



SPEED PLOTTER

BUSH HOG®

MODELS SP48L, SP48P, SP72L

Published 08/13

Manual Part No. 50073746

OPERATOR'S MANUAL



This Operator's Manual is an integral part of the safe operation of this machine and must be maintained with the unit at all times. READ, UNDERSTAND, and FOLLOW the Safety and Operation Instructions contained in this manual before operating the equipment. C01-Cover



BUSH HOG®

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¡ATENCIÓN!
LEA EL INSTRUCTIVO



Si No Lee Ingles, Pida
Ayuda a Alguien
Que Se Lo Lea Para Que le
Traduzca Las
Medidas de Seguridad

A MEMBER OF THE
ALAMO GROUP
ALWAYS ON THE CUTTING EDGE®

THANK YOU!

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

The care you give your Bush Hog equipment 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. Please call us at 1-800-363-6096, or visit our website for a downloadable copy.

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.

RETAIL CUSTOMER'S RESPONSIBILITY

It is the Retail Customer and/or Operator's responsibility to read the Operator's Manual, to operate, 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 the other parts or cause a safety hazard.

It is the Retail Customer and/or Operator's responsibility to contact Bush Hog immediately for any warranty claims. Claims for warranty consideration must be made within seven (7) days of failure.

It is the Retail Customer and/or Operator'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.

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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 judgment 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 judgment 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 finishes 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 judgment 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, 2501 GRIFFIN AVE., SELMA, ALABAMA 36703.

Read and understand the complete Warranty Statement found in this Manual. At time of purchase your dealer should register your product with warranty information on line with Bush Hog. Dealer should supply the customer with a printed copy of the completed warranty registration.

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

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.

Safety of the operator is one of the main concerns in designing and developing a piece of equipment. This product was designed with as many safety features as possible. However, every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following precautions in this section. To avoid personal injury, study the following precautions and insist those working with you, and for you, follow them.

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 implement. 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 operation whenever anyone comes within the area.
7. Lower the implement to the ground, stop Tractor/ATV engine, and apply parking brake before leaving the vehicle.
8. Keep hands and feet away from implement.
9. 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's moving parts.
10. When performing adjustments or maintenance on the implement, first lower it to the ground or block it securely at a workable height.
11. Never stand between the Tractor/ATV and implement when the Tractor/ATV is being backed to the hitch.
12. Reduce speed when transporting implement to avoid bouncing and momentary loss of steering.
13. Use Tractor flashing warning lights, day or night, when transporting implement on road or highways unless prohibited by law.
14. Use a rollover protective structure and seat belt equipped Tractor for all implement operations.



ALWAYS PAY CLOSE
ATTENTION TO ALL
CAUTION, DANGER
AND WARNING
DECALS!

INTRODUCTION and DESCRIPTION

Introduction:

We are pleased to have you as a Bush Hog customer. Your Speed Plotter has been engineered to provide customers with the best performance with the least maintenance and down-time possible. Please read this manual completely and understand the operation of the Speed Plotter before using. Observe and obey all safety precautions noted. If you need any information, please contact us at 1-800-363-6096.

Description:

The Bush Hog Speed Plotter is intended for planting in no-till or min-till conditions, in an environment relatively clear of rocks and debris. Every Speed Plotter is equipped with a chain guard covering the drive-chain. This chain guard must be in place for proper use.

PREPARATION FOR USE



WARNING: To avoid serious injury or death, additional Tractor front ballast may be needed for stable operation and transport of the Plotter/seeder. See Tractor operator's manual for recommended weights.



WARNING: To avoid serious injury or death, never stand between Tractor/ATV and Plotter/seeder while Tractor/ATV is being backed to hitch.

1. Carefully and thoroughly read this owner's manual.
2. Attach the Speed Plotter to the Tractor/ATV you will be using.
3. Adjust the top link until the frame of the Speed Plotter is level.
4. Select what seed type you want to plant.
5. Examine the seed chart to determine the required setting for your selected seed type.
6. Loosen wing-nut locking seed meter handle. Pull handle to appropriate opening width (tape gauge is located on the side of the hopper). Tighten handle wing-nut to lock into place.
7. Set the depth control (Refer to illustration).
8. After setting the machine, make a trial pass to ensure the machine is working correctly.

