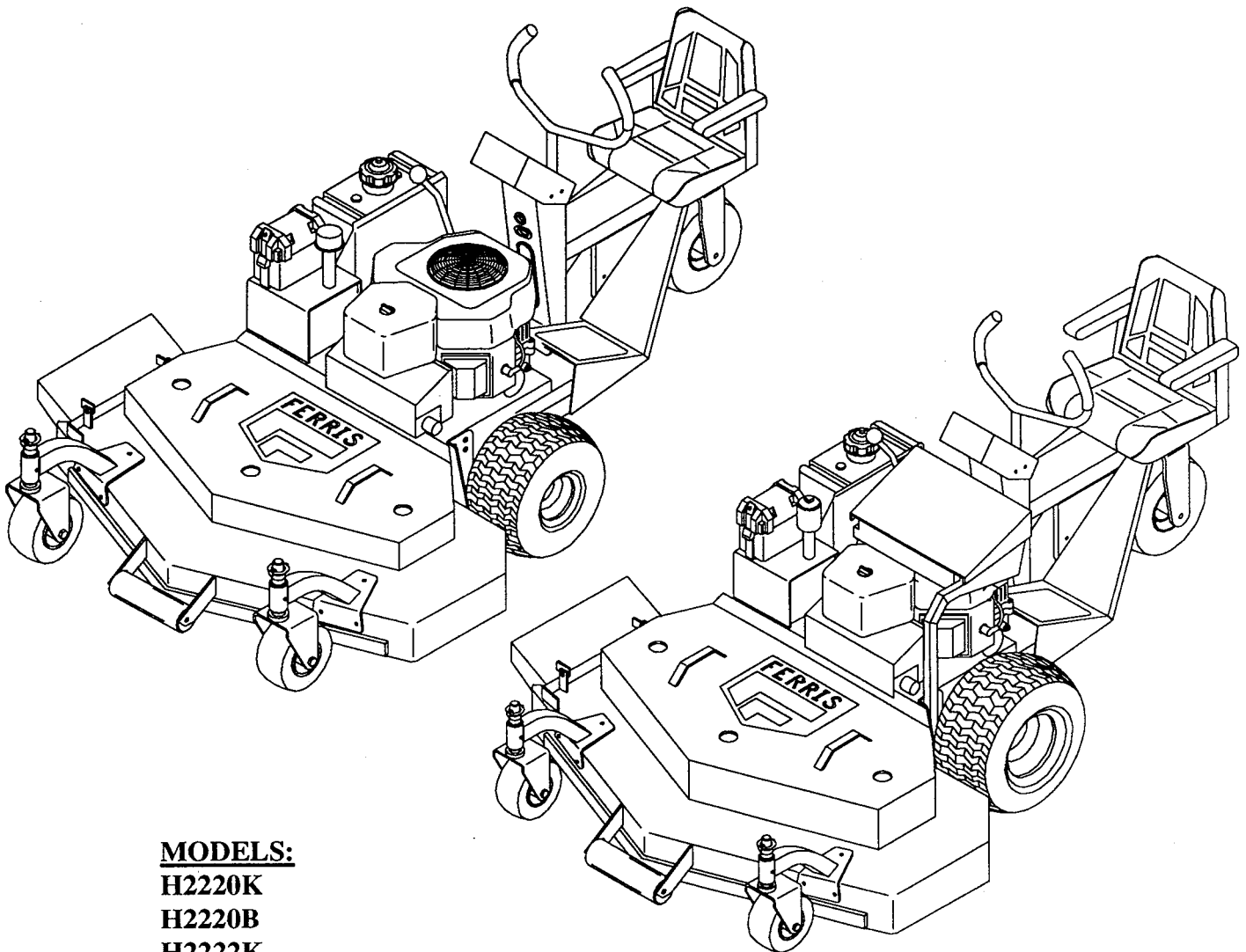


# FERRIS

## OWNER/OPERATOR MANUAL

### *Hydro Drive Rider Commercial Mowers*



**MODELS:**

H2220K

H2220B

H2222K

H3222K

**CUTTER DECKS:**

R52

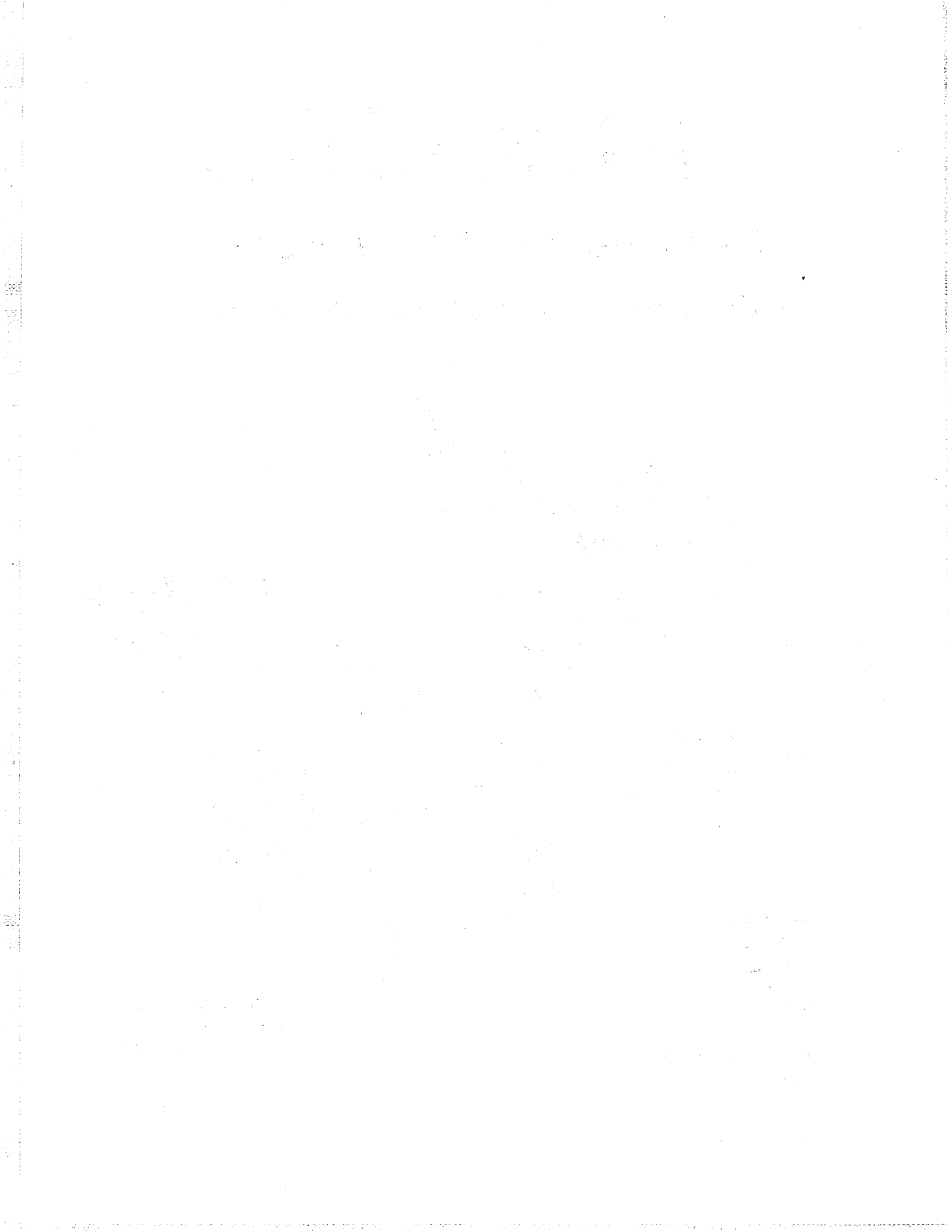
R61

P61

P72

*Ferris Industries, Inc.  
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Munnsville, NY 13409*

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## To the Owner/Operator:

### **Congratulations on the purchase of your new FERRIS Commercial Mower.**

This product has been carefully designed and manufactured to give you a maximum amount of mowability, dependability and trouble-free years of operating.

