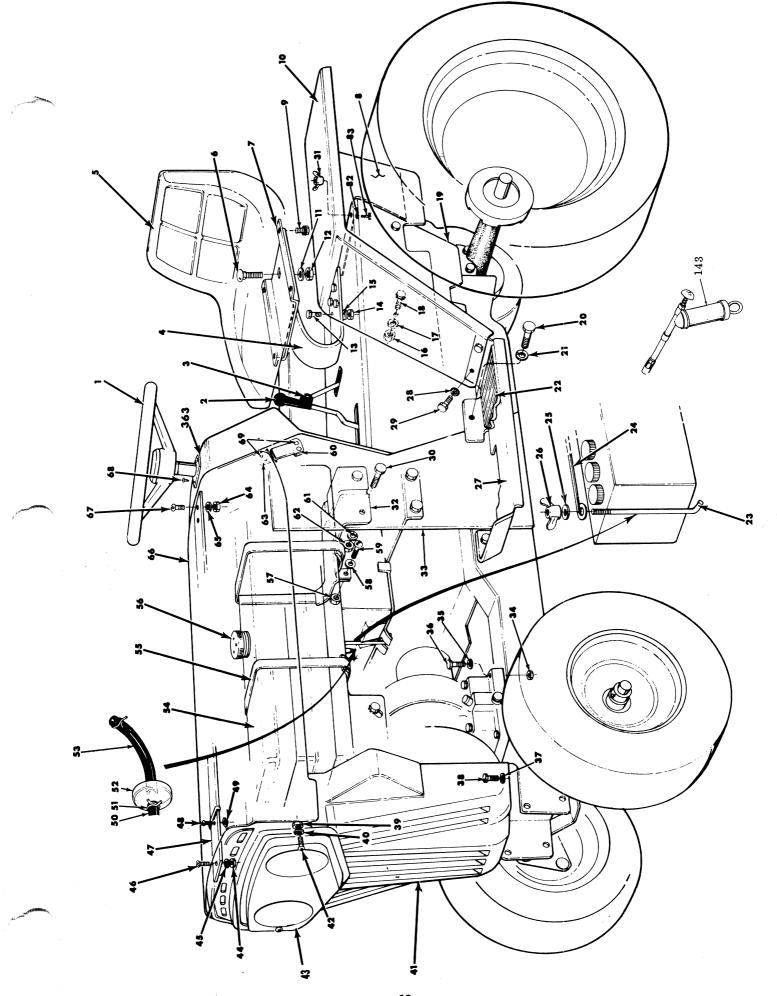
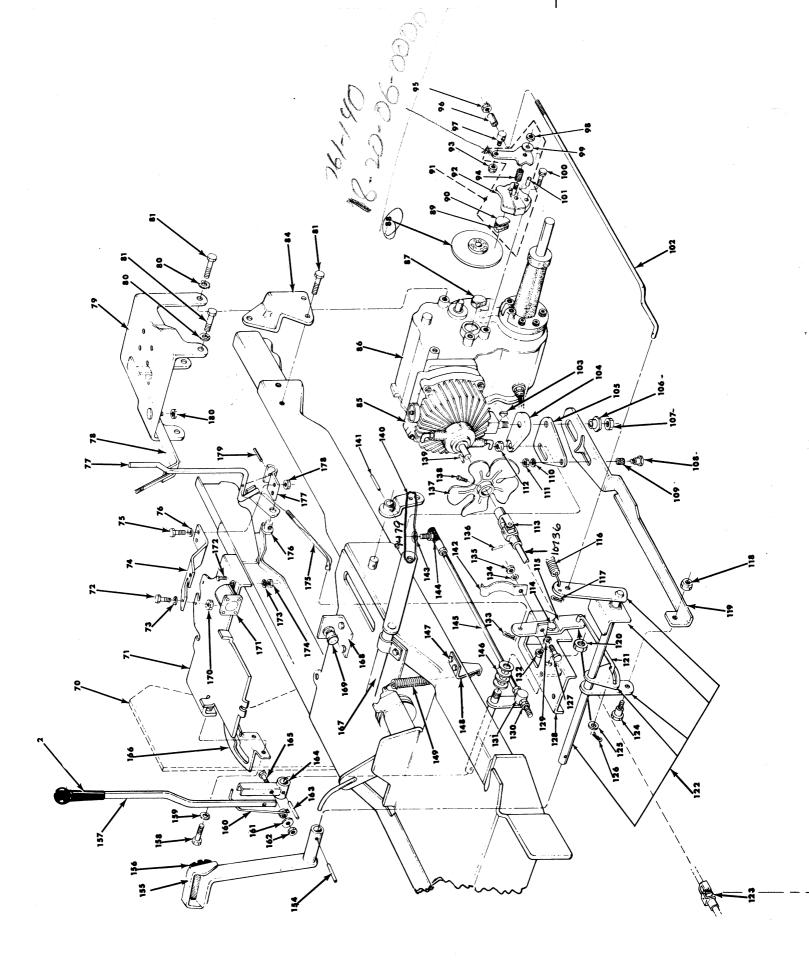
