BRADCO

PALADIN LIGHT CONSTRUCTION GROUP

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SWEEPSTER

The Power of Combined Excellence

OPERATOR'S AND PARTS MANUAL

TS10 TREE SHEAR

SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: OM757
Part Number: 75657
Rev.

800-456-7100 I www.paladinlcg.com 503 Gay Street, Delhi, IA 52223, United States of America

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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 the attachment.

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.

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

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

To facilitate parts ordering, record the model and serial number of your unit in the space provided on the cover of this manual. This information may be obtained from the identification plate located on the product.

The parts department needs this information to insure that you receive the correct parts for your specific model.

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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 IS USED WHERE SERIOUS INJURY OR DEATH WILL RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.**

WARNING — **THIS SIGNAL WORD IS USED WHERE SERIOUS INJURY OR DEATH COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.**

CAUTION — **THIS SIGNAL WORD IS USED WHERE MINOR INJURY COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.**

NOTICE — **NOTICE INDICATES A PROPERTY DAMAGE MESSAGE.**

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.

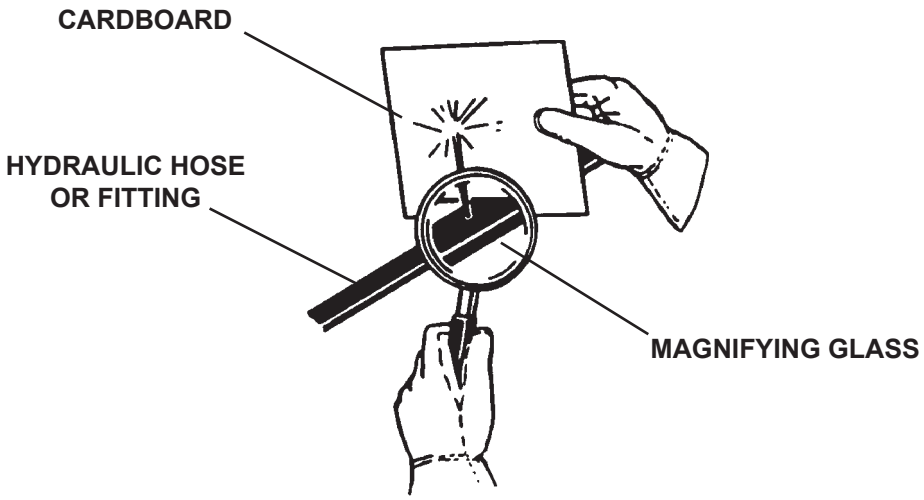
WARNING! LOWER OR SUPPORT RAISED EQUIPMENT

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 Protection 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.

EQUIPMENT SAFETY PRECAUTIONS

WARNING! KNOW WHERE UTILITIES ARE

Observe overhead electrical and other utility lines. Be sure equipment and any trees being sheared will clear them. Electrocution could occur if trees contact or damage overhead electrical lines.

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.

OPERATING THE TREE SHEAR

- Block off work area from bystanders, livestock, etc. Do not operate if people are in the felling area. Stop operation if bystanders or livestock enter the work area.
- Operate only from the operator's station.
- Do not operate without adequate operator protection.
- Operator enclosure must comply with regulations and provide a safe operating environment for the risks associated with shearing trees.
- Do not operate the tree shear with the push over bar removed.
- Do not shear from the downhill side of a slope or hill.
- Do not operate in high winds.
- Do not shear trees with a diameter larger than the 10" stated capacity of the TS10 Tree Shear.
- Do not fell (shear) a tree that is leaning across the line of machine travel.
- 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 unit to the ground, turn off the prime mover's engine, remove the key and apply the brakes.
- Do not use the tree shear blades as a step when climbing in or out of the prime mover.
- Be alert to changes in the work area. Watch out for bystanders, changes in weather and soil conditions.

EQUIPMENT SAFETY PRECAUTIONS

TRANSPORTING THE TREE SHEAR

- 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 fuel tank for expansion. Wipe up any spilled fuel. Secure cap tightly when done.
- When transporting keep the tree shear as low as the terrain will allow.

