



OPERATOR'S MANUAL

TREE SPADE 2625, 3625 & 4425

**FOR
SKID STEER LOADERS**



SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: OM679
Part Number: 75579
Rev. 5

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PREFACE

GENERAL COMMENTS

Congratulations on the purchase of your new BRADCO product! This product was carefully designed and manufactured to give you many years of dependable service. Only minor maintenance (such as cleaning and lubricating) is required to keep it in top working condition. Be sure to observe all maintenance procedures and safety precautions in this manual and on any safety decals located on the product and on any equipment on which the attachment is mounted.

This manual has been designed to help you do a better, safer job. Read this manual carefully and become familiar with its contents.

WARNING! Never let anyone operate this unit without reading the "Safety Precautions" and "Operating Instructions" sections of this manual.



Always choose hard, level ground to park the vehicle on and set the brake so the unit cannot roll.

Unless noted otherwise, right and left sides are determined from the operator's control position when facing forward.

NOTE: The illustrations and data used in this manual were current (according to the information available to us) at the time of printing, however, we reserve the right to redesign and change the attachment as may be necessary without notification.

BEFORE OPERATION

The primary responsibility for safety with this equipment falls to the operator. Make sure the equipment is operated only by trained individuals that have read and understand this manual. If there is any portion of this manual or function you do not understand, contact your local authorized dealer or the manufacturer to obtain further assistance. Keep this manual available for reference. Provide the manual to any new owners and/or operators.

SAFETY ALERT SYMBOL



This is the "Safety Alert Symbol" used by this industry. This symbol is used to warn of possible injury. Be sure to read all warnings carefully. They are included for your safety and for the safety of others working with you.

SERVICE

Use only manufacturer replacement parts. Substitute parts may not meet the required standards.

Record the model and serial number of your unit on the cover of this manual. The parts department needs this information to insure that you receive the correct parts.

SOUND AND VIBRATION

Sound pressure levels and vibration data for this attachment are influenced by many different parameters: some items are listed below (not inclusive):

- prime mover type, age, condition, with or without cab enclosure and configuration
- operator training, behavior, stress level
- job site organization, working material condition, environment

Based on the uncertainty of the prime mover, operator, and job site, it is not possible to get precise machine and operator sound pressure levels or vibration levels for this attachment.

NOTE: A list of all Paladin Patents can be found at <http://www.paladinattachments.com/patents.asp>.

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SAFETY STATEMENTS



THIS SYMBOL BY ITSELF OR WITH A WARNING WORD THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY OR THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.



DANGER

THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.



WARNING

THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.



CAUTION

THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN MINOR OR MODERATE INJURY.

NOTICE

NOTICE IS USED TO ADDRESS PRACTICES NOT RELATED TO PHYSICAL INJURY.

GENERAL SAFETY PRECAUTIONS

WARNING!



READ MANUAL PRIOR TO INSTALLATION

Improper installation, operation, or maintenance of this equipment could result in serious injury or death. Operators and maintenance personnel should read this manual, as well as all manuals related to this equipment and the prime mover thoroughly before beginning installation, operation, or maintenance. **FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND THE PRIME MOVER'S MANUAL(S).**



READ AND UNDERSTAND ALL SAFETY STATEMENTS

Read all safety decals and safety statements in all manuals prior to operating or working on this equipment. Know and obey all OSHA regulations, local laws, and other professional guidelines for your operation. Know and follow good work practices when assembling, maintaining, repairing, mounting, removing, or operating this equipment.



KNOW YOUR EQUIPMENT

Know your equipment's capabilities, dimensions, and operations before operating. Visually inspect your equipment before you start, and never operate equipment that is not in proper working order with all safety devices intact. Check all hardware to ensure it is tight. Make certain that all locking pins, latches, and connection devices are properly installed and secured. Remove and replace any damaged, fatigued, or excessively worn parts. Make certain all safety decals are in place and are legible. Keep decals clean, and replace them if they become worn or hard to read.

GENERAL SAFETY PRECAUTIONS

WARNING!



PROTECT AGAINST FLYING DEBRIS

Always wear proper safety glasses, goggles, or a face shield when driving pins in or out, or when any operation causes dust, flying debris, or any other hazardous material.

WARNING!



LOWER OR SUPPORT RAISED EQUIPMENT

Do not work under raised booms without supporting them. Do not use support material made of concrete blocks, logs, buckets, barrels, or any other material that could suddenly collapse or shift positions. Make sure support material is solid, not decayed, warped, twisted, or tapered. Lower booms to ground level or on blocks. Lower booms and attachments to the ground before leaving the cab or operator's station.

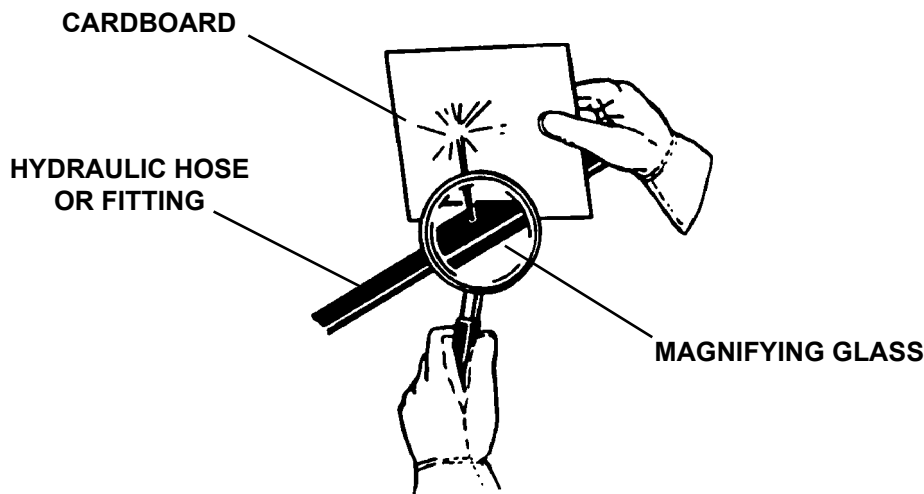
WARNING!



USE CARE WITH HYDRAULIC FLUID PRESSURE

Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death. Hydraulic leaks under pressure may not be visible. Before connecting or disconnecting hydraulic hoses, read your prime mover's operator's manual for detailed instructions on connecting and disconnecting hydraulic hoses or fittings.

- Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.
- If injured by injected fluid, see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.
- Wear safety glasses, protective clothing, and use a piece of cardboard or wood when searching for hydraulic leaks. **DO NOT USE YOUR HANDS!** **SEE ILLUSTRATION.**



GENERAL SAFETY PRECAUTIONS

WARNING!



DO NOT MODIFY MACHINE OR ATTACHMENTS

Modifications may weaken the integrity of the attachment and may impair the function, safety, life, and performance of the attachment. When making repairs, use only the manufacturer's genuine parts, following authorized instructions. Other parts may be substandard in fit and quality. Never modify any ROPS (Roll Over Protective Structure) or FOPS (Falling Object Protective Structure) equipment or device. Any modifications must be authorized in writing by the manufacturer.

WARNING!



SAFELY MAINTAIN AND REPAIR EQUIPMENT

- Do not wear loose clothing or any accessories that can catch in moving parts. If you have long hair, cover or secure it so that it does not become entangled in the equipment.
- Work on a level surface in a well-lit area.
- Use properly grounded electrical outlets and tools.
- Use the correct tools for the job at hand. Make sure they are in good condition for the task required.
- Wear the protective equipment specified by the tool manufacturer.



SAFELY OPERATE EQUIPMENT

Do not operate equipment until you are completely trained by a qualified operator in how to use the controls, know its capabilities, dimensions, and all safety requirements. See your machine's manual for these instructions.

- Keep all step plates, grab bars, pedals, and controls free of dirt, grease, debris, and oil.
- Never allow anyone to be around the equipment when it is operating.
- Do not allow riders on the attachment or the prime mover.
- Do not operate the equipment from anywhere other than the correct operator's position.
- Never leave equipment unattended with the engine running, or with this attachment in a raised position.
- Do not alter or remove any safety feature from the prime mover or this attachment.
- Know your work site safety rules as well as traffic rules and flow. When in doubt on any safety issue, contact your supervisor or safety coordinator for an explanation.

WARNING!



CALIFORNIA PROPOSITION 65 WARNING

This product may contain a chemical known to the state of California to cause cancer, or birth defects or other reproductive harm. www.P65Warnings.ca.gov

EQUIPMENT SAFETY PRECAUTIONS

WARNING!



KNOW WHERE UTILITIES ARE

Observe overhead electrical and other utility lines. Be sure equipment will clear them. When digging, call your local utilities for location of buried utility lines, gas, water, and sewer, as well as any other hazard you may encounter.

WARNING!



EXPOSURE TO RESPIRABLE CRYSTALLINE SILICA DUST ALONG WITH OTHER HAZARDOUS DUSTS MAY CAUSE SERIOUS OR FATAL RESPIRATORY DISEASE.

It is recommended to use dust suppression, dust collection and if necessary personal protective equipment during the operation of any attachment that may cause high levels of dust.

WARNING!



REMOVE PAINT BEFORE WELDING OR HEATING

Hazardous fumes/dust can be generated when paint is heated by welding, soldering or using a torch. Do all work outside or in a well ventilated area and dispose of paint and solvent properly. Remove paint before welding or heating.

When sanding or grinding paint, avoid breathing the dust. Wear an approved respirator. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

WARNING!



END OF LIFE DISPOSAL

At the completion of the useful life of the unit, drain all fluids and dismantle by separating the different materials (rubber, steel, plastic, etc.). Follow all federal, state and local regulations for recycling and disposal of the fluid and components.