Like all mechanical products, the useful life and service you obtain from your machine depends, to a large extent, on the way it is maintained and operated. Outlined in this instruction manual you will find safety and service guidelines to keep your mower operating like new for years to come.

We recommend that you read this instruction manual and the enclosed engine manual before operating this unit. Keep this booklet handy for all operators and service technicians.

Throughout this manual, the terms **DANGER**, **WARNING** and **CAUTION** are used in conjunction with the Safety Alert Symbol (a triangle with an exclamation point) to indicate a personal safety hazard. The term **IMPORTANT** is used to indicate that failure to observe the instruction can cause damage to the equipment.



The Safety Alert Symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

#### **DANGER:**

Denotes an extreme intrinsic hazard exists, which would result in high probability of death or irreparable injury if proper precautions are not taken.

#### **WARNING:**


Denotes a hazard exists which can result in injury or death in proper precautions are not taken.

#### **CAUTION:**

Denotes a reminder of safety practices or directs attention to unsafe practices which could result in personal injury if proper precautions are not taken.

#### **IMPORTANT:**

Indicates that failure to observe can cause damage to equipment.

 **CAUTION:** If any safety or control decals are missing, non-legible, or damaged, replace them as soon as possible.

## GENERAL INFORMATION

### USING THIS MANUAL

Illustrations used in this manual were current at the time of printing, but subsequent production changes may cause your machine to vary slightly in detail. **Ferris Industries, Inc.** reserves the right to redesign and change the machine as deemed necessary, without notification. Throughout this manual, references are made to right and left directions. These are determined from the operator's position, facing the direction of forward travel. Blade rotation is "clockwise" as viewed from the top of the cutter deck.

### WARRANTY REGISTRATION

Please complete and sign the warranty registration card. It is necessary to validate your warranty protection. As the new equipment owner, you are expected to see that the card is completed and forwarded to **Ferris Industries, Inc.** at the time of delivery.

**⚠ WARNING:** Any unauthorized modification, alteration, or use of non-approved attachments may present safety hazards that are not presented in this manual. If any such modifications, alterations or attachments are used, it voids all warranties and releases **Ferris Industries, Inc.** from any liability from injury and/or damage arising from subsequent use of this equipment.

**⚠ WARNING:** Some illustrations in this manual show the mower with safety shields removed to provide a better view. The machine should **NEVER** be operated with any safety shields removed.

### MODEL AND SERIAL NUMBER

Model and serial numbers are found on the serial identification plate, located on the front of the trailer column. These numbers are required on the Warranty Registration card. They will also ensure you of the correct service parts if replacement becomes necessary.

### PARTS AND SERVICE

Use original **FERRIS** equipment replacement parts only. These parts are available through your local **FERRIS** equipment dealer. Use of substitute parts could affect the performance and safety of your **FERRIS** mower. To obtain prompt, efficient service, provide the following information when ordering parts:

1. Correct part description and number, as given in the illustrated list supplied within your owner's packet.
2. Correct model number.
3. Correct serial number.

**ALL WARRANTY REPAIR AND SERVICE MUST BE HANDLED THROUGH AN AUTHORIZED FERRIS DEALER.**

## **SAFETY PRECAUTIONS**



Safety is NO accident.....BE ALERT!

This symbol is used to attract your attention to the safety precautions that should be understood by the operator to avoid accidents.

Safety is a primary concern in the design and manufacture of **FERRIS** products and your **FERRIS** commercial mower has been built to the highest standards in the industry. However, a mower is only as safe as the operator. As with any type of power equipment, carelessness or error on the part of the operator can result in injury. Please read and follow these instructions on safe operation and be certain anyone using this lawn mower is familiar with these simple rules.

### **TRAINING**

1. Read this operator's manual and the engine operating instructions carefully. Be thoroughly familiar with the controls and proper use of the equipment.
2. Never allow children to operate this machine.
3. Operators must be instructed in and be capable of safe operation of the equipment and all controls. Do not allow anyone to operate this equipment without proper instruction.
4. Understand the controls. Learn how to stop the engine, transmission and blades in an emergency.
5. No one should operate this unit while intoxicated or taking medication that impairs the senses or reactions.
6. Keep area of operation clear of all persons, especially small children and pets.
7. This machine is not intended for highway use.

### **PREPARATION**



**WARNING:** Always disconnect the spark plug wire and place wire where it cannot contact spark plug to prevent accidental starting when setting up, adjusting or servicing.

1. Thoroughly inspect the area where the equipment is to be used. Remove all stones, sticks and other foreign objects.
2. Do not operate the equipment when barefoot, wearing open-toed sandals or shorts. Always wear hard-toed or safety footwear, eye protection, hearing protection, long sleeve shirts and pants.
3. Check the fuel level before starting. Do not fill the fuel tank indoors, when the engine is running, or while the engine is still hot. Wipe off any spilled gasoline before starting the engine.
4. Mow only in daylight or in good artificial light.
5. Never permit any person other than the operator to ride or board the machine at any time.
6. Before starting the machine, with the key removed from the ignition switch, visually inspect to see the cutter blades, blade bolts and cutter assembly are not worn or damaged. (Replace in sets to preserve balance.)
7. Never attempt to make a caster wheel height adjustment while the engine is running.
8. Before starting the engine, be sure all guards are in place.

## OPERATION

1. Do not change the engine governor settings or over-rev the engine.
2. Do not put hands or feet near or under rotating parts. Keep clear of the discharge opening at all times. Never pick up or carry a mower while it is running.
3. Stop the blades when crossing gravel drives, walks or roads.
4. After striking a foreign object, stop the engine and remove the spark plug wire. Thoroughly inspect the mower for any damage and repair before restarting and operating the machine.
5. If the equipment should start to vibrate abnormally, immediately stop the engine and check for the cause. Vibration is generally a warning of trouble.
6. Stop the engine whenever you leave the mower, before cleaning the cutter deck, when making any repairs or inspections.
7. When cleaning, repairing or inspecting, make sure the blades and all moving parts have stopped. Disconnect the spark plug wire and place the wire where it cannot contact the spark plug to prevent accidental starting.
8. Do not run the engine indoors. They produce deadly carbon monoxide gas.
9. Shut the engine off and wait until the blades have come to a complete stop before unclogging the chute or removing the grass catcher.
10. Mow across the face of slopes, never up and down. Exercise extreme caution when changing direction on slopes. Do not mow excessively steep slopes. (See illustration on pg. 6)
11. Never operate the mower without the proper guards, plates, or other safety protection devices in place.
12. Do not use any attachments unless they are approved by FERRIS.
13. Make sure blade switch is "OFF", parking brake is "ON" and operator is on the seat before attempting to start the engine.
14. Keep operation clear of all persons and never direct discharge of material toward bystanders.
15. Know how to stop the blades and engine quickly in case of an emergency.
16. Never leave key in the ignition switch of unattended equipment.
17. Avoid sudden starts and stops. Decrease speed when turning, especially on slopes.

WHEN YOU SEE THIS SYMBOL



IT MEANS:

**ATTENTION!**

**BECOME ALERT!**

**YOUR SAFETY IS INVOLVED!**

# CONTROLS AND OPERATIONS

**⚠ READ THE SAFETY INSTRUCTIONS.**

## PRE-START

1. Make sure the fuel shut-off valve on the bottom of the fuel tank is "ON". (Handle is VERTICAL)
2. Check oil level in engine.

3. **⚠ WARNING:** Gasoline is extremely flammable. Do not perform this operation indoors, while smoking or near open flame or spark.

Fill fuel tank outdoors with good, clean regular grade unleaded gasoline (87 octane). DO NOT USE HIGH TEST FUEL!