MAINTAINING THE TREE SHEAR

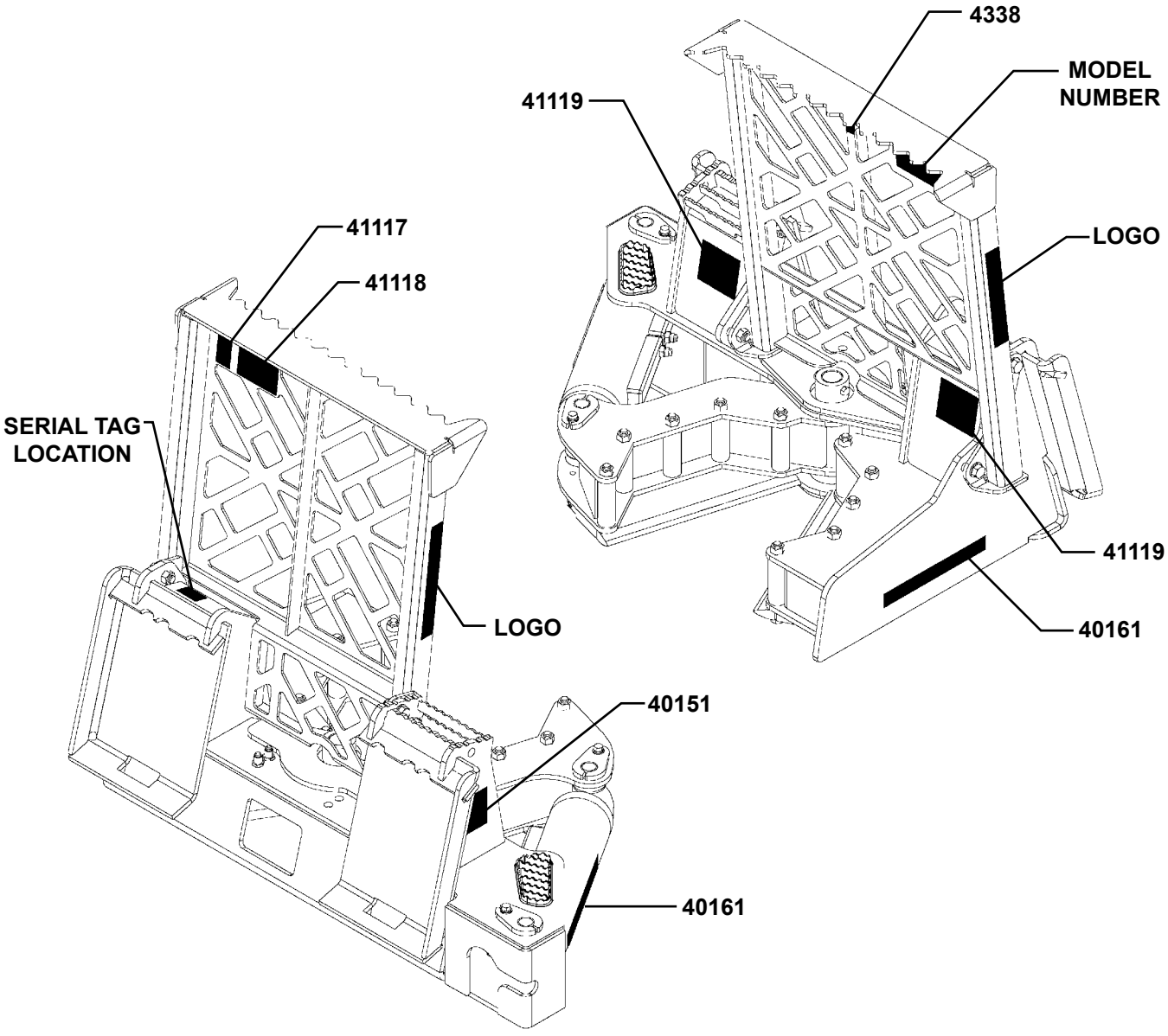
- Before performing maintenance, lower the attachment to the ground, apply the brakes, turn off the engine, and remove the key.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator service manuals before any repair is made. After completing maintenance or repair, check for correct functioning of the tree shear. 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 BRADCO.
- Never make hydraulic repairs while the system is under pressure. Serious personal injury or death could result.
- Never work under a raised attachment.
- Replace all safety shields and guards (including the push bar) when done performing maintenance. Do not operate tree shear with protective equipment removed.

DECALS

DECAL PLACEMENT

GENERAL INFORMATION

The diagrams on this page show the location of all the decals used on the TS10 Tree Shear. The decals are identified by their part numbers, with the 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 shear. They contain information you need to know for both safety and attachment longevity. All logo's and model numbers can be purchased from your local dealer.