OPERATING THE TREE SPADE

- Block off work area from bystanders, livestock, etc.
- Operate only from the operator's station.
- Do not lift loads in excess of the capacity of the prime mover.
- When operating on slopes, drive up and down, not across. Avoid steep hillside operation, which could cause the prime mover to overturn.
- Reduce speed when driving over rough terrain, on a slope, or turning, to avoid overturning the vehicle.
- An operator must not use drugs or alcohol, which can change his or her alertness or coordination. An operator taking prescription or over-the-counter drugs should seek medical advice on whether or not he or she can safely operate equipment.
- Before exiting the prime mover, lower the attachment to the ground, turn off the prime mover's engine, remove the key and apply the brakes.

EQUIPMENT SAFETY PRECAUTIONS



TRANSPORTING THE TREE SPADE

- Travel only with the attachment in a safe transport position to prevent uncontrolled movement. Drive slowly over rough ground and on slopes.
- When driving on public roads use safety lights, reflectors, Slow Moving Vehicle signs etc., to prevent accidents. Check local government regulations that may affect you.
- Do not drive close to ditches, excavations, etc., cave in could result.
- Do not smoke when refueling the prime mover. Allow room in the gas tank for expansion. Wipe up any spilled fuel. Secure cap tightly when done.
- Use extra care when loading onto or unloading the machine from a trailer or truck



MAINTAINING THE TREE SPADE

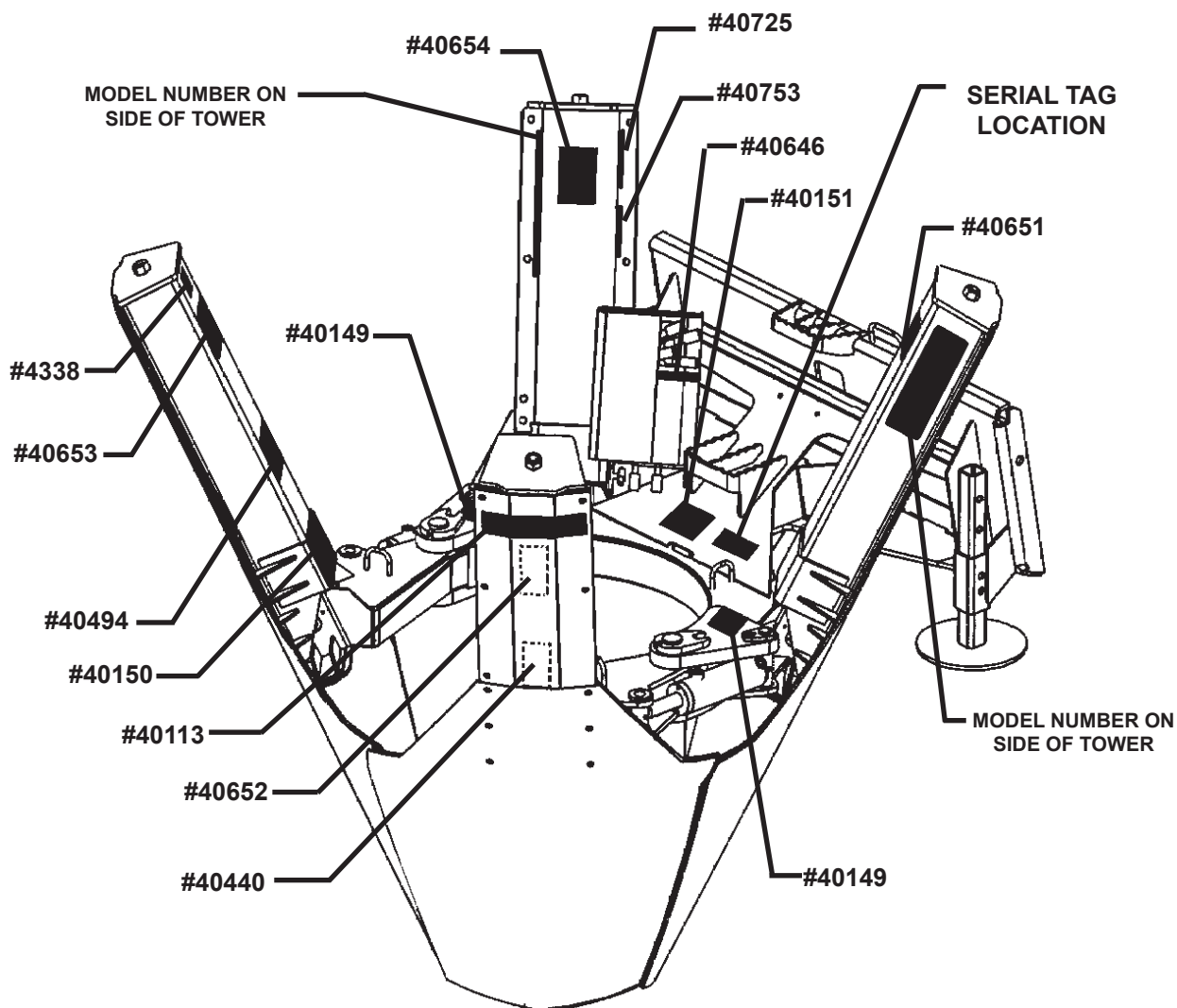
- Before performing maintenance, lower the attachment to the ground, turn off the engine, remove the key and apply the brakes.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator service manual's before any repair is made. After completing maintenance or repair, check for correct functioning of the attachment. If not functioning properly, always tag "DO NOT OPERATE" until all problems are corrected.
- Worn, damaged, or illegible safety decals must be replaced. New safety decals can be ordered from PALADIN.
- Never make hydraulic repairs while the system is under pressure. Serious personal injury or death could result.
- Never work under a raised attachment.

DECALS

DECAL PLACEMENT

GENERAL INFORMATION

The diagram on this page shows the location of the decals used on the BRADCO Tree Spades. The decals are identified by their part numbers, with reductions of the actual decals located on the following pages. Use this information to order replacements for lost or damaged decals. Be sure to read all decals before operating the tree spade. They contain information you need to know for both safety and attachment longevity.



IMPORTANT: Keep all safety decals clean and legible. Replace all missing, illegible or damaged safety decals. When replacing parts with safety decals attached, the safety decals must also be replaced.

REPLACING SAFETY DECALS: Clean the area of application with a nonflammable solvent, then wash the same area with soap and water. Allow the surface to dry. Remove the backing from the safety decals, exposing the adhesive surface. Apply the safety decals to the position shown in the diagram above and smooth out any bubbles.

DECALS

USE NUMBER DECALS FOR BLADE NUMBER AND IN MODEL NUMBER (IF REQUIRED)

1 2 3 4 5 6

NUMBER "1"
PART #40651

NUMBER "2"
PART #40652

NUMBER "3"
PART #40653

NUMBER "4"
PART #40654

NUMBER "5"
PART #40655

NUMBER "6"
PART #40656

REAR STABILIZER

#40646

REAR STABILIZER
PART #40646



CAUTION

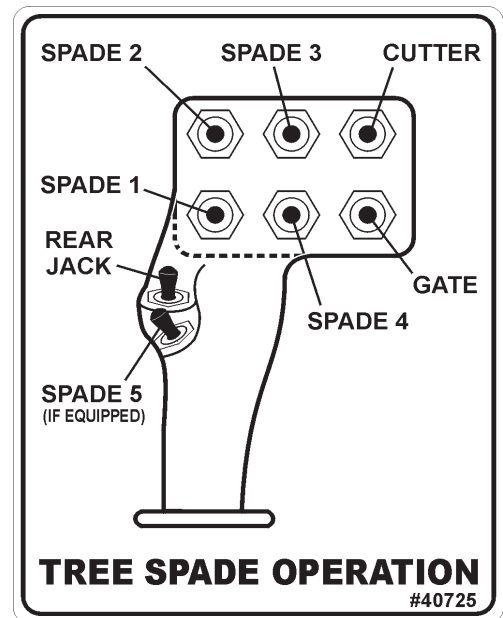
TO AVOID CYLINDER DAMAGE:

**DO NOT OPEN GATES WHEN THE
BLADES ARE DOWN.**

**DO NOT LOWER BLADES WHEN THE
GATES ARE OPEN.**

#40753

CAUTION! CYLINDER DAMAGE
PART #40753



TREE SPADE OPERATION

#40725

OPERATION DECAL
PART #40725



BRADCO

BY PALADIN

BRADCO
PART #40113



MADE IN U.S.A.
PART #4338

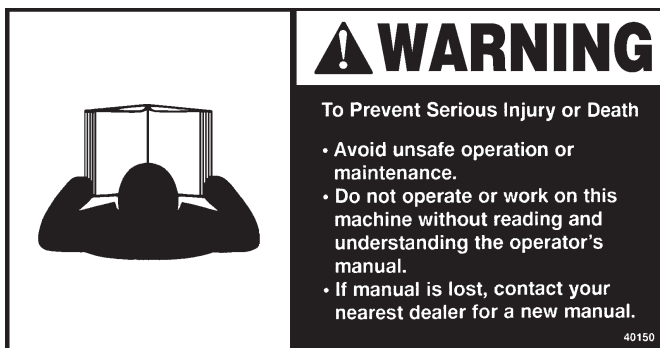
DECALS



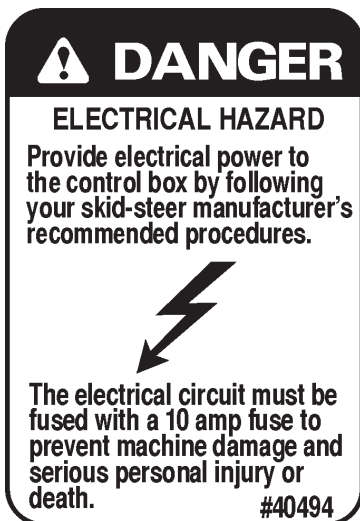
DANGER! PINCH POINT
PART #40149



WARNING! HIGH PRESSURE FLUID
PART #40151



WARNING! READ MANUAL
PART #40150



DANGER! ELECTRICAL HAZARD
PART #40494



CALL BEFORE YOU DIG
PART #40440

PRE-OPERATION

GENERAL INFORMATION

The BRADCO tree spades were designed to be easy to use and maintain. They are powered by the prime mover auxiliary hydraulics and a 12 DC electrical source. They are controlled by a joystick and electrical valve. Although BRADCO does offer various options for connecting to existing electrical controls, we will be covering the BRADCO operating controls in these instructions. The joystick control consists of 8 momentary toggle switches and is equipped to handle up to 5 blades, the gate, an under-cutter and the rear stabilizers (if so equipped)

SKID STEER OR OTHER HOST MACHINE

The BRADCO Tree Spades mount to various host machines such as, but not limited to skid steers, loaders, tractors and excavators. Due to the quantity of skid-steer applications, we will be referring to the host machine as a skid steer loader or prime mover throughout this manual.

