

Tractor Safety

1. 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.
2. Do not allow children to operate the cutter. Do not allow adults to operate it without proper instruction.
3. Do not carry passengers.
4. Keep the area of operation clear of all persons, particularly small children and pets. The operator should cease mowing whenever anyone comes with the operating area.
5. Clear the work area of objects which might be picked up and thrown.
6. 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.
7. Do not operate without all guards and shields in place and in good condition.
8. Lower implement to ground, stop tractor engine, apply parking brake, and allow blades to completely stop before leaving the tractor.
9. Keep hands and feet away from blades.
10. 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.
11. 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.
12. When performing adjustments or maintenance on the cutter, first lower it to the ground or block it securely at a workable height.
13. Never stand between tractor and cutter while tractor is being backed to the cutter hitch.
14. Reduce speed when transporting cutter to avoid bouncing and momentary loss of steering.
15. Use tractor flashing warning lights, day or night, when transporting cutter on road or highways unless prohibited by law.
16. Stand clear of wing(s) when raising or lowering.
17. Purge air from hydraulic system before attempting to raise or lower wings.
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) enclosed cab, and a seat belt.

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 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 II Preparation for Use

2-1 Attaching to Tractor

- A. **Important-Adjust tractor drawbar length to dimension shown in Figure 2-1. Incorrect drawbar length will change angle of driveline causing possible damage to constant velocity joint. Do not use PTO adapters. Use of PTO adapters will invalidate your warranty.** See operator's manual for drawbar adjustment procedures.

Bush Hog offers a driveline to match your tractor PTO shaft. The proper driveshaft should always be used instead of a PTO adapters.

Important

PTO Adapters should not be used with any Bush Hog Equipment. Failure to follow these instructions will cause driveline failure and possible tractor damage.

- B. Raise cutter using jackstand until tongue is at drawbar height.
- C. Connect cutter to tractor using 1-inch (25.4 mm) diameter approved pin with lynch pin retainer or equivalent.
- D. If connecting cutter hydraulic lines directly to tractor, wing hydraulic lines must be connected to tractor outlets that permit flotation of wings.
- E. If optional valve is used, mount as desired. If optional valve mounting bracket is used with valve, attach to tractor as described in paragraph 2-2.
- F. Connect hydraulic lines to tractor auxiliary outlet(s)

Warning!

Use a piece of cardboard or wood rather than hands and wear eye protection when searching for hydraulic leaks. Escaping hydraulic oil under pressure can penetrate skin. If oil is injected into skin, it must be surgically removed within a few hours by a doctor or gangrene may result.

- G. Unpin wing lift cylinders at rod end. Fully extend cylinders by pulling on clevis. Retract cylinders using hydraulic valve. This removes most of the air from cylinder. Repin Cylinders.
- H. Attach driveline on tractor and cutter with constant velocity joint at tractor. Pull on each driveline section to be sure yokes lock into place. Make certain driveline shielding is in place and in good condition.
- I. Attach driveline shield chains from both ends of driveline shielding to stationary location. Note: The shield around the constant velocity joint should not be chained in place.
- J. Remove jackstand and pin in storage position on deck.

2-2 Optional Valve Mounting Bracket Installation (Figure 2-2)

- 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, flat washers and lock washers.
- C. Attach valve to top bracket using three 3/8" x 2-1/2" bolts, nuts, and lock washers.
- D. Mount top bracket to bottom bracket using quarter turn fasteners. Insert quarter turn fastener into clip-on receptacle and turn 90 degrees.

Caution!

Failure to match valve to tractor hydraulic system by using incorrect plug will cause damage to tractor.

2-3 Pitch Adjustment

The pitch of the cutter (front or rear) is controlled by adjusting the link rods. Shortening the linkage rod assemblies will raise the front of the cutter. Lengthening the linkage rod assemblies will lower the front of the cutter. The pitch adjustment is primarily for compensating for the different height of tractor drawbar. As described in the following, it can also be used to alter the cutting performance. Note that operating the cutter at any pitch other than the parallel to the ground will produce a slightly uneven cut.

Warning!

To avoid serious injury or death: Operating cutter with rear lowered excessively will result in an uneven cut and could cause rapid blade, skid, and driveline wear and possibly cause structural failures in the wing hinge area.

Warning!

To avoid serious injury or death: do not place hands, feet, or other parts of the body under cutter while making adjustments. Never make adjustments with cutter operating.

Important

Never adjust the turnbuckle so that the threaded end of any rod is not fully engaged in the turnbuckle.

Adjust the pitch as follows:

- A. Loosen jam nut on each linkage rod assembly.
- B. Use the turnbuckles to lengthen or shorten the leaving rod assemblies. Shortening the rods will raise the front of the cutter and lengthening rods will lower the front of the cutter. While adjusting, alternate from one rod to the other.
- C. When the desired pitch is attained, make a final adjustment of the rods so that each will be under the same amount of tension. This may be done by tapping the rods and “tuning” them to the same sound.
- D. Re-tighten jamnut.