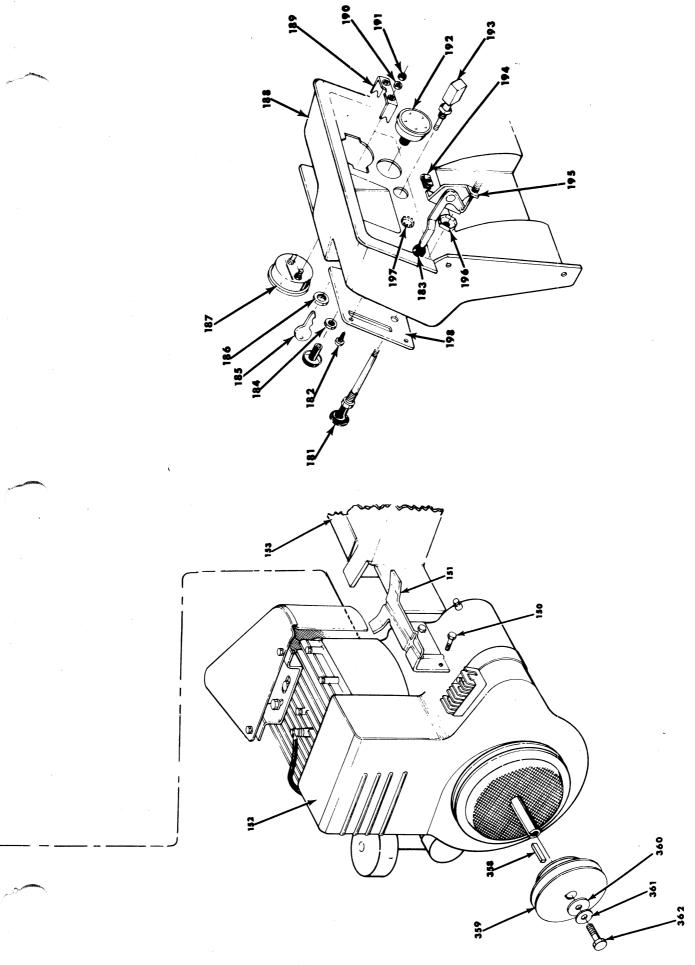
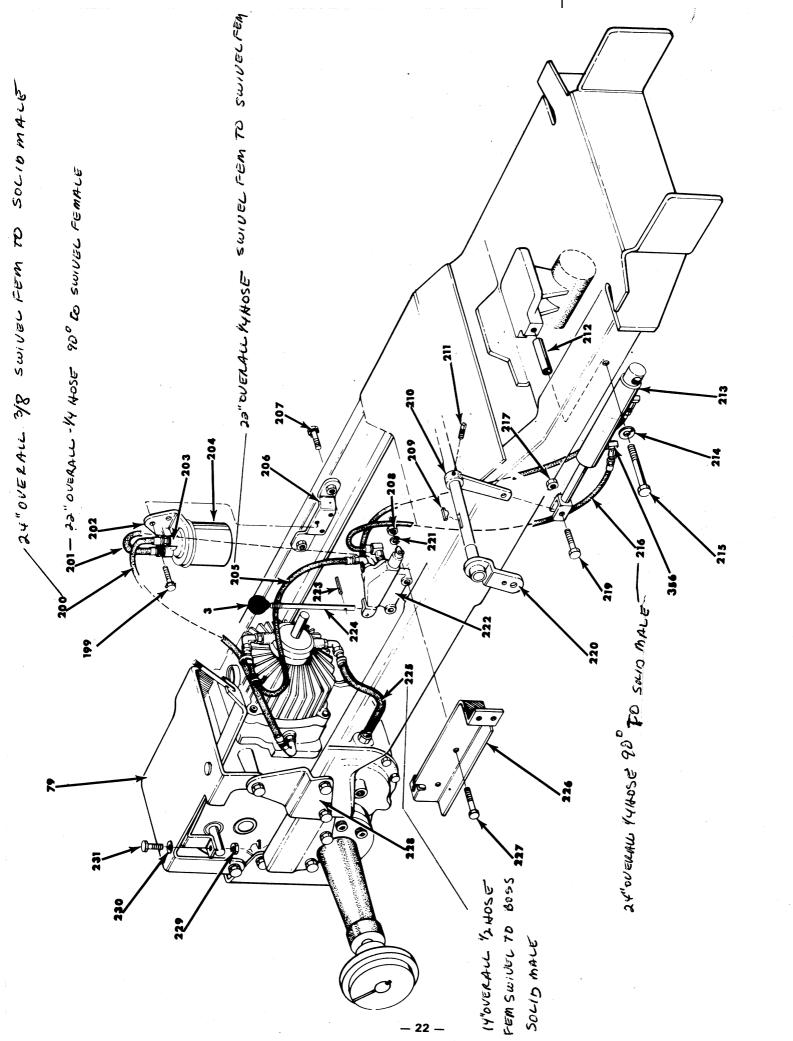