The prime mover must have front auxiliary hydraulics and a 12 Volt DC electrical power source available for spade operation. The **BRADCO** Tree Spades are NOT designed for use on high flow skid-steers.

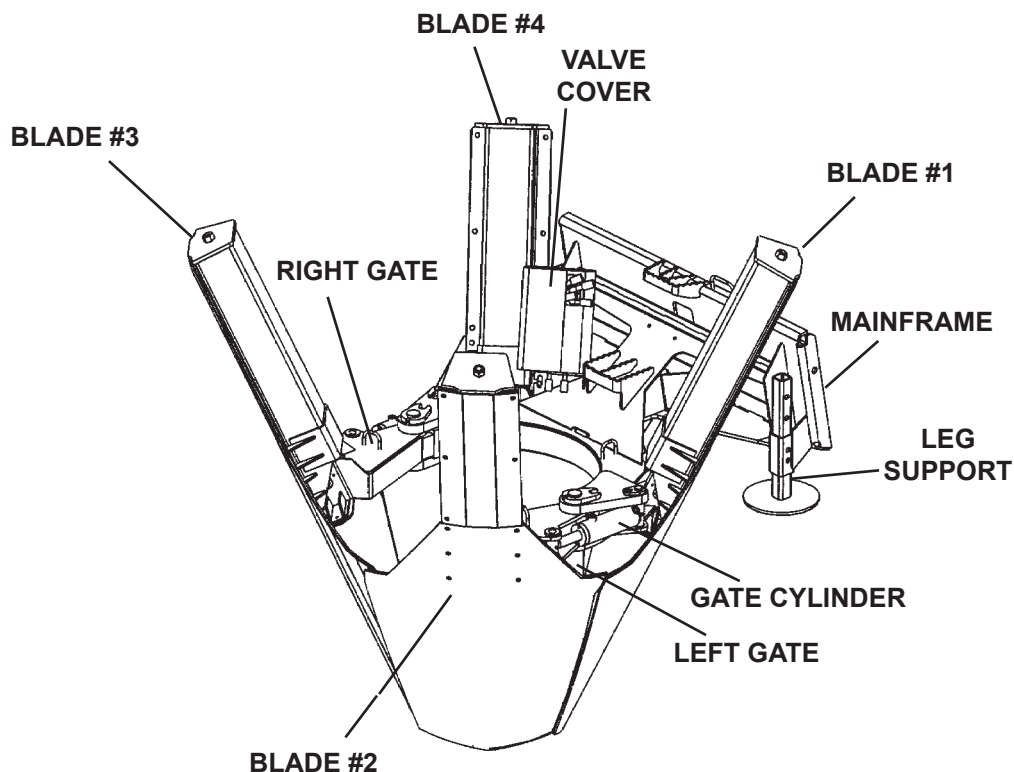
Rear stabilizers are recommended to get the maximum performance of your tree spade. The rear stabilizers allow as much weight as possible to be transferred to the front of the prime mover and therefore to the tree spade for maximum digging ability.

NOMENCLATURE

Throughout this manual, reference is made to various attachment components. The purpose of this section is to acquaint you with the various names of these components. This knowledge will be helpful when reading through the manual or when ordering service parts.

The blades are identified in a clockwise direction starting with the left rear spade.

Model 4425 Tree Spade shown



9641 6-3-14-2

INSTALLATION INSTRUCTIONS

GENERAL INFORMATION


The following instructions will assist you in mounting your tree spade onto your prime mover. The tree spade uses the quick attach mechanism for ease of installation. Therefore, if you know how to attach the loader bucket, attaching the tree spade should prove no problem.

NOTE: For mounting to other host machines see the specific mounting instructions that are supplied separately.


Remember to read all safety warnings, decals and operating instructions before operating the prime mover or tree spade.

MOUNTING INSTRUCTIONS

1. Remove any attachment from the front of the loader.
2. Following all standard safety practices and the instructions for installing an attachment in your prime mover operator's manual, install the attachment onto your loader.

WARNING!  **To avoid serious personal injury, make sure the attachment is securely latched to the attachment mechanism of your unit. Failure to do so could result in separation of the attachment from the prime mover.**

3. Lower the unit to the ground and relieve pressure to the auxiliary hydraulic lines.
4. Following the safety shut down procedure for your prime mover, shut down and exit the prime mover.
5. After making sure that the hydraulic couplers are free from any foreign material or contaminants, connect the couplers to the auxiliary hydraulic system of your prime mover.
6. Install your rear stabilizers (if so equipped) by following the instructions that were supplied with the rear stabilizers for your unit.
7. Connect the power and return hoses for the rear stabilizers to the two bulkhead fittings on the top of the mainframe (directly beside the power and return hoses for the tree spade).
8. Connect the cord assembly (with joystick) to the control cord from the tree spade. Connect the power cord from the joystick control to a power source on the prime mover. **NOTE: Some host machines have an auxiliary electrical outlet to plug in the control cord and then use their own joystick controls.**

DANGER!  **ELECTROCUTION HAZARD**
Provide electrical power to the joystick by following your prime mover manufacturer's recommended procedures. The electrical circuit must be fused with a 10 amp fuse to prevent machine damage and serious personal injury or death.

9. The length of control cord extending from the tree spade mainframe to the skid steer can be adjusted to suit the reach required for your application. (To adjust: Loosen the nut on the strain relief fitting to release the grip of the grommet and either push or pull on the cord to obtain your desired length. Tighten the nut by hand to secure the cord in place. Use plastic ties to secure the control cord to the hydraulic hoses to help keep it from interfering with operation of the tree spade and also to assist in keeping it free from pinching or chafing.)
10. Following the standard start up procedure for your prime mover, start the loader and run all cylinders on the attachment to purge any air from the system. Check for proper hydraulic connection, hose routing and hose length.
11. Attachment installation is complete.

INSTALLATION INSTRUCTIONS

DETACHING

1. Before exiting the prime mover, lower the attachment to the ground, apply the brakes, turn off the prime mover's engine, and remove the key.
2. Follow prime mover operator's manual to relieve pressure in the hydraulic lines.
3. Disconnect couplers and connect them together or install dust caps and plugs to prevent contaminants from entering the hydraulic system. Store hoses on attachment, off the ground.
4. Disconnect the electrical power cord to the control box and store the control box in a dry and suitable location.
5. Follow your prime mover operator's manual for detaching (removing) an attachment.

OPERATING INSTRUCTIONS

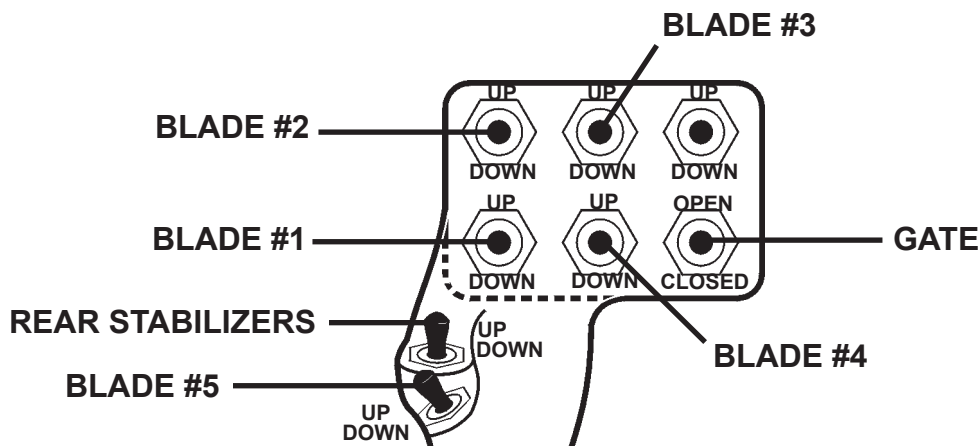
CONTROLS

GENERAL INFORMATION

Your tree spade is controlled by a joystick and an electrical valve assembly. Although BRADCO does offer various options for connecting to existing electrical joystick controls, we will be covering the BRADCO operating controls in these instructions. The joystick control consists of 8 momentary toggle switches and is equipped to handle up to five blades, the under-cutter, gate and rear stabilizers (if equipped).