4. Make sure the blade engagement switch is "OFF" and the parking brake is "ON".
5. Adjust operator's seat to a comfortable position by using the adjustment lever on the right side of the seat.

**IMPORTANT:** Before using this machine for the first time, check engine oil level.

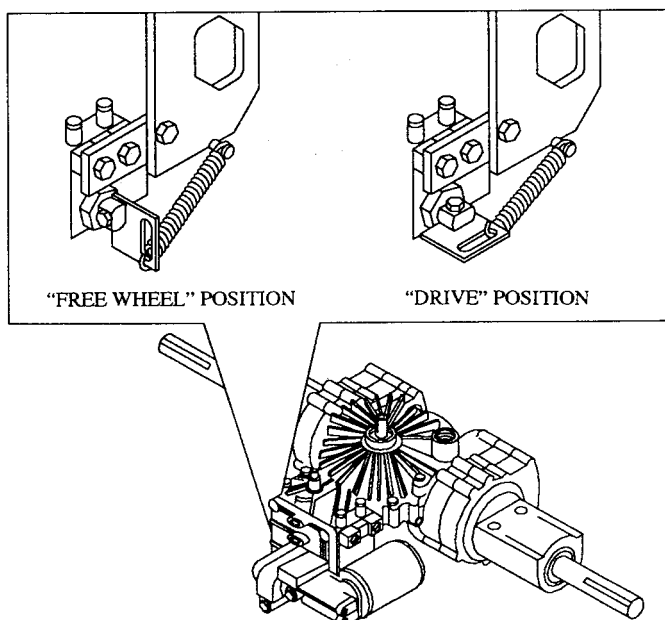
## STARTING THE ENGINE (HOT OR COLD)

1. Move throttle control to approximately 1/2 position.
2. Fully pull out choke cable. (Note: A warm engine may require less choke than a cold engine.)
3. Turn key to "START" position until the engine starts and release key.
4. When the engine starts, push choke cable in approximately 1/2 way, and continue to push in choke cable until engine reaches normal operating speed. Failure to do so will flood the engine.

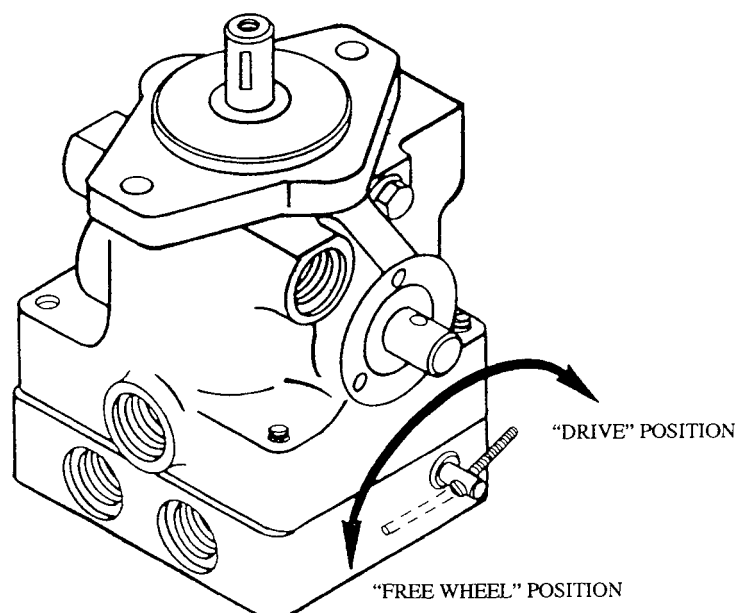
NOTE: The blade engagement switch must be "OFF, the parking brake must be "ON" and the operator must be on the seat in order to allow the engine to start.