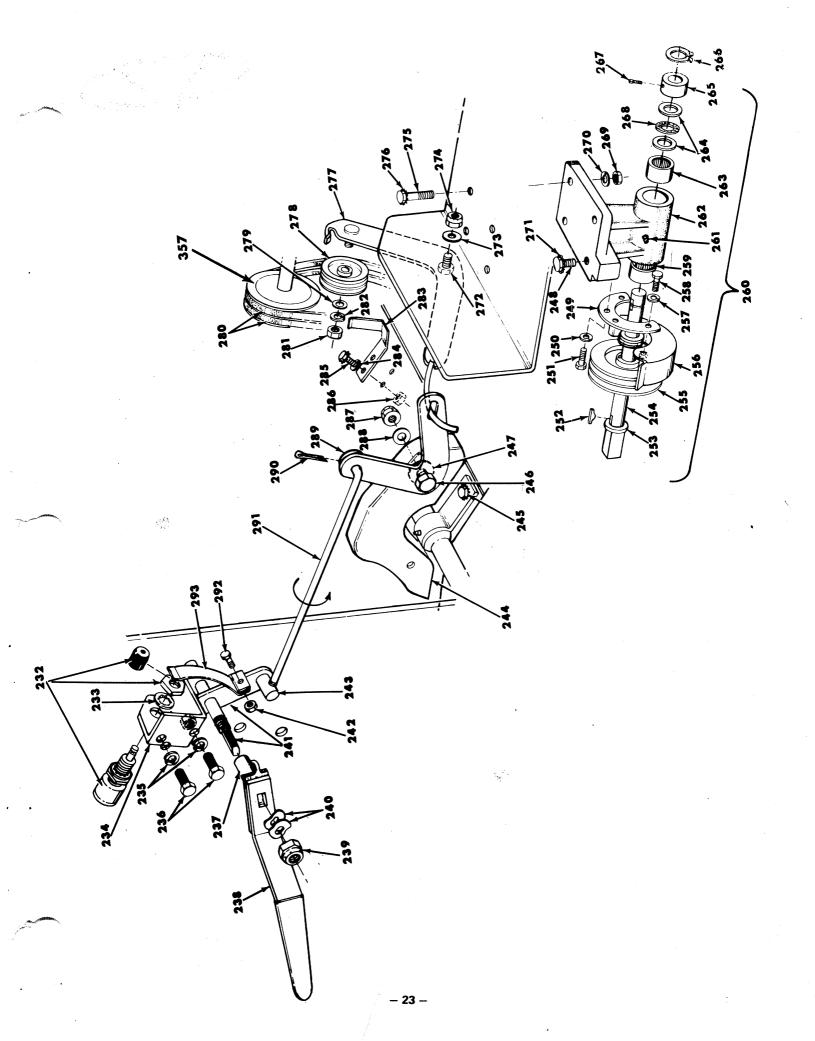
FIGURE 27. LUBRICATION CHART

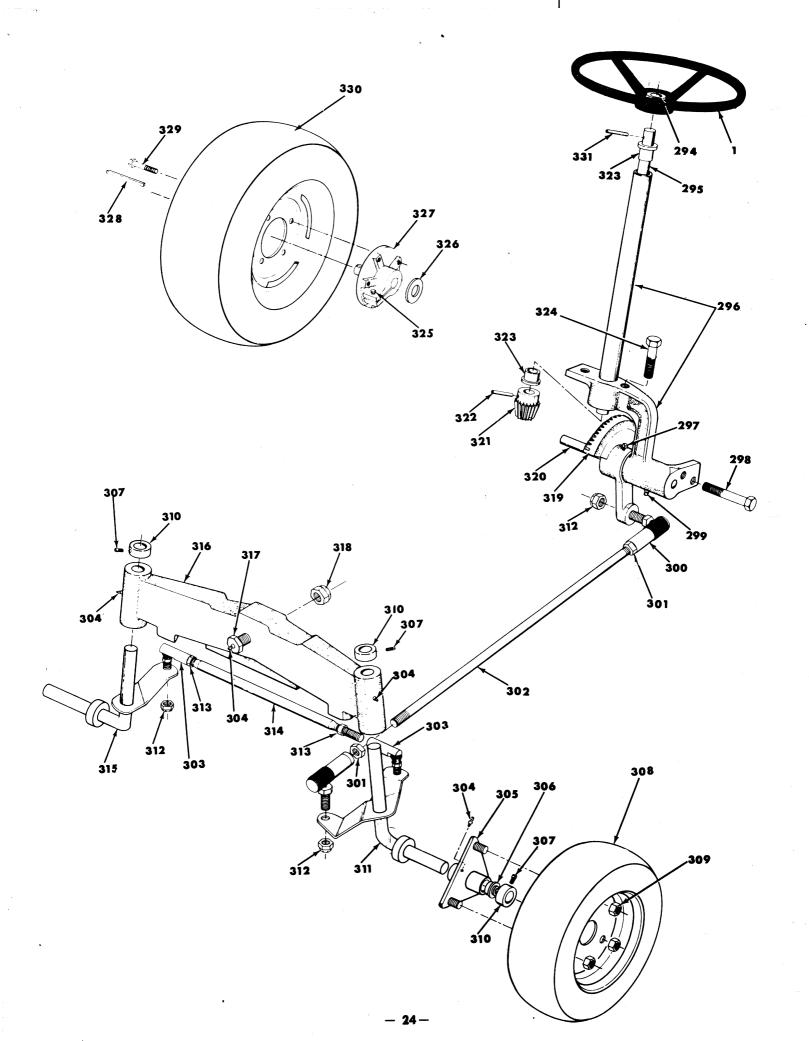


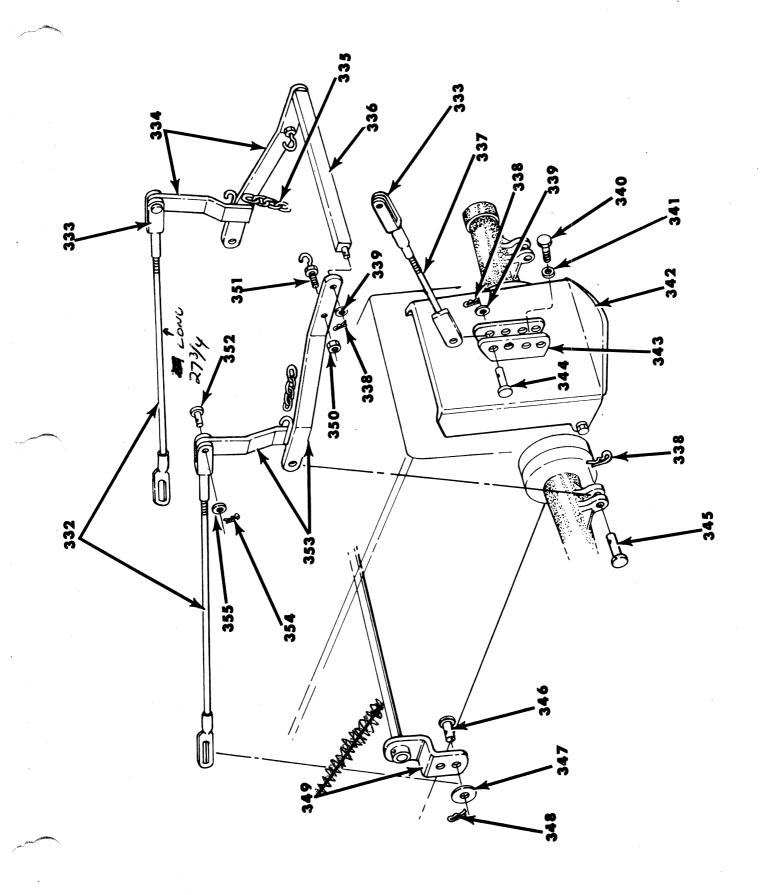












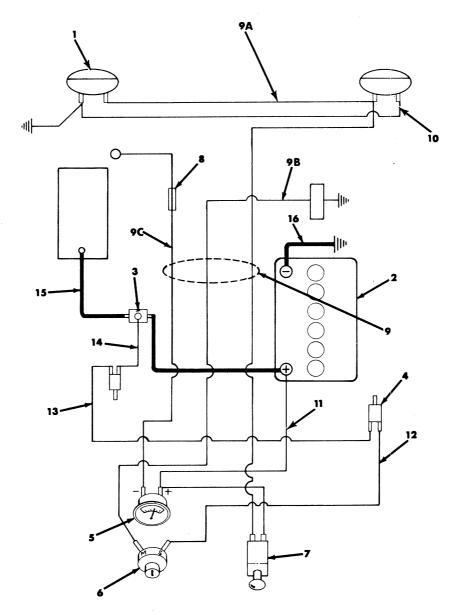
Ref.	Part		Ref.	Part	
No.	No.	Description	No.	No.	Description
	702.050	Changing William	70	420 10710	0116.1
1 2	723-250 720-143	Steering Wheel Grip	78	438-10713	Shift Lever Assembly
3	722-116	Gear Shift Knob	79 80	438-10675 736-114	Seat Bracket Assembly
4	723-146	Seat Spring	81		Internal Lockwasher ½" Scr.*
5	757-203	Seat	82	710-49#3	Hex Hd. Cap Scr. ½-13 x 1" Lg.*
6	710-385	Carriage Bolt ½-13 x 1" Lg.	83	736-222	External Lockwasher 1/4" Scr.*
7	348-10807	Seat Bracket	84	438-10678	Hex Hd. Cap Scr. ¼-20 x ½" Lg.*
8	438-10927	Tool Tray Assembly	85	717-168	Axle Support—L.H. Hydrostatic Unit—Complete
9	710-209	Sems Hex Hd. Cap Scr. 38-16 x 58" Lg.	86	/ / /	Transaxle—Complete
10	312-10739	Fender Assembly—L. H.		15-1154-0163	Friction Pad (Glued In Transaxle Housing)
	312-10740	Fender Assembly—R. H. (Not Shown)	88	723-272	Brake Disc Assembly
11	736-921	Spring Lockwasher ½-Screw		15-1154-0163	
12	712-204	Elastic Stopnut ½-13 Thd.			Back-Up Disc
13	710-198	Sems Hex Hd. Cap Scr. 5/16-18 x ¾" Lg.*	91	723-269	Caliper Disc Brake Assembly
14	712-267	Hex Nut 5/16-18 Thd.*	92	12-1041-0000	Casting Carrier
15	736-170	Spring Lockwasher 5/16 Screw*	93	712-429	Elastic Stop Nut 5/16-18 Thd.
16	710-289	Hex Hd. Cap Screw ¼-20 x ½" Lg.*	94	06-1029-0000	
17	736-329	Spring Lockwasher 1/4" Scr.*	95	712-430	Elastic Stopnut %-16 Thd.
18	712-287	Hex Nut ¼-20 Thd.*	96	750-160	Spacer (Brake Rod)
19	438-10743	Rear Frame Cover	97	711-471	Ferrule (Brake Rod)
20	710-216	Hex Hd. Cap Screw %-16 x ¾" Lg.*	98	02-1011-0000	
21	736-169	Spring Lockwasher % Scr.*	1		Int. Hair Pin
22	723-215	Foot Pad		03-1030-0000	