BLADE CONTROLS

The joystick control can accommodate up to five blades and is wired for the number of blades on the tree spade you have purchased. Pushing the toggle switch up will raise that specific blade up, and pushing the toggle switch down will lower that blade. When the toggle switch is released, all movement will stop. If you have purchased a Model 2625 or 3625, the switches for blades number 4 and 5 will be "inoperable". The blade controls are located in the same pattern as the blades on the unit, with blade Number 1 being the closest blade to the operator on the left hand side (left rear blade).



GATE CONTROL

The gate control operates in the same fashion as the blade controls. Pushing the toggle switch up will open the gates (left and right arms) and pushing the toggle switch down will close the gate. When the toggle switch is released all movement will stop.

OPERATING INSTRUCTIONS

CONTROLS

REAR "JACK" STABILIZER CONTROL

The rear stabilizer control operates in the same fashion as the other controls. Pushing the toggle switch up will raise the left and right stabilizers and pushing the toggle switch down will lower the left and right stabilizer. When the toggle switch is released all movement will stop.

Rear stabilizer kits are available from your BRADCO dealer for fitup to various skid-steer loaders. The rear stabilizer hoses connect to the tree spade control valve and are therefore controlled by the operating control switch on the joystick.

Rear stabilizers are recommended to get the maximum performance from your tree spade. The rear stabilizers allow as much weight as possible to be transferred to the front of the skid-steer and therefore to the tree spade for maximum digging ability.

GENERAL INFORMATION

The following information will assist you in determining the size of ball needed for the job at hand. These charts (*taken from the American Standard for Nursery Stock - ANSI Z60.1-1996*) are to be used as a guideline only and you should contact your local nursery for more detailed instructions.

Multi-Stem Trees or Shrubs

Height	Min. Dia. Ball
4'	14"
5'	16"
6'	18"
7'	20"
8'	22"
10'	24"
12'	28"
14'	32"
16'	38"
18'	42"

Deciduous Shrubs

Height	Min. Dia. Ball
12"	8"
18"	9"
2'	10"
3'	12"
4'	14"
5'	16"
6'	18"
7'	20"
8'	22"
9'	24"
10'	26"

Shade Trees

Caliper	Min. Dia. Ball
1/2"	12"
3/4"	14"
1"	16"
1-1/4"	18"
1-1/2"	20"
1-3/4"	22"
2"	24"
2-1/2"	28"
3"	32"
3-1/2"	38"
4"	42"

Small Trees
(Ht. up to 6' / Caliper 6' & over)

Ht./Caliper	Min. Dia. Ball
2'	10"
3'	12"
4'	14"
5'	16"
3/4"	16"
1"	18"
1-1/2"	20"
1-3/4"	22"
2"	24"
2-1/2"	28"
3"	32"
3-1/2"	38"
4"	42"

Coniferous Evergreens
Spreading/Semi-Spreading/Globe/Dwarf

Spread	Min. Dia. Ball
9"	8"
12"	8"
15"	10"
18"	10"
2'	12"
2-1/2'	14"
3'	16"
3-1/2'	18"
4'	21"
5'	24"
6'	28"
7'	32"
8'	36"

Coniferous Evergreens
Conical & Broad Uprights

Height	Min. Dia. Ball
12"	10"
18"	10"
2'	12"
3'	14"
4'	16"
5'	20"
6'	22"
7'	24"
8'	27"
9'	30"
10'	34"
12'	34"
14'	42"

OPERATING INSTRUCTIONS

**Columnar Coniferous Evergreens
Regular Growing**

Height	Min. Dia. Ball
12"	10"
18"	10"
2'	12"
3'	13"
4'	14"
5'	16"
6'	18"
7'	20"
8'	22"
9'	24"
10'	27"
12'	30"
14'	33"
16'	36"
18'	40"

**Columnar Coniferous Evergreens
Rapid Growing**

Height	Min. Dia. Ball
12"	8"
2'	9"
3'	11"
4'	12"
5'	14"
6'	16"

**Broadleaf Evergreen
Cone and Upright**

Height	Min. Dia. Ball
18"	10"
2'	12"
3'	14"
4'	16"
5'	20"
6'	22"
7'	24"
8'	27"
9'	30"
10'	34"
12'	38"
14'	42"

**Broadleaf Evergreen
Spreading/Semi-Spreading/
Globe/Dwarf**

Spread	Min. Dia. Ball
18"	10"
2'	12"
2-1/2'	14"
3'	16"
3-1/2'	18"
4'	21"

**Processed Balled
Fruit Trees**

Caliper	Min. Dia. Ball
1/4"	8"
5/16"	8"
3/8"	10"
31/2"	10"
5/8"	10"
3/4"	12"
1" & UP	12"

In sizing shade trees, caliper shall take precedence over height. In size grading small and flowering trees, height shall take precedence up to 6 feet; thereafter, caliper takes precedence.

Caliper of the trunk shall be taken 6 inches above the ground up to and including 4 inch caliper size, and 12 inches above the ground for larger sizes. (Seldom are tree trunks perfectly round. Caliper measurement may be taken with "slot" type caliper, "pincer" type calipers or diameter tape.)

The diameter of the ball is determined by the blade size or the digging depth. Each blade is changed by removing one pin. The ball depth is determined by the position of the adjustable legs.

On larger bushy trees the branches may have to be tied up so the blades do not cut off the lower branches.

On some types of trees it is recommended for best results that transplanting take place while the tree is dormant. Contact your local nursery for the specifications on the type of tree you are transplanting.

OPERATING INSTRUCTIONS

INTENDED USE: This unit is designed for removing or transplanting trees and shrubs. Use in any other way is considered contrary to the intended use.

The BRADCO Tree Spades are designed to meet the needs of the professional nurseryman. The machine has proven capable of continuous digging with a minimum of maintenance. It is used extensively for removing trees for burlapping and for transplanting and rearranging nursery rows.

NOTE: These instructions include the use of rear "jack" stabilizers. Rear stabilizer kits are available from your BRADCO dealer for fitup to various loaders. The rear stabilizer hoses connect to the tree spade control valve and are therefore controlled by the operating control switch on the joystick. Rear stabilizers are recommended to get the maximum performance from your tree spade. The rear stabilizers allow as much weight as possible to be transferred to the front of the prime mover and therefore to the tree spade for maximum digging ability.

IMPORTANT: Always follow the instructions in your prime mover operators manual for operating the auxiliary hydraulic controls and follow the Safety Shutdown Procedure whenever leaving the operator's station.

After the tree spade has been properly attached, raise the unit above the ground approximately 2 feet. Acquaint yourself with the various control levers. After becoming familiar with the controls it is advisable to dig in soil without a tree. This will provide an opportunity to check ball size as well as attachment operation.

The blades on the tree spade are number 1, 2, 3 and 4 (if so equipped). The two forward blades open when the gate control is pushed forward. The gates will open and close together.

Soil condition and type affect how the tree spade operates. In firm soil the blades may only travel one-third of the way down on the first stroke and in loose or sandy soil the blades may penetrate completely in one stroke.

The amount of root ball needed will vary per the diameter of the tree trunk, the height of the tree or the type of tree. Refer to the charts at the beginning of this section. A general rule of thumb is every one inch of tree diameter requires a minimum of ten inch ball diameter.

Adjusting Leg Height

The tree spades are equipped with adjustable legs that are used for adjusting the ball size. With the legs fully raised the ball size will be the rated size of your tree spade. Moving the legs down will decrease the ball size approximately 1.50" for each adjustment hole. If the legs are removed completely the tree spade will dig a slightly larger hole than rated size.

Lift and block the spade before making any leg adjustment.

OPERATING INSTRUCTIONS

Balled and Burlapped Trees (with or without Wire Basket)

NOTE: There are a wide range of presewn burlap bags, wire baskets and containers available from reputable manufacturers for the BRADCO Tree Spade.

Determine the size of ball required for the type and size of tree. Adjust the legs to achieve the desired ball size.

CAUTION: TO AVOID CYLINDER DAMAGE:



**DO NOT OPEN GATES WHEN THE BLADES ARE DOWN.
DO NOT LOWER BLADES WHEN THE GATES ARE OPEN.**

1. With the gates open and the blades in the up position, center the tree in the tree spade from left to right: and front to back. **NOTE: It is CRITICAL that the tree is centered in the ball. Therefore, it is advisable to have someone on the ground to aid in the alignment process.**
2. Close the gate.
3. Lower the loader arms, therefore raising the front wheels off the ground.
4. Lower the rear stabilizers (if so equipped), until the loader feels level.

NOTE: Raising the loader until the wheels are only slightly off the ground transfers the weight to the tree spade for maximum digging power. Lifting the loader too high may cause an unstable condition.

5. Tilt the tree spade until it is level.
6. Once the tree spade is level, the loader raised slightly and the gate closed, it is time to start lowering the blades. Using the joystick control, lower "Blade 1" as far as it will go into the soil. (Due to the different soil conditions the blade may go all the way into the ground or only slightly.)
7. As soon as the blade starts to tilt the attachment, stop movement and raise the blade slightly to remove some of the down pressure. (This will assist in digging the maximum ball size and prevent digging an angled hole.)
8. Using the joystick control, lower "Blade 2" as far as it will go into the soil. As soon as the blade starts to tilt the attachment, stop movement and raise the blade slightly to remove some of the down pressure.
9. Repeat step #8 for "Blade 3" and "Blade 4" (if so equipped).