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 decal, exposing the adhesive surface. Apply the safety decal to the position shown in the diagram above, and smooth out any bubbles.

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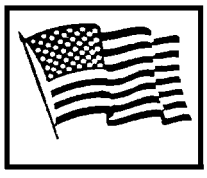
DECALS

PART #41119
WARNING! CUTTING OR SEVER DECAL

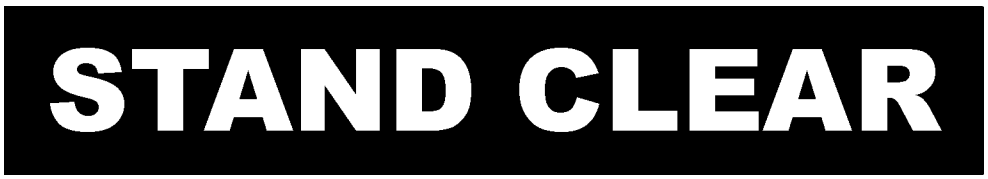
PART #41117
WARNING! READ MANUAL

PART #41118
DANGER! ELECTROCUTION OR CRUSHING DECAL

PART #40151
WARNING! HIGH PRESSURE FLUID



PART #338
MADE IN U.S.A.



PART #40161
DANGER STAND CLEAR DECAL

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INSTALLATION

INSTALLATION

Your TS10 Tree Shear was shipped complete with the hydraulic hoses and couplers installed.

Install the tree shear by following your power unit operator's manual for installing an attachment.

WARNING! To Avoid Serious Personal Injury, make sure the tree shear is securely latched to the attachment mechanism of your unit. Failure to do so could result in separation of the shear from the unit.

WARNING! The prime mover must be equipped with an operator enclosure that will comply with regulations and provide a safe operating environment for the risks associated with shearing trees up to 10” in diameter.

Connect the hydraulic quick couplers to the auxiliary hydraulics and route the hoses in such a fashion as to prevent chafing and pinching.

Start engine and slowly cycle the shear cylinder several times to purge system of air, and check for proper hydraulic connection, hose routing, and hose length.

Check the attachment for proper assembly, installation, and hydraulic leaks.

DETACHING

On firm level ground, close the blades and lower the boom arms completely down on the frame until the shear is level and approximately 2" off the ground.

Turn off the engine. Move the control levers back and forth to relieve pressure in line. Disconnect couplers.

NOTE: Connect couplers together or install caps to prevent contaminants from entering the hydraulic system.

Follow your power unit operator's manual for detaching (removing) an attachment.

NOTE: Frequent lubrication of grease fittings at the ends of the cylinder and the pivot point with a multi-purpose grease will greatly increase life of the product.

STORAGE

1. Clean the unit thoroughly, removing all mud, dirt, and grease.
2. Inspect for visible signs of wear, breakage, or damage. Order any parts required and make the necessary repairs to avoid delays when starting next season.
3. Tighten loose nuts, capscrews, and hydraulic connections.
4. Cap hydraulic couplers to protect against contaminates.
5. Touch up all unpainted surfaces with paint, to prevent rust.
6. Coat the exposed portion of the cylinder rod with grease.
7. Store the unit in a dry and protected place. Leaving the unit outside will materially shorten its life.

OPERATION

GENERAL INFORMATION

The BRADCO TS10 hydraulic actuated Tree Shear with push over bar is perfect for clearing small trees and scrub brush (up to 10" in diameter) from pastures, building sites and wild fire fuel control operations. The TS10 attaches to the quick attach mechanism of your skid steer. Due to this arrangement, thorough knowledge of the skid steer is necessary for machine operation. Read and understand your power units operator's manual before attempting to use the tree shear.

To "fell a tree" means more than just cutting it down. Felling means to cut the tree in a way that it falls in the desired direction and results in the least damage to the tree. To safely fell any tree you must first eliminate or at least minimize exposure to potential hazards found in the tree and in the surrounding area. Secondly determine the felling direction and work area and last but not least, use the proper shearing technique to ensure the tree falls in the desired direction.

POTENTIAL HAZARDS: Determine the hazards that exist for the area and types of trees that your are working with and eliminate or minimize your exposure to these hazards.

