

# BUSH HOG®

## Model SM 60 Side Mount Rotary Cutter Operator's Manual



**OPERATION ● MAINTENANCE**

# CONGRATULATIONS!

You have invested in the best implement of its type on the market today.

The care you give your Bush Hog implement will greatly determine your satisfaction with its performance and its service life. We urge a careful study of this manual to provide you with a thorough understanding of your new implement before operating, as well as suggestions for operation and maintenance.

If your manual should become lost or destroyed, Bush Hog will be glad to provide you with a new copy. Order from Bush Hog, P. O. Box 1039, Selma, Alabama 36702-1039. Most of our manuals can also be downloaded from our website at [www.bushhog.com](http://www.bushhog.com).

As an authorized Bush Hog dealer, we stock genuine Bush Hog parts which are manufactured with the same precision and skill as our original equipment. Our trained service personnel are well informed on methods required to service Bush Hog equipment, and are ready and able to help you.

Should you require additional information or assistance, please contact us.

YOUR AUTHORIZED  
BUSH HOG DEALER

BECAUSE BUSH HOG MAINTAINS AN ONGOING PROGRAM OF PRODUCT IMPROVEMENT, WE RESERVE THE RIGHT TO MAKE IMPROVEMENTS IN DESIGN OR CHANGES IN SPECIFICATIONS WITHOUT INCURRING ANY OBLIGATION TO INSTALL THEM ON UNITS PREVIOUSLY SOLD.

BECAUSE OF THE POSSIBILITY THAT SOME PHOTOGRAPHS IN THIS MANUAL WERE TAKEN OF PROTOTYPE MODELS, PRODUCTION MODELS MAY VARY IN SOME DETAIL. IN ADDITION, SOME PHOTOGRAPHS MAY SHOW SHIELDS REMOVED FOR PURPOSES OF CLARITY. **NEVER OPERATE** THIS IMPLEMENT WITHOUT ALL SHIELDS IN PLACE.

# Side Mount Rotary Cutter Models SM60R, SM160R Operator's Manual

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## RETAIL CUSTOMER'S RESPONSIBILITY UNDER THE BUSH HOG WARRANTY

It is the Retail Customer and/or Operator's responsibility to read the Operator's Manual, to operate, lubricate, maintain and store the product in accordance with all instructions and safety procedures. Failure of the operator to read the Operator's Manual is a misuse of this equipment.

It is the Retail Customer and/or Operator's responsibility to inspect the product and to have any part(s) repaired or replaced when continued operation would cause damage or excessive wear to other parts or cause a safety hazard.

It is the Retail Customer's responsibility to deliver the product to the authorized Bush Hog Dealer, from whom he purchased it, for service or replacement of defective parts which are covered by warranty. Repairs to be submitted for warranty consideration must be made within forty-five (45) days of failure.

It is the Retail Customer's responsibility for any cost incurred by the Dealer for traveling to or hauling of the product for the purpose of performing a warranty obligation or inspection.



# LIMITED WARRANTY



Bush Hog warrants to the original purchaser of any new Bush Hog equipment, purchased from an authorized Bush Hog dealer, that the equipment be free from defects in material and workmanship for a period of one (1) year for non-commercial, state, and municipalities' use and ninety (90) days for commercial use from date of retail sale. The obligation of Bush Hog to the purchaser under this warranty is limited to the repair or replacement of defective parts.

Replacement or repair parts installed in the equipment covered by this limited warranty are warranted for ninety (90) days from the date of purchase of such part or to the expiration of the applicable new equipment warranty period, whichever occurs later. Warranted parts shall be provided at no cost to the user at an authorized Bush Hog dealer during regular working hours. Bush Hog reserves the right to inspect any equipment or parts which are claimed to have been defective in material or workmanship.

## DISCLAIMER OF IMPLIED WARRANTIES & CONSEQUENTIAL DAMAGES

Bush Hog's obligation under this limited warranty, to the extent allowed by law, is in lieu of all warranties, implied or expressed, **INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE** and any liability for incidental and consequential damages with respect to the sale or use of the items warranted. Such incidental and consequential damages shall include but not be limited to: transportation charges other than normal freight charges; cost of installation other than cost approved by Bush Hog; duty; taxes; charges for normal service or adjustment; loss of crops or any other loss of income; rental of substitute equipment, expenses due to loss, damage, detention or delay in the delivery of equipment or parts resulting from acts beyond the control of Bush Hog.

### THIS LIMITED WARRANTY SHALL NOT APPLY:

1. To vendor items which carry their own warranties, such as engines, tires, and tubes.
2. If the unit has been subjected to misapplication, abuse, misuse, negligence, fire or other accident.
3. If parts not made or supplied by Bush Hog have been used in connection with the unit, if, in the sole judgement of Bush Hog such use affects its performance, stability or reliability.
4. If the unit has been altered or repaired outside of an authorized Bush Hog dealership in a manner which, in the sole judgement of Bush Hog, affects its performance, stability or reliability.
5. To normal maintenance service and normal replacement items such as gearbox lubricant, hydraulic fluid, worn blades, or to normal deterioration of such things as belts and exterior finish due to use or exposure.
6. To expendable or wear items such as teeth, chains, sprockets, belts, springs and any other items that in the company's sole judgement is a wear item.

NO EMPLOYEE OR REPRESENTATIVE OF BUSH HOG IS AUTHORIZED TO CHANGE THIS LIMITED WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY UNLESS SUCH CHANGE IS MADE IN WRITING AND SIGNED BY BUSH HOG'S SERVICE MANAGER, POST OFFICE BOX 1039, SELMA, ALABAMA 36702-1039.



Record the model number, serial number and date purchased. This information will be helpful to your dealer if parts or service are required.

MODEL NUMBER \_\_\_\_\_

SERIAL NUMBER \_\_\_\_\_

MAKE CERTAIN THE WARRANTY REGISTRATION CARD HAS BEEN FILED WITH BUSH HOG/SELMA, ALABAMA

DATE OF RETAIL SALE \_\_\_\_\_

# DEALER PREPARATION CHECK LIST

## SM60 ROTARY CUTTER

BEFORE DELIVERING MACHINE — The following check list should be completed.  
Use the Operator's Manual as a guide.

- 1. Assembled completed.
- 2. Gearbox filled with oil.
- 3. All fittings lubricated.
- 4. All shields in place and in good condition.
- 5. All fasteners torqued to specifications given in Torque Chart.
- 6. Slip clutches have been checked for proper operation.
- 7. All decals in place and readable. (See Decal Page)
- 8. Overall condition good (i.e. paint, welds)
- 9. Operators manual has been delivered to owner and he has been instructed on the safe and proper use of the cutter.
- 10. Purchaser or dealer elects to delete deflectors. (front belting, rear bands, front and rear chains)

### WARNING

For Non-Agricultural use, OSHA, ASAE, SAE and ANSI standards require the use of Chain Guards or other protective guards at all times. Bush Hog strongly recommends the use of such guards for Agricultural uses as well, to reduce the risk of property damage, serious bodily injury or even death from objects thrown out by or from contact with the cutting blades.

Dealer's Signature \_\_\_\_\_

Purchaser's Signature \_\_\_\_\_

### THIS CHECKLIST TO REMAIN IN OWNER'S MANUAL

It is the responsibility of the dealer to complete the procedures listed above before delivery of this implement to the customer.



# IMPORTANT SAFETY PRECAUTIONS

**This symbol is used to call attention to safety precautions that should be followed by the operator to avoid accidents. When you see this symbol, carefully read the message that follows and heed its advice. Failure to comply with safety precautions could result in serious bodily injury.**



In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel in the operation, transport, maintenance and storage of equipment. Lack of attention to safety can result in accident, personal injury, reduction of efficiency and worst of all—loss of life. Watch for safety hazards and correct deficiencies promptly. Use the following safety precautions as a general guide to safe operations when using this machine. Additional safety precautions are used throughout this manual for specific operating and maintenance procedures. Read this manual and review the safety precautions often until you know the limitations.

1. Read the Operator's Manual. Failure to read the Operator's Manual is considered a misuse of this equipment.
2. Become familiar with all the machine's controls and all the caution, warning and danger decals affixed to the machine before attempting to start or operate.
3. Before starting or operating the machine, make a walk around inspection and check for obvious defects such as loose mounting bolts and damaged components. Correct any deficiency before starting.
4. Do not allow children to operate the cutter. Do not allow adults to operate it without proper instruction.
5. Do not carry passengers.
6. Keep the area of operation clear of all persons, particularly small children and pets. The operator should cease mowing whenever anyone comes within the operating area.
7. Clear the work area of objects which might be picked up and thrown.
8. Wear eye protection and use a piece of cardboard or wood rather than hands to search for hydraulic leaks. Escaping hydraulic oil under pressure can penetrate skin. If fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.
9. Do not operate without all guards and shields in place and in good condition.
10. Stop PTO, lower implement to ground, place tractor transmission in neutral or park, set parking brake, stop tractor engine, remove ignition key and wait for all motion to completely stop before leaving the tractor.
11. Keep hands and feet away from blades.
12. This cutter is not to be operated along highways or in any area where people may be present unless all sides of the unit are enclosed by permanent bands, safety chains or other factory approved safety shields that are in good repair.
13. Wear personal protective equipment such as, but not limited to, protection for eyes, ears, feet, hands and head when operating or repairing the equipment. Do not wear loose clothing or jewelry that may catch on equipment moving parts.
14. When performing adjustments or maintenance on the cutter, first lower it to the ground or block it securely at a workable height.
15. Never stand between tractor and cutter while tractor is being backed to the cutter hitch.
16. Reduce speed when transporting cutter to avoid bouncing and momentary loss of steering.
17. Use tractor flashing warning lights, day or night, when transporting cutter on road or highways unless prohibited by law.
18. In the event that someone other than yourself will operate this equipment we firmly suggest that all SAFETY references be discussed prior to operation.
19. It is recommended that tractor be equipped with Rollover Protective System (ROPS) or ROPS enclosed cab and seat belt.

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# IMPORTANT FEDERAL LAWS AND REGULATIONS\* CONCERNING EMPLOYERS, EMPLOYEES AND OPERATIONS.

\*(This section is intended to explain in broad terms the concept and effect of the following federal laws and regulations. It is not intended as a legal interpretation of the laws and should not be considered as such).

U.S. Public Law 91-596 (The Williams-Steiger Occupational and Health Act of 1970) OSHA

## **This Act Seeks:**

"...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources..."

## DUTIES

Sec. 5 (a) Each employer—

- (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
- (2) shall comply with occupational safety and health standards promulgated under this Act.
  - (b) Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

## **OSHA Regulations**

Current OSHA regulations state in part: "At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and servicing of all equipment with which the employee is, or will be involved." These will include (but are not limited to) instructions to:

Keep all guards in place when the machine is in operation;

Permit no riders on equipment;

Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment.

Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine.