OPERATING INSTRUCTIONS

10. If the blades failed to lower completely due to the soil conditions, repeat Steps #6 thru #9 until all the blades are completely lowered into the soil.
11. Raise the rear stabilizers, (if so equipped).
12. Raise the loader arms until the wheels are fully on the ground.
13. Lift the tree out of the hole.
14. Placing the burlap on the ground or in the wire basket, position the tree in the center of the burlap. **NOTE: Carry the tree as low as possible when transporting.**
15. Release the ball by first raising "Blade 4", and continue to raise the blades in reverse order 3, 2, & 1. **NOTE: If the tree ball sticks to the blades, use a shovel to press down on the tree ball to loosen it from the blades.**
16. Lift the tree spade slightly, and open the gates. Back the loader away from the tree. The ball is ready for covering, with no additional shaping necessary.
17. Finish wrapping the tree.

Direct Transplanting

1. Determine the size of hole needed for the tree you are transplanting, and adjust the legs to achieve the desired hole size.
2. Raise the blades and drive the skid steer to the location that the tree will be planted and position the skid-steer so the loader is as level as possible. Follow Steps 2 thru 12 in the previous instructions (Balled and Burlapped Trees) to dig a spot for the tree.
3. Lift the dirt ball out of the ground and move out of the way for tree transplanting. Set the tree spade on the ground and raise the blades to release the dirt ball. The blades should be raised in reverse order 4, 3, 2 and 1. Open gates.
4. See Steps 1 thru 13 in the previous instructions (Balled and Burlapped Trees) to dig up the desired tree for transplanting.
5. Position the tree over the previously dug hole, and while keeping the tree trunk as vertical as possible, lower the tree.
6. Release the ball by first raising "Blade 4" and continue to raise the blades in reverse order 3, 2, & 1. **NOTE: If the tree ball sticks to the blades, use a shovel to press down on the tree ball to loosen it from the blades.**
7. Lift the tree spade slightly and open the gates. Back the loader away from the tree. **NOTE: Follow any specific transplanting instructions, such as watering and mulching etc., for the type of tree you are transplanting.**

OPERATING INSTRUCTIONS

GENERAL INFORMATION

The following storage procedure will help you to keep your attachment in top condition. It will also help you get off to a good start the next time your tree spade is needed. We therefore, strongly recommend that you take the extra time to follow these procedures whenever your attachment will not be used for an extended period of time.

PREPARATION FOR STORAGE

1. Clean the exterior thoroughly removing all mud, dirt and grease.
2. Inspect the unit for visible signs of wear. Order any parts required and make any necessary repairs to avoid delays when starting next season.
3. Inspect the graphite coating on the blades. Repaint as needed.
4. Check the blades for wear. If sharpening is required use a hand grinder.
5. Tighten all loose nuts and capscrews.
6. Grease all grease fittings.
7. Coat the exposed portions of the cylinder rods with grease.
8. Seal hydraulic system from contaminants and secure all hydraulic hoses off the ground to help prevent damage. (Connect the hydraulic couplers together and cap the fittings for the rear stabilizers.)
9. Replace decals if damaged or in unreadable condition.
10. Store the unit in a dry and protected place. Leaving the unit outside will materially shorten its life.

REMOVING FROM STORAGE

1. Remove all protective coverings.
2. Check hydraulic hoses for deterioration and replace if necessary.

TRANSPORTING

1. Follow all federal, state and local regulations when transporting the unit on public roads.
2. Use extra care when loading or unloading the machine onto a trailer or truck.
3. Before transporting, raise the blades and keep the unit as close to the ground as possible.

CAUTION! Be sure to install a SMV (Slow Moving Vehicle) sign on the loader before attempting to transport.



When transporting on a road or highway at night or during the day, use accessory lights and devices for adequate warning to the operators of other vehicles. In this regard, check local government regulations.

Always drive slowly over uneven terrain to avoid tipping the unit.

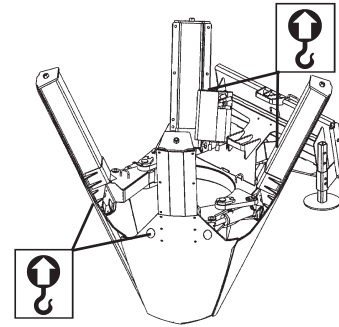
OPERATING INSTRUCTIONS

LIFT POINTS

Lifting points are identified by a lifting decals where required. Lifting at other points is unsafe and can damage attachment. Do not attach lifting accessories around cylinders or in any way that may damage hoses or hydraulic components. See Diagram

- Attach lifting accessories to unit at recommended lifting points.
- Bring lifting accessories together to a central lifting point.
- Lift gradually, maintaining the equilibrium of the unit.
-

WARNING! Use lifting accessories (chains, slings, ropes, shackles and etc.) that are capable of supporting the size and weight of your attachment. Secure all lifting accessories in such a way to prevent unintended disengagement. Failure to do so could result in the attachment falling and causing serious personal injury or death.



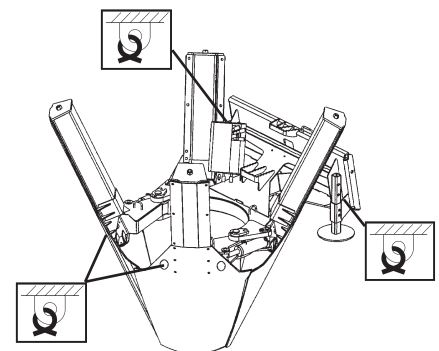
25 SERIES
4 POINTS - ONE EACH BLADE

TIE DOWN POINTS

Tie down points are identified by tie down decals where required. Securing to trailer at other points is unsafe and can damage attachment. Do not attach tie down accessories around cylinders or in any way that may damage hoses or hydraulic components. See Diagram

- Attach tie down accessories to unit as recommended.
- Check unit stability before transporting.

WARNING! Verify that all tie down accessories (chains, slings, ropes, shackles and etc.) are capable of maintaining attachment stability during transporting and are attached in such a way to prevent unintended disengagement or shifting of the unit. Failure to do so could result in serious personal injury or death.



25 SERIES
4 POINTS - ONE EACH OUTSIDE
BLADE, ONE EACH SIDE OF FRAME

LUBRICATION

GENERAL INFORMATION

Economical and efficient operation of any machine is dependent upon regular and proper lubrication of all moving parts with a quality lubricant. Neglect leads to reduced efficiency, wear, breakdown, and needless replacement of parts. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.

IMPORTANT: Avoid excessive greasing. Dirt collects on exposed grease and greatly increases wear. After greasing, wipe off excessive grease from fittings.

NOTE: A scraping sound during blade operation is an indication that the slide channel and slider bars require lubricating.

EVERY EIGHT HOURS OF OPERATION

- (1) Fitting on Gate Pivot Pin - Model 2625 and 3625.
- (2) Fittings on Gate Pivot Pin - Model 4425.
- (2) Fitting on Gate Cylinder - Model 2625 and 3625.
- (4) Fittings on Gate Cylinders - Model 4425.

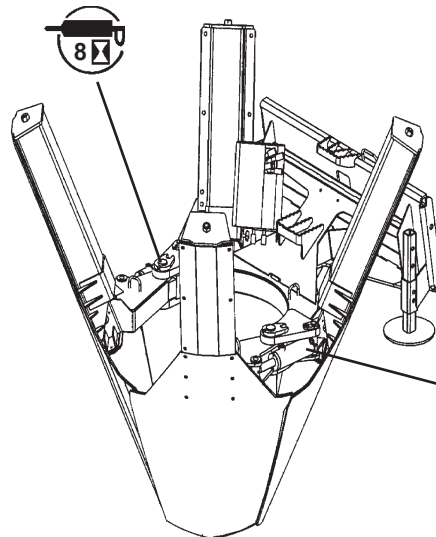
LUBRICATION SYMBOLS

Lubricate daily or every 8 hours of operation with SAE Multi-Purpose Lubricant or an equivalent SAE Multi-Purpose type grease.



Model 4425 Tree Spade shown

**GATE PIVOT PIN
(1 EACH SIDE)**



**GATE CYLINDER
(2 EACH CYLINDER)**



MAINTENANCE AND SERVICE

GENERAL INFORMATION

Regular maintenance is the key to long equipment life and safe operation. Maintenance requirements have been reduced to an absolute minimum. However, it is very important that these maintenance functions be performed as described below.

Procedure	Daily	Every 40 Hours
Check all bolts and nuts for tightness.	✓	
Replace any missing bolts or nuts with approved replacement parts.	✓	
Check hydraulic system for hydraulic oil leaks. See procedure below.	✓	
Visually inspect the machine for worn parts or cracked welds, and repair as necessary.	✓	
Check for missing or illegible Safety / Warning Decals.	✓	
Lubricate all grease fittings.		✓

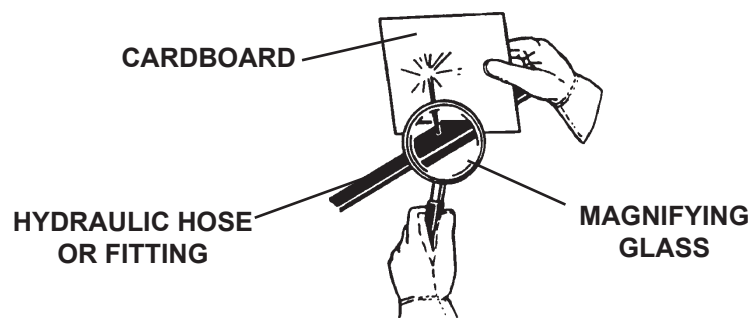
WARNING! Escaping hydraulic / diesel fluid under pressure can penetrate the skin causing serious injury. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands to search for suspected leaks.



Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities. If injured by injected fluid, see a doctor at once.

Stop the engine and relieve pressure before connecting or disconnecting lines.