POTENTIAL HAZARD	WAYS TO ELIMINATE, MINIMIZE OR AVOID HAZARD
THROWBACK: As the tree falls through other trees or lands on objects, those objects or branches may get thrown back towards the operator.	If possible, avoid felling into other trees or onto objects.
TERRAIN: If the tree falls onto stumps, rocks, or uneven ground, a hazard may be created.	If possible, move the obstacle, or change the felling direction.
LODGED TREE: A tree that has not fallen completely to the ground because it is lodged or leaning against another tree.	Do not work in the presence of a lodged tree. Have these pushed or pulled down.
WIDOWMAKER: Broken off limbs that are hanging freely in the trees to be felled or in the trees close by.	Knock them down or pull them down. Avoid working underneath them.
SNAG: Standing dead tree, standing broken tree, or a standing rotted tree.	Remove these with a "machine" such as the tree shear, or avoid them by at least two tree lengths.
SPRING POLE: A tree, segment of a tree, limb, or sapling which is under stress or tension due to the pressure or weight of another tree or object.	Use a "machine" or possibly a chain saw to release the tension.
EXTREME WEATHER: Strong wind.	Do not fell tress during high winds.
ENTANGLEMENT: Vines or limbs of other trees intertwined with the limbs of the tree to be felled.	Undo the entanglement if possible, or use a "machine" such as the tree shear to fell the tree.
RESOURCES: Other workers or machines in the immediate area.	Request the workers or machines be moved and block off the work area.
NOTE: Potential hazards and descriptions have been taken from OSHA standard 1910.266 (h)	

OPERATION

IDENTIFY THE APPROPRIATE FELLING DIRECTION: Determining the desired direction that the tree is to fall is an important step and there are numerous factors to consider. Visualize the fall path and identify hazards. Finding a clear path will eliminate lodged trees and throwbacks. When working with a leaning tree, it generally easier to fell the tree in the direction that it is already leaning and when working on a slope take into consideration the chance that the tree will roll or slide. Whenever possible, fell the tree so the butt faces the direction of removal. This will assist you in removing the tree after it is down.

DETERMINE TREE HEIGHT: There are numerous ways to check for tree height. We have listed just a couple.

SHADOW METHOD:

a. Know your exact height (in the shoes you will be wearing when measuring the tree.
b. Stand next to the tree. (Bright sunny day works best.)
c. Measure your shadow from your feet to the tip of your shadow. NOTE: If you are alone, place a rock on the ground and then position yourself so the tip of your shadow is at the rock then measure from where you are standing to the rock.
d. Measure the length of the tree's shadow. From the base of the tree to the tip of the shadow.
e. Calculate to obtain the trees height. (Be sure to use the same units of measure, inches to inches or feet to feet.) To calculate the height of the tree multiply the length of the tree shadow by your height and then divide the resulting number by the length of your shadow.

(length of tree shadow) X (your height) divided by (your shadow length) = (tree height)

Example: your height @ 5' tall, multiplied by the trees shadow @100' and then divided by your shadow's length of 8' gives you a tree height of 62.5.

PENCIL METHOD: (This method requires an assistant.)

a. Stand far enough from the tree so you can view the whole tree, without moving your head and as level with the tree as possible.
b. Have a friend stand near the tree.
c. Hold up a small pencil or straight stick in one hand and stretch your arm out so the pencil is at arm's length in front of you (between you and the tree).
d. Close one eye and adjust the pencil up/down so that you can sight the very top of the tree at the tip of the pencil. Move your thumb up or down so the tip of your thumbnail is aligned with the tree's base.
e. Rotate your arm so that the pencil is horizontal (parallel to the ground). Keep your arm help straight out and make sure your thumbnail is still aligned with the tree's base.
f. Have your friend move so that you can sight his/her feet through the tip of your pencil. (You will have to direct your friend left, right, backwards or sideways using the hand that is not holding the pencil.
g. Measure the distance between your friend and the tree. This is the height of the tree.

DETERMINE THE WORK AREA: The work area shall be at least two tree lengths of the tree being felled. A distance greater than two tree lengths shall be maintained on any slope where rolling or sliding of trees or logs is reasonably foreseen. No one should enter the work area until the machine operator has acknowledged that is it safe to do so.

OPERATION

WARNING! Block off the work area from bystanders and livestock and etc. Do not operate the tree shear if people are in the felling area Stop operation immediately if people or livestock enter the work area.

WARNING! Before exiting the prime mover, lower the attachment to the ground, apply the parking brakes, turn off the engine and remove the key.