SEED CHART – SPEED PLOTTER

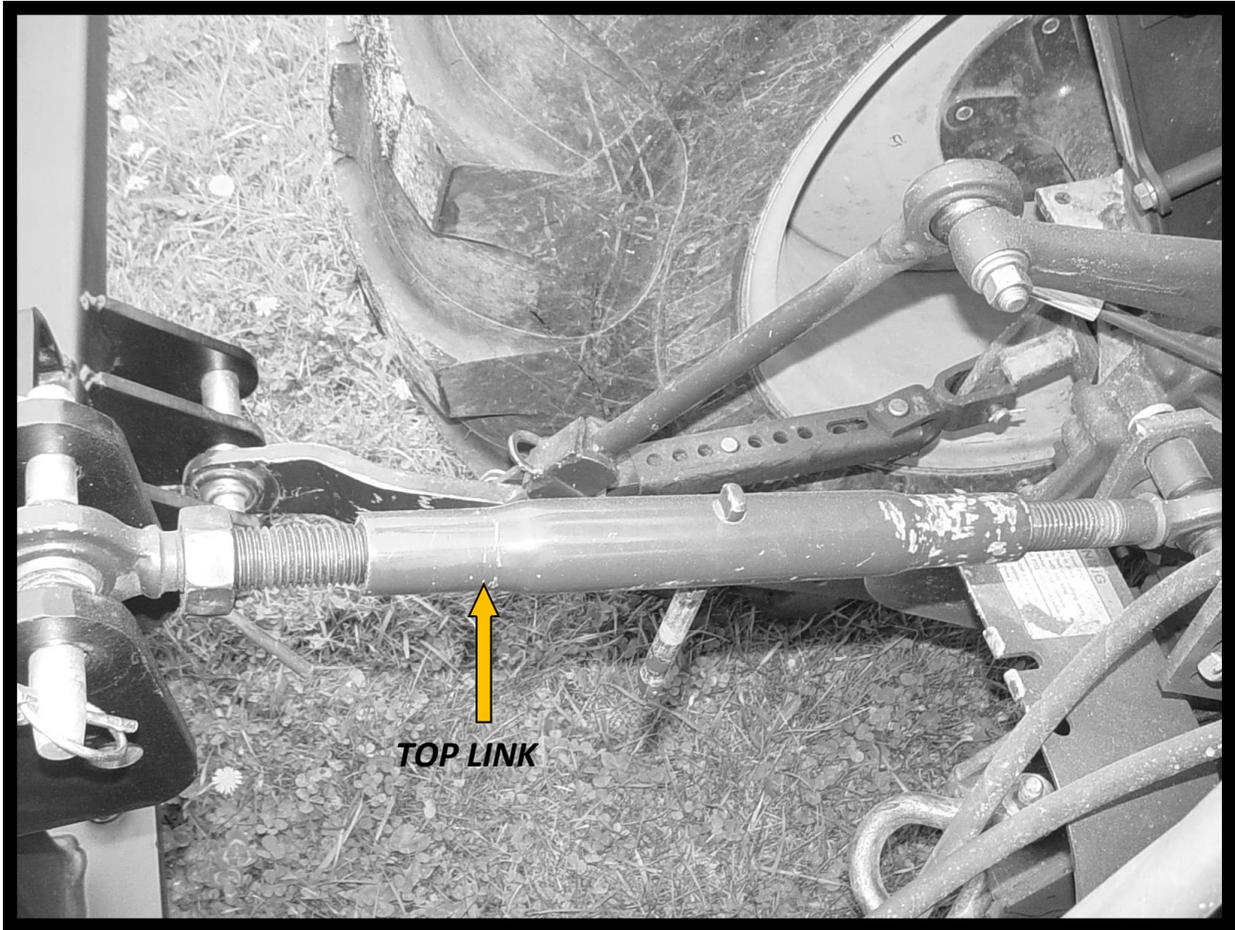
Crop	Seeding Rate	Seed Drop
	lbs/ acre	Setting
Alfalfa	15-20	3/16"
Bermuda Grass, Common	10-20	1/16"
Birdsfoot Trefoil	8-10	3/32"
Blue Grass	60-100	5/8"
Buckwheat	45-60	7/16"
Canola	10-12	1/8"
Clover, Red	8-12	1/8"
Clover, Sweet	10-13	1/8"
Cow Peas	25-40	3/8"
Fescue	150-180	7/8"
Illinois Bundlesflower	2-3	1/16"
Landscape Mix	120-150	7/8"
Millet, Brown Top	30-50	3/8"
Millet, Japanese	25-40	3/8"
Milo (grain sorghum)	10-25	1/4"
Oats	65-95	5/8"
Orchardgrass	10-12	1/4"
Partridge Peas	10-15	1/8"
Peas, Austrian Winter	90-120	5/8"
Rye Grass	80-110	9/16"
Rye, Grain	80-110	9/16"
Switchgrass	8-14	1/8"
Timothy	8-12	1/8"
Turf Grass Mix	60-100	5/8"
Turnips	3-4	3/32"
Wheat	120-180	11/16"

NOTE:

This seeding chart is to be used as a guide only. Desired seeding rate (pounds/acre) may vary according to application and geographic location.

NOTE: Recommended seeding rate is for pure stand; rates will be reduced in seed mixes.

DEPTH CONTROL



Depth Control is determined by One Measurement

The front slicing disc can be adjusted by the top link. Shortening the top link will put more depth and pressure on to the slicing discs; lengthening the top link will remove depth and pressure from the slicing discs.

Metering System Calibration Calculations

Every attempt has been made to provide settings for the most common seeds which are used in the Plotter. However, it is understood that other seed types and/or seeding rates may be desired depending upon the usage of the implement. Below is the metering system calibration sequence:

Steps for Calibration of Seed Metering System	
1. Block all but one seed drop inside the seed hopper.	<i>Note: Capture Seed from (1) Metering System Only – Otherwise Conversion Calculations Below Will Be Affected and an Inaccurate Result Will Occur.</i>
2. Place a Small Cup or Plastic Bag or Other Container Directly under the drop shoot to Collect the Seed as it is Metered from the Hopper.	
3. Fill the Seed Hopper with a Small Amount of the Seed Type to be calibrated – The Seed can be placed over the Metering System on the Left Side to Reduce Seed Dropped on the Ground.	
4. Using the Provided Seed Rate Chart – Set the Metering System to the Approximate Desired Settings.	<i>Note: Use the Seed Chart to Judge Seed Size and lbs/acre to find Starting Settings.</i>
5. Raise the Plotter off the Ground.	CAUTION: Use Stands or Jacks to Block the Frame of the Plotter To Prevent Serious Crushing Injury!!!
6. Rotate the Culti-Packer 20 Revolutions – As the Culti-Packer Wheels are Rotating, Seed will Meter from the Hopper. Ensure that Seed Completely Covers the Metering System in the Hopper During the 20 Rotations for Accurate Results. For Plotters with seed metering drive wheel rotate the drive tire 13 ½ revolutions.	
7. Weigh the Captured Seed in “Grams”.	
8. Multiply the Seed Weight (in Grams) by 3.2013 to find Seeding Rate in lbs/acre.	
9. Adjust the Metering System Opening and Repeat Steps 6 – 8, if Rate needs to be Re-Adjusted.	
<i>Please call Bush Hog Inc. at 1-800-363-6096 if there are any questions or concerns during the calibration of the Speed Plotter.</i>	

OPERATION

GENERAL OPERATION INSTRUCTIONS

It is the Operator's responsibility to be knowledgeable of all potential operating hazards and to take every reasonable precaution to ensure oneself, others, animals, and property are not injured or damaged by the Implement, Tractor/ATV, or a thrown object. DO NOT operate the Implement if passersby, pets, livestock, or property are directly in front or to the rear of the unit.