## TRANSMISSION BY-PASS (FREE WHEEL)

22 Series

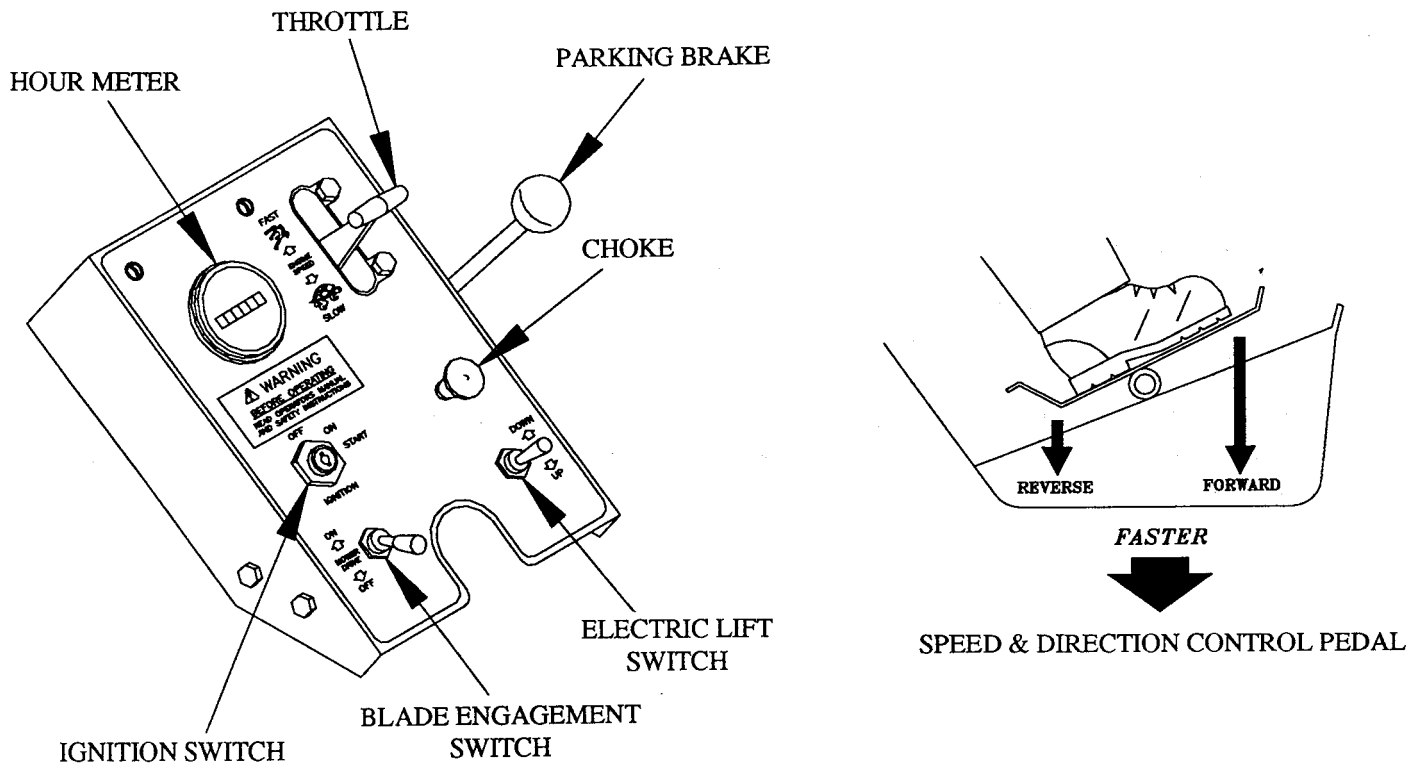


32 Series

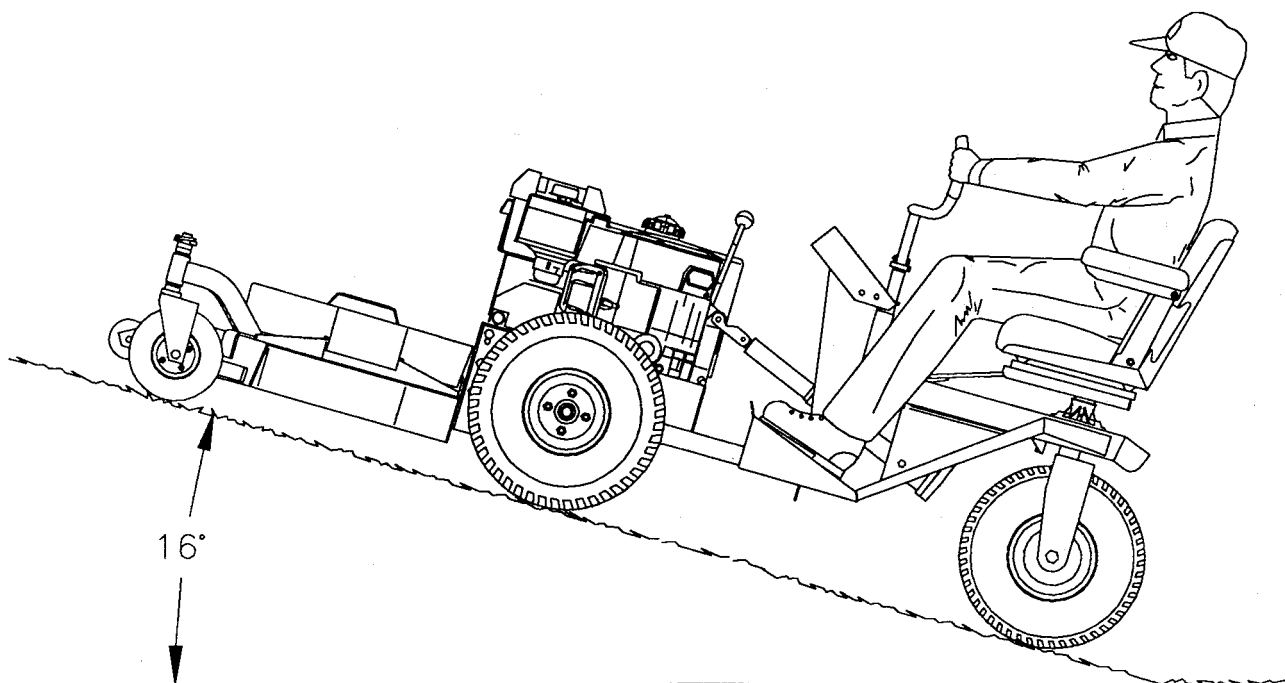




### OPERATING CONTROLS




### MAXIMUM SAFE OPERATING ANGLE



## OPERATING CONTROLS

1. Both the hydrostatic transmission (22 series) and hydraulic pump (32 series) have an infinite number of speeds between full speed forward and reverse, with the faster speeds being achieved by moving the speed control pedal farthest in the direction of travel. Reverse is limited to a ratio of 1/2 the speed of forward.
2. TO MOVE:
  - A) Disengage the parking brake.
  - B) Gently move the speed control pedal in the direction of travel desired.
3. TO SLOW OR STOP MACHINE:
  - A) Moving the speed control pedal to neutral will bring the machine to a stop on level ground.
4. Steering is controlled by turning the handle bars in the desired direction. The farther the handle bars are turned, the sharper the turn will be. When making sharp turns, reduce your speed to avoid being thrown from the machine.
5. For normal use, the throttle should be kept fully open and the ground speed of the machine determined by the speed control pedal. When transporting the machine or when loading or unloading from a truck/trailer, partial-throttle should be used to slow the reaction time of the controls and reduce noise.
6. Practice maneuvering the machine. Use a slow engine speed on level ground with the blade engagement switch in the "OFF" position until you are familiar with the controls.
7. WORKING ON A SLOPE:

 **CAUTION:** This machine will climb a greater slope than it is safe to be on. Always reduce speed when working on a slope.

- A) Climbing Hills: Since the hill climbing ability of the machine will probably far exceed any other machine you may have operated, caution should be observed as followed:
    - 1.) Never make a abrupt speed or direction change on a slope.
    - 3.) **NEVER** attempt to mow any grade when the grass is wet.
  - B) Going Down Hills: A very slow speed should always be used when traveling down hill. This can be accomplished by GENTLY moving the speed control pedal in the reverse direction.
8. An electric lift is provided as a safe and convenient way to raise the cutter deck for servicing. Pulling the deck lift switch towards the operator will raise the deck. Pushing it away from the operator lowers the deck. A "ratcheting" sound will be heard at the end of the stroke in either direction. Keeping the electric lift fully extended will provide maximum flotation of the cutter deck.
  9. Safety Interlock System: This mower is equipped with an electrical interlock system that will not allow the engine to start unless the blade engagement switch is "OFF", the parking brake is "ON" and the operator is on the seat. In order to dismount the machine after the engine is running, the blade engagement switch is must be "OFF" and the parking brake must be "ON". The safety interlock system has been designed to protect the operator. Any attempt to defeat the safety interlock system could result in serious personal injury and/or property damage and voids your warranty.

## TRIAL RUN

Now that you have located the controls and understand their function and operation, it is time to test run your new mower. Do this with the cutter blades "OFF" until you feel comfortable with operating the machine.

**⚠ WARNING:** Improper use of this machine can result in serious injury. Give complete and undivided attention to safe operation of the mower.

## CUTTING WITH THE MACHINE

**IMPORTANT:** Do not disengage the parking brake until you are ready to move. Do not engage mower blades until you are ready to start mowing.

1. To engage the cutter blades, pull up on the yellow handle of the Blade Engagement Switch while pushing the handle forward until it snaps into place.
2. To disengage the mower blades, pull the Blade Engagement Switch back towards the operator.

## CUTTING SPEED

For best mowing results, it is important that the blades be run at maximum speed. Set the throttle control at the "FAST" position which will provide the proper blade speed and maximum engine horsepower.

Choose a ground speed which will provide the desired finish cut, maximum operator comfort and will not overload the mower drive. A slower ground speed will provide a smoother operating machine and a more uniform cut.

## GRASS DISCHARGE

**⚠ DANGER:** To avoid personal injury, keep all shields and guards in place. Never operate machine without Grass Discharge Chute in place.

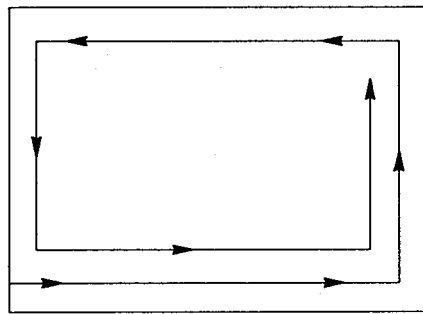
The Grass Discharge Chute has been designed to scatter clippings and prevent clogging in heavy cutting. When cutting lush, thick, tall or wet grass, reduce ground speed and/or reduce width of cut to prevent clumping and possible belt damage. For best cutting results, DO NOT mow wet grass. Wet grass will cause clogging and produce unsightly clumping on the lawn. In medium to heavy cuttings, plan your mowing to discharge clippings away from uncut grass.

If the mower becomes clogged, turn the blade engagement switch "OFF" and back unit out from uncut grass. Turn the engine off, remove ignition key and spark plug wire and clean underside of deck using a stick or scraper.

NOTE: The underside of the cutter deck should be cleaned out (hosed off with water) after each use with the engine off and the blade engagement switch "OFF". This will aid in the performance of the mower on its next use.