PUSH OVER BAR ADJUSTMENT

The push over bar is standard from the factory and installed in the back position. The front position should be used when shearing trees on a hill to position the push bar back towards the operator therefore allowing the blades to shear the tree without the push bar interfering.

WARNING! When shearing a tree on a slope always approach the tree from an uphill direction. Never attempt to fell a tree from the side or from a downhill direction.

Do not operate the tree shear with the Push Over Bar removed.

OPERATION

Read and understand all warnings and precautions in this manual and on the machine before operating the tree shear. The BRADCO tree shear is relatively simple to use and with a little practice, you should become proficient in its operation and able to develop procedures suitable to your particular situation. Remember, the TS10 is designed for trees up to but not exceeding 10” in diameter.

WARNING! The prime mover must be equipped with an operator enclosure that will comply with regulations and provide a safe operating environment for the risks associated with shearing trees up to 10” in diameter.

Do not operate the tree shear with the Push Over Bar removed.

1. Approach the tree with the blades completely open. Position the shear with the blades on each side of the tree at the point where the cut is to be made.

2. Tilt the shear forward a little to provide a slight angle to the cutting blades which will assist in the tree falling away from the machine and operator.

3. Activate the auxiliary hydraulic which will close the blades on the shear.

NOTE: As an extra precaution, as the blades come completely together tilt the shear forward and use the push over bar to help direct the tree. Backing up the prime mover slightly will also assist in ensuring the tree will fall forward.

MAINTENANCE & SERVICE

GENERAL INFORMATION

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

DAILY

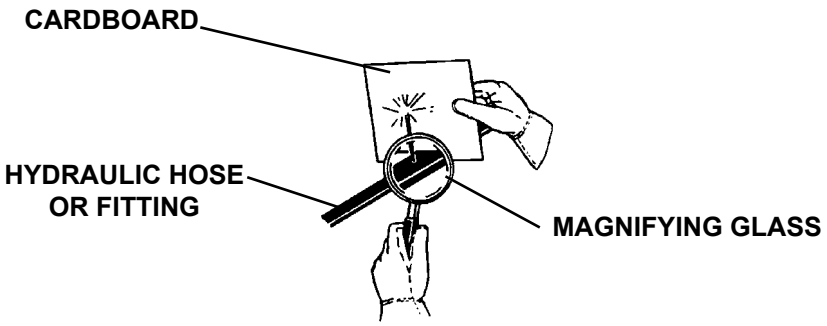
- Check all bolts and nuts for tightness.
- Replace any missing bolts or nuts with approved replacement parts.
- Check hydraulic system for hydraulic oil leaks. See procedure below.
- Visually inspect the machine for worn parts or cracked welds, and repair as necessary.
- Visually inspect the machine for worn, blades. Repair or replace as necessary.
- Lubricate grease fittings on both ends of the cylinder and the arm at the main pivot
- point.
- Clean rotor of any accumulated debris and dirt.

EVERY 40 HOURS

WARNING! Escaping fluid under pressure can have sufficient force to penetrate the skin, causing serious personal 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. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.



IMPORTANT: When replacing parts, use only factory approved replacement parts. Manufacturer will not claim responsibility for use of unapproved parts or accessories, and/or other damages as a result of their use.