## **EMPLOYEE TRACTOR OPERATING INSTRUCTIONS:**

1. Securely fasten your seat belt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments, and holes.
3. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
4. Stay off slopes too steep for safe operation.
5. Watch where you are going, especially at row ends, on roads, and around trees.
6. Do not permit others to ride.
7. Operate the tractor smoothly - no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by tractor manufacturers.
9. When tractor is stopped, set brakes securely and use park lock if available.

## **Child Labor Under 16 Years Old**

Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)



# SECTION I

## INTRODUCTION AND DESCRIPTION

### 1-1 INTRODUCTION

We are pleased to have you as a Bush Hog customer. Your Side Mount Rotary Cutter, Model SM60, has been carefully designed to assure maximum service with minimum down time. This manual is provided to give you the necessary operating and maintenance instructions for keeping your rotary cutter in top operating condition. Please read this manual thoroughly. Understand what each control is for and how to use it. Observe all safety precautions decaed on the machine and noted throughout the manual to insure safe operation of the equipment. If any assistance or additional information is needed, contact your local authorized Bush Hog dealer.

### 1-2 DESCRIPTION

The Side Mount Rotary Cutter (Fig. 1-1) is an agricultural implement designed primarily for cutting brush up to 1 inch (2.5cm) in diameter along ditches

and banks. It is to be used on tractors weighing a minimum of 6000 lbs. (2722 kg) not including ballast and having a minimum of 50 PTO horsepower. Two models are available; the model SM60R, requiring 540 rpm PTO speed and the model SM160R, requiring a 1000 rpm PTO speed. Front and rear discharge shields are standard on each.

The cutter is all hydraulically powered as shown in Fig. 1-2. A hydraulic gear pump is driven by the tractor PTO. The 35 gallons of oil are delivered to the motor at a maximum of 3200 PSI on a cast iron pump and motor. The hydraulic oil is filtered by a suction strainer mounted inside the tank and a canister type return line filter. Each filter is equipped with a bypass to prevent pumpt cavitation, should it become clogged. Slide cylinder and deck pivot cylinders are controlled by the tractor auxiliary hydraulic system.

Figure 1-1 Major Components

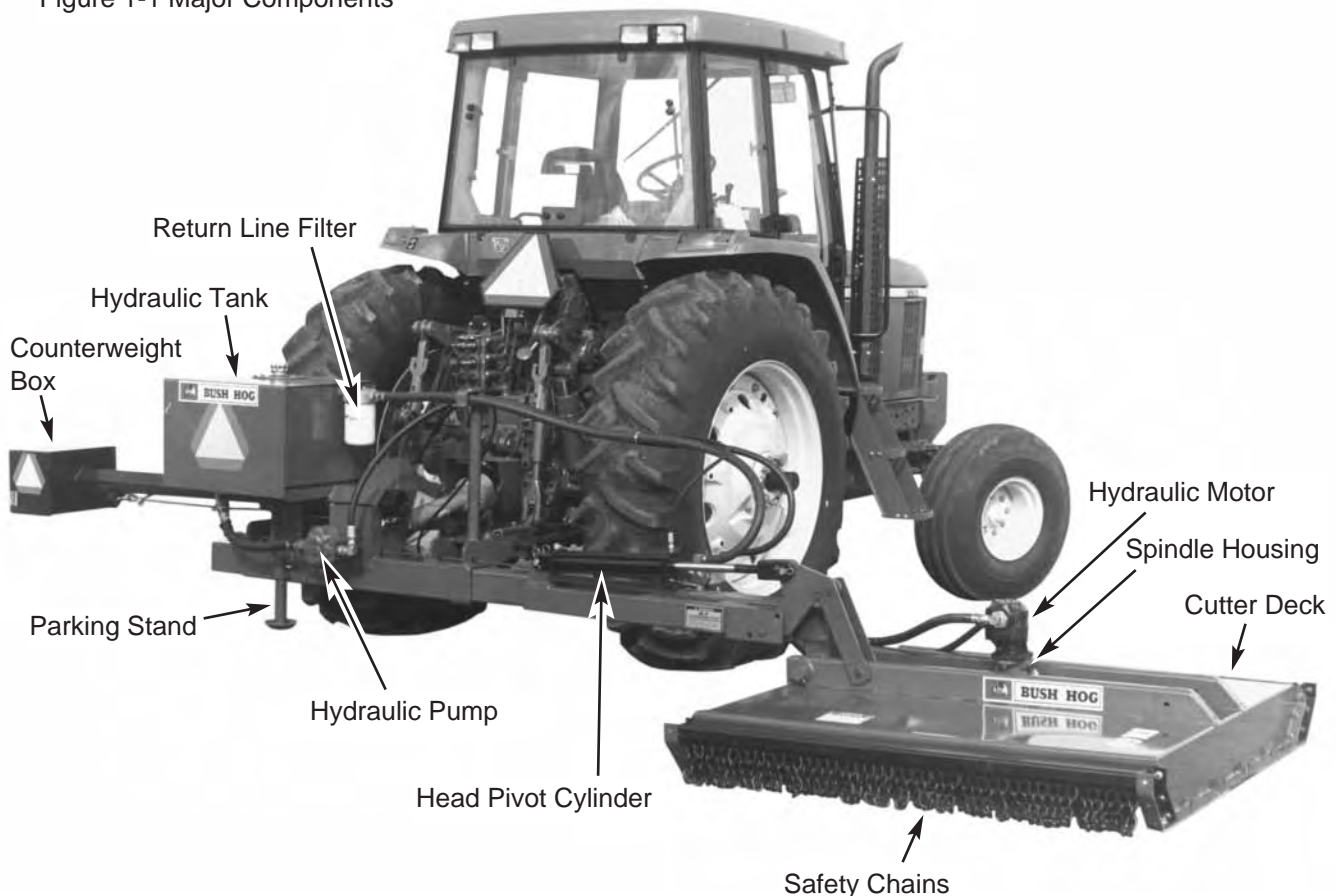
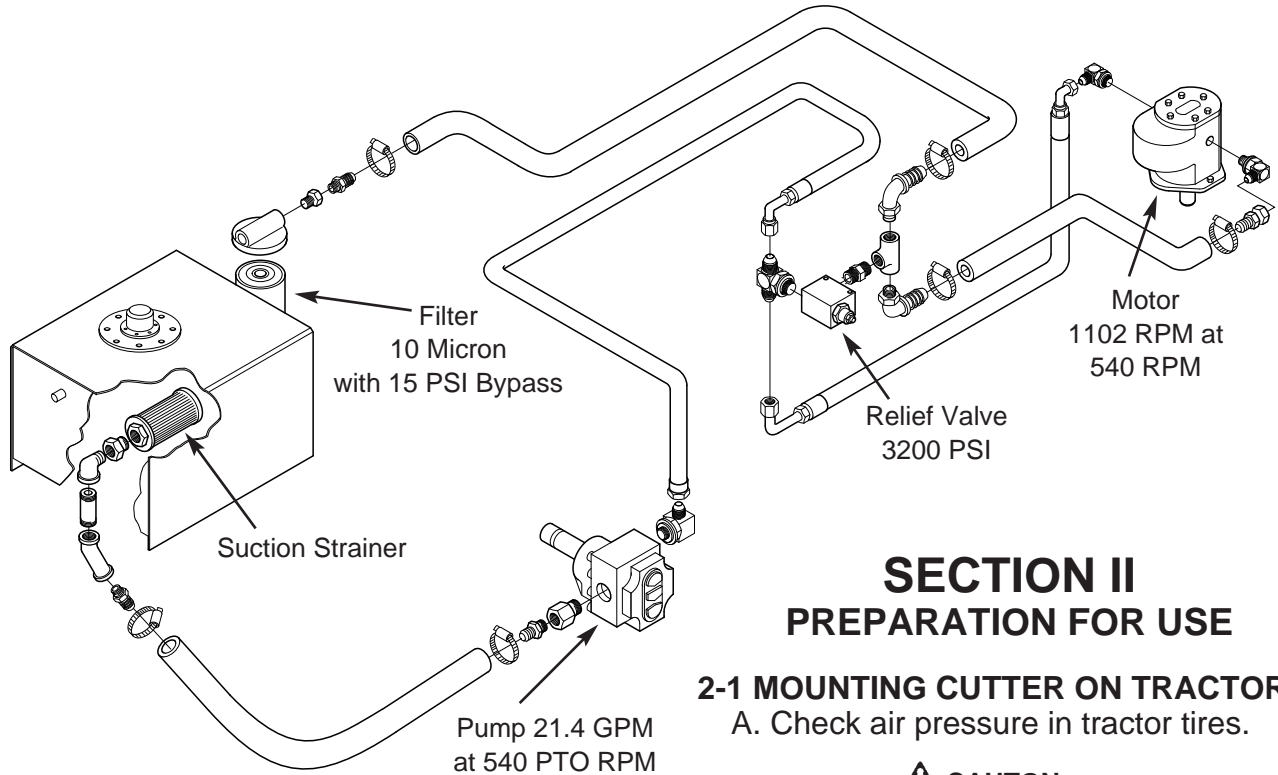


Fig. 1-2 Hydraulic Circuit (Cast Iron Pump & Motor)



**TABLE 1-1 SPECIFICATIONS  
(For Cast Iron Pump & Motor Only)**

	MODEL NUMBER	
	SM60R	SM160R
Required PTO Speed	540 rpm	1000 rpm
Pump Output	21.4 gpm	19.1 gpm
Motor Speed	1101 rpm	1182 rpm
Blade Tip Speed	17,300 ft./min.	18,570 ft./min.
Blade Type	1/2" x 3" Dble. Edge	1/2" x 3" Dble. Edge
Cutting Width	60"	60"
Max. Reach from Center of Tractor	145"	145"
Transport Width	120-1/2"	120-1/2"
Weight	1580 lbs.	1580 lbs.
Hydraulic Oil Capacity	35 gal.	35 gal.
Maximum Hydraulic System Pressure	3200 psi	3200 psi
Hitch Size	Cat. II Std. Cat. II & III Quick Hitch	Cat. II Std. Cat. II & III Quick Hitch

## SECTION II PREPARATION FOR USE

### 2-1 MOUNTING CUTTER ON TRACTOR

A. Check air pressure in tractor tires.

#### **CAUTION**

**IT IS CRITICAL FOR STABILITY THAT TRACTOR TIRES CARRY PROPER PRESSURE. REFER TO TRACTOR OPERATOR'S MANUAL.**

B. Connect cutter to tractor 3-point hitch. Adjust stabilizer bars, sway blocks, or chains. Refer to tractor operator's manual.

#### **CAUTION**

**USE OF THIS MACHINE ON TOO SMALL A TRACTOR CAN CAUSE TRACTOR UPSET. DO NOT USE THIS MACHINE ON A TRACTOR WEIGHING LESS THAN 6000 LBS. (2722 KG) NOT INCLUDING BALLAST. IT IS RECOMMENDED THAT FRONT BALLAST BE USED FOR ADDED STEERING STABILITY. THIS MACHINE REQUIRES 50 PTO HORSEPOWER.**

C. If valve kit is used, mount valves on tractor as desired. If optional valve mounting brackets are used, attach brackets and valve to tractor as described in paragraph 5-6. Make certain all hoses are free of sharp bends, creases, or moving parts. It is recommended that valves be mounted on right side of tractor.