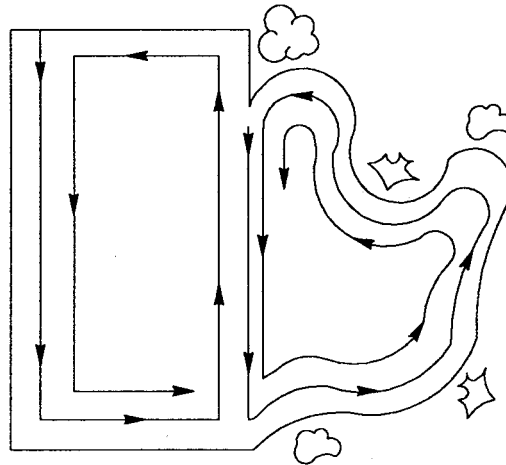
## CUTTING PATTERNS

1. Changing direction wastes time. Plan to keep mower moving forward as much as possible.
2. Plan for the longest straight runs that are possible.
3. Save the close trimming for the end.
4. Sometimes it is easier to divide a large, irregular shaped area into smaller sections to keep the mower working more steadily or to prevent reversing, turning or repeating too often.
5. In a small area where turns would cause loss of time in the center, try cutting method #3. Make the second pass down the center of the area, rather than down the opposite side from the first pass. This allows you to swing wide at the end of each pass and still cut all the grass with the minimum of reversing.



### **CUTTING METHOD #1**

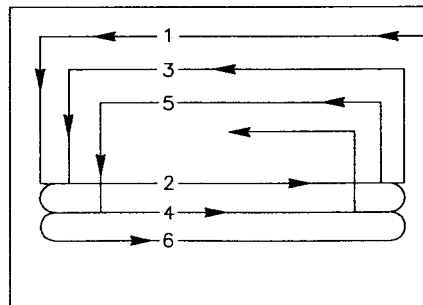
Normal round and round method for large, easy areas.



### **CUTTING METHOD #2**

Divide large or irregular areas into sections for easier mowing.

Overlap in tight corners to give yourself room to turn.



### **CUTTING METHOD #3**

It is possible to cut small areas without wasting time by turning in the middle

## ADJUSTMENTS AND SERVICING

### CUTTING HEIGHT

#### 52" & 61" Cutter Decks:

1. The cutter deck mounts have two sets of holes, which allow for a great range of adjustment on cutting height. The lower holes are used for the higher settings, the upper holes for the lower settings. Refer to Fig. .1 on page 11 for the desired height of cut settings. Install the eight mounting bolts as shown in their appropriate holes but do not tighten at this time.

NOTE: It may be necessary to extend the electric lift to aid in the alignment between the engine and cutter decks.

2. It is important that the top of the cutter deck is parallel to the top of the engine deck to ensure proper pulley alignment and avoid premature belt wear. Tighten the eight mounting bolts extremely tight.
3. Install the deck drive belt. See "Belt Removal and Replacement" on page 15 for proper belt routing and installation instructions.

#### 72" Cutter Deck:

1. Refer to Fig. 2 on page 11 for the desired height of cut settings.
2. Install the long bolts through the rear deck mounts into the appropriate holes and tighten extremely tight.

NOTE: There are four holes on the deck hanger frame for the different deck heights. DO NOT use the highest hole (fourth from the bottom). This is for manufacturing purposes only. Any attempt to use this hole will result in improper pulley alignment, cutter deck & engine deck interference and belt failure.

3. It is important that the cutter deck be parallel with the ground in its highest setting for each mounting position. This will ensure proper pulley alignment and avoid premature belt wear. To adjust, determine the desired cutting height and install the long bolt, washer and spacer in the appropriate hole and tighten. Then place all of the caster spacers below the deck hanger frame and use the eyebolts on the front of the cutter deck to adjust. The eyebolts are factory set for the deck to be parallel with the ground in the lowest deck mounting position.
4. Install the deck drive belt. See "Belt Removal and Replacement" on page 15 for proper belt routing and installation instructions.

**52" & 61" Cutter Decks**

HEIGHT OF CUT	2"	2-1/4"	2-1/2"	2-3/4"	3"	3-1/4"	3-1/2"	3-3/4"	4"	4-1/4"	4-1/2"
Deck Mount Position (Lower or Upper)	U	U	U	U	U	L	L	L	L	L	L
Blade Spacers (# above spindle)	1	2	1	2	3	2	1	4	3	4	5
Caster Spacers (# above arm)	3	3	2	2	2	1	0	1	0	0	0

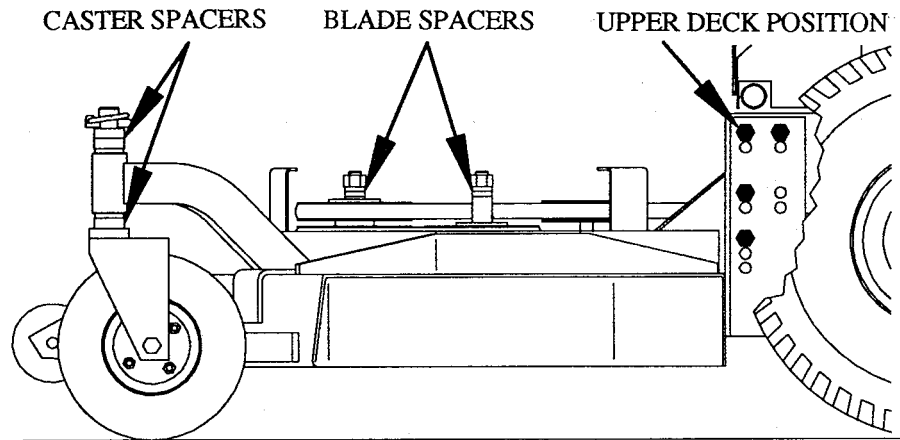


FIG. 1

**72" Cutter Deck**

HEIGHT OF CUT	2"	2-1/4"	2-1/2"	2-3/4"	3"	3-1/4"	3-1/2"	3-3/4"	4"	4-1/4"	4-1/2"
Deck Mount Position (Lower, Middle, Upper)	L	L	L	M	M	M	M	U	U	U	U
Blade Spacers (# above spindle)	1	1	2	3	1	2	2	4	5	4	5
Caster Spacers (# above arm)	3	2	2	3	1	1	0	1	1	0	0

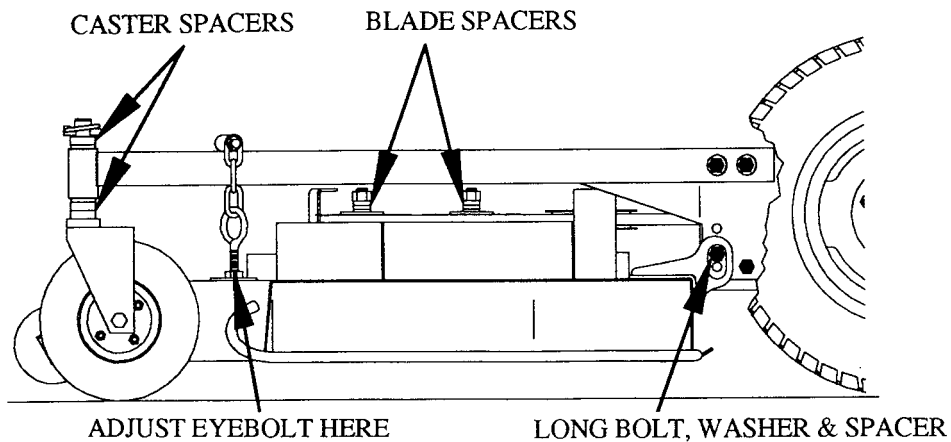


FIG. 2

## CUTTER BLADES

**⚠ DANGER:** Before performing any maintenance on the machine, be sure ignition key is "OFF", the blade engagement switch is "OFF", and the spark plug wire is removed from the spark plug.

- A) Remove belt guard from cutter deck by pulling up and away the three rubber latches.
- B) Use the electric lift to raise the cutter deck completely.
- C) Using two 15/16" wrenches, remove the nut from the top of the blade bolt.
- D) Withdraw the blade bolt complete with washer, blade and blade spacers.
- E) Sharpen the blade following the original sharpening pattern and angle. Do not sharpen to a razor's edge. Leave approximately 1/32"-1/16" of an edge on the blade. The distance "X" should never exceed 1/3 the distance "Y". (See illustration below.)