Tighten all connections before starting engine or pressurizing lines.



9451 2-14-13-3

MAINTENANCE & SERVICE

WARNING! Be sure to follow Safety Shutdown Procedures before performing any maintenance on attachment.



BLADE MAINTENANCE

Maintaining the condition of the blades will result in a cleaner ball and a smoother digging operation. The blades are painted before shipping. This prevents the earth from sticking to the blades and aids in the digging operation. The performance of the blade is affected by soil conditions and can be repainted or coated with Slip Plate #1, manufactured by Acrotech Industries Inc. One gallon of Slip Plate #1 can be purchased from BRADCO under part #25154. It is important that oil not be used on the blades as long as the graphite coating remains.

SHARPENING BLADES

Although the blades should remain in good condition for a long time, extensive use and rocky soil conditions may dull portions of the blades. If sharpening is required, use a hand grinder and sharpen the blades in an even pattern.

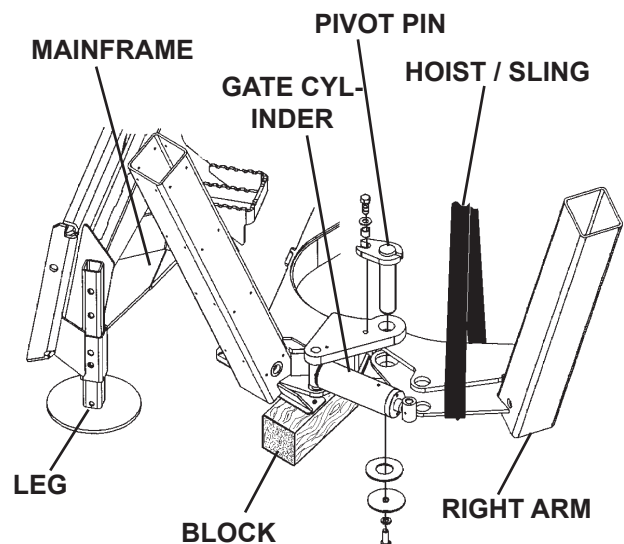
REPLACING BUSHINGS

To Replace Arm Bushings:

1. Lower the mainframe onto the rear legs as close to the ground as possible, and block up the front of the mainframe to keep it level.
2. Remove Blades #2 and #3.
3. Disconnect the gate cylinders at the arm weldments.
4. Attach a hoist to the arm to prevent it from falling and causing personal injury or undue stress to the hoses when it is disconnected from the mainframe.

NOTE: If you are removing the arm completely for bushing replacement, the blade cylinder hoses will need to be tagged and removed.

5. With the arm supported, remove the pivot pin securing the arm to the mainframe. While continuing to support the arm, press out the top and bottom bushing and replace with new.
6. Position the arm, and replace the pivot pin.
7. Connect the gate cylinder to the arm weldment.
8. Repeat steps #3 through #7 for the remaining arm (if equipped).
9. Reinstall Blades #2 and #3. Bushing replacement is complete.



9647 6-4-14-2

MAINTENANCE & SERVICE

BLADE ADJUSTMENT

Proper adjustment of the blades is required for best performance of the tree spade. Loose blades hinder the spades ability to cut the roots. As the blades and plastic wear plates begin to wear, the blades may need to be adjusted to maintain the close positioning of the blades and prevent gapping between the blades. There are shims provided between the tower and the blades and the tower and the tower cover that can be removed (to tighten the tower on the mainframe) or moved to the opposite side (to maintain blade tightness).

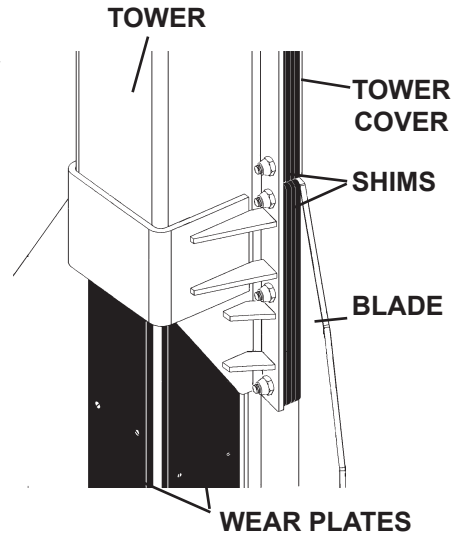
To adjust blades:

1. Loosen the .50" capscrews securing the tower cover and blades to the tower.
2. Slide in a shim or remove a shim as required to maintain blade tightness.

(NOTE: Keep all shims for future adjustments.)

3. Re-tighten capscrews and check the blade positioning.

NOTE: Once the blades can no longer be adjusted the wear plate(s) will need to be replaced.

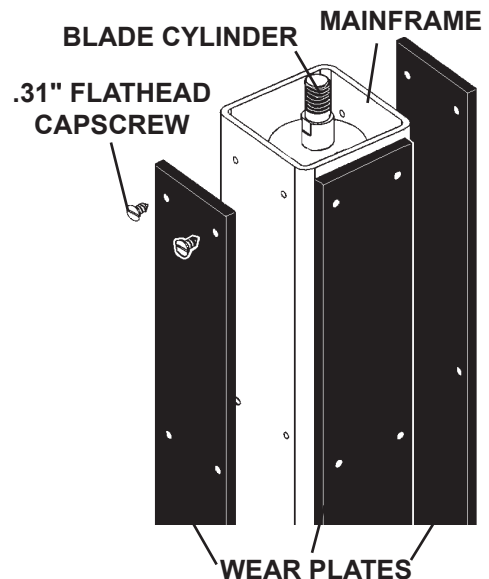


WEAR PLATE REPLACEMENT

If the wear plate(s) have worn to the point that the towers are riding on the capscrews or when the blades have reached the end of their adjustment and gapping between the blades is still evident the wear plate(s) will need to be replaced.

To replace wear plates:

1. Remove the blade and the tower cover from the tower.
2. Position a wrench on the flat spot of the blade cylinder to prevent it from rotating as you remove the lock nut securing the blade to the tower.
3. Remove the tower and inspect the wear plates. Replace any wear plates that are worn. **NOTE: There are two different size wear plates on each slide tower. The front wear plate is shorter than the remaining three.**
4. Re-install the tower and secure the blade cylinder to the tower using the hardware removed in step #2.
5. Install the tower cover to the tower while inserting all of the original shims.
6. Install the blade to the tower while inserting all of the original shims.
7. Check blade position. Insert or remove shims as required to obtain blade tightness.



9686 6-4-14-2

MAINTENANCE AND SERVICE

CYLINDER SEAL REPLACEMENT

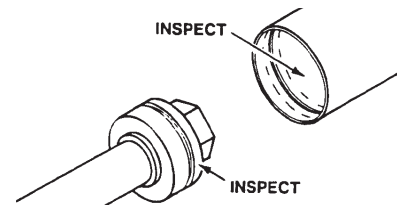
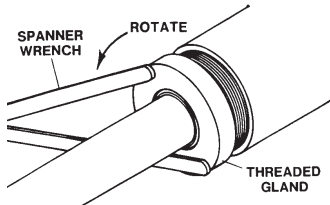
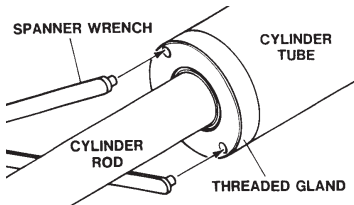
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic cylinders. Always protect the active part of the cylinder rod (the chrome section). Nicks or scratches on the surface of the rod could result in cylinder failure. Clean all parts thoroughly with a cleaning solvent before reassembly.

DISASSEMBLY PROCEDURE

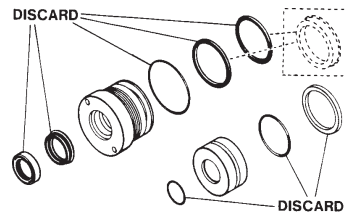
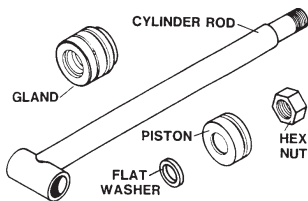
IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

THREADED TYPE GLAND

1. Rotate the gland with a spanner wrench counterclockwise until the gland is free of the cylinder tube.
2. Pull the cylinder rod from the cylinder tube and inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston AND the cylinder tube must be replaced.



3. Remove the hex nut, piston, flat washer or spacer tube (if so equipped), and gland from the cylinder rod. If the cylinder rod is rusty, scratched, or bent, it must be replaced.
4. Remove and discard all the old seals.

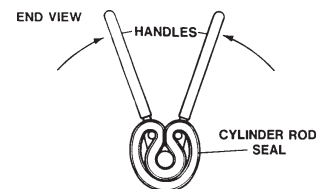
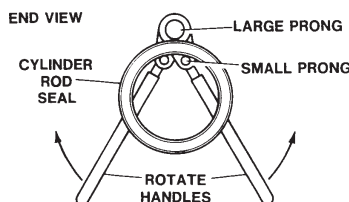
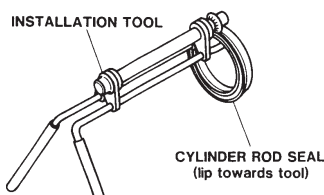


ASSEMBLY PROCEDURE

IMPORTANT: Replace all seals even if they do not appear to be damaged. Failure to replace all seals may result in premature cylinder failure. **NOTE:** Seal kits will service most cylinders of similar bore size and rod diameter.

1. Install the cylinder rod seal in the gland first. Be careful not to damage the seal in the process, as it is somewhat difficult to install.