This section of the Operator's Manual is designed to familiarize, instruct, and educate safe and proper Implement use to the operator. Pictures contained in this section are intended to be used as a visual aid to assist in explaining the operation of tillage Implement. Some pictures may show shields removed for purposes of clarity. The operator must be familiar with the Implement and Tractor/ATV operation and all associated safety practices before operating the Implement and Tractor/ATV. Proper operation of Implement, as detailed in this manual, will help ensure years of safe and satisfactory use of the Implement.

IMPORTANT: To avoid Implement damage, re-torque all bolts after the first 10 hours of operation. Refer to the Torque Chart at the end of the Maintenance Section to ensure bolts are properly tightened.

READ AND UNDERSTAND THE ENTIRE OPERATING INSTRUCTIONS AND SAFETY SECTION OF THIS MANUAL AND THE TRACTOR/ATV MANUAL BEFORE ATTEMPTING TO USE THE TRACTOR/ATV AND IMPLEMENT. If you do not understand any of the instructions, contact your nearest authorized dealer for a full explanation. Pay close attention to all safety signs and safety messages contained in this manual and those affixed to the Implement and Tractor/ATV. *OPS-U-0001*

READ, UNDERSTAND, and FOLLOW the following Safety Messages. Serious injury or death may occur unless care is taken to follow the warnings and instructions stated in the Safety Messages. Always use good common sense to avoid hazards. (SG-2)



OPERATION

2. Operator Requirements

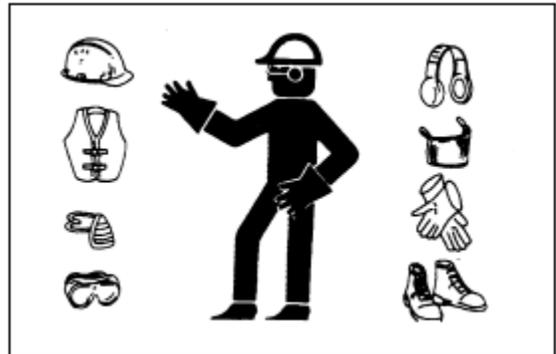
Safe operation of the unit is the responsibility of a qualified operator. A qualified operator has read and understands the Implement and Tractor/ATV. Operator's Manuals and is experienced in Implement and Tractor/ATV operation and all associated safety practices. In addition to the safety messages contained in this manual, safety signs are affixed to the Implement and Tractor/ATV. If any part of the operation and safe use this equipment is not completely understood, consult an authorized dealer for a complete explanation.

If the operator cannot read the manuals for themselves or does not completely understand the operation of the equipment, it is the responsibility of the supervisor to read and explain the manuals, safety practices, and operating instructions to the operator.

Safe operation of equipment requires that the operator wear approved Personal Protective Equipment (PPE) for the job conditions when attaching, operating, servicing, and repairing the equipment. PPE is designed to provide operator protection and includes the following safety wear:

PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Always wear safety glasses
- Hard hat
- Steel toe safety footwear
- Gloves
- Hearing protection
- Close fitting clothing
- Respirator or filter mask (depends on operating conditions) *OPS-U-002*



DO NOT use drugs or alcohol immediately before or while operating the Tractor/ATV and Implement. Drugs and alcohol will affect an operator's alertness and coordination and therefore affect the operator's ability to operate the equipment safely. Before operating the Tractor/ATV or Implement, an operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the equipment safely. NEVER knowingly allow anyone to operator the equipment when their alertness or coordination is impaired. Serious injury or death to the operator or others could result if the operator is under the influence of drugs or alcohol. (SG-27)



OPERATION

3. Tractor/ATV Requirements

Tractor/ATV Requirements and Capabilities

- Certified approved Roll-Over Protective Structure (ROPS) or ROPS cab and seat belt
- Tractor/ATV safety devices Slow Moving Vehicle (SMV) emblem, lighting, PTO master shield
- Tractor/ATV Horsepower – Minimum See Model Specification chart
- Hitch See Model Specification chart

3.1 ROPS and Seat Belt

The Tractor/ATV must be equipped with a Roll-Over Protective Structure (ROPS) (Tractor/ATV cab or roll-bar) and seat belt to protect the operator from falling off the Tractor/ATV, especially during a roll over where the driver could be crushed or killed. Only operate the Tractor/ATV with the ROPS in the raised position and seat belt fastened. Tractor models not equipped with a ROPS and seat belt should have these life saving features installed by an authorized dealer. *OPS-U-0003*

▲ WARNING Operate this Equipment only with a Tractor/ATV equipped with an approved Roll-Over Protective Structure (ROPS). Always wear seat belts. Serious injury or even death could result from falling off the Tractor/ATV--particularly during a turnover when the operator could be pinned under the ROPS. (SG-7)



3.2 Tractor/ATV Safety Devices

If transporting or operating the Tractor/ATV or Implement near a public roadway, the Tractor/ATV must be equipped with proper warning lighting and a Slow Moving Vehicle (SMV) emblem which are clearly visible from the rear of the unit. Lights and a SMV emblem must be directly on Implements if the visibilities of the Tractor/ATV warning signals are obscured.