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MAINTENANCE & SERVICE

BLADE ADJUSTMENT

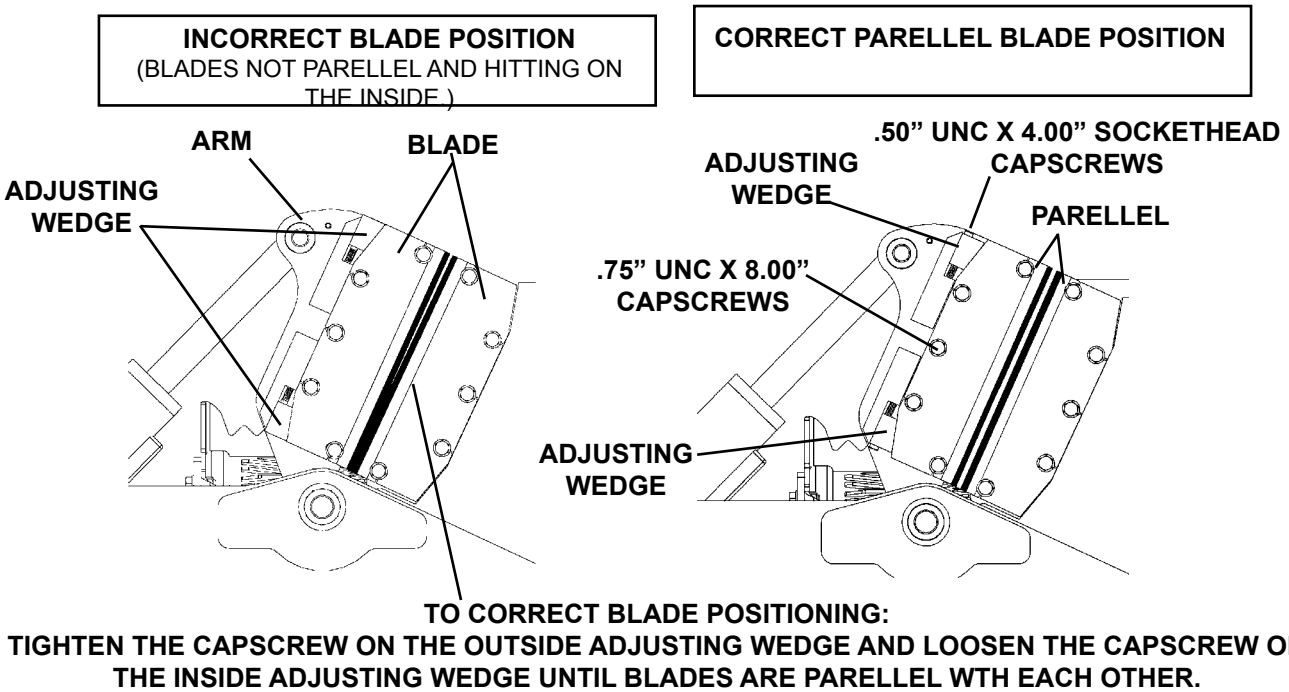
The blade on the arm of the tree shear is adjustable and should be checked before operation. The cutting edge on the blades should always be parallel to each other with as little gap as possible.

If the blades have worn irregularly or shifted during operation and are not parallel, adjusting one adjuster wedge may be required to bring them into alignment.

1. Slightly loosen the 5 bolts on the arm blade.
2. With the shear arm completely closed, position the blade until the cutting edges are parellel and just about touching. Tighten or loosen the .50” UNC X 4” sockethead capscrews on the adjusting wedges to maintain the correct positioning of the blades.

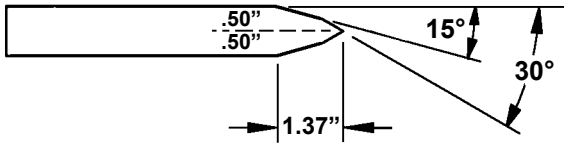
NOTE: Do not allow the blades to make contact during shearing.

3. Be sure the blade is tight against the adjusting wedges and then tighten the .75” UNC X 8” blade bolts. Torque bolts to 270-324 ft. lbs.



BLADE SHARPENING

The shear blades are sharpened at the factory to the most effective cutting angle. Maintaining this angle is important for performance and efficiency. Use the following diagram as a guide when sharpening the blades.



MAINTAIN THIS CUTTING ANGLE ON EACH SIDE

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TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
Blades misaligned.	Worn shear arm bushing.	Replace as necessary.
	Worn pivot pin.	Replace as necessary.
	Improper blade sharpening.	Refer to Blade Sharpening section in manual and resharpen blade.
	Irregular wearing of the blade.	Sharpen if necessary and adjust blade.
	Hardware or adjusting wedge loose.	Tighten hardware and properly adjust blade.
Blades will not stay adjusted.	Maximum adjustment has already been accomplished.	Replace blades.
Hydraulic cylinder not operating	Insufficient hydraulic flow from the prime mover.	Refer to the prime mover owners manual and verify hydraulic flow using an inline flow meter or other attachment.
	Cylinder rod bend.	Replace cylinder.
	Cylinder seals damaged.	Replace cylinder seals.
	Obstruction in hydraulic lines.	Remove obstruction and replace if necessary.
insufficient power.	Insufficient hydraulic flow from the prime mover.	Refer to the prime mover owners manual and verify hydraulic flow using an inline flow meter or other attachment.
	Loose or damaged hydraulic line.	Tighten or replace.
	Upper bearing failure.	Replace as necessary
	O-Rings on fittings damaged.	Replace if necessary.
	Fittings loose or damaged.	Tighten or replace.
	Cylinder seals damaged.	Replace cylinder seals.
	Attempting to shear a tree larger than recommend.	Refer to specifications.