NOTE: A special installation tool (Part #65349) is available to help with installing the seal. Simply fit the end of the tool over the seal so that the large prong of the tool is on the outside of the seal, and the two smaller prongs on the inside. The lip of the seal should be facing towards the tool. Rotate the handles on the tool around to wrap the seal around the end of the tool.



Rotate the handles on the tool around to wrap the seal around the end of the tool.

10356 10-13-05

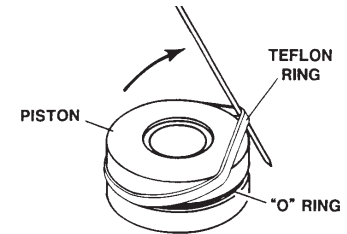
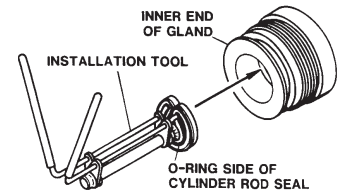
MAINTENANCE AND SERVICE

Now insert the seal into the gland from the inner end. Position the seal in its groove, and release and remove the tool. Press the seal into its seat the rest of the way by hand.

2. Install the new piston ring, rod wiper, O-rings and backup washers, if applicable, on the piston.

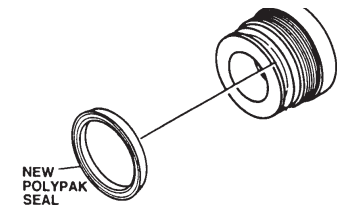
Be careful not to damage the seals. Caution must be used when installing the piston ring. The ring must be stretched carefully over the piston with a smooth, round, pointed tool.

3. After installing the rod seal inside the gland, as shown in step #1, install the external seal.



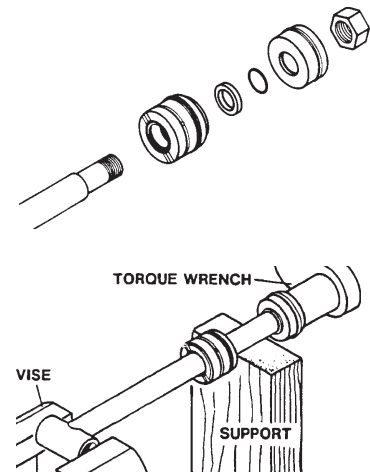
NOTE: Threaded glands may have been equipped with a separate O-ring and backup washer system or a polypak (all in one) type seal. Current seal kits contain a polypak (all in one) type seal to replace the discarded seal types on ALL THREADED GLANDS.

4. Slide the gland onto the cylinder rod, being careful not to damage the rod wiper. Then install the spacer, or flat washer (if so equipped), small o-ring, piston, and hex nut onto the end of the cylinder rod.
5. Secure the cylinder rod (mounting end) in a vise with a support at its center. Torque the nut to the amount shown for the thread diameter of the cylinder rod (see chart).



Thread Diameter	POUNDS - FEET
7/8"	150-200
*1"	230-325
1-1/8"	350-480
1-1/4"	490-670
1-3/8"	670-900
* 1" Thread Diameter WITH 1.25" Rod Diameter	
Min. 230 ft. lbs. Max. 250 ft. lbs.	

IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.



6. Apply a lubricant (such as Lubriplate #105) to the piston and teflon ring. Insert the cylinder rod assembly into the cylinder tube.

IMPORTANT: Ensure that the piston ring fits squarely into the cylinder tube and piston groove, otherwise the ring may be damaged and a leak will occur.

7. Use a spanner wrench to rotate the gland clockwise into the cylinder. Continue to rotate the gland with the spanner wrench until it is tight.

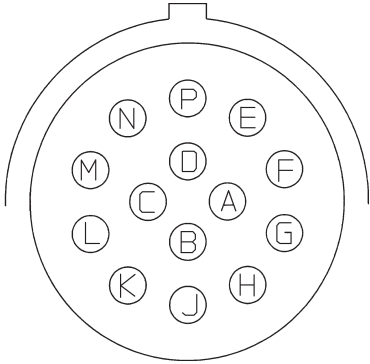
WARNING!



Cylinders serviced in the field are to be tested for leakage prior to the attachment being placed in work. Failure to test rebuilt cylinders could result in damage to the cylinder and/or the attachment, cause severe personal injury or even death.

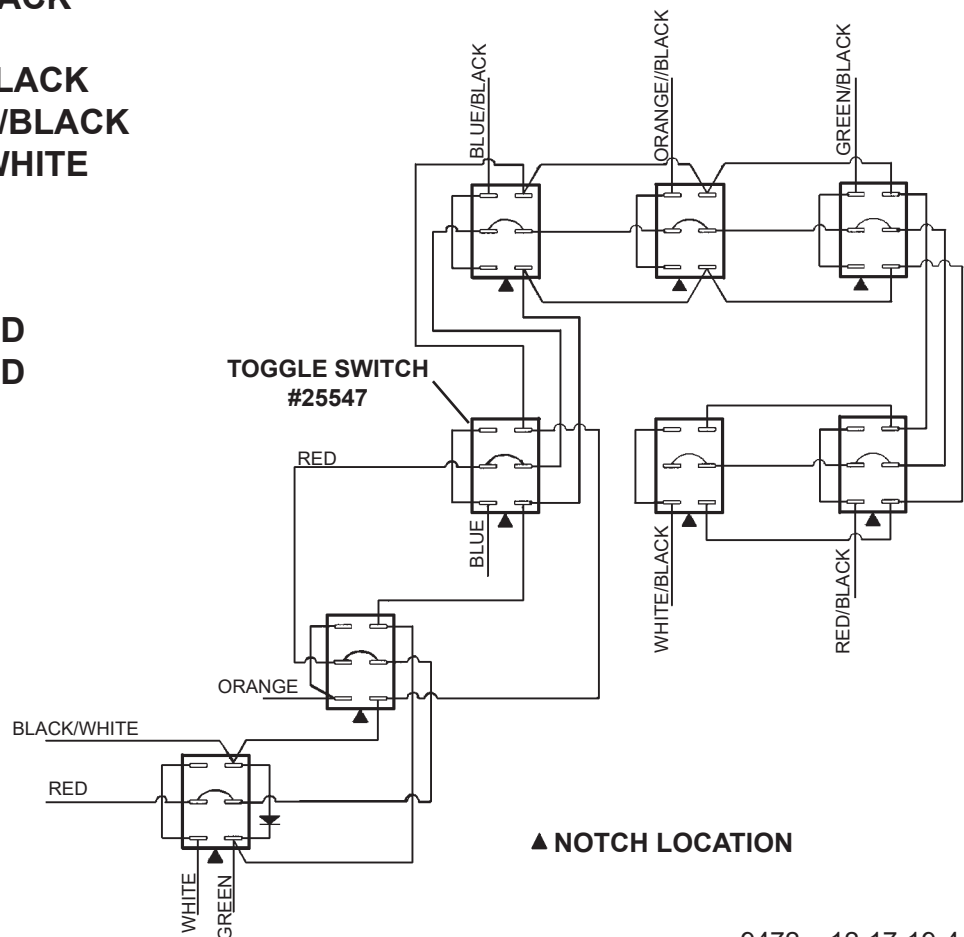
WIRING SCHEMATICS

DEUTSCH CONNECTORS
PIN OUT DETAIL



A = GREEN
B = BLACK
C = RED/BLACK
D = GREEN/BLACK
E = BLUE/BLACK
F = BLUE
G = WHITE/BLACK
H = ORANGE/BLACK
J = BLACK/WHITE
K = RED
L = ORANGE
M = WHITE
N = NOT USED
P = NOT USED

FUNCTION	WIRE COLOR
FLOW REVERSER	BLACK / WHITE
UNLOADER	GREEN
REAR STABILIZER	ORANGE
BLADE #1	BLUE
BLADE #2	BLUE / BLACK
BLADE #3	ORANGE / BLACK
BLADE #4 (if equipped)	WHITE / BLACK
BLADE #5 (if equipped)	WHITE
GATE	RED / BLACK
UNDERCUTTER (if equipped)	GREEN / BLACK



9472 12-17-19-4

TROUBLESHOOTING

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>	<u>POSSIBLE REMEDY</u>
Tree Spade will not operate.	Auxiliary hoses not hooked up to the prime mover.	Engage Couplers
	Obstruction in hydraulic lines.	Remove obstruction and replace if necessary.
	Prime mover auxiliary valve not engaged.	Engage auxiliary valve.
	Loss of electrical power to joystick control.	Check electrical connection and circuit fuse.
Blades activate sluggishly.	Insufficient hydraulic flow from the prime mover.	Refer to prime mover's owners manual.
	Damaged quick coupler.	Replace if necessary.
	Oil filter on prime mover is dirty.	Refer to prime mover's owners manual.
Leaking Oil.	Loose or damaged hydraulic line.	Tighten or replace.
	O-Rings on fittings damaged.	Replace if necessary.
	Fittings loose or damaged.	Tighten or replace.
	Cylinder seals damaged.	Replace cylinder seals.
Insufficient power.	Insufficient hydraulic flow from the prime mover.	Refer to prime mover's owners manual.
	Relief valve setting adjusted too low.	Refer to prime mover's owners manual.
	Oil filter on prime mover is dirty.	Refer to prime mover's owners manual.
	Blades or Undercutter worn or chipped.	Sharpen as needed.
Cylinders operate in the wrong direction.	Hoses from the valve to the prime mover incorrectly connected.	Switch couplers at the skid steer end.
	Incorrect wiring from the joystick control.	Check wiring diagram and correct.