23	711-284	Battery Hold Down Stud	100	710-216	Hex Hd. Cap Scr. %-16 x ¾" Lg.*
24 25	711-287 736-173	Battery Hold Down Rod		05-1033-0000	
26	712-109	Flat Washer	102	711-475	Brake Rod
27	438-10745	Wing Nut ¼-20 Thd.* Foot Pad Assembly—L.H.	103	714-131	Hi Pro Key #504
27	438-10744	Foot Pad Assembly—R.H. (Not Shown)	104	438-10772	Control Lever
28	736-222	External Lockwasher 1/4" Scr.*	105	438-10712	Control Adjustment Plate
29	712-287	Hex Nut ¼-20 Thd.*	106	711-473	Slide Nut
30	710-216	Hex Hd. Cap Screw %-16 x ¾" Lg.*	107	712-375	Center Locknut %-16 Thd.
31	712-109	Wing Nut 1/4-20 Thd.*	108	710-491	Shoulder Bolt 5/16 Dia. x ½" Lg.
32	438-10726	Gas Tank Bracket—Rear	109	741-154	Needle Bearing
33	438-10685	Side Plate—L.H.	110	736-329	Spring Lockwasher ¼" Scr.*
34	712-798	Hex Nut 3-16 Thd.*	111	712-107	Hex Nut 1/4-20 Thd.*
35	736-169	Spring Lockwasher % Scr.*	l l	712-116	Elastic Stop Nut %-24 Thd.*
36	710-347	Hex Hd. Cap Scr. %-16 x 1¾" Lg.*	113	717-171	Universal Joint (Dr. Shaft to Hydrostat)
37	736-169	Spring Lockwasher % Scr.*	114	710-373	Shoulder Bolt—Special
38	710-253	Hex Hd. Cap Scr. %-16 x 1" Lg.*	115	438-10709	Parking Brake Crank
39	712-287	Hex Nut ¼-20 Thd.*	116	732-121	Brake Return Spring
40	736-329	Spring Lockwasher ¼" Scr.*	118	714-101	Int. Hairpin Cotter
41	719-139	Grille		1	Elastic Stopnut 5/16-18 Thd.
42	710-346	Oval Hd. Scr. ¼-20 x 1½" Lg.*	119 120	438-10711 712-923	Control Slide
43	438-9516	Bezel Head Lamp	121	310-10698	Center Locknut %-18 Thd.
44	712-287	Hex Nut 1/4-20 Thd.*	I	1	Parking Brake Rod—Front
45	736-329	Spring Lockwasher ¼" Scr.*	122	438-10727	Brake Shaft Assembly
46	710-350	Counter Sunk Flat Hd. Scr. ¼-20 x 1" Lg.	123	717-170	Universal Joint (Dr. Shaft to Engine)
47	438-9576	Grille Brace	124 125	711-118	Shoulder Bolt—Special Flat Washer
48	710-473	Truss Hd. Mach. Screw #10-24 x ½" Lg.*	125	736-300 714-109	Cotter Pin*