D. Connect hoses to hydraulic quick disconnects on rear of tractor.

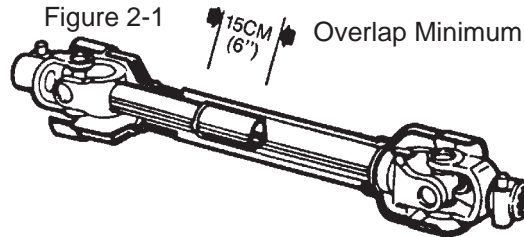
E. Raise and lower implement to determine the shortest distance between the tractor PTO shaft and pump input shaft. Stop tractor leaving implement in position of shortest distance. Block implement in position.

F. Pull driveline apart. Attach the outer (female) section to the tractor PTO shaft and the inner (male) section to the pump input shaft. Pull on each driveline section to make sure yokes lock into place.

G. Hold driveline sections parallel to each other to determine if driveline is too long. (Fig. 2-4) **If driveline must be shortened, perform steps "D" through "H" in paragraph 2-2.**

H. Position implement at point with greatest distance between pump input shaft and PTO shaft.

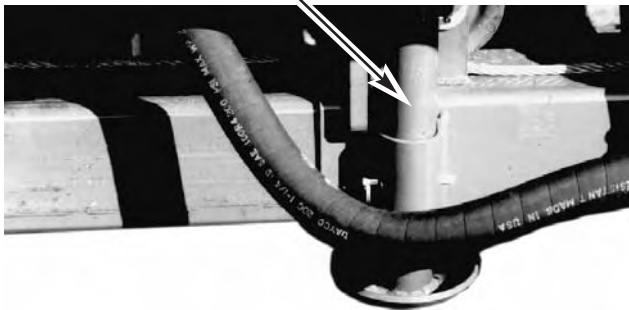
I. **Hold driveline halves parallel to each other and check for minimum of 6 inches (15 cm) overlap.** (Fig. 2-1)



J. Apply multi-purpose grease to inside of outer (female) driveline section. Assemble driveline and install on machine and implement. Pull on each driveline section to make sure yokes lock into place.

K. Raise implement off ground. Pin parking stand in the up position. (Fig. 2-2)

Figure 2-2 Parking Stand In Up Position



L. Remove transport lock pin located at deck pivot linkage and insert into storage holes. (Fig. 2-3)

**⚠ WARNING**

**STAY CLEAR OF DECK DURING AND AFTER REMOVAL OF LOCK PIN. AIR IN HYDRAULIC LINES COULD ALLOW CUTTER DECK TO FALL, CAUSING POSSIBLE INJURY.**

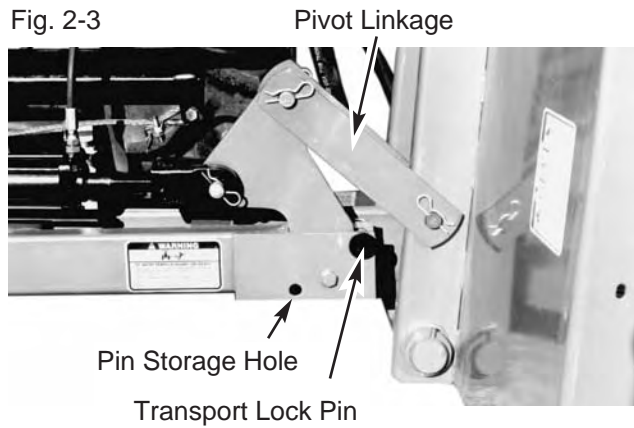
M. Position cutter deck straight out (parallel to ground) and approximately 2 inches (51 mm) from ground.

N. Adjust cutter deck front to rear using top link of 3-point hitch. **Rear of cutter deck should be 1-2 inches (25-51 mm) higher than front.**

O. Adjust lower 3-point hitch arms to level cutter deck sliding beam right to left.

P. Adjust 3-point hitch position control to stop at present height. This will prevent accidental dragging of sliding beam.

Fig. 2-3



Q. If equipped with optional valve stand, adjust to desired working position.

R. Raise cutter deck and install transport lock pin before traveling. (Fig. 2-3)

**NOTE**

**It is recommended that front end ballast (weights) be added to tractor for stabilization. In some uses, added stabilization may be gained by weighting left rear wheel heavier than right rear wheel. Do not exceed tractor ballast rating. Consult your tractor dealer.**

**2-2 DRIVELINE MODIFICATION**

**IMPORTANT**

**IT IS EXTREMELY IMPORTANT THAT DRIVELINE MATCH THE TRACTOR BEING USED. IF UNIT IS ATTACHED ON ANOTHER TRACTOR, DRIVELINE MUST BE CHECKED FOR CORRECT LENGTH. FAILURE TO MATCH DRIVELINE TO TRACTOR WILL CAUSE FAILURE TO THE PUMP.**

Due to the many variations in tractor/implement hitch points and corresponding differences in distances between tractor PTO shafts and implement input shafts, drivelines may need to be shortened as follows:

A. Attach implement to tractor 3-point hitch.

B. Raise and lower implement to determine the shortest distance between the tractor PTO shaft and the pump input shaft. Stop tractor leaving implement in position of shortest distance. Block implement in position.

C. Pull driveline apart. Attach the outer (female) section to the tractor PTO shaft and the inner (male) section to the pump input shaft. Pull on each driveline section to make sure yokes lock into place.

D. Hold driveline halves parallel to each other to determine amount to be removed. Measure approximately 3 in. (76 mm) back from the opposite universal joint shield and mark the free end of the shield. Do this for each section. (Fig. 2-4)

E. Clamp the end of driveline in a vice. Cut off shield at point it was marked.

F. Using the cut off section of shield as a guide, cut the shaft the same amount. (Fig. 2-6)

G. Repeat steps "E" and "F" to other driveline section.

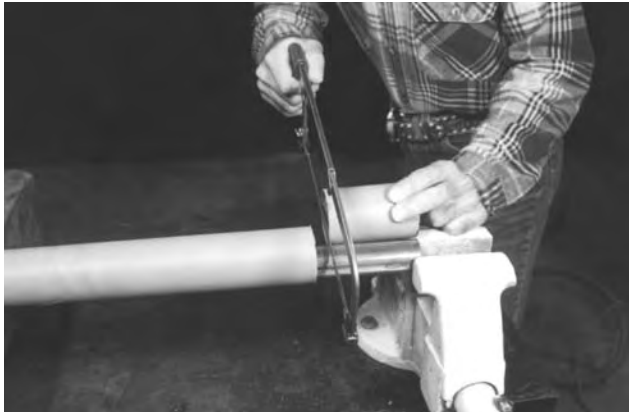
H. De-burr the ends of the drivelines and clean away all chips and filings. (Fig. 2-7)

I. Apply grease to inside of outer (female) driveline

Figure 2-4



Figure 2-6



section. Reassemble driveline and attach to tractor and implement. Pull on driveline section to make sure yokes lock into place.

J. Raise and lower implement to check for proper operation.

Figure 2-5



Figure 2-7



## SECTION III OPERATING PROCEDURES

### 3-1 TRACTOR REQUIREMENTS AND RECOMMENDATIONS

#### 3-1.1 Requirements

The tractor shall weigh a minimum of 6000 lbs. (2722 kg) not including ballast to prevent tractor upset. A PTO rating of not less than 50 horsepower is required. The 3-point hitch shall have stabilizer bars, sway blocks, chains or equivalent to prevent mower swaying. Tractor rear wheel base (outside of tire to outside of tire) shall not exceed 92 inches (233.7 cm).

#### 3-1.2 Recommendations

Tractor should have front end ballast (weights) to help prevent front end skidding. Tractor should be equipped with Rollover Protective System (ROPS) and a seat belt used. Check chains for 3-point hitch are recommended on tractors without position control stop adjustment to prevent accidental dragging of slide assembly on ground.

#### WARNING

WHEN CUTTING WITH ANY SIDE MOUNT ROTARY CUTTER, IT IS LIKELY THAT SOME DEBRIS WILL BE THROWN TOWARD OPERATION. IT IS HIGHLY RECOMMENDED THAT OPERATOR BE PROTECTED BY ROLLOVER PROTECTIVE SYSTEM (ROPS) ENCLOSED CAB AND CUTTER DECK BE ENCLOSED BY FACTORY APPROVED PERMANENT BANDS OR SAFETY CHAINS. THE OPERATOR SHOULD WEAR SAFETY GLASSES AND SAFETY (HARD) HAT FOR PERSONAL PROTECTION.

### 3-2 OPERATION

A. Perform BEFORE EACH USE maintenance listed in Table 4-1.

B. Make certain parking stand is pinned in the up position. (Fig. 2-2)

C. Remove deck transport lock pin and place in storage holes. (Fig. 2-3)



**⚠ WARNING**

**KEEP CLEAR OF MACHINE WHEN RAISING AND LOWERING THE CUTTER HEAD.**

- D. Place cutter deck in desired working position.
- E. Engage PTO drive with tractor at idle speed. Allow 2-3 minutes for hydraulic fluid to warm up.

**⚠ DANGER**

**KEEP HANDS AND FEET FROM UNDER CUTTER AT ALL TIMES TO AVOID SERIOUS INJURY.**

- F. Set tractor throttle for tractor/implement PTO speed rating (540 or 1000 rpm).

**⚠ WARNING**

**IT IS RECOMMENDED THAT TRACTOR BE EQUIPPED WITH ROLLOVER PROTECTIVE SYSTEM (ROPS) AND THAT A SEAT BELT BE USED BY THE OPERATOR FOR ALL MOWING OPERATIONS.**

G. Place tractor in gear and begin cutting. **Do not exceed 3 mph forward speed.** Use caution when working along a ditch. If cutter contacts ground, encounters thick brush, or hits an obstacle, it may cause tractor front wheels to slide into ditch. For this reason it is recommended, when cutting in a ditch where obstacles (i.e. stumps, rocks) cannot be seen, that the cutter deck be adjusted 2-3 inches above normal cutting height. **Do not stall cutter repeatedly or operate in stalled position as overheating will occur.**

**IMPORTANT**

WHEN USED ON TRACTORS WEIGHING MORE THAN 10,000 LBS. (4536 KG), CARE MUST BE USED TO PREVENT BENDING THE SLIDE ASSEMBLY IF CUTTER DECK STRIKES AN IMMOVABLE OBJECT.

**The cutter deck pivot cylinder is a single-acting cylinder having hydraulic pressure only for raising the cutter deck.** When working on steep banks with the cutter on the uphill side of tractor, the cutter deck can be raised high enough to go over the center of gravity. If this happens, the tractor will have to be driven to more level ground to lower deck. This condition should be avoided if possible.