TROUBLESHOOTING

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>	<u>POSSIBLE SOLUTION</u>
Excessive oil temperature.	Hydraulic oil level too low.	Refer to prime mover's owners manual
	Obstruction in hydraulic lines.	Remove obstruction and replace if necessary.
	Hydraulic oil or oil filter in prime mover is dirty.	Refer to prime mover's owners manual.
	Relief valve setting adjusted too low.	Refer to prime mover's owners manual.
	Couplers not engaged.	Engage couplers.
A hydraulic cylinder not operating.	Insufficient hydraulic flow from the prime mover.	Refer to prime mover's owners manual.
	Cylinder rod bent.	Visually inspect the cylinder for damage.
	Cylinder seals damaged.	Replace cylinder seals.
	Obstruction in hydraulic lines.	Remove obstruction and replace if necessary.
	An electrical coil not functioning at valve.	Check voltage readings at valve and replace coil if necessary.
All hydraulic cylinders not functioning.	Blown fuse on prime mover.	Refer to prime mover's owners manual.
	Damaged electrical wiring.	Test and replace if necessary.
	Loss of hydraulic power.	Check hydraulic circuit.
	Electrical power connected to wrong polarity.	Reverse red and black wires.
Hydraulic cylinders only operating in one direction.	Contaminants in the hydraulic system and solenoid valve.	Remove spool from solenoid valve and check for foreign material. Clean or replace.
		Remove spool from solenoid valve and check seals for damage. Replace if necessary.
	Damaged electrical wiring.	Test and replace if necessary.
	Bad electrical connection at Reversing valve.	Check connections and correct.
	Coil or spool damaged in reversing valve.	Replace as necessary.

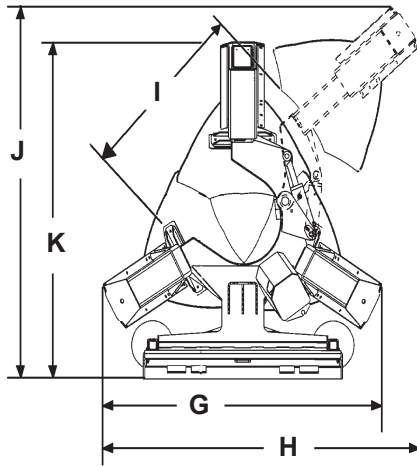
9466 6-4-14-3

SPECIFICATIONS

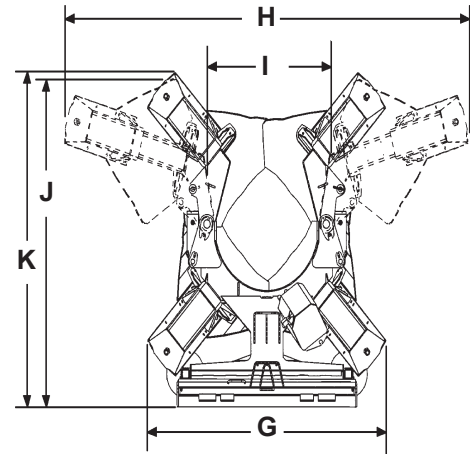
25 SERIES TREE SPADES

SPECIFICATION AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE AND WITHOUT LIABILITY THEREFORE.

2625 & 3625



4425



DESCRIPTION	2625	3625	4425
A. Overall Height - Blades Up (Open)	51.00"	64.50"	64.50"
B. Overall Height - Blades Down (Closed)	53.50"	69.00"	69.00"
C. Shipping Height - (Blades Removed)	32.00"	38.00"	38.00"
D. Frame Height	22.50"	22.50"	22.50"
E. Digging Depth	22.00"	31.00"	31.00"
F. Cutting Angle	25°	25°	25°
G. Overall Transport Width (Gate Closed)	51.00"	66.00"	63.00"
H. Overall Width (Gate Open)(Blades Up)	66.50"	88.50"	107.00"
I. Maximum Gate Opening	29.00"	40.00"	33.00"
J. Overall Length (Gate Open)	64.00"	75.00"	68.00"
K. Overall Transport Length (Gate Closed)	63.00"	68.00"	69.50"
L. Maximum Leg Adjustment	10.50"	10.50"	10.50"
Number of Blades	3	3	4
Tree Ball Diameter	18" to 26"	24" to 36"	30" to 44"
Tree Diameter	1.50"-2.50"	2.00"-3.50"	3.00"-4.50"
Ball Weight (LBS)	150#-500#	250#-1000#	1200#-1400#
Flow Requirements (GPM)	10	10	10
Recommended Operating Pressure (PSI)	2250	2250	2250
Weight (LBS)	1100#	1500#	1825#

BOLT TORQUE SPECIFICATIONS

GENERAL TORQUE SPECIFICATION TABLES


Use the following charts when determining bolt torque specifications when special torques are not given. Always use grade 5 or better when replacing bolts.

SAE BOLT TORQUE SPECIFICATIONS




NOTE: The following torque values are for use with extreme pressure lubricants, plating or hard washer applications. Increase torque 15% when using hardware that is unplated and either dry or lubricated with engine oil.

Bolt Size		SAE GRADE 5 TORQUE				SAE GRADE 8 TORQUE				Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary
		Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters		
Inches	Millimeters	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	
1/4	6.35	8	9	11	12	10	13	14	18	
5/16	7.94	14	17	19	23	20	25	27	34	
3/8	9.53	30	36	41	49	38	46	52	62	
7/16	11.11	46	54	62	73	60	71	81	96	
1/2	12.70	68	82	92	111	94	112	127	152	
9/16	14.29	94	112	127	152	136	163	184	221	
5/8	15.88	128	153	174	207	187	224	254	304	
3/4	19.05	230	275	312	373	323	395	438	536	
7/8	22.23	340	408	461	553	510	612	691	830	
1	25.40	493	592	668	803	765	918	1037	1245	
1-1/8	25.58	680	748	922	1014	1088	1224	1475	1660	
1-1/4	31.75	952	1054	1291	1429	1547	1700	2097	2305	
1-3/8	34.93	1241	1428	1683	1936	2023	2312	2743	3135	
1-1/2	38.10	1649	1870	2236	2535	2686	3026	3642	4103	




GRADE 2



GRADE 5






GRADE 8



METRIC BOLT TORQUE SPECIFICATIONS

NOTE: The following torque values are for use with metric hardware that is unplated and either dry or lubricated with engine oil. Reduce torque 15% when using hardware that has extreme pressure lubricants, plating or hard washer applications.

Bolt head identification marks as per grade.		
		

Size of Bolt	Grade No.	Pitch (mm)	Pounds Feet	Newton-Meters	Pitch (mm)	Pounds Feet	Newton-Meters
M6	5.6	1.0	3.6-5.8	4.9-7.9	-	-	-
	8.8		5.8-4	7.9-12.7		-	-
	10.9		7.2-10	9.8-13.6		-	-
M8	5.6	1.25	7.2-14	9.8-19	1.0	12-17	16.3-23
	8.8		17-22	23-29.8		19-27	25.7-36.6
	10.9		20-26	27.1-35.2		22-31	29.8-42
M10	5.6	1.5	20-25	27.1-33.9	1.25	20-29	27.1-39.3
	8.8		34-40	46.1-54.2		35-47	47.4-63.7
	10.9		38-46	51.5-62.3		40-52	54.2-70.5
M12	5.6	1.75	28-34	37.9-46.1	1.25	31-41	42-55.6
	8.8		51-59	69.1-79.9		56-68	75.9-92.1
	10.9		57-66	77.2-89.4		62-75	84-101.6
M14	5.6	2.0	49-56	66.4-75.9	1.5	52-64	70.5-86.7
	8.8		81-93	109.8-126		90-106	122-143.6
	10.9		96-109	130.1-147.7		107-124	145-168
M16	5.6	2.0	67-77	90.8-104.3	1.5	69-83	93.5-112.5
	8.8		116-130	157.2-176.2		120-138	162.6-187
	10.9		129-145	174.8-196.5		140-158	189.7-214.1
M18	5.6	2.0	88-100	119.2-136	1.5	100-117	136-158.5
	8.8		150-168	203.3-227.6		177-199	239.8-269.6
	10.9		175-194	237.1-262.9		202-231	273.7-313
M20	5.6	2.5	108-130	146.3-176.2	1.5	132-150	178.9-203.3
	8.8		186-205	252-277.8		206-242	279.1-327.9
	10.9		213-249	288.6-337.4		246-289	333.3-391.6

PARTS

In order to provide you with the most UP-TO-DATE part information, all parts for this attachment have been moved to our website at www.paladinattachments.com/Manuals. Please use these diagrams and parts lists to locate replacement parts.

When servicing your attachment, remember to use only original manufacturer replacement parts. Substitute parts may not meet the standards required for safe, dependable operation.

To facilitate parts ordering when contacting the factory, please have the product control number (PCN or C/N) or model and serial number of your product ready to ensure that you receive the correct parts for your specific attachment.

The product control number, model and serial number for your attachment should be recorded in the space provided on the cover of this manual. This information may be obtained from the serial number identification plate located on your attachment.

NOTE: Most daily and emergency parts orders (in stock) received by 10:30 A.M. (Eastern Standard Time) will be shipped UPS Ground the same day received. UPS Next Day orders must be received by 1:30 PM (Eastern Standard Time.)

SERVICE DEPARTMENT

(734) 996-9116

(800) 456-7100

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PLC_Sales@paladinattachments.com

(734) 996-9014

WARRANTY

In order to provide you with the most UP-TO-DATE Warranty information, Paladin Warranty Statement and Warranty Procedures along with Warranty Registration and Claim Forms have been moved to our website at www.paladinattachments.com.

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