**IMPORTANT:** Be sure to balance the blades after sharpening. Unbalanced blades will cause excessive vibration which can damage the blade spindle bearings. This vibration could also cause other structural damage.

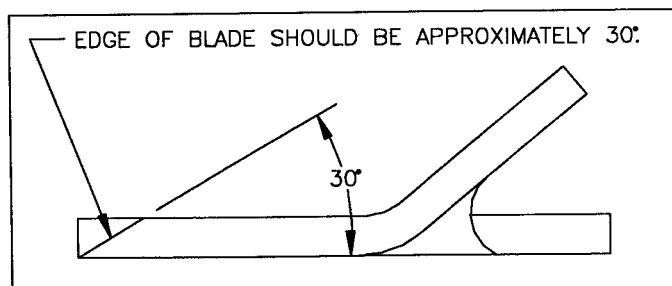
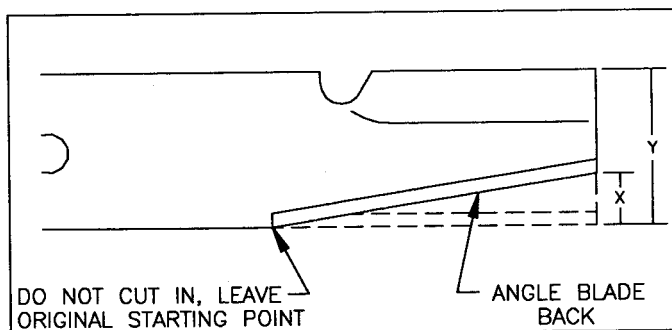
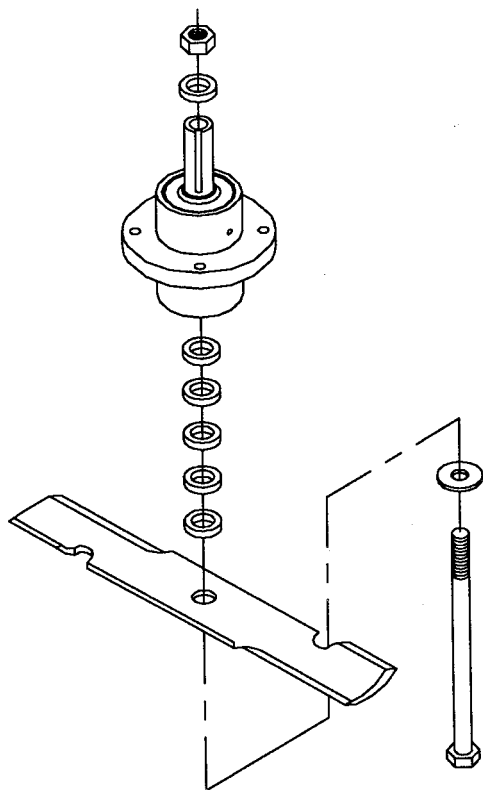
- F) Place required number of blade spacers below the cutter deck on the blade bolt. Five on the top of the blade is the factory pre-set. (See illustration below.)

**NOTE:** NEVER place all six blade spacers on either side of the spindle housing.

- G) Replace bolt, washer, blade (with wings up) and blade spacers.

- H) Place remaining spacer(s) above spindle pulley. Replace nut and tighten to 70 FT/LBS.

**⚠ DANGER:** Insert blade bolt from under cutter deck only. Never place blade spacers below blade.



## BELT TENSIONS AND ADJUSTMENTS

**⚠ DANGER:** Before performing any maintenance on the machine, be sure ignition key is "OFF", the blade engagement switch is "OFF", and the spark plug wire is removed from the spark plug.

### 52" & 61" Cutter Decks

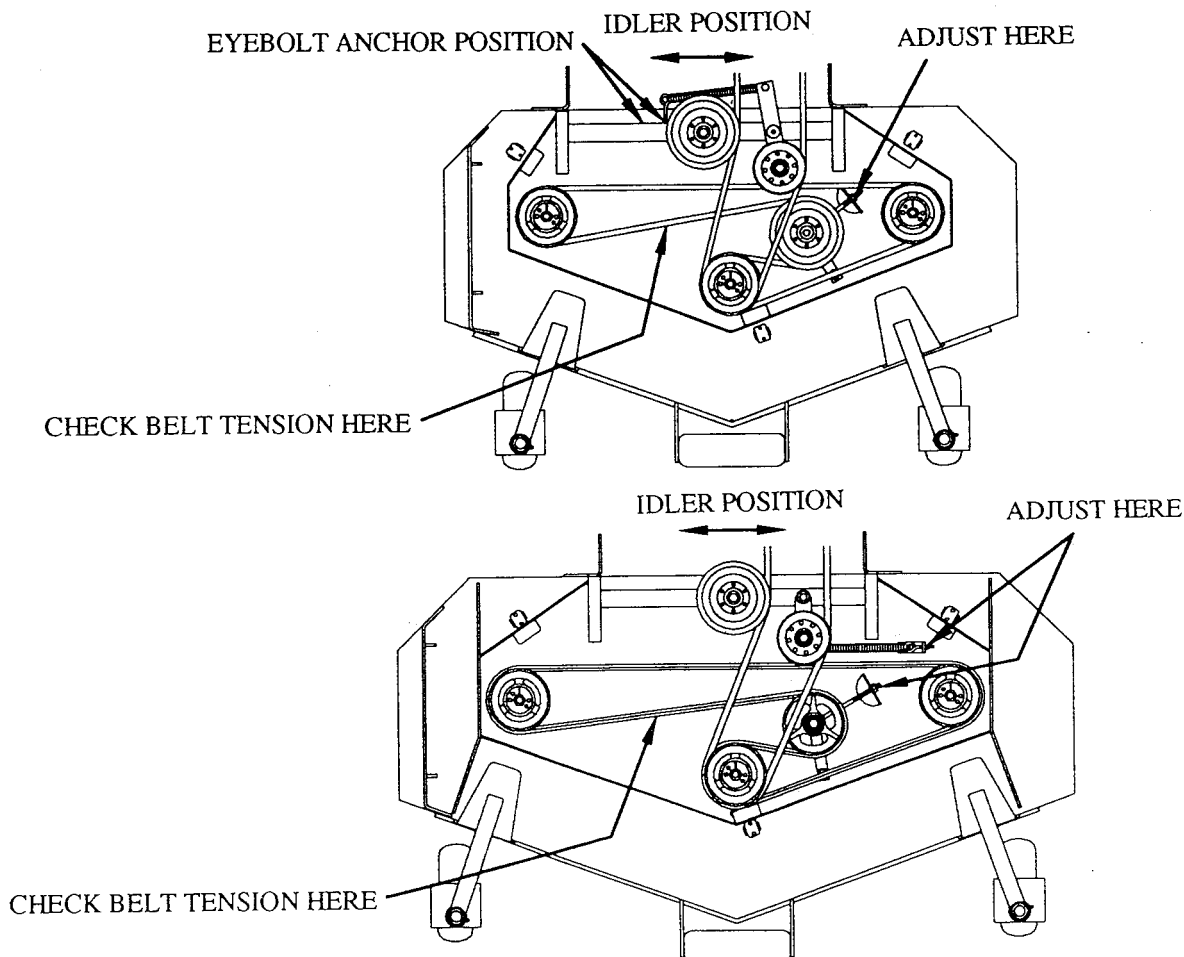
#### Blade Spindle Belt:

Tools required: 9/16" combination wrench

Tighten the 3/8" nylon lock nut on the eyebolt so a 10 lb. pull is required to deflect the belt 1/2" between the idler pulley and the right hand spindle. (See illustration below for tension, adjustment points & proper belt routing.)