**Always be aware that cutter deck and counter-weight box may extend beyond tractor.** This is especially important when working along roads and traveling through gates and around buildings. A slow moving vehicle (SMV) sign and tractor warning lights are recommended for working along highways. A bracket is provided on weight box for SMV sign.

**⚠ WARNING**

**ALL ROTARY CUTTERS HAVE THE ABILITY TO DISCHARGE OBJECTS AT HIGH SPEEDS, WHICH COULD RESULT IN SERIOUS INJURY TO BYSTANDERS OR PASSERS-BY.**

**THEREFORE, THIS CUTTER IS NOT TO BE OPERATED ALONG HIGHWAYS OR IN ANY AREA WHERE PEOPLE MAY BE PRESENT UNLESS ALL SIDES OF THE UNIT ARE ENCLOSED BY PERMANENT BANDS, SAFETY CHAINS, OR OTHER FACTORY APPROVED SAFETY SHIELDS THAT ARE IN GOOD REPAIR.**

**3-3 REVERSING BLADE ROTATION**

Some cutting operations may require a counter-clockwise blade rotation. This may be achieved by replumbing the reversible motor. Replumbing procedures are given in paragraph 4-9.

**⚠ WARNING**

**DO NOT OPERATE CUTTER WITH COUNTER-CLOCKWISE BLADE ROTATION UNLESS CUTTER DECK IS EQUIPPED WITH SAFETY CHAINS AND THE OPERATOR WEAR SAFETY GLASSES AND SAFETY (HARD) HAT. SAFETY CHAINS WILL REDUCE AMOUNT OF DEBRIS THROWN TOWARD OPERATOR. IT IS HIGHLY RECOMMENDED THAT OPERATOR BE PROTECTED WITH ROLLOVER PROTECTIVE SYSTEM (ROPS) ENCLOSED CAB AND THAT SEAT BELT BE USED FOR ALL MOWING OPERATIONS.**

**3-4 PARKING**

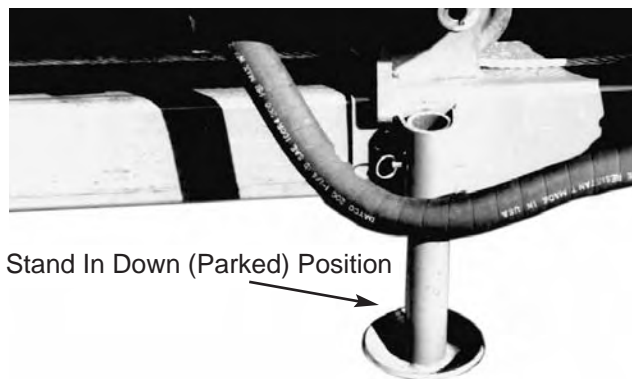
- A. Apply tractor parking brake.
- B. Disengage PTO drive.
- C. Slide cutter deck in.
- D. After all blade motion has stopped, raise and pin cutter deck in the travel position. (Fig. 2-3)

**⚠ WARNING**

**KEEP CLEAR OF MACHINE WHEN RAISING AND LOWERING THE CUTTER HEAD.**

- E. Pin stand in the down position. (Fig. 3-1)
- F. Lower implement to rest on ground.
- G. Shut down tractor.

Figure 3-1 Parking Stand





### 3-5 STORAGE

- A. Apply light coat of multi-purpose grease to sliding assemblies.
- B. Perform steps "A" through "G" in paragraph 3-4.
- C. Relieve hydraulic pressure by shifting implement control valve levers back and forth.
- D. Disconnect implement hydraulic lines connected to tractor. Make certain tractor auxiliary valves

neutral position before disconnecting lines.

- E. Remove valve kit from tractor (if used).
- F. Disconnect implement from 3-point hitch and driveline from PTO shaft.
- G. Clean debris from cutter deck to prevent corrosion.
- H. Oil all pivot points and cable sheaves.
- I. Wearing gloves and using an oil soaked rag, wipe down all hoses and cables.

## SECTION IV MAINTENANCE

### 4-1 MAINTENANCE CHECK LIST

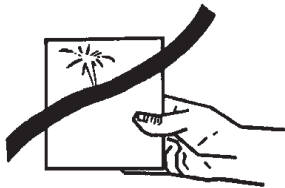
Perform scheduled maintenance as outlined in Table 4-1. Secure machine as outlined in paragraph 3-3 before doing maintenance inspections or work. All bolts should be torqued as recommended in Table 4-2 unless otherwise indicated.

**Table 4-1 Maintenance Check List**

1. Check hydraulic oil level in tank. Add as necessary to bring oil level to bottom of strainer. (See paragraph 4-2 for more details.)
2. Inspect hydraulic lines and fittings for wear or leaks. Replace only with genuine Bush Hog replacement parts.

#### WARNING

**WEAR EYE PROTECTION AND USE A PIECE OF CARDBOARD OR WOOD RATHER THAN HANDS TO SEARCH FOR HYDRAULIC LEAKS. ESCAPING HYDRAULIC OIL UNDER PRESSURE CAN PENETRATE THE SKIN. IF FLUID IS INJECTED INTO THE SKIN IT MUST BE SURGICALLY REMOVED BY A DOCTOR FAMILIAR WITH THIS FORM OF INJURY OR GANGRENE MAY RESULT.**



3. Check tractor tire air pressure. It is critical for stability that tractor tires carry proper air pressure. Refer to tractor operator's manual.
4. Check blades and spindle to be sure that no foreign objects such as wire or steel strapping bands are wrapped around them.
5. **Check blade bolts for tightness. Tighten to 450 ft./lbs. (609.7 Nm)**
6. Clean all debris from machine, especially underside of deck.

7. Check that cables are tight. Tighten per paragraph 4-7.
8. Inspect blades for wear. Replace if necessary per paragraph 4-6. Always replace both blades with a match pair. Use only genuine Bush Hog replacement parts.
9. Make certain chains and/or side bands are in good repair to minimize potential thrown debris or objects from cutter.
10. During operation, listen for abnormal sounds which might indicate loose parts, damaged bearings or other damage.
11. Perform BEFORE EACH USE lubrication per paragraph 4-2.

### 4-2 LUBRICATION (Refer to Fig. 4-1)

#### BEFORE EACH USE

1. Hydraulic Tank - Check hydraulic oil level. Fill as necessary to bring oil level to bottom of filler strainer or to side fill plug. Filter oil to 10 microns before adding. See paragraph 4-3 for recommended hydraulic oils.
2. PTO Driveline Universal Joints - Apply multi-purpose grease, with grease gun.
3. PTO Driveline Guard - Apply 2-3 shots of multi-purpose grease, with a grease gun, to plastic fitting. (1 fitting each end)

#### EVERY 40 HOURS

1. **PTO Driveline - Disconnect PTO driveline, separate the two sections, wipe inner (male) section clean, and apply multi-purpose grease to inside of outer (female) driveline section. Reassemble and install. Pull on each driveline section to make sure yokes lock into place.**
2. Slide Assemblies - Wearing gloves, clean sliding surfaces of dirt and grease. Apply thin coat of graphite based lubricant (preferred) or multi-purpose grease.
3. Spindle Assembly - With cutter deck in horizontal position, remove check plug at top of housing and check oil level. **Add EP80W-90 gear oil as necessary to fill to check plug.**

Figure 4-1 Lubrication

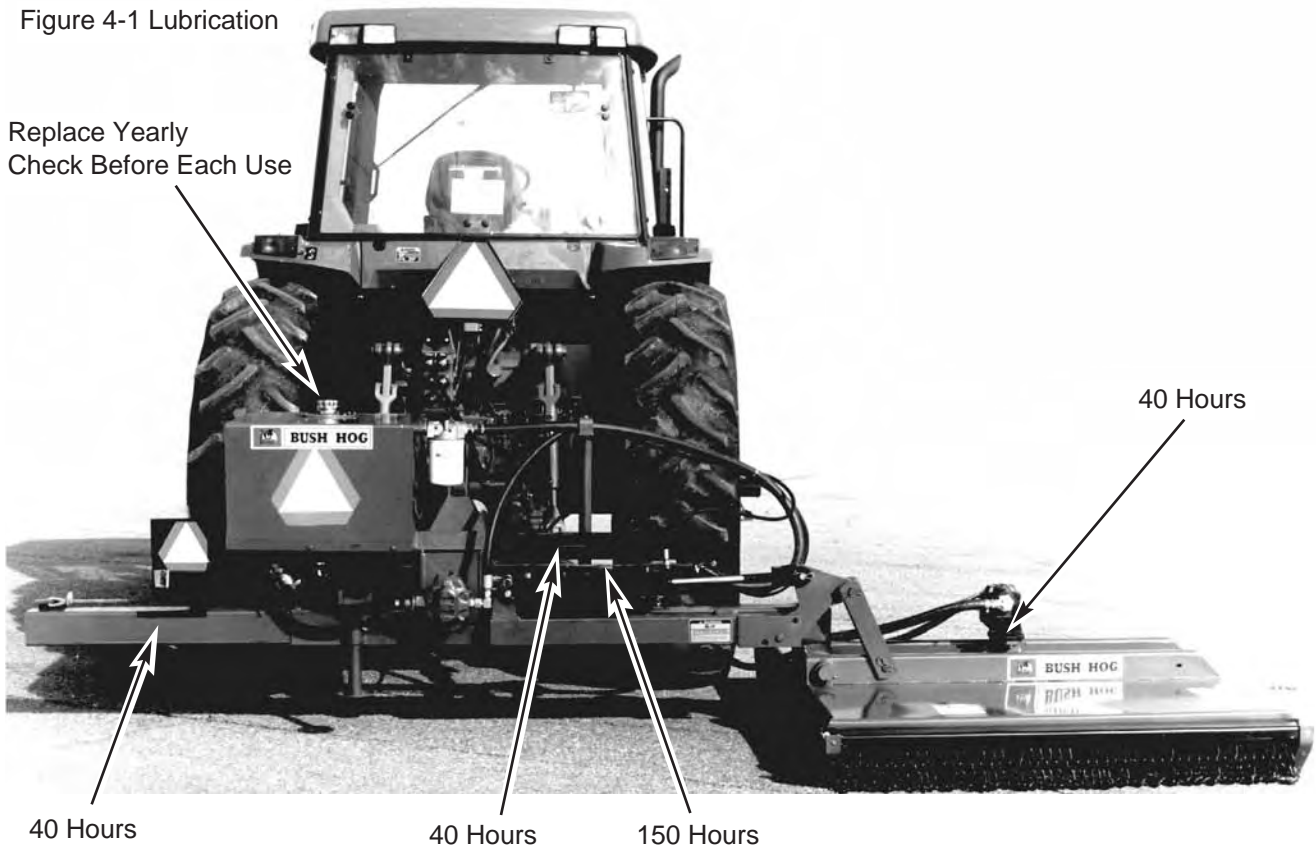
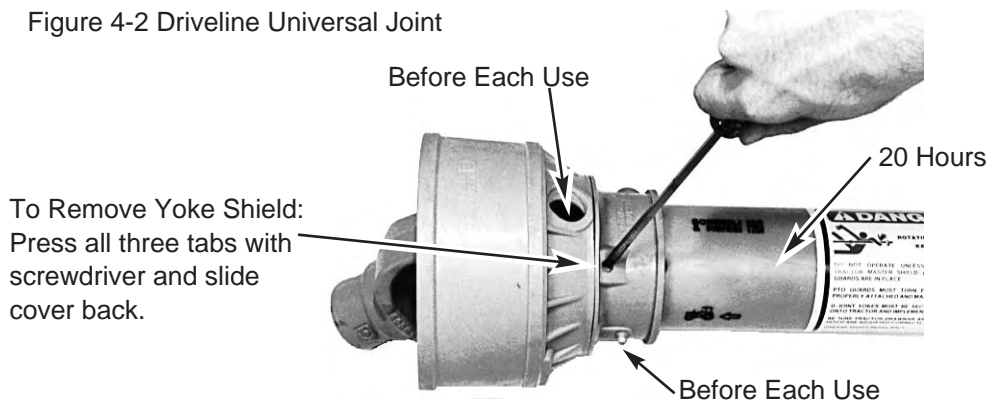