Maintain all manufacturer equipped safety shields and guards. Always replace shields and guards that were removed for access to connect, service, or repair the Tractor/ATV or Implement. Never operate the Tractor/ATV PTO with the PTO master shield missing or in the raised position. *OPSU-0004*

OPERATION

4. Tractor and ATV Horsepower

The power required to operate an Implement is determined by the Tractor/ATV PTO horsepower. For most operating conditions, Implement requires for ATV's a minimum of 500cc on Models SP48P and Tractor with a minimum of 25hp for the Model SP48L and 35hp for the Model SP72L. Operating the Implement with a Tractor or ATV that does not have adequate power may damage the Tractor or ATV engine. Exceeding required HP may cause Implement damage by overpowering the unit in heavy cutting conditions.

4.1 Front End Weight

A minimum of 20% total Tractor/ATV weight must be maintained on the Tractor/ATV front end at all times. Front end weight is critical to maintain steering control and to prevent the Tractor/ATV from rearing up while driving. If the front end is too light, add weight until a minimum of 20% total weight is reached on the front tires. Front weights and weight carriers can be purchased through an authorized Tractor/ATV dealership. *OPS-U-0005*

OPERATION

5. Getting On and Off the Tractor/ATV

Before getting onto the Tractor/ATV, the operator must and completely understand the Implement and Tractor/ATV Operator Manuals. If any part of either manual is not completely understood, consult an authorized dealer for a complete explanation. *OPS-U-0007*

▲ WARNING DO NOT mount or dismount the Tractor/ATV while the Tractor/ATV is moving. Mount the Tractor/ATV only when the Tractor/ATV and all moving parts are completely stopped. (SG-12)



5.1 Boarding the Tractor/ATV

Use both hands and equipped handrails and steps for support when boarding the Tractor/ATV. Never use control levers for support when mounting the Tractor/ATV. Seat yourself in the operator's seat and secure the seat belt around you.

Never allow passengers to ride on the Tractor/ATV or attached equipment. Riders can easily fall off and be seriously injured or killed from falling off and being run over. It is the operator's responsibility to forbid all extra riders at all times. *OPS-U-0008*

▲ DANGER Never allow children to operate, ride on, or come close to the Tractor/ATV or Implement. Usually 16-17 year-old children who are mature and responsible can operate the Implement with adult supervision, if they have read and understand the Operator's Manuals, been trained in proper operation of the Tractor/ATV and Implement, and are physically large enough to reach and operate the controls easily. (SG-11)



▲ DANGER Never allow children or other persons to ride on the Tractor/ATV or Implement. Falling off can result in serious injury or death. (SG-10)

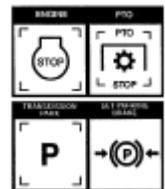


5.2 Dismounting the Tractor/ATV

Before dismounting, park the Tractor/ATV and Implement on a reasonably level surface, apply the parking brake, idle the engine down, and lower the Implement to the ground. Shut down the Tractor/ATV engine according to the Operator's Manual, remove the key, and wait for all motion to completely stop. Never leave the seat until the Tractor/ATV, its engine and all moving parts have come to a complete stop.

Use hand rails and steps when exiting the Tractor/ATV. Be careful of your step and use extra caution when mud, ice, snow or other matter has accumulated on the steps or handrails. Use all handrails and steps for support and never rush or jump off the Tractor/ATV.

▲ DANGER BEFORE leaving the Tractor/ATV seat lower the Implement, set the parking brake and/or set the Tractor/ATV transmission in parking gear, disengage the PTO, stop the engine, remove the key, and wait for all moving parts to stop. Place the Tractor/ATV shift lever into a low range or parking gear to prevent the Tractor/ATV from rolling. Never dismount a Tractor/ATV that is moving or while the engine is running. Operate the Tractor/ATV controls from the Tractor/ATV seat only. (SG-9)



OPERATION

6. Starting the Tractor/ATV

The Operator must have a complete understanding of the placement, function, and operational use of all Tractor/ATV controls before starting the Tractor/ATV. Review the Tractor/ATV Operator's Manual and consult an authorized dealer for Tractor/ATV operation instructions if needed.

Essential Tractor/ATV Controls:

- Locate the light control switch
- Locate the engine shut off control
- Locate the brake pedals and the clutch
- Locate the PTO control
- Locate the 3-point hitch control lever
- Locate the hydraulic remote control levers

Before starting the Tractor/ATV ensure the following:

- Conduct all pre-start operation inspection and service according to the Tractor/ATV Operator's Manual
- Make sure all guards, shields, and other safety devices are securely in place
- The parking brake is on
- The PTO control lever is disengaged
- The 3-point hitch control lever is in the lowered position
- The hydraulic remote control levers are in the neutral position
- The Tractor/ATV transmission levers are in park or neutral

Refer to the Tractor/ATV Owner's Manual for Tractor/ATV starting procedures. Only start the Tractor/ATV while seated and belted in the Tractor/ATV Operator's seat. Never bypass the ignition switch by short circuiting the starter solenoid.

After the Tractor/ATV engine is running, avoid accidental contact with the Tractor/ATV transmission to prevent sudden and unexpected Tractor/ATV movement. *OPS-U-0028*

⚠ DANGER Never run the Tractor/ATV engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23)

⚠ DANGER Start Tractor/ATV only when properly seated in the Tractor/ATV seat. Starting a Tractor/ATV in gear can result in injury or death. Read the Tractor/ATV Operator's Manual for proper starting instructions. (SG-13)



OPERATION

7. Connecting the Implement to the Tractor/ATV

Use extreme caution when connecting the Implement to the Tractor/ATV. The Implement should be securely resting at ground level or setting on blocks. Keep hands and feet from under the Implement frame and clear of pinch points between the Tractor/ATV hitch arms and Implement pins.