Note

If the cutter is allowed to rest on the ground in order to relieve tension on the rods, the tongue must be disconnected from the tractor to allow it to move.

2-4 Wing Adjustment

Wings should be adjusted before use if they are not level (parallel) left to right with center deck section. Adjust as follows:

- A. Lower cutter until skids on center section are approximately 1-2 inches (25-51 mm) off ground.
- B. Remove wing transport lock pin (s) and place in pin storage hole.

Warning!

To avoid serious injury or death: stand clear of wing (s) during and after removal of transport lock pin (s). Air in hydraulic components may allow wing (s) to fall. Do not “Drive out” pin if it is tight against wing lug. To remove pin, retract wing left cylinder to relive load on pin.

- C. Lower wing (s) to ground allowing weight to rest on wheel (s).
- D. If wing (s) are not level (parallel to center section), back jamnut off and adjust turnbuckle shorter to raise the wing outside edge and longer to lower the wing outside edge. It may be necessary to use wing lift cylinder to relieve pressure from the linkage retaining pin.
- E. Tighten jam nut when complete.

Prior to engaging PTO drive, all gearboxes should have the proper level of gear oil and all lubrication points should be serviced according to the “Maintenance Section.”

Section III Operating Instructions

3-1 General Safety

Only qualified people should operate this machine. Operator should wear hard hat, safety glasses, and safety shoes. It is recommended that tractor be equipped with Rollover Protective System (ROPS) and a seat belt be used. Before beginning operation, clear work area of objects that may be picked up and thrown. Check for ditches, stumps, holes or other obstacles that could upset tractor or damage brake, and allow cutter blades to come to a complete stop before dismounting tractor.

3-2 Transporting

When implement is transported on road or highway, day or night, use tractor flashing warning lights unless prohibited by law. A slow moving vehicle (SMV) sign must be visible from the rear by approaching vehicles. A bracket for SMV sign is provided on the center axle support. Do not exceed 15 mph (24 kph) when traveling. Prepare machine for transporting as follows:

- A. Disengage tractor PTO.
- B. Raise cutter and install stop collars on height adjustment cylinder. Install transport lock.
- C. Raise wing(s) and insert transport lock pin(s).

3-3 Operation

- A. Perform Before Each Use maintenance listed in paragraph 4-1.
- B. Make certain jack stand is stored for work.
- C. Start tractor. Raise cutter and remove stop collars and transport lock. Remove wing transport lock pins and place in storage hole. Lower wings to working position. Raise/Lower cutter to working height. The cutter should be operated at the highest position that will give desired cutting results. This will help prevent the blades from striking the ground, reducing blade wear and undue strain on the whole machine. Continuous ground and blade contact could force blades into deck area.
- D. Install stop collars to stop cylinder at cutting height. Store remaining stop collars (if any) around self-leveling linkage rod.
- E. With tractor at idle speed, engage PTO drive.

Important

During operation, the hydraulic valve wing levers must be locked in the float position to avoid damage to the cylinders and axles.

Warning!

To avoid serious injury or death: It is hazardous to operate unit with wings raised above ground.

Warning!

To avoid serious injury or death: keep clear of machine when raising or lowering wings. Do not “Drive out” transport lock pin if it is tight against wing lug. To remove pin, retract wing lift cylinder to relieve load on pin.

Danger!

Stay clear of rotating drivelines. Do not operate without driveline shields in place and in good condition. Failure to heed these warnings may result in personal injury or death.

Danger!

Rotary cutter blades. Stand well clear until all motion has stopped. To avoid an accidental fall from tractor and possible injury or death by mower, it is recommended that tractor be equipped with rollover protective system (ROPS) and a seat belt be used by the operator for all mowing operations.

- F. Place tractor in gear and proceed forward. Advance tractor throttle to correct PTO speed for implement (540 or 1000 RPM). Tractor forward speed should be controlled by gear selection, not engine speed. **For maximum cutting efficiency, forward speed should allow cutter to maintain a constant, maximum blade speed.** Failure to maintain proper blade RPM will result in poor cutting performance and excessive blade and blade bolt wear. If PTO drive is disengaged due to cutter stalling or tractor engine bogging, cutter must be raised to maximum cutting height and tractor throttle reduced to idle before re-engaging. Rear deck bands can be installed when extra mulching or foliage is desired. When in areas with tall, dense material, the front skids may push material over and hold it down long enough to prevent blades from cutting it. This will be evidenced by streaking in the skid area. To alleviate this problem, remove the front skids.

Section IV Maintenance**4-1 Maintenance Check List**

Perform scheduled maintenance as outlined below. Lower machine to ground, turn off tractor and set parking brake before doing maintenance inspections or work. Some checks may require raising machine off ground and supporting with blocks. All bolts should be torqued as recommended in Torque Chart unless otherwise indicated.