Figure 4-2 Driveline Universal Joint



**EVERY 150 HOURS**

1. Cables - Wearing gloves, wipe cables with an oil soaked rag.

**YEARLY**

1. Hydraulic Tank - Drain hydraulic tank while oil is warm. Clean suction strainer and filler strainer with compressed air. Replace return line filter. Refill tank with hydraulic oil. Filter oil to 10 microns before filling tank. See paragraph 4-3 for recommended hydraulic oils. Tank capacity is 35 gal. (132.5l.).

**NOTE**

The suction strainer and filler strainer are located inside the hydraulic tank. They are accessible by

removing the tank lid secured by eight self-tapping screws. A gasket is required for reassembly.

2. **Spindle Assembly - Drain spindle housing. Refill with EP80W-90 gear oil. Capacity is 26 fl. oz.**

**4-3 RECOMMENDED HYDRAULIC OILS**

Recommended hydraulic oils are listed in Table 4-3 (page 13). Other brands may be used provided they are equivalent. Approved hydraulic oils may be mixed provided that anti-wear oils are mixed with anti-wear oils. All hydraulic oils listed in Table 4-3 are anti-wear oils. **Do not use motor oil or transmission oil.**

#### 4-4 BLADE HOLDER REMOVAL (Fig. 4-3)

##### **⚠ WARNING**

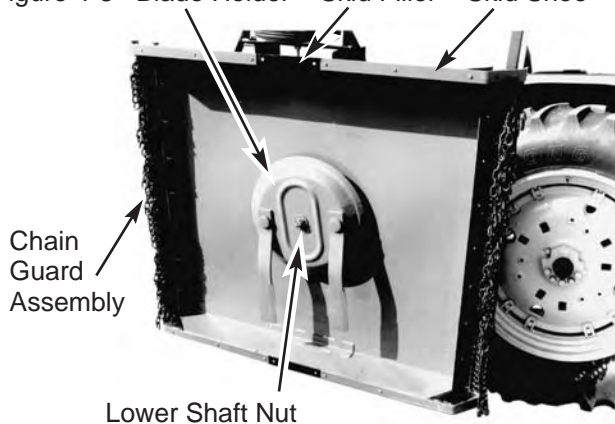
**THE CUTTER CAN FALL FROM HYDRAULIC SYSTEM FAILURE. TO AVOID SERIOUS INJURY OR DEATH, SECURELY SUPPORT CUTTER BEFORE WORKING UNDERNEATH.**

##### **NOTE**

**The spindle is a straight splined shaft, not a tapered shaft. Do not hit on end of spindle shaft as this will damage spindle assembly.**

- A. Remove cotter pin and castle nut.
- B. Pull blade holder off shaft. It may be necessary to remove blades and pan, then remove blade holder with gear puller.

Figure 4-3 Blade Holder Skid Filler Skid Shoe



#### 4-5 BLADE HOLDER INSTALLATION

- A. If blades were removed, perform steps "C" and "D" in paragraph 4-6 to reinstall blades and pan.
- B. Assemble blade holder and castle nut onto spindle shaft. **Tighten nut to 300 ft./lbs. (406 Nm).**
- C. Insert cotter pin.

#### 4-6 BLADE REPLACEMENT

##### **⚠ WARNING**

**THE CUTTER CAN FALL FROM HYDRAULIC SYSTEM FAILURE. TO AVOID SERIOUS INJURY OR DEATH, SECURELY SUPPORT CUTTER BEFORE WORKING UNDERNEATH.**

It is not necessary to remove the complete blade holder assembly to replace the blades. Blade bolts are accessible through a hole in the top of the cutter deck. Blades should only be replaced in matched pairs. Use only genuine Bush Hog replacements parts.

- A. Remove nuts from blade bolts.
- B. Inspect blade bolt shoulder for wear. Replace if necessary.
- C. Assemble new blades and pan to blade holder using blade bolts, nuts and lockwashers. **Tighten nuts to 450 ft./lbs. (610 Nm).**

D. Check to be sure that blades will swing freely. If blades will not swing freely, remove, locate problem, and repair. Operating cutter when blades will not swing freely will cause excessive stress and vibration causing damage to implement.

#### 4-7 CABLE ADJUSTMENT

A. Extend slide cylinder completely. Assure full extension by measuring from center of mounting pin to center of opposite mounting pin. **Measurement should be 72-3/4 in. (1847.8 mm).**

B. Put slack into cables by loosening eye bolts (if necessary).

C. Position counterweight box 1 inch (25.4 mm) from hydraulic tank.

D. Tighten eye bolts until slack is taken out of cables.

#### 4-8 ADJUSTING HYDRAULIC PRESSURE

**The hydraulic pressure for the cast iron system is preset from the factory at 3200 psi. If a hydraulic pressure adjustment is necessary, contact your authorized Bush Hog dealer.**

##### **⚠ WARNING**

**DO NOT ATTEMPT TO ADJUST HYDRAULIC SYSTEM PRESSURE. AN INCORRECT ADJUSTMENT COULD CREATE EXTREMELY HIGH PRESSURES RESULTING IN PERSONAL INJURY AND EQUIPMENT DAMAGE.**

#### 4-9 CHANGING BLADE ROTATION

(Fig. 4-4)

To change the direction of blade rotation perform the following procedures:

##### **⚠ WARNING**

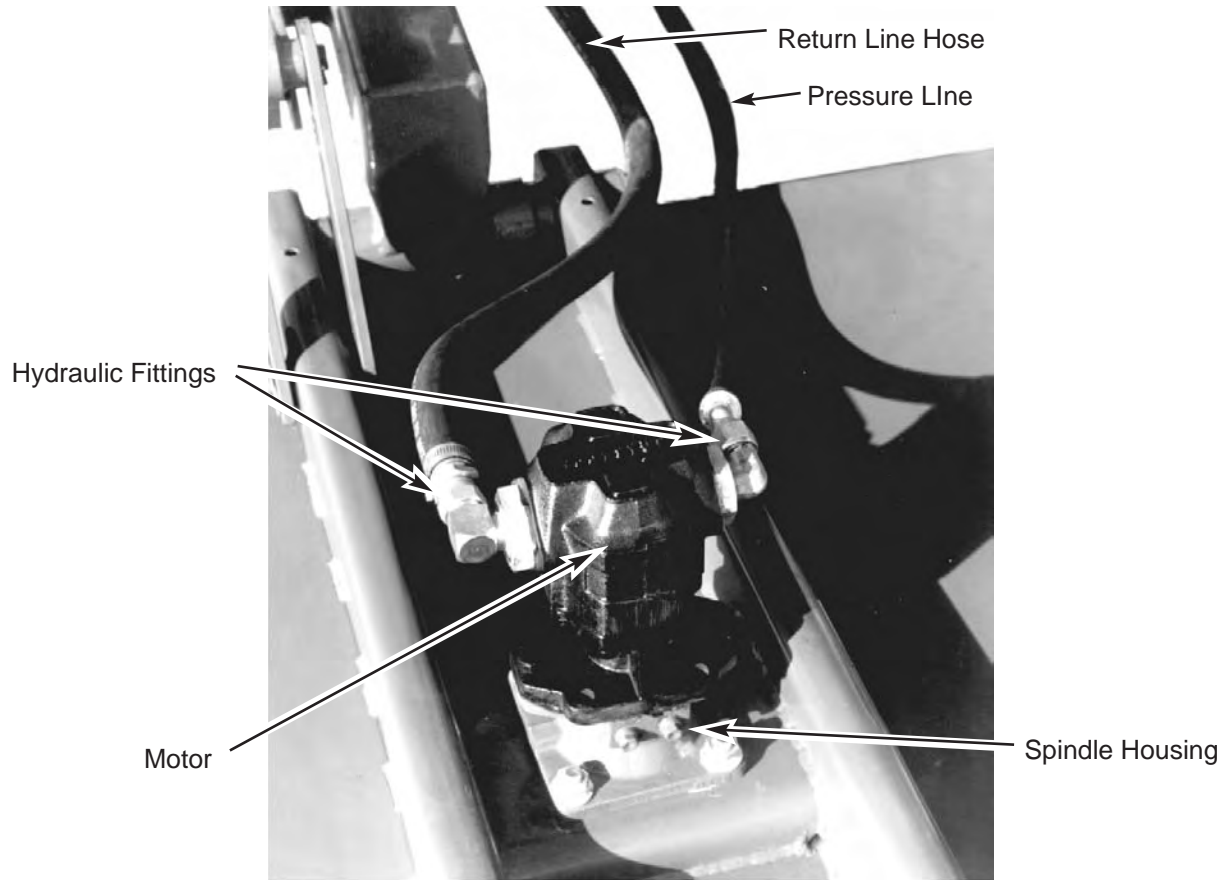
**DO NOT OPERATE CUTTER WITH COUNTERCLOCKWISE BLADE ROTATION UNLESS CUTTER DECK IS EQUIPPED WITH SAFETY CHAINS AND THE OPERATOR WEARS SAFETY GLASSES AND SAFETY (HARD) HAT. SAFETY CHAINS WILL REDUCE AMOUNT OF DEBRIS THROWN TOWARD OPERATOR. IT IS HIGHLY RECOMMENDED THAT OPERATOR BE PROTECTED WITH ROLLOVER PROTECTIVE SYSTEM (ROPS) ENCLOSED CAB AND THAT SEAT BELT BE USED FOR ALL MOWING OPERATIONS.**

A. Remove hydraulic pressure and return lines from connections on motor.

B. Remove hydraulic fittings from both sides of motor.

C. Remove bolts retaining motor to spindle housing.

Figure 4-4 Hydraulic Motor



D. Turn motor 180°. Reinstall bolts retaining motor to spindle housing.

E. Reinstall hydraulic fittings, and hoses. Replace fitting O-rings as necessary.

#### 4-10 TROUBLESHOOTING

Cleanliness is of primary importance for obtaining satisfactory life of hydraulic components. **The life of hydraulic components is dependent upon the degree of contamination in the hydraulic oil.** During usage, proper oil filling and servicing of filters, breather, tank, etc., cannot be over emphasized.