#### Engine to Deck Belt:

This belt is spring tensioned and requires no adjustment. However, due to normal belt wear the pre-set spring tension may be insufficient. The first step in achieving more belt tension is increasing the spring tension. The 52" cutter decks have two holes provided for the spring anchor eyebolt. The 61" cutter decks have an adjustment nut on the eyebolt. The second step is to move the stationary idler towards the left of the machine (opposite the discharge opening) to increase belt tension. Both the 52" and 61" deck's stationary idlers on the back of the cutter deck have three mounting holes for adjustment. (See illustration below for tension, adjustment points & proper belt routing.)



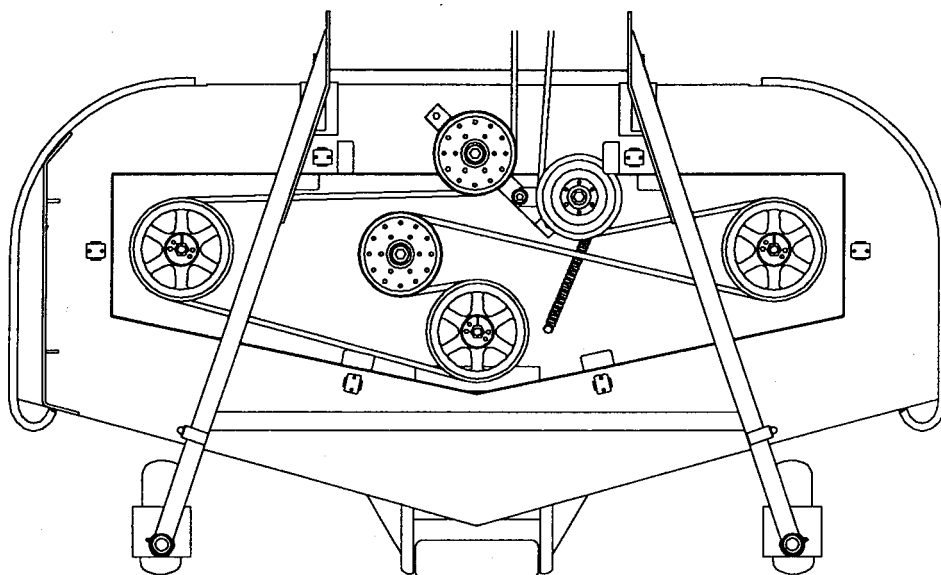


## BELT TENSIONS AND ADJUSTMENTS

### 72" Cutter Deck

#### Deck Drive Belt:

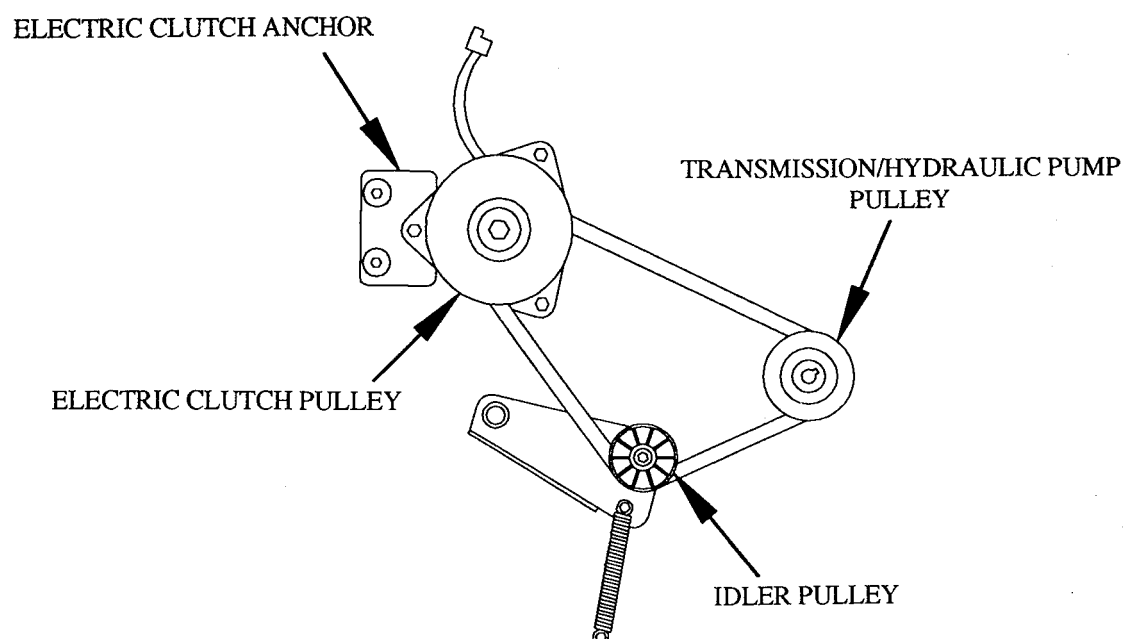
This belt is spring tensioned and requires no adjustment. (See illustration below for proper belt routing.)




### 22 Series & 32 Series Engine Decks

#### Engine to Transmission/Hydraulic Pump Belt:

This belt is spring tensioned and requires no adjustment. (See illustration below.)



## **BELT REMOVAL AND REPLACEMENT**

** DANGER:** Before performing any maintenance on the machine, be sure ignition key is "OFF", the blade engagement switch is "OFF", and the spark plug wire is removed from the spark plug.

NOTE: We strongly recommend using only **FERRIS** replacement belts. Other belts may be slightly longer or shorter. This could cause interference, damage and/or improper tensioning of belts.

### **Deck Drive Belt**

#### 1. 52" & 61" Cutter Decks:

- A.) Using a 3/4" combination wrench, place the wrench on the mount bolt on the small idler pulley on the idler arm. By pushing towards the discharge opening (as if to tighten the bolt) you will stretch the spring, creating enough slack to remove the belt from the idler pulley groove.
- B.) Roll the belt off of the front spindle pulley then remove from engine/electric clutch pulley.
- C.) Replace in reverse order. See "Belt Tensions and Adjustments" on page 13 for proper belt routing and tension. Since belt is spring tensioned, use caution when removing or installing the belt.

#### 2. 72" Cutter Deck:

- A.) Push the spring loaded idler pulley towards the rear of the machine to create enough slack to remove the belt from the idler pulley groove. OR, remove the retainer nut on the spring anchor bolt and remove the spring.
- C.) Remove belt from deck pulleys then the engine/electric clutch pulley.
- B.) Replace in reverse order. See "Belt Tensions and Adjustments" on page 14 for proper belt routing. Since the belt is spring tensioned, use caution when removing or installing the belt.

### **Blade Spindle Belt (52" & 61" decks only)**

- A.) The Deck Drive Belt must be removed before this belt can be serviced. See the instructions above.
- B.) Using a 9/16" wrench or deep socket, loosen the nylon lock nut on the eyebolt to release the belt tension.
- C.) Remove belt from spindle and idler pulleys.
- D.) Replace in reverse order. See "Belt Tensions and Adjustments" on page 13 for proper belt routing and tension.

## **BELT REMOVAL AND REPLACEMENT**

### **Engine to Transmission/Hydraulic Pump Belt**

- A.) The Deck Drive Belt must be removed before this belt can be serviced. See instructions on previous page.
- B.) Using a 1/2" socket, remove the 5/16" nylon lock nut from the spring anchor bolt and release the spring tension. Use caution when performing this operation.
- C.) Unplug the electric clutch.
- D.) Using a 1/2" socket, remove the two bolts and nuts that fasten the electric clutch to the rubber anchor.
- E.) 22 Series:
  - 1.) Remove belt from idler pulley and electric clutch.
  - 2.) Feed belt up and over the transmission cooling fan.
  - 3.) Replace in reverse order. See "Belt Tensions and Adjustments" for proper belt routing.
- F.) 32 Series:
  - 1.) Remove belt from idler pulley, electric clutch and pump pulley.
  - 2.) Replace in reverse order. See "Belt Tensions and Adjustments" for proper belt routing.