Warning!

The cutter can fall from hydraulic system failure. To avoid serious injury or death, securely support cutter before working underneath.

Before Each Use

1. Make certain driveline shields are in place and in good repair to minimize entanglement injuries to persons by rotating drivelines.
2. Make certain deflector shields (chains, bands, etc.) are in good repair to minimize injuries to persons by the discharge of high speed thrown objects.
3. Inspect blades for wear. Replace if necessary per paragraph 4-3. **Always replace both blades on spindle with two blades equal to weight. Use only genuine Bush Hog replacement blades.**
4. Check blade bolts for tightness. **Tighten to 600ft./lbs. (812 Nm).**
5. Check blades and spindles to be sure that no foreign objects such as wire or steel strapping bands are wrapped around them.
6. Inspect hydraulic lines and fittings for wear or leaks. Repair or replace if needed.

Important

During operation, stop at regular intervals and clean accumulated debris from the top of cutter deck, especially around drivelines and gearboxes. This will help prevent material from catching fire.

Warning!

All rotary cutters have the ability to discharge objects at high speeds which could result in serious injury to bystanders or passers-by. Do not operate cutter along roadways or in the vicinity of other persons without enclosed sides, permanent brands, belting, highway chains or other factory approved discharge shields in place and in good working order.

Warning!

Use a piece of cardboard or wood rather than hands and wear eye protection when searching for hydraulic leaks. Escaping hydraulic oil under pressure can penetrate the skin. If oil is injected into the skin, it must be surgically removed within a few hours by a doctor or gangrene may result.

7. Inspect wheel (s) for wear, damage or foreign objects. Repair or replace if necessary.
8. Check tractor tire air pressure. Refer to tractor operator's manual.
9. Perform BEFORE EACH USE lubrication per paragraph 4-2.
10. During operation, listen for abnormal sounds which might indicate loose parts, damaged bearings or other damage.
11. **Check tapered pin retaining each end of each driveline for tightness. Tighten nut to 30 ft./lbs. Use only genuine Bush Hog replacement parts.**

After Each Use

1. Clean all debris from machine especially underside of deck and affixed safety decals. Replace any missing or illegible decals.
2. Inspect cutter for worn or damaged components. Repair or replace before next use. Any replacement components installed during repair shall include the components current safety decals specified by the manufacturer to be affixed to the component.
3. Store cutter in a dry place.

4-2 Lubrication

The multi-purpose grease referenced in this section is an NLGI Grade 2 type grease.

Input Driveline-Machine must be lowered to ground before lubrication so holes in shield will align.

Before Each Use

1. Driveline Universal Joints- Apply 2-3 shots of multi-purpose grease with grease pin.
2. Driveline Guard- Apply 2-3 shots of multi-purpose grease with grease gun to plastic fitting.
3. **Constant Velocity (CV) Joint- Position CV joint as straight as possible to be sure grease will penetrate to ball joint. Lubricate the central body with a minimum of 30 shots of grease every 8 hours. Lubricate telescoping members with 10 shots every 8 hours and clean telescoping members every 40 hours and completely coat with grease.**
4. Axle Pivot- Apply 2-3 shots of multi-purpose grease with grease pin.
5. **Driveline- Apply 3-4 shots multi-purpose grease to grease fitting accessible on outer shield half.**
6. Axle Arm Pivot Pins- Apply multi-purpose grease with grease pin.
7. **Gearboxes-Add EP80W-90 oil, if necessary, to bring oil level to check plug located on side of housing. Capacity of transfer gearbox is 2.75 quarts (2.6L). Blade gearbox capacity is 6 quarts (5.7L).**
8. Wing Turnbuckles- Apply multi-purpose grease slowly with grease gun until grease relieves around seal.

4-3 Blade Replacement

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. Always replace both blades on a spindle using two blades having the same weight. Use only genuine Bush Hog replacement blades.

- A. Remove nuts from blade bolts
- B. Inspect blade bolt shoulder for wear. Replace if necessary.

- C. Assemble new blades to blade holder using blade bolts, nuts and lockwashers. **Refer to BLADE ROTATION DIAGRAM for blade placement. Tighten nuts to 600 ft./lbs. Strike blade bold head with heavy hammer to seat, then retighten.**
- D. Check to be sure blades swing 360 degrees freely. If blades will not swing freely, remove, locate problem, and repair. Operating cutter when blades do not swing freely will cause excessive vibration, damaging implement.

Note:

If the round blade holder is removed from the gear box output shaft for any reason, it must be reassembled with the slotted nut **torqued to a minimum of 450 ft. lbs.** If 450 ft. lbs. is reached and slots in the nut do not align with the hole through the output shaft, tighten slowly more so that cotter pin may be installed. Do not “back off” on the nut to align slots with hole.