▲ DANGER Always shut the Tractor/ATV completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor/ATV hitches. (S3PT-15)

7.1 Connecting the Implement

1. Shorten or remove the tractor drawbar to avoid interference when raising and lowering the equipment.
2. Board the Tractor/ATV and start the engine. Position the Tractor to the equipment with the 3-point lift arms positioned between the respective set of equipments A-frame lift lugs. *Note: Set the 3point lift control to “Position Control” so that the lift arms maintain a constant height when attaching the equipment. See the Tractor Operator’s Manual for correct settings when attaching 3-point equipment.*
3. Turn off the Tractor/ATV engine, set the parking brake, place the Tractor/ATV in park, and dismount.
4. One lift arm at a time, align arm end hole between the set of holes of A-frame lift lugs. Insert hitch pin through the lug and arm holes and insert retaining pin into hitch pin. Walk around to opposite side and repeat procedure for remaining lift arm and hitch pin.
5. Extend or retract the 3-point top link to align its end hole with the holes of the road grader top link. Insert the top link pin and retain with cotter pin.



Adjust any lower link check chains, guide blocks, or sway blocks to prevent the equipment from swaying side to side and possible contact with Tractor rear tires.

OPERATION

8. Pre-Operation Inspection and Service

Before each use, a pre-operation inspection and service of the Implement and Tractor/ATV must be performed. This includes routine maintenance and scheduled lubrication, inspecting that all safety devices are equipped and functional, and performing needed repairs. DO NOT operate the unit if the pre-operation inspection reveals any condition affecting safe operation. Perform repairs and replacement of damaged and missing parts as soon as noticed. By performing a thorough pre-operation inspection and service, valuable down time and repair cost can be avoided. *OPS-U-0029*

▲ WARNING Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order. (SG-21)



8.1 Tractor/ATV Pre-Operation Inspection/Service

Refer to the Tractor/ATV Operator's Manual to ensure a complete pre-operation inspection and scheduled service is performed according to the manufacturer's recommendations. The following are some of the items that require daily service and inspection:

- Tire condition/air pressure
- Wheel lug bolts
- Steering linkage
- PTO shield
- SMV sign is clean and visible
- Tractor/ATV's lights are clean and functional
- Tractor/ATV seat belt is in good condition
- Tractor ROPS is in good condition
- ROPS is in the raised position
- No Tractor/ATV oil leaks
- Radiator free of debris
- Engine oil level and condition
- Engine coolant level and condition
- Power brake fluid level
- Power steering fluid level
- Fuel condition and level
- Sufficient lubrication at all lube points
- Air filter condition *OPS-U-0030*



OPERATION

8.2 Implement Pre-Operation Inspection/Service

Before each Implement use, a complete inspection and service is required to ensure the Implement is in a good and safe working condition. Damaged and/or broken parts should be repaired and/or replaced immediately. To ensure the Implement is ready for operation, conduct the following. *OPS-T-0002*

The Operator's Manual and safety signs affixed on the unit contain important instructions on the safe and proper use of the Equipment. Maintain these important safety features on the Implement in good condition to ensure the information is available to the Operator at all times.

- Ensure the manual canister is secured to the equipment with the Operator's Manual inside.
- Ensure all safety signs are in place and legible. Replace missing, damaged, and illegible decals. *OPS-U-0011*
- Perform scheduled lubrication as detailed in the maintenance section.
- Ensure all decals are in place and legible.
- Ensure that a properly rated safety tow chain is equipped securing the Implement to the Tractor/ATV.
- Before operation check disc blades and spools for breakage or cracking and replace if needed.



OPERATION

Tractor/ATV PRE-OPERATION Inspection

Tractor/ATV ID#: _____ Make: _____

Date: _____ Shift: _____

⚠ WARNING Before conducting the inspection, make sure the Tractor/ATV engine is off, all rotation has stopped and the Tractor/ATV is in park with the parking brake engaged. Make sure the Implement is resting on the ground or securely blocked up and all hydraulic pressure has been relieved.

ITEM	CONDITION AT START OF SHIFT	SPECIFIC COMMENTS IF NOT OK
The flashing lights function properly		
The SMV Sign is clean and visible		
The tires are in good condition with proper pressure		
The wheel lug bolts are tight		
The Tractor/ATV brakes are in good condition		
The steering linkage is in good condition		
There are no visible oil leaks		
The hydraulic controls function properly		
The ROPS or ROBS Cab is in good condition		
The seat belt is in place and in good condition		
The 3-point hitch is in good condition		
The drawbar pins are securely in place		
The PTO master shield is in place		
The engine oil level is full		
The brake fluid level is full		
The power steering fluid level is full		
The fuel level is adequate		
The engine coolant fluid level is full		
The radiator is free of debris		
The air filter is in good condition		

Operator's Signature: _____

DO NOT OPERATOR AN UNSAFE TRACTOR/ATV OR IMPLEMENT

OPERATION

Bush Hog Implement PRE-OPERATION Inspection

Blade ID#: _____ Make: _____

Date: _____ Shift: _____

▲ WARNING Before conducting the inspection, make sure the Tractor/ATV engine is off, all rotation has stopped and the Tractor/ATV is in park with the parking brake engaged. Make sure the Implement is resting on the ground or securely blocked up and all hydraulic pressure has been relieved.