49	712-425	Square Nut #10-24 Thd.*	127	710-289	· ·
50	723-158	Gas Hose ½" O.D. x ¼" I.D. 10½" Lg.	128	438-10699	Sems Hex Hd. Cap Scr. ¼-20 x ½" Lg.* Control Bracket Assembly
51	723-157	Gas Hose Clamp ½" O.D.	129	430-10077	Part of Ref. No. 127
52	723-154	Gas Line Filter	130	712-711	Hex Jam Nut %-24 Thd.
53	723-247	Gas Hose ½" O.D. x ¼" 1.D. 3" Lg.	131	711-471	Ferrule (Speed Control)
54	723-249	Gas Tank	132	712-430	Elastic Stopnut %-16 Thd.
55	348-10852	1	133	714-101	Int. Hair Pin Cotter
56	723-155	Gas Gauge	134	736-329	Spring Lockwasher ¼" Scr.*
57	712-287	Hex Nut ¼-20 Thd.*	135	712-107	Hex Nut 1/4-20 Thd.*
58	736-329	Spring Lockwasher ¼" Scr.*	136	715-114	Spirol Pin ¼" Dia, x 1½" Lg.*
59	710-279	Fillister Hd. Scr. ¼-20 x 1¾"Lg.*	137	310-10695	Fan Assembly
60	723-186	Hood Latch	138	710-356	Sq. Hd. Set Screw 5/16-18 x ½" Lg.*
61 62	736-169 712-798	Spring Lockwasher 36" Scr.*	139	714-388	Hi Pro Key #506
63		Hex Nut %-16 Thd.* Hood Catch	140	438-10716	Lift Arm Assembly
64		Hex Nut 1/4-20 Thd.*	141	715-107	Spirol Pin 5/16 Dia. 1%" Lg.*
65		Spring Lockwasher 1/4" Scr.*	142	310-9521	Height Adjustment Spring
66	1	Hood	143	736-300	Flat Washer*
67		Truss Hd. Machine Scr. ¼-20 x 1½" Lg.*	144	723-156	Tie Rod End
68	1	Truss Hd. Mach. Screw #10-24 x ½" Lg.*	145	710-454	Control Rod
69		Pop Rivet SD 44B5	146	736-116	Washers (4)
70			147	710-198	Sems Hex Hd. Cap Scr. 5/16-18 x ¾" Lg.*
71			148	438-9438	P.T.O. Spring Bracket
72		Hex Hd. Cap Scr. %-16 x 1" Lg.*	149	732-155	Extension Spring
73		Spring Lockwasher % Scr.*	150	710-198	Sems Hex Hd. Cap Scr. 5/16-18 x ¾" Lg
74			151	438-10725	Gas Tank Bracket—Front
75		Hex Hd. Cap Scr. ¼-20 x %''Lg.*	152	-	Engine
76		Spring Lockwasher 1/4" Scr.*	153	438-10893	Frame Assembly—Complete
77	i i		154	715-107	Spirol Pin 5/16" Dia. x 1%" Lg.*
	,		155	438-10714	Brake Pedal Assembly