The hydraulic system must be cleaned after a major

contamination such as pump failure. This requires removal and individual flushing and cleaning of all components and lines that were exposed to the contaminated oil flow. **Flushing of the system components should be done with a suitable solvent or diesel fuel.** Clean the suction strainer, replace the return line filter, and refill tank with new hydraulic oil.

Troubleshooting procedures are listed in Table 4-4. If the problem cannot be solved or replacement parts are necessary, contact your authorized Bush Hog dealer. Please have ready your machine name, serial number, model number, purchase date, and exact cause or description of problem.

**Table 4-3 List of Recommended Hydraulic Oils**

Manufacturer	Hydraulic Oil	Manufacturer	Hydraulic Oil
Chevron	AW46	Mobil	DTE-25
Gulf	Harmony 46AW	Union 76	Hyd. Oil AW215
Texaco	Rando HD46	Exxon	Magnas A15
Citgo	AW46	Exxon	Nutoh 46
Shell	Tellus 46 HY Oil 46	Standard	EP Hyd. Oil #1

**Table 4-4 General Troubleshooting**

<b>TROUBLE</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
1. Hydraulic Pump Noisy	Cavitation	Check condition of suction strainer and return line filter. Clean or replace as necessary.
		Check for clogged or restricted inlet line to pump.
		Check for loose fittings on suction line.
		Clean hydraulic tank breather cap.
	Aeration	Check all connections on inlet side of pump. Pour hydraulic fluid over suspected leak. If noise stops, the leak has been found.
		Fill hydraulic tank to bottom of filler strainer.
		Check condition of pump shaft seal.
Pump worn or damaged	Overhaul or replace.	
2. Hydraulic fluid overheated (above 200° F [93°C])	Pressure too high	Contact authorized Bush Hog dealer.
	Fluid dirty or fluid level low	Clean or replace filter and strainer. Add fluid bring up to bottom of filler strainer.
	Hydraulic fluid incorrect viscosity.	Check fluid. Should a change of hydraulic fluid be required, flush entire system and change filters before adding new fluid.
	Continuously stalling cutter	See Item 3
	Hydraulic fluid bypassing internally due to worn pump, motor, or relieve valve.	Overhaul or replace faulty component.
3. Cutter stalls continuously	Low hydraulic pressure	Contact authorized Bush Hog dealer
	Cutting height too low.	Increase cutting height.
	PTO speed too slow	Increase to implement PTO speed rating.
	Tractor forward speed too fast.	Use lower gear.
4. Cutter deck will not pivot down.	Tractor on incline.	Move tractor to level position



# SECTION V ASSEMBLY



## **THE FOLLOWING SAFETY PRECAUTIONS SHOULD BE THOROUGHLY UNDERSTOOD BEFORE ATTEMPTING MACHINE ASSEMBLY.**

1. Wear personal protective equipment such as, but not limited to protection for eyes, ears, feet, hands, lungs and head when assembling the equipment. Do not wear loose clothing or jewelry that may catch on equipment moving parts.
2. Do not lift heavy parts or assemblies. Use crane, jack, tackle, fork trucks or other mechanical devices.
3. Select an area for assembly that is clean and free of any debris which might cause persons working on the assembly to trip.
4. Arrange parts to be assembled neatly in the work area and have tools or other mechanical assisting devices in easy reach.
5. Inspect all parts and assemblies thoroughly and remove any sharp edges, grease, oil or dirt which might cause pieces to slip when handling.
6. Preview the assembly instructions in your operator's manual before proceeding further.
7. If the assembly instructions call for parts or assemblies to be blocked up, use only blocking material that is in good condition and is capable of handling the weight of the assembly to be blocked. Also, insure that the blocking material is on a clean, dry surface.
8. Never put hands or any other part of body under blocked up assemblies if at all possible.
9. Always wear goggles or safety glasses when hammering, grinding, or drilling metal parts.
10. If the assembly calls for welding or cutting, be sure that there are no flammable materials close at hand and that bystanders have taken necessary precautions.

## **AFTER COMPLETING ANY ASSEMBLY STEP, THOROUGHLY READ THE NEXT STEP IN THE ASSEMBLY INSTRUCTIONS BEFORE PROCEEDING WITH THAT STEP.**

11. After completing assembly, thoroughly inspect the machine to be sure that all nuts, bolts, hydraulic fittings or any other fastened assemblies have been thoroughly tightened.
12. After completing assembly, be sure that all safety locking devices or guards are in place.
13. Before operating the machine, thoroughly read the operation section of this manual.
14. Before operating the machine, read the maintenance section of this manual to be sure that any parts requiring lubrication such as gearboxes are full to avoid any possible damage.

## **BEFORE OPERATING THE EQUIPMENT, IF YOU HAVE ANY QUESTIONS REGARDING THE PROPER ASSEMBLY OR OPERATION, CONTACT YOUR AUTHORIZED BUSH HOG DEALER OR REPRESENTATIVE.**

## 5-1 BASIC MACHINE ASSEMBLY



**BASE UNIT IS EXTREMELY TOP HEAVY WHEN DISCONNECTED FROM CUTTER DECK AND SHOULD BE MOVED ONLY BY CONNECTING TO TRACTOR 3-POINT HITCH. DO NOT REMOVE WOODEN SUPPORT UNLESS UNIT IS CONNECTED TO TRACTOR 3-POINT HITCH OR OVERTURNING WILL RESULT.**

- A. Connect base unit to tractor 3-point hitch.
- B. Remove wooden support.
- C. With cutter deck flat on ground, connect it to base unit using pivot pin, two washers and roll pins.
- D. Connect lift linkage to cutter deck with pin and

roll pins. It may be necessary to remove cylinder port caps to extend cylinder. With port caps removed, watch out for oil spraying out of cylinder ports.

E. Remove cover plate and gasket from spindle housing on cutter deck. Remove O-ring gasket packed inside spindle housing and retain for motor installation.

F. **Fill spindle housing with 26 fl. oz. of EP80W-90 gear oil or until oil reaches check plug.**

G. Mount hydraulic motor to spindle housing using O-ring gasket to seal. Fasten with nuts, bolts and lockwashers removed from cover plate.

H. Assemble hydraulic valve kit (Fig. 5-1) or tractor kit (Fig. 5-2). Use pipe joint compound on pipe fittings only. **Do not use thread tape.** Do not over-tighten fittings.

I. Check hydraulic oil level. Fill as needed to bring oil level to bottom of filler strainer. See paragraph 4-3 for compatible hydraulic oils.

Figure 5-1 Hydraulic Valve Kit

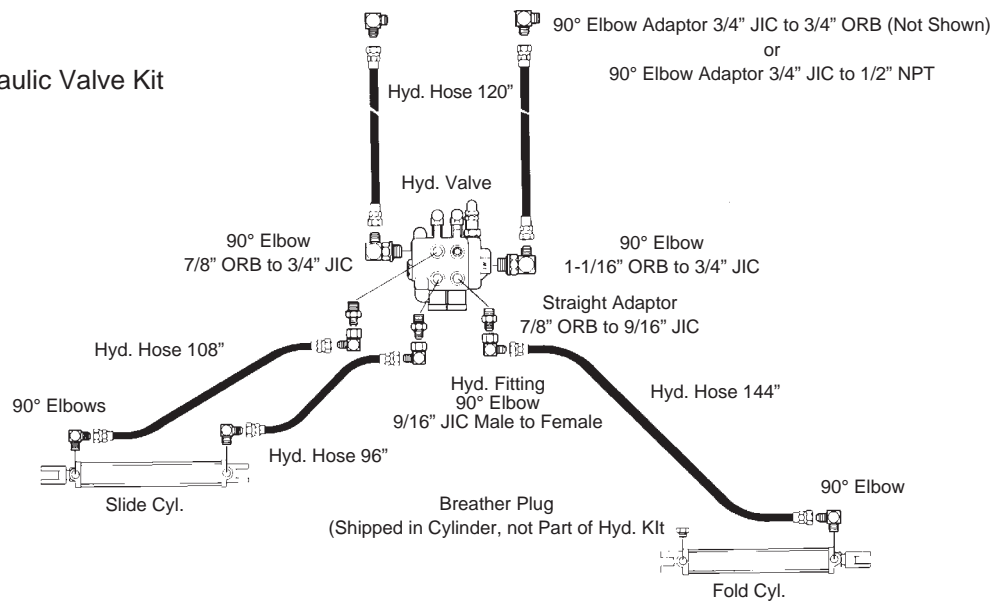
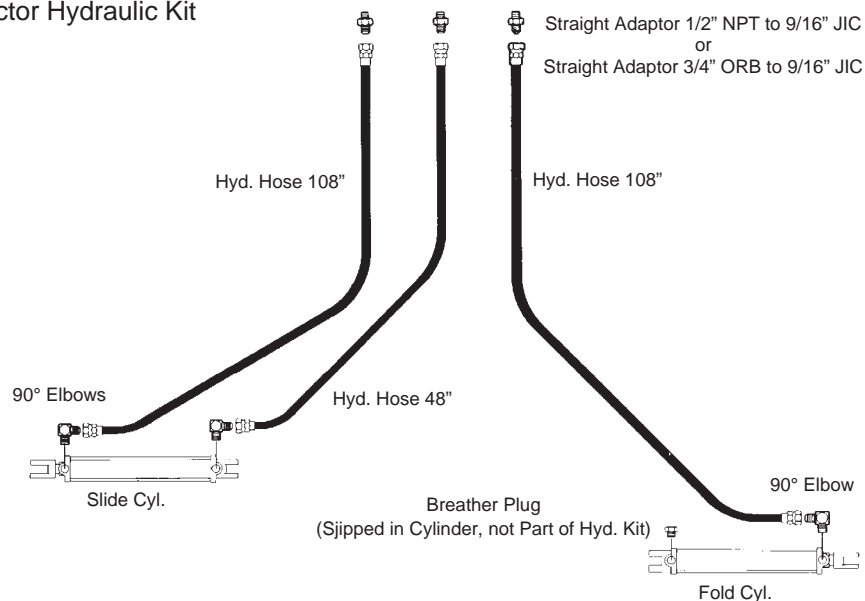


Figure 5-2 Tractor Hydraulic Kit



**CAUTION**

**USE OF THIS MACHINE ON TOO SMALL A TRACTOR CAN CAUSE TRACTOR UPSET. DO NOT USE THIS MACHINE ON A TRACTOR WEIGHING LESS THAN 6000 LBS. (2722 kg), NOT INCLUDING BALLAST. IT IS RECOMMENDED THAT FRONT BALLAST BE USED FOR ADDED STEERING STABILITY. THIS MACHINE REQUIRES 50 PTO HORSEPOWER.**