ITEM	CONDITION AT START OF SHIFT	SPECIFIC COMMENTS IF NOT OK
The Operator's Manual has been read and understood.		
All Safety Decals are in place and legible		
The Hitch connection pins are properly retained		
There are no cracks in hitch		
All bolts are in place and properly tightened		
All grease fittings and lubrication points have been greased		
All wear items are not chipped, cracked or worn past intended use		

Operator's Signature: _____

DO NOT OPERATOR AN UNSAFE TRACTOR/ATV OR IMPLEMENT

OPERATION

9. Driving the Tractor/ATV and Implement

Safe Tractor/ATV transport requires the Operator possess a thorough knowledge of the model being operated and precautions to take while driving with an attached Implement. Ensure the Tractor/ATV has the capacity to handle the weight of the Implement and the Tractor/ATV operating controls are set for safe transport. To ensure safety while driving the Tractor/ATV with an attached Implement, review the following. *OPS-U-0012*

⚠ DANGER Never run the Tractor/ATV engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23)

⚠ WARNING Transport only at speeds where you can maintain control of the equipment. Serious accidents and injuries can result from operating this equipment at high speeds. Understand the Tractor/ATV and Implement and how it handles before transporting on streets and highways. Make sure the Tractor/ATV steering and brakes are in good condition and operate properly.



Before transporting the Tractor/ATV and Implement, determine the proper transport speeds for you and the equipment. Make sure you abide by the following rules:

- Test the Tractor/ATV at a slow speed and increase the speed slowly. Apply the brakes smoothly to determine the stopping characteristics of the Tractor/ATV and Implement. As you increase the speed of the Tractor/ATV the stopping distance increases. Determine the maximum transport speed not to exceed 20 mph (30 kph) for transporting this equipment.
- Test the equipment at a slow speed in turns. Increase the speed through the turn only after you determine that the equipment can be operated at a higher speed. Use extreme care and reduce your speed when turning sharply to prevent the Tractor/ATV and Implement from turning over. Determine the maximum turning speed for you and this equipment before operating on roads or uneven ground.
- Only transport the Tractor/ATV and Implement at the speeds which allow you to properly control the equipment.
- Be aware of the operating conditions. **DO NOT** operate the Tractor/ATV with weak or faulty brakes or worn tires. When operating down a hill or on wet or rain slick roads, the braking distance increases: use extreme care and reduce your speed. When operating in traffic always use the Tractor/ATV's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out the other guy. (SG-19)



9.1 Starting the Tractor/ATV

The procedure to start the Tractor/ATV is model specific. Refer to the Tractor/ATV Operator's Manual for starting procedures for your particular Tractor/ATV. Consult an authorized dealer if the starting procedure is unclear. Ensure the 3-point control lever is in the lowered position and the PTO is disengaged before starting the Tractor. *OPS-U-0003*



OPERATION

9.2 Brake and Differential Lock Setting

Make sure the Tractor/ATV brakes are in good operating condition. Tractor brakes can be set to operate independently allowing single rear wheel braking action or locked together to provide simultaneous rear wheel braking. FOR MOST DRIVING AND OPERATING CONDITIONS, THE BRAKE PEDALS SHOULD BE LOCKED TOGETHER TO PROVIDE THE MOST EFFECTIVE BRAKING ACTION.

Always disengage the Tractor differential lock when turning. When engaged the differential lock will prevent or limit the Tractor from turning. During normal cutting conditions, locking the differential provides no benefit and should not be used. OPS-U-0013



▲ WARNING Be aware of the operating conditions. DO NOT operate the Tractor/ATV with weak or faulty brakes. When operating down a hill or on wet or rain slick roads, the braking distance increases; use extreme care and reduce your speed in these conditions. When operating in traffic, always use the Tractor/ATV's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy.

9.3 Driving the Tractor/ATV and Implement

Start off driving at a slow speed and gradually increase your speed while maintaining complete control of the Tractor/ATV and unit. Moving slowly at first will also prevent the Tractor/ATV from rearing up and loss of steering control. The Tractor/ATV should never be operated at speeds that cannot be safely handled or which will prevent the Operator from stopping quickly during an emergency. If the power steering or engine ceases operating, stop the Tractor/ATV immediately as the Tractor/ATV will be difficult to control. If the Tractor/ATV becomes stuck or the tires are frozen to the ground, reverse the Tractor/ATV out to prevent overturning.

Perform turns with the Tractor/ATV and unit at slow speeds to determine how the Tractor/ATV with the unit handles a turn. Determine the safe operating speed to maintain proper control of the Tractor/ATV when making turns. When turning with an attached rear Implement, the overall length of the working unit is greatly increased. Allow additional clearance for the Implement to swing when turning.

To avoid overturns, drive the Tractor/ATV with care and at safe speeds, especially when operating over rough ground, crossing ditches or slopes, and turning corners. Tractor/ATV wheel tread spacing should be increased when working on inclines or rough ground to reduce the possibility of tipping.

Use extreme caution when operating on steep slopes. Keep the Tractor/ATV in a low gear when going downhill. DO NOT coast or free-wheel downhill.

OPERATION

10. Operating the Tractor/ATV and Implement

THE OPERATOR MUST COMPLETELY UNDERSTAND HOW TO OPERATE THE TRACTOR/ATV AND IMPLEMENT AND ALL CONTROLS BEFORE ATTEMPTING TO OPERATE. The operator must read and understand the Safety and Operation Sections of the Implement and Tractor/ATV Operator's Manuals. These manuals must be read and explained to any operator who cannot read. Never allow someone to operate the Implement and Tractor/ATV without complete operating instructions.

Before starting any operation, the operator must become familiar with the area to be worked in and any obstacles and hazards contained within to ensure safety to the operator, bystanders, and equipment. Special attention should be paid to foreign debris, rough terrain, steep slopes, and passersby and animals in the area. *UPS-U-0015*

▲ WARNING Many varied objects, such as wire, cable, rope, or chains, can become entangled in the rotating parts of the Implement. These objects could then swing outside the housing at greater velocities than the blades. Such a situation is extremely hazardous and could result in serious injury or even death. Inspect the area for such objects before working in the area. Remove any such objects from the site. Never allow the Implement to contact such objects. (STL-6)

11. Disconnecting the Implement from the Tractor/ATV

Before disconnecting the Implement move the Implement to a level storage location and lower it to the ground. If the Implement is not resting securely on the ground, block the Implement up securely before attempting to disconnect it from the Tractor/ATV.