Ref. No.	Part No.	Description	Ref	1	Description
140.	140.	Description	No	No.	Description
156	305-10614	. 1	23	5 736-329	Spring Lackwasher 14" Scr.*
157		Control Lever	23	6 710-258	
158	710-216	Hex Hd. Cap Scr. %-16 x ¾" Lg.*	23		Sleeve
159 160	736-169 723-231	Spring Lockwasher % Scr.*	23		
161	736-463	Torsion Spring Flat Washer 1/4" Screw*	23		Elastic Stopnut 1/2-13 Thd.*
162	712-324	Elastic Locknut ¼-20 Thd.	240	i	
163	715-107	Spirol Pin 5/16 Dia. x 1%" Lg.*	24		
164	438-10841	Handle Bracket Assembly	24		Hex Center Locknut ¼-20 Thd.* Ferrule
165	710-136	Hex Hd. Cap Scr. ¼-20 x 1¾" Lg.*	24		
166	438-10908	Control Index Bracket	245	1	Sems Hex Hd. Cap Screw 5/16-18 x 3/4" Lg
167	438-9457	Pivot Bar Assembly	246	1	Shoulder Screw %-16 x .625 Dia.
168	438-10710	Switch Bracket	247		Flat Washer
169	725-203	Safety Switch	248		Hex Hd. Cap Screw %-16 x 21/2" Lg.*
170	712-798	Hex Nut %-16 Thd.*	249	438-9496	
171	725-185	Solenoid	250	736-329	Spring Lockwasher ¼" Scr.*
172	710-258	Hex Hd. Cap Scr. ¼-20 x %" Lg.*	251		Hex Hd. Cap Scr. ¼-20 x ½" Lg.*
173	736-329	Spring Lockwasher 1/4" Scr.*	252	1	Key—Hi Pro #606
174	712-287	Hex Nut ¼-20 Thd.*	253	1	Thrust Race
175	711-474	Parking Brake Adjustment Rod	254		P.T.O. Shaft
176 177	711-288 438-10705	Ferrule	255	1	P.T.O. Drive Pulley
178	712-287	The state of the s	256	1	1
179	715-247	Hex Nut ¼-20 Thd.* Spirol Pin 3/16" Dig × 1" La *	257		Spring Lockwasher ¼" Screw*
180	712-107	Spirol Pin 3/16" Dia. x 1" Lg.* Hex Center Lock Nut ¼-20 Thd.	258	1	Hex Head Cap Screw ¼-20 x ½" Lg.*
181	746-129	Choke Control	259		Needle Bearing 34" I.D. x 1.187 O.D.
182	710-351	Phil. Hd. Screw #10-Type Z-½" Lg.*	260 261		P.T.O. Shaft Assembly—Complete
83	722-118	Throttle Control Knob	262	737-109	Grease Fitting 1/4-28 x 11/16 Thd.
184		Part of Ref. No. 193	263	741-123	P.T.O. Shaft Housing
85	725-201	Starter Key	264	741-123	Needle Bearing ¾" I.D. x 1.187 O.D. Thrust Race
86	· -	Part of Ref. No. 192	265	711-139	Collar
	Ī		266	716-110	Snap Ring
87	725-119	Ammeter	267	710-356	Sq. Hd. Cap Pt. Set Screw 5/16-18 x ½" Lg.
188	305-10850	Dash Panel	268	741-150	Thrust Bearing
89	-	Part of Ref. No. 187	269	712-798	Hex Nut %-16 Thd.*
90	_	Part of Ref. No. 187	270	736-169	Spring Lockwasher % Scr.*
91	_	Part of Ref. No. 187	271	736-148	External Lockwasher 3 Scr.*
192	725-200	Starter Switch with Key	272	710-334	Shoulder Screw %-16 x .625 Dia.
193	725-202	Light Switch	273	736-300	Flat Washer*
194	712-526	Speed Nut	274	712-430	Elastic Stop Nut %-16 Thd.*
195	746-130	Throttle Control	275	710-344	Hex Hd. Cap Screw %-16 x 1½" Lg.*
196	704 110	Part of Ref. No. 181	276	736-148	External Lockwasher % Screw*
97 98	726-119 310-9528	Button	277 278	438-10489 756-127	I Procket Waselilbly
99	710-322	Bezel—Instrument Panel Sems Hex Hd. Cap Scr. 5/16-18 x 1" Lg.*	279	736-300	Idler P.T.O.
200	727-165	Filter Return Hose	280	754-123	Flat Washer*
01	727-169	Valve to Filter Hose 14HOSE 900 to Swill-F.		712-798	P.T.O. Belt 33" Lg.† Hex Nut %-16 Thd.* .
02	727-163	Filter Base	282	736-169	Spring Lockwasher % Scr.*
03	727-173	Pipe Adapter (9/16-18 JIC to ½-14 NPTE)	283	438-9476	P.T.O. Belt Trapout
04	727-162	Fram—Filter Assembly	284	736-329	Spring Lockwasher 1/4 Screw*
05	727-167	Pump to Valve Hose	285	710-211	Sems Hex Hd. Cap Screw ¼-20 x ¾" Lg.
06	438-10707	Filter Bracket Assembly	286	712-107	nex Locknut ¼-20 Thd.*
07	710-198	Sems Hex Hd. Cap Scr. 5/16-18 x ¾" Lg.*	287	712-430	Elastic Stopnut 38-16 Thd.*
80	712-287	Hex Nut ¼-20 Thd.*	288	736-300	Flat Washer*
09	714-134	Hi Pro Key #808*	289 290	736-264	Flat Washer 5/16 Scr.*
10	438-9553	Hdy. Lift Lever Assembly	291	714-474	Cotter Pin ¼ Dia. x ¾" La.*
11	710-356	Sq. Hd. Set Screw 5/16-18 x ½" Lg.*	292	711-293	P.T.O. Clutch Rod
12	750-157	Cylinder Spacer	292	710-258	Hex Hd, Cap Screw ¼-20 x 5%" Lg.
13	727-159	Hyd. Cylinder	294	310-9521 723-251	Spring
14 15	736-921 710-496	Spring Lockwasher 1/2" Scr.*	295	310-9535	Steering Wheel Cap
16	710-498 727-168	Hex Hd. Cap Scr. ½-13 x 4½"Lg. *	296	438-10851	Steering Rod
7	712-384	Valve to Cylinder Hose Hex Center Locknut ½-13 Thd.*	297	710-349	Steering Tube Segment Assembly
9	710-488	Hex Hd. Cap Scr. ½-13 x 1½" Lg.*	298	710-253	Sq. Hd. Set Screw 5/16-18 x 3/4" Lg.* Hex Hd. Cap Screw %-16 x 1" Lg.*
o	438-10724	Lift Arm Shaft Assembly	299	737-479	Grease Fitting
i	736-329	Spring Lockwasher ¼" Scr.*	300	723-179	Drag Link Ends
2	727-160	Hdy, Valve	301	712-922	Hex Nut 1/2-20 Thd.**
23	715-122	Spirol Pin 1/8" Dia, x 1/2" Lg.*	302	711-455	Drag Link
24	310-10738	Lift Valve Handle	303	723-156	Tie Rod Ends
25	727-166	Axle to Pump Hose	304	737-108	Grease Fitting
26	438-10731	Lift Valve Assembly	305	312-10457	Front Wheel Hub Assembly
27	710-106	Hex Hd. Cap Scr. ¼-20 x 1¼" Lg.*	306	741-141	Ball Bearing
8	438-10677	Axle Support—R.H.	307	710-356	Sq. Hd. Set Screw 5/16-18 x 1/2" 10 *
9	712-107	Hex Center Locknut 1/4-20 Thd.*	308	503-9262	rront Wheel Assembly— Complete**
30	736-463	Flat Washer ¼" Scr.*	309	712-193	Lug Nut %-24 Thd.
31		Hex Hd. Cap Scr. ¼-20 x 1¼" Lg.*	310	748-386	Axle Collar
2		Safety Switch	311	438-10718	Front Axle Assembly—L.H.
~a I	736-225	Internal Lockwasher % Scr.*		712-200	Elastic Stop Nut 1/2-20 Thd.*
3		P.T.O. Handle Shaft Support Assembly	313	712-711	Hex Jam Nut %-24 Thd.*