**IMPORTANT:** When reinstalling the belt, be sure to position the electric clutch so the wire harness is towards the rear of the machine. Also be sure to reinstall the clutch anchor securely or damage to the clutch will occur.

## MAINTENANCE AND LUBRICATION

**⚠ DANGER:** To avoid personal injury, turn engine OFF and wait for all movement to stop. Remove key from the ignition and remove the spark plug wire from the spark plug before servicing the mower.

### BREAK-IN MAINTENANCE AND LUBRICATION

- A.) The engine oil, filter and air cleaner should be changed according to the manufacturers recommendations. See the engine owners manual for proper instruction. The best time to change the engine oil is just after the engine has been run.
- B.) Check and perform all operations outlined in the "DAILY MAINTENANCE" section of the manual.
- C.) Check all belt tensions after the first 5 hours of operation. See the "Belt Tensions and Adjustments" section of this manual.
- D.) 22 Series:

The hydrostatic transmission is a sealed unit. The only maintenance required keeping the cooling fins clean. This is the single most important factor in the useful life span of the transmission.

- E.) 32 Series:

The hydraulic pump and circuit is a sealed system. The only maintenance required is keeping the oil cooler fins clean. This is the single most important factor in the useful life span of the hydraulic pump.

## DAILY MAINTENANCE

- A.) GENERAL: Make a general visual inspection of the mower for loose or damaged parts. Periodically check nuts and bolts (i.e. lug nuts) for looseness caused by vibration or rough handling. Damaged parts should be replaced before operating the mower again.
- B.) BELTS: Check the condition and tension of all belts. Replace any badly worn or damaged belt BEFORE it fails and possibly causes component damage. See the "ADJUSTMENT AND SERVICING" section of this manual for belt adjustment or replacement.
- C.) ENGINE OIL LEVEL: Refer to the engine owner's manual. Check oil level with the mower on level ground and the engine OFF. Before removing the oil fill cap, clean any dirt or debris near the oil fill area.
- D.) AIR INTAKE SCREENS: Check both air intake screens on the engine and engine deck (22 Series only) for debris build up. Also check the cooling fins of both the engine, hydrostatic transmission (22 Series) and oil cooler (32 Series) for debris build up. Clean as necessary.
- E.) AIR CLEANER: Visually inspect if operating under dusty conditions. Refer to the engine owner's manual for cleaning instructions.
- F.) TIRE PRESSURE: Check the tire pressure in both the drive tires and caster tires. Be sure the drive tires are inflated to 15 PSI and the caster tires and rear steering tire are inflated to 25 PSI.
- G.) BATTERY: Terminals should be tight and free of corrosion.
- H.) Grease all points specified in the "GREASE FITTING LOCATION & LUBRICATION" section.

## EVERY 25 OPERATION HOURS

- A) Perform the "DAILY MAINTENANCE" schedule.
- B) ENGINE OIL: Refer to the engine owner's manual for proper time frame for changing the oil.
- C) AIR CLEANER: Clean or replace the air cleaner cartridge every 25 operating hours. (Clean or replace more often if operating under dusty conditions.) Refer to engine owner's manual for cleaning instructions.
- D) Oil all linkage points. See the "GREASE FITTING LOCATIONS & LUBRICATION" section for these points.

**IMPORTANT:** Wipe off grease fittings before attaching grease gun. Wipe off all excess grease as it will only attract dirt which could cause bearing damage or failure.

### **EVERY 100 OPERATING HOURS**

- A.) Perform the "EVERY 25 OPERATING HOURS" schedule.
- B.) ENGINE COOLING SYSTEM: Remove the engine blower/flywheel shroud and clean any dirt or debris build up on the engine to prevent overheating and engine damage. Refer to the engine owner's manual for cleaning instructions.
- C.) Check chain tension and handle bar alignment and adjust as necessary.

### **EVERY 250 OPERATING HOURS**

- A.) Under severe conditions of dust, dirt or moisture, change the hydraulic oil filter. See "CHANGING THE HYDRAULIC OIL FILTER" for instructions.

### **EVERY 500 OPERATING HOURS (or once per year)**

- A.) Change the hydraulic oil filter. See "CHANGING THE HYDRAULIC OIL FILTER" for instructions.

### **CHANGING THE HYDRAULIC OIL FILTER**

The 32 Series hydraulic system holds 10-1/2 quarts of oil and the 22 Series transmission and reservoir holds 7 quarts of oil. When changing the filter, use a pan large enough to accommodate the large amount of fluid. Both systems will gravity drain so how fast the filter is changed will determine how much oil is lost. Make sure the pan is free of dirt, dust and water to prevent the oil from becoming contaminated so it can be reused. If the oil becomes contaminated, replace the same amount drained (from both filter and reservoir) with new oil.

Use ONLY the following listed oils:

22 Series: Mobil™ DTE26 hydraulic oil or SAE 20W-20 motor oil.

32 Series: SAE 5W-30 conventional motor oil or Mobil 1™ 5W-30 motor oil.

NOTE: To minimize the amount of air infiltration into the hydraulic system on the 32 Series, fill the filter with oil before removing the old filter.

**IMPORTANT:** NEVER use a filter other than one supplied by FERRIS. Automotive type filters will allow dirt particles large enough to cause transmission/hydraulic pump damage to pass through. This will greatly reduce the life expectancy of the transmission/hydraulic pump and void the warranty.

## GREASE FITTING LOCATIONS & LUBRICATION

Lubrication Point	Quantity	1-Pump Grease Interval	Oil Interval
Caster Wheel Mounts	2	Daily	
Caster Wheel Bearings	2	Daily	
Blade Spindle Bearings	3	Weekly	
Parking Brake Handle Pivot	1	Monthly	
Steering Column	1	Weekly	
Speed & Direction Control Pedal	1	Weekly	
Rear Wheel Steering Spindle	1	Monthly	
Rear Wheel Bearings		Re-pack yearly	
Steering Chain			Weekly (light application)
Electric Lift Pivots	2	Monthly	
Electric Lift Linkage			Weekly
Wheel Motors (32 Series only)	2	Monthly	

NOTE: When greasing the blade spindle bearings for the first time, grease until it starts to extrude through the relief hole. From then on, grease as specified above.

NOTE (32 Series only): In order to reach the grease fittings on the wheel motors, the tires must be removed.

**IMPORTANT:** Apply oil and grease carefully only where required. Oil and grease on drive belts or pulleys will cause slippage and loss of drive. Wipe up all spills of excess oil and grease completely. Lubricate the blade spindle bearings with a "high speed, no melt grease. Use of a conventional grease may greatly decrease the life expectancy of the bearings. The same grease may be used on all other grease points but is not necessary.

## GENERAL MAINTENANCE & STORAGE

1. Periodically check blade and engine mounting bolts for proper tightness.
2. Keep all nuts and bolts tight to ensure the equipment is in safe working order.
3. To reduce fire hazard, keep engine and the immediate surrounding area free from grass clippings, leaves and excessive grease.
4. If parts are worn, use only **FERRIS** replacement parts.
5. When working underneath lifted parts or machines, make sure adequate support is given.
6. Use caution when rotating one blade as it will rotate the other blades.
7. Do not dismantle the machine without releasing or restraining forces which can cause parts to move suddenly.
8. Lubricate all points specified above to prevent moisture damage.
9. Sand areas where paint has chipped and repaint to prevent rust.
10. Never store the equipment with gasoline in the tank indoors where fumes may reach an open flame or spark. Allow the engine to cool before storing in any enclosed area.
11. For winter storage, drain the fuel tank the run the engine to remove all of the fuel or use a high quality gasoline stabilizer to prevent gumming and varnishing in the carburetor float bowl.