▲ DANGER Use extreme care to keep feet and hands from under the Implement and clear of any pinch points caused by the Tractor/ATV hitch arms and Implement pins. Never stand or allow another person to stand between a running Tractor/ATV and the Implement when disconnecting the Implement from the Tractor/ATV. Always shut the Tractor/ATV off completely and set the parking brake before attempting to disconnect the Implement pins from the Tractor/ATV hitch.

▲ WARNING Never unhitch without using the Tongue Jack. The Tongue is very heavy. Attempting to lift the Tongue without using the Tongue Jack could cause strains or other injury. Allowing the Tongue to fall suddenly and unexpectedly could result in crushing injury. Use the Tongue Jack for lifting the Implement only. Overloading the Tongue Jack can cause failure with possible serious bodily injury or even death. (STL-04)

▲ DANGER Always shut the Tractor/ATV completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor/ATV hitches. (S3PT-15)

OPERATION

11.1 Implement Storage

Properly preparing and storing the Implement at the end of the season is critical to maintaining its appearance and to help ensure years of dependable service. The following are suggested storage procedures:

- Thoroughly clean all debris off the Implement to prevent damage from rotting grass and standing water
- Lubricate all Implement grease points as detailed in the Maintenance Section
- Tighten all bolts and pins to the recommended torque
- Check the Implement for worn and damaged parts. Perform repairs and make replacements immediately so that the Implement will be ready for use at the start of the next season
- Store the Implement in a clean, dry place with the Implement housing resting securely on blocks or at ground level
- Use spray touch-up enamel where necessary to prevent rust and maintain the appearance of the Implement

⚠ DANGER Never allow children or other persons to ride on the Tractor/ATV or Implement. Falling off can result in serious injury or death. (SG-10)



⚠ WARNING DO NOT use your hands or feet to clean the disc gangs. The discs are sharp and serious injuries could result from inadvertent contact with the discs. Never attempt to stand on the discs, tires, or frame members of the Implement. (STL-11)

OPERATION

12. Transporting the Tractor/ATV and Implement

Inherent hazards of operating the Tractor/ATV and Implement and the possibility of accidents are not left behind when you finish working in an area. Therefore, the operator must employ good judgment and following safe transport procedures, the possibility of accidents while moving between locations can be substantially minimized. OPS-U-0017

⚠ DANGER Never allow children or other persons to ride on the Tractor/ATV or Implement. Falling off can result in serious injury or death. (SG-10)



12.1 Transporting on Public Roadways

Extreme caution should be used when transporting the Tractor/ATV and Implement on public roadways. The Tractor/ATV must be equipped with all required safety warning features including a SMV emblem and flashing warning lights to alert drivers of the Tractor/ATV's presence. Remember that roadways are primarily designed for automotive drivers and most drivers will not be looking out for you, therefore, you must look out for them. Check your side view mirrors frequently and remember that vehicles will approach quickly because of the Tractor/ATV's slower speed. Be extremely cautious when the piece of equipment that you are towing is wider than the Tractor/ATV tire width and/or extends beyond your lane of the road.

Make sure that a proper size safety tow chain is secured between the Tractor/ATV and Implement before entering a public road. OPS-U-0019

⚠ WARNING Make certain that the "Slow Moving Vehicle" (SMV) sign is installed in such a way as to be clearly visible and legible. When transporting the Equipment use the Tractor/ATV flashing warning lights and follow all local traffic regulations. (SG-6)



The SMV (Slow Moving Vehicle) emblem is universal symbol used to alert drivers of the presence of equipment traveling on roadways at a slow speed. SMV signs are triangular bright orange with reflective red trim for both easy day and night visibility. Make sure the SMV sign is clean and visible from the rear of the unit before transporting the Tractor/ATV and Implement on a public roadway. Replace the SMV emblem if faded, damaged, or no longer reflective. OPS-U-0020



Make sure that all Tractor/ATV flashing warning lights, headlights, and brake/tail lights are functioning properly before proceeding onto public roads. While newer model Tractor/ATVs have plenty of lighting to provide warning signals and operating lighting, most older models are only equipped with operating lights. Consult an authorized Tractor/ATV dealer for lighting kits and modifications available to upgrade the lighting on older Tractor/ATV models. OPS-U-0021



OPERATION

When operating on public roads, have consideration for other road users. Pull to the side of the road occasionally to allow all following traffic to pass. DO NOT exceed the legal speed limit set in your area for agricultural Tractor/ATVs. Always stay alert when transporting the Tractor/ATV and Implement on public roads. Use caution and reduce speed if other vehicles or pedestrians are in the area. *OPS-T-0013*

Reduce speed before turning or applying the brakes. Ensure that both brake pedals are locked together when operating on public roads. *OPS-U-0023*



12.2 Hauling the Tractor/ATV and Implement

Before transporting a loaded Tractor/ATV and Implement, measure the height and width dimensions and gross weight of the complete loaded unit. Ensure that the load will be in compliance with the legal limits set for the areas that will be traveled through. *OPS-U-0024*



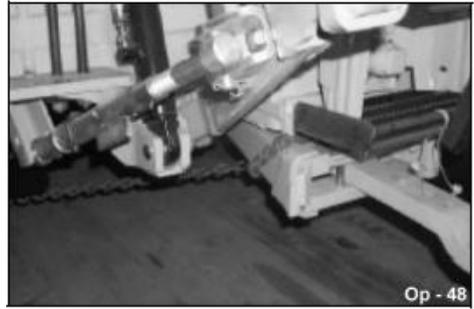
Use adequately sized and rated trailers and equipment to transport the Tractor/ATV and Implement. Consult an authorized dealer to determine the proper equipment required. Using adequately sized chains, heavy duty straps, cables and/or binders, securely tie down both the front and rear of the Tractor/ATV utilizing the proper tie down locations as specified by the Tractor/ATV manufacturer. *OPS-U-0025*



Arrange the chains so that when tightened, the chains are pulling downward and against themselves. Carefully tighten the securing chains or other fasteners using boomers or binders to apply maximum tension. Use extreme care when attaching and removing the securing devices as the extreme tension involved when released has the potential to inflict serious injury.