PARTS LIST FOR TRACTOR (CONTINUED)

REF. NO.	PART NO.	DESCRIPTION
340	710-216	Hex Hd. Cap Screw 3/8-16 x 3/4" Lg.*
341	736-169	Spring Lockwasher % Scr.*
342	438-10679	Hitch Plate Assembly
343	438-10993	Upper Hitch Bracket
344	711-174	Clevis Pin
345	711-299	Axle Clevis Pin 5% Dia.
346	711-308	Clevis Pin
347	736-179	Flat Washer 17/32 I.D.
348	714-109	Hair Pin Cotter
349	438-10716	Lift Arm Assembly
350	712-342	Hex Jam Nut %-16 Thd.
351	310-10988	Hitch Chain Hook ¾ Thd.
352	711-225	Clevis Pin
353	438-10985	Draft Bar Assembly—L.H.
354	714-117	Hair Pin Cotter % Pin.
355	310-7387	Flat Washer
356	727-174	90° Adapter (Cylinder Parts)
357	438-10771	P.T.O. Engine Sheave
358	714-119	Square Key ¼ x ¾" Lg.*
359	719-137	Front Sheave
360	736-133	Flat Washer*
361	736-171	Spring Lockwasher 7/16" Scr.*
362	710-348	Hex Hd, Cap Screw 7/16-20 x 3/4" Lg.*
363	438-10706	Steering Tube Hole Cover
364 3 65	721-116 727-143	Gasket—(Shown in Transaxle Diagram) Grease Gun