**5-2 OPTIONAL SAFETY CHAIN INSTALLATION**

- A. Place cutter deck in the travel (stored) position. Insert transport lock pin.
- B. Remove the skid shoes from the side bands.
- C. Position chain guard assembly so that mounting holes align with holes in deck.
- D. Fasten using 3/8 x 1-1/4" bolts, flatwashers, lockwashers, and nuts. (Fig. 5-3)
- E. Align skid shoes with holes in chain guard assembly and side bands.
- F. Fasten skids into position with 3/8 x 1-1/4" clipped share bolts, flatwasher, lockwashers and nuts.
- G. If chain assemblies are used on the front and rear of the cutter deck, skid fillers should be installed between the front and rear skid shoes. (Fig. 4-3)

**5-3 BELTING INSTALLATION**

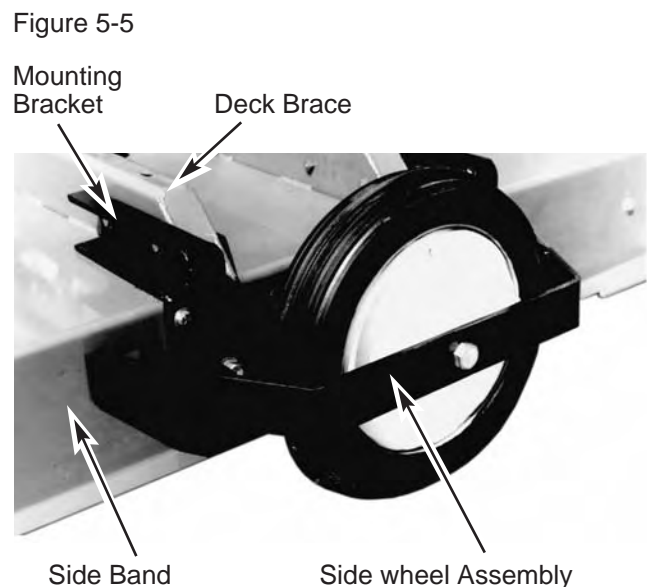
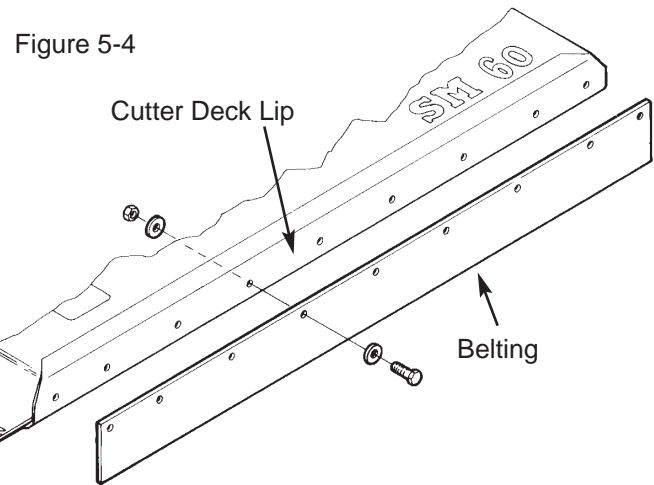
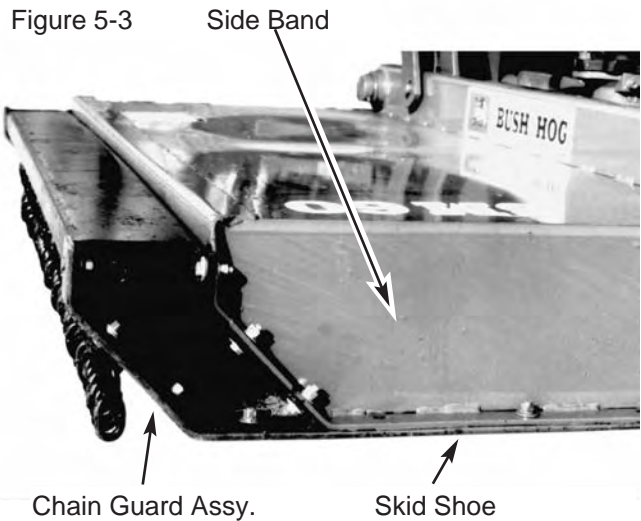
- A. Align belting with holes in lip of cutter deck.
- B. Fasten with 3/8 x 1-1/4" bolts, flatwashers and locknuts. (Fig. 5-4)

**5-4 OPTIONAL SIDEWHEEL INSTALLATION**

- A. Position sidewheel on cutter deck as shown (Fig. 5-5)
- B. Fasten sidewheel assembly to cutter deck using 3/8 x 3" bolts and locknuts through deck braces and 3/8 x 1-1/4" bolts and locknuts through side band.

The sidewheel is adjustable in one inch increments for a cutting height of 1-6 inches. To adjust, remove bolts securing wheel assembly to mounting brackets. Reassemble installing bolts in holes corresponding to desired cutting height.

When cutter is equipped with both sidewheel and tailwheel, the adjustment of one can affect adjustment of the other. When cutting a ditch or bank, sidewheel and tailwheel can be adjusted independently as needed.



## 5-5 OPTIONAL TAILWHEEL INSTALLATION

A. Position mounting bracket against underside of frame as shown. (Fig. 5-6)

B. Position mounting plate on top side of frame and fasten with four 5/8 x 7-1/2" bolts and locknuts.

C. Apply warning decal to top of tailwheel beam.

### ADJUSTMENT

The tailwheel is adjustable in one inch increments using collars on tailwheel spindle. To adjust, raise cutter and securely block in position. While holding wheel, remove pin from spindle. Remove wheel assembly from mounting bracket. Stack spacers on spindle as necessary to achieve desired height. Large spacers are two inches, small spacers are one inch.

Slide spindle back into bracket placing remaining collars on top of spindle. Install retaining pin. Note that any change in tailwheel height should be followed by a 3-point hitch top link adjustment to keep cutter level.

### WARNING

**TAILWHEEL IS NOT TO BE USED TO SUPPORT CUTTER AT TRANSPORT SPEEDS. MAXIMUM SPEED FOR TAILWHEEL IS 6 MPH. EXCEEDING THIS SPEED COULD CAUSE EQUIPMENT FAILURE WITH POSSIBLE INJURY TO OPERATOR.**

Note that when cutter is equipped with both side-wheel and tailwheel, the adjustment of one can affect adjustment of the other. If the cutting height is higher than 4 inches, cutter must be totally supported by tractor 3-point lift. When cutting a ditch or bank, sidewheel and tailwheel can be adjusted independently as needed.

## 5-6 OPTIONAL VALVE MOUNTING BRACKET INSTALLATION (Fig. 5-7)

A. Place bottom bracket at desired mounting location. Mark 2-4 holes (as needed) for drilling using bracket as pattern. Drill holes using 13/32 drill bit.

B. Mount lower bracket using four 3/8 x 1-1/2" bolts, nuts, flatwashers and lockwashers.

C. Attach valve to top bracket using three 3/8" x 2-1/2" bolts, nuts and lockwashers.

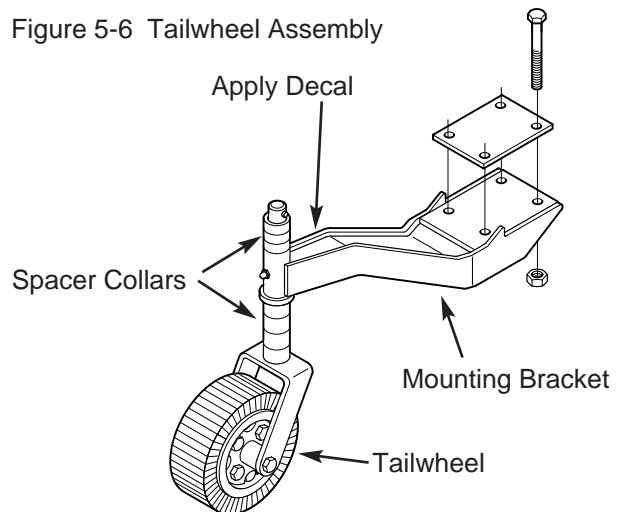
D. Mount top bracket to bottom bracket using quarter turn fasteners. Insert quarter turn fastener into clip-on receptacle and turn 90 degrees.

E. Install hydraulic fittings as shown in Fig. 5-7 (if necessary).

## 5-7 HITCH PIN ORIENTATION (Fig. 5-8)

Insert lower hitch pins through hitch lugs on frame according to category hitch of your tractor. Locate bolt and bushing as shown in illustration.

Figure 5-6 Tailwheel Assembly



Disconnect Hose and Install this 90° Adaptor. Reconnect Hose 3/4" JIC Female to 3/4" JIC Male

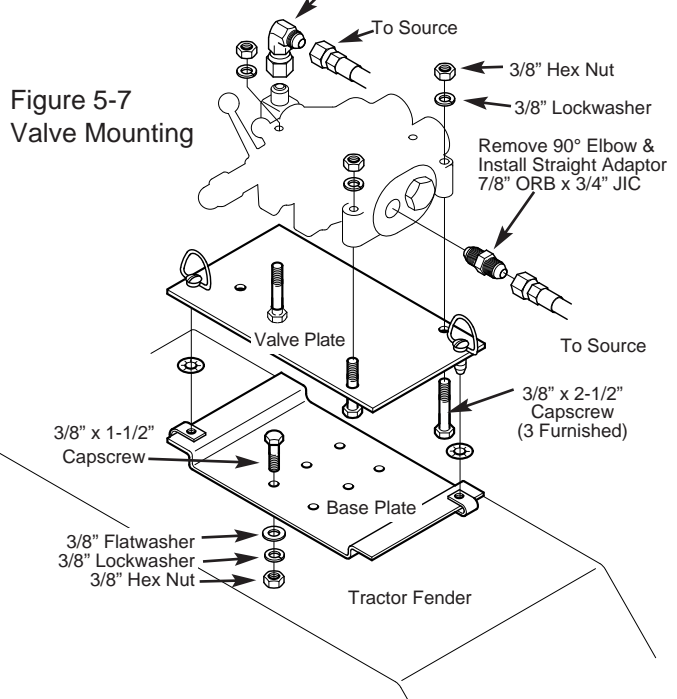
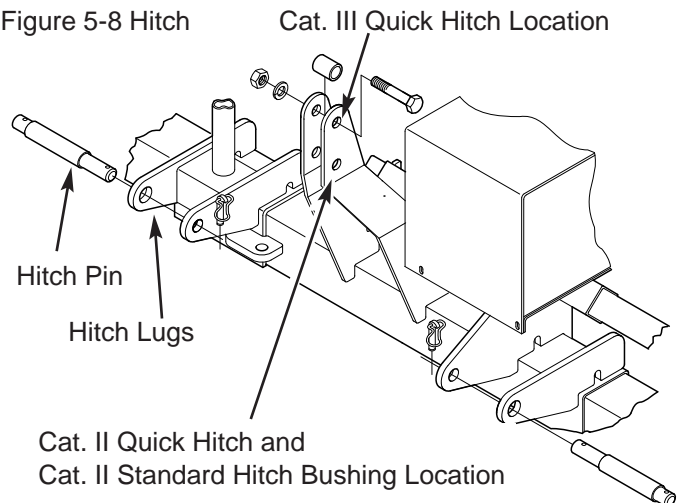


Figure 5-7 Valve Mounting

Figure 5-8 Hitch



# SAFETY DECALS

To promote safe operation, Bush Hog supplies safety decals on all products manufactured. Because damage can occur to safety decals either through shipment, use or reconditioning, Bush Hog will, upon request, provide safety decals for any of our products in the field at no charge. Contact your authorized Bush Hog dealer for more information.