OPERATION

While hauling the Tractor/ATV and Implement, make occasional stops to check that the Tractor/ATV and Implement have not moved or shifted and that the securing chains have maintained tension. If during transport a hard braking, sharp turning, or swerving action was performed, stop at the next safe location to inspect the security of the load. *OPS-U-002*



MAINTENANCE

General Maintenance

1. Grease all grease fittings and lubrication points before each use
2. Inspect the implement for any worn or damaged parts and replace with a genuine Bush Hog part.
3. Make sure all safety decals are intact and legible.
4. Inspect unit for cracks and chips and repair if necessary. Consult your Bush Hog dealer before any repair is made. Any unauthorized repairs will void the warranty
5. Keep tires inflated to the proper specification found in this manual if implement is equipped with tires.
6. Check all bolt and nuts to insure they are properly torque. Consult the torque chart found in this manual for torque values.
7. Repack transport wheels, gauge wheels and coultter bearings yearly.

Proper Torque Chart for Fasteners

The chart lists the correct tightening torque for fasteners. When bolts are to be tightened or replaced, refer to this chart to determine the grade of bolts and the proper torque except when specific torque values are assigned in manual text.

RECOMMENDED TORQUE IN FOOT POUNDS UNLESS OTHERWISE STATED IN THE MANUAL*

NOTE: These values apply to fasteners as received from supplier, dry or when lubricated with normal engine oil. They do not apply if special graphite or molydisulphide greases or other extreme pressure lubricants are used. This applies to both UNF fine and UNC coarse threads.

MAINTENANCE TORQUE SPECIFICATIONS

Torque Values Chart For Common Bolt Size													
Bolt size (inches) in-tpi	Grade 2		Grade 5		Grade 8		Bolt size (Metric) mm x pitch	Class 5.8		Class 8.8		Class 10.9	
	N·m	ft-lb	N·m	ft-lb	N·m	ft-lb		N·m	ft-lb	N·m	ft-lb	N·m	ft-lb
1/4"-20	7.4	5.6	11	8	16	12	M 5 X .8	4	3	6	5	9	7
1/4"-28	8.5	6	13	10	18	14	M 6 X 1	7	5	11	8	15	11
5/16"-18	15	11	24	17	33	25	M 8 X 1.25	17	12	26	19	36	27
5/16"-24	17	13	26	19	37	27	M 8 X 1	18	13	28	21	39	29
3/8"-16	27	20	42	31	59	44	M10 X 1.5	33	24	52	39	72	53
3/8"-24	31	22	47	35	67	49	M10 X .75	39	29	61	45	85	62
7/16"-14	43	32	67	49	95	70	M12 X 1.75	58	42	91	67	125	93
7/16"-20	49	36	75	55	105	78	M12 X 1.5	60	44	95	70	130	97
1/2"-13	66	49	105	76	145	105	M12 X 1	90	66	105	77	145	105
1/2"-20	75	55	115	85	165	120	M14 X 2	92	68	145	105	200	150
9/16"-12	95	70	150	110	210	155	M14 X 1.5	99	73	155	115	215	160
9/16"-18	105	79	165	120	235	170	M16 X 2	145	105	225	165	315	230
5/8"-11	130	97	205	150	285	210	M16 X 1.5	155	115	240	180	335	245
5/8"-18	150	110	230	170	325	240	M18 X 2.5	195	145	310	230	405	300
3/4"-10	235	170	360	265	510	375	M18 X 1.5	220	165	350	260	485	355
3/4"-16	260	190	405	295	570	420	M20 X 2.5	280	205	440	325	610	450
7/8"-9	225	165	585	430	820	605	M20 X 1.5	310	230	650	480	900	665
7/8"-14	250	185	640	475	905	670	M24 X 3	480	355	760	560	1050	780
1"-8	340	250	875	645	1230	910	M24 X 2	525	390	830	610	1150	845
1"-12	370	275	955	705	1350	995	M30 X 3.5	960	705	1510	1120	2100	1550
1 1/8"-7	480	355	1080	795	1750	1290	M30 X 2	1060	785	1680	1240	2320	1710
1 1/8"-12	540	395	1210	890	1960	1440	M36 X 3.5	1730	1270	2650	1950	3660	2700
1 1/4"-7	680	500	1520	1120	2460	1820	M36 X 2	1880	1380	2960	2190	4100	3220
1 1/4"-12	750	555	1680	1240	2730	2010	in-tpi = nominal thread diameter in inches-threads per inch N·m = newton-meters ft-lb = foot-pounds mm x pitch = nominal thread diameter in millimeters x thread pitch						
1 3/8"-6	890	655	1990	1470	3230	2380							
1 3/8"-12	1010	745	2270	1670	3680	2710							
1 1/2"-6	1180	870	2640	1950	4290	3160							
1 1/2"-12	1330	980	2970	2190	4820	3560							

Torque tolerance +0%, -15% of torque values. Unless otherwise specified use torque values listed above.





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Performance You Can Count OnSM

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