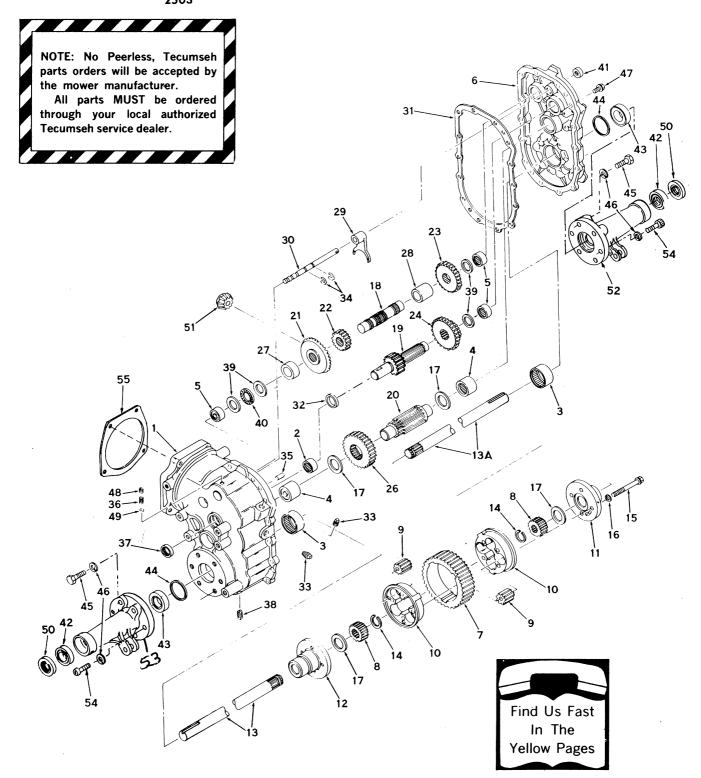
- ** When ordering service parts include all the information on the side wall of the tire such as the size and brand name.
- For faster service obtain standard nuts, bolts and washers locally. If these items cannot be obtained locally, order by part number and size as shown on parts list.
- + Power Take Off belts are matched. Always order in pairs.



PARTS LIST FOR ELECTRICAL SYSTEM

Ref. No.	Part No.	Qty.	Description	
1	725-222	2	Head Light	
2	725-130	1	Battery	
3	725-185	1	Solenoid	
4	725-203	2	Safety Switch	
5	725-119	1	Ammeter	
6	725-200	1	Key Starter Switch	
7	725-202	1	Light Switch	
8	725-215	1	Two Way Connector	
9	725-215	1	Wire Harness	
9A	-	1	Head Light Wire (Part of No. 9)	
9B	-	1	Engine Mag. Wire (Part of No. 9)	
9C	_	1	Alternator Wire (Part of No. 9)	
10	725-204	1	Light Ground Wire	
11	725-214	1	Battery To Solenoid and Battery to Ammeter	
12	725-223	1	Key Switch To Safety Switch	
13	725-223	1	PTO Switch To Drive Switch Wire	
14	725-224	1	Drive Switch To Solenoid Wire	
15	725-221	1	Solenoid To Starter Motor	
16	725-139	1	Battery Ground Wire	

TRANSAXLE PEERLESS 2503



PEERLESS MODEL 2503

Parts and service available through all authorized Tecumseh, Lauson Power Products Service Dealers. Check the "Yellow Pages" of your telephone directory under "Engines—Gasoline."

TRANSAXLE MODEL 2503

	Ref.	1	Description
T	1	770060	Case Assy., Transaxle (Incl. Nos. 2 thru 5)
١	2	780097	Bearing, Needle
1	3	780098	Bearing, Needle
ı	4	780099	Bearing, Needle
	5	780100	Bearing, Needle
	6	772065	Cover Assy., Transaxle (Incl. 3, 4 & 5)
	7	778084	Gear, Ring
ı	8	778085	Gear, Side
	9	778086	Gear, Pinion
	10	786054	Core, Body
	11	774199	Carrier, Differential
1	12	774200	Carrier, Differential
	13	774204	Axle, Left Hand
	13A	774205	Txle, Right Hand
	14	792062	Ring, Snap
l	15	792063	Screw, %-16 x 3% Hex Hd.
	16	792011	Lockwasher, ¾''
l	17	780101	Washer, Thrust
l	18	<i>7</i> 76118	Shaft, Counter
	19	776122	Shaft, Brake
ł	20	776120	Pinion, Output
	21	778087	Gear, Bevel (30 teeth)
	22	778088	Gear, Spur (16 teeth)
	23	778096	Gear, Spur (23 teeth)
	24	778097	Gear, Cluster (20 and 27 teeth)
	26	778098	Gear, Output (37 teeth)
	27	786055	Spacer
	28	786056	Spacer
	29	784195	Fork, Shift
	30	784196	Rod, Shift
	31	788047	Gasket, Case and Cover
	32	780005	Spacer
	33	792010	Plug, Pipe
	34	792064	Ring, Snap
	35	786026	Pin, Dowel
	36 3 <i>7</i>	792003	Spring
		788008	Seal, Oil
	38 39	792019 780045	Plug, Magnetic drain
			Washer, Thrust
	40 41	780012	Bearing, Thrust
	12	788034 780103	Seal, Oil Bearing, Ball
	13	780103 780104	Bearing, Thrust
	14	788048	Seal, Square Cut
	15	792065	Screw, ½-13 x 1½ Hex Hd.
	16	792066	Lockwasher, ½"
	17	792067	Screw, 5/16-18 x 1Thrd. Forming Hex Hd.
	8	792068	Screw, 14-20 x 1/2 Set
4	9	792001	Ball, Steel
5	- 1	788049	Seal, Oil
5	- 1	778093	Pinion, Bevel
5		782039	Housing, Axle
5	1	782040	Housing, Axle
5	- 1	792069	Screw, ½-13 x 1½ Allen Hd. Cap
	5	788050	Gasket

NOTE: No Peerless, Tecumseh parts orders will be accepted by the mower manufacturer.

All parts MUST be ordered through your local authorized Tecumseh service dealer.



PEERLESS MODEL 2503

Parts and service available through all authorized Tecumseh, Lauson Power Products Service Dealers. Check the "Yellow Pages" of your telephone directory under "Engines—Gasoline."