**WARNING**



**TO AVOID SERIOUS INJURY OR DEATH:**

- READ OPERATOR'S MANUAL BEFORE OPERATING AND FOLLOW ALL PRECAUTIONS. (CONTACT DEALER FOR MANUAL)
- KEEP SHIELDS AND GUARDS IN PLACE. KEEP CLEAR OF DRIVES AND BELTS.
- LOWER IMPLEMENT, STOP ENGINE AND PTO. ALLOW ALL MOVING PARTS TO STOP AND REMOVE KEY BEFORE DISMOUNTING FROM TRACTOR.
- KNOW HOW TO STOP TRACTOR AND EQUIPMENT QUICKLY IN AN EMERGENCY.
- ALLOW NO CHILDREN OR UNQUALIFIED PERSONS TO OPERATE EQUIPMENT.
- BE CAREFUL ON UNEVEN TERRAIN. DECREASE SPEED WHEN TURNING.
- DO NOT OPERATE MOWER IN TRANSPORT POSITION.

**WARNING**



**IMPLEMENT CAN FALL FROM HYDRAULIC SYSTEM RELEASE. TO AVOID SERIOUS INJURY OR DEATH:**

- SHUT OFF TRACTOR ENGINE, REMOVE KEY, SECURE TRACTOR PARKING BRAKE AND BLOCK UP OR SECURELY SUPPORT IMPLEMENT BEFORE WORKING UNDERNEATH.
- PURGE ALL AIR FROM HYDRAULIC SYSTEM BEFORE ATTEMPTING TO RAISE OR LOWER THIS IMPLEMENT.
- STAND CLEAR IF LOWERING OR RAISING IMPLEMENT.
- DO NOT USE HAND OR SKIN TO CHECK FOR HYDRAULIC LEAKS. USE CARDBOARD OR WOOD.
- HIGH PRESSURE OIL LEAKS CAN PENETRATE SKIN CAUSING SERIOUS INJURY AND GANGRENE. CONSULT A PHYSICIAN IMMEDIATELY.
- LOWER THE IMPLEMENT AND RELEASE HYDRAULIC PRESSURE BEFORE LOOSENING FITTINGS.
- REFER TO OWNER'S MANUAL FOR DETAILS.

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**DANGER**



**ROTATING DRIVELINE CONTACT CAN CAUSE DEATH KEEP AWAY!**

**DO NOT OPERATE WITHOUT -**

- ALL DRIVELINE GUARDS, TRACTOR AND EQUIPMENT SHIELDS IN PLACE
- DRIVELINES SECURELY ATTACHED AT BOTH ENDS
- DRIVELINE GUARDS THAT TURN FREELY ON DRIVELINE



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**WARNING**



**IMPLEMENT CAN FALL FROM HYDRAULIC SYSTEM FAILURE. TO AVOID SERIOUS INJURY OR DEATH:**

- SHUT OFF TRACTOR ENGINE, REMOVE KEY, SECURE TRACTOR PARKING BRAKE AND BLOCK UP OR SECURELY SUPPORT IMPLEMENT BEFORE WORKING UNDERNEATH.
- PURGE ALL AIR FROM HYDRAULIC SYSTEM BEFORE ATTEMPTING TO RAISE OR LOWER THIS IMPLEMENT.
- STAND CLEAR IF LOWERING OR RAISING IMPLEMENT.
- DO NOT USE HAND OR SKIN TO CHECK FOR HYDRAULIC LEAKS. USE CARDBOARD OR WOOD.
- HIGH PRESSURE OIL LEAKS CAN PENETRATE SKIN CAUSING SERIOUS INJURY AND GANGRENE. CONSULT A PHYSICIAN IMMEDIATELY.
- LOWER THE IMPLEMENT AND RELEASE HYDRAULIC PRESSURE BEFORE LOOSENING FITTINGS.
- REFER TO OWNER'S MANUAL FOR DETAILS.

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**DANGER**



**GUARD MISSING DO NOT OPERATE**

**DANGER**



**GUARD MISSING DO NOT OPERATE**

**DANGER**

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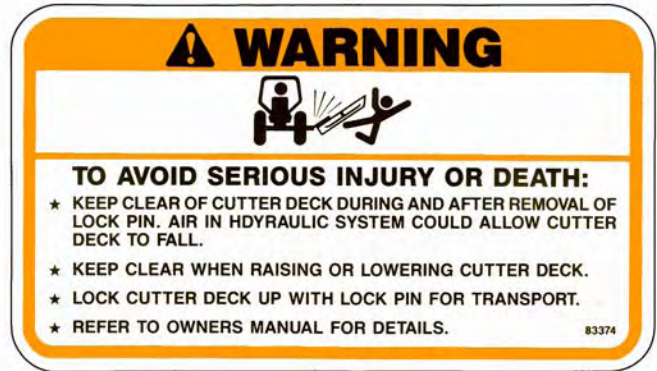
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# SAFETY DECALS CONTINUED



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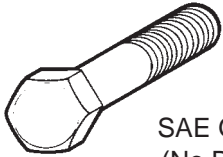
83375

# TORQUE SPECIFICATIONS

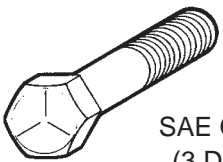
Proper torque for American fasteners used on Bush Hog equipment.  
Recommended Torque in Foot Pounds (Newton Meters).\*

## AMERICAN

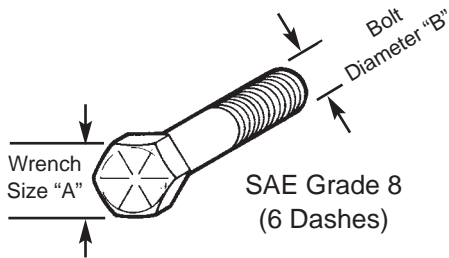
Bolt Head Markings



SAE Grade 2  
(No Dashes)



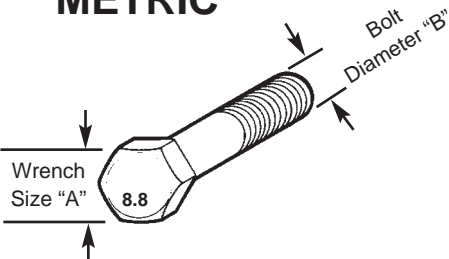
SAE Grade 5  
(3 Dashes)



SAE Grade 8  
(6 Dashes)

WRENCH SIZE (IN.) "A"	BOLT DIAMETER (IN.) "B" AND THREAD SIZE	SAE GRADE 2	SAE GRADE 5	SAE GRADE 8
7/16	1/4 - 20 UNC	6 (7)	8 (11)	12 (16)
7/16	1/4 - 28 UNF	6 (8)	10 (13)	14 (18)
1/2	5/16 - 18 UNC	11 (15)	17 (23)	25 (33)
1/2	5/16 - 24 UNF	13 (17)	19 (26)	27 (37)
9/16	3/8 - 16 UNC	20 (27)	31 (42)	44 (60)
9/16	3/8 - 24 UNF	23 (31)	35 (47)	49 (66)
5/8	7/16 - 14 UNC	32 (43)	49 (66)	70 (95)
5/8	7/16 - 20 UNF	36 (49)	55 (75)	78 (106)
3/4	1/2 - 13 UNC	49 (66)	76 (103)	106 (144)
3/4	1/2 - 20 UNF	55 (75)	85 (115)	120 (163)
7/8	9/16 - 12 UNC	70 (95)	109 (148)	153 (207)
7/8	9/16 - 18 UNF	79 (107)	122 (165)	172 (233)
15/16	5/8 - 11 UNC	97 (131)	150 (203)	212 (287)
15/16	5/8 - 18 UNF	110 (149)	170 (230)	240 (325)
1-1/8	3/4 - 10 UNC	144 (195)	266 (360)	376 (509)
1-1/8	3/4 - 16 UNF	192 (260)	297 (402)	420 (569)
1-5/16	7/8 - 9 UNC	166 (225)	430 (583)	606 (821)
1-5/16	7/8 - 14 UNF	184 (249)	474 (642)	668 (905)
1-1/2	1 - 8 UNC	250 (339)	644 (873)	909 (1232)
1-1/2	1 - 12 UNF	274 (371)	705 (955)	995 (1348)
1-1/2	1 - 14 UNF	280 (379)	721 (977)	1019 (1381)
1-11/16	1-1/8 - 7 UNC	354 (480)	795 (1077)	1288(1745)
1-11/16	1-1/8 - 12 UNF	397 (538)	890 (1206)	1444 (1957)
1-7/8	1-1/4 - 7 UNC	500 (678)	1120 (1518)	1817 (2462)
1-7/8	1-1/4 - 12 UNF	553 (749)	1241 (1682)	2013 (2728)
2-1/16	1-3/8 - 6 UNC	655 (887)	1470 (1992)	2382 (3228)
2-1/16	1-3/8 - 12 UNF	746 (1011)	1672 (2266)	2712 (3675)
2-1/4	1-1/2 - 6 UNC	870 (1179)	1950 (2642)	3161 (4283)
2-1/4	1-1/2 - 12 UNF	979 (1327)	2194 (2973)	3557 (4820)

## METRIC



Numbers appearing on bolt heads indicate ASTM class.

Proper torque for metric fasteners used on Bush Hog equipment.  
Recommended torque in foot pounds (newton Meters).\*

WRENCH SIZE (mm) "A"	BOLT DIA. (mm) "B"	ASTM 4.6	ASTM 8.8	ASTM 9.8	ASTM 10.9
8	5	1.8 (2.4)		5.1 (6.9)	6.5 (8.8)
10	6	3 (4)		8.7 (12)	11.1 (15)
13	8	7.3 (10)		21.1 (29)	27 (37)
16	10	14.5 (20)		42 (57)	53 (72)
18	12	25 (34)	74 (100)	73 (99)	93 (126)
21	14	40 (54)	118 (160)	116 (157)	148 (201)
24	16	62 (84)	167 (226)	181 (245)	230 (312)
30	20	122 (165)	325 (440)		449 (608)
33	22		443 (600)		611 (828)
36	24	211 (286)	563 (763)		778 (1054)
41	27		821 (1112)		1138 (1542)
46	30	418 (566)	1119 (1516)		1547 (2096)

\*Use 75% of the specified torque value for plated fasteners. Use 85% of the specified torque values for lubricated fasteners.



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