BOLT TORQUE SPECIFICATIONS

GENERAL TORQUE SPECIFICATION TABLES

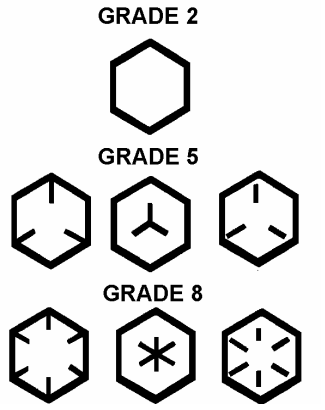
Use the following charts when determining bolt torque specifications when special torques are not given. Always use grade 5 or better when replacing bolts.

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			
		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

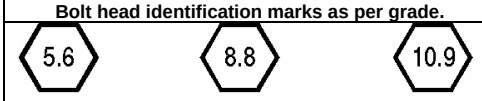
Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary



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.

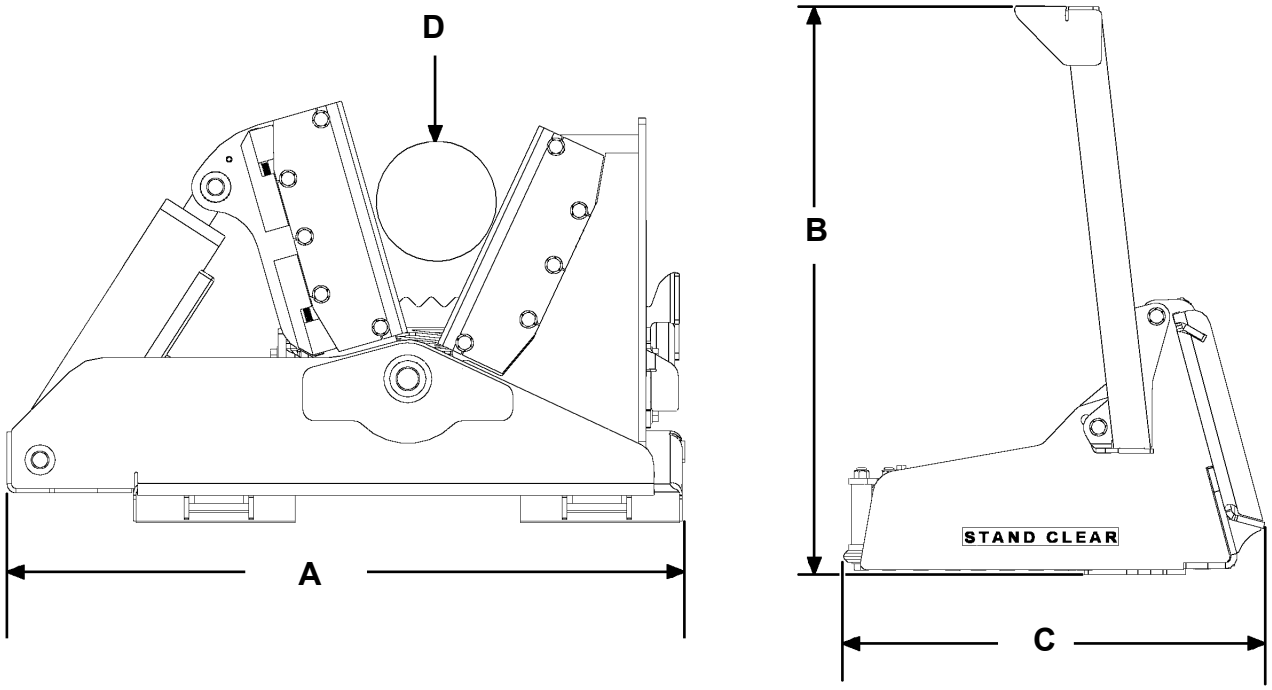
Bolt head identification marks as per grade.



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

SPECIFICATIONS

TS10 TREE SHEAR



DESCRIPTION

A. Overall Width ..... 56.22”
B. Overall Height ..... 46.90”
C. Overall Length ..... 35.11”
D. Maximum Tree Diameter ..... 10.00”

Operating Pressure ..... 3000 PSI
Clamping Force @ 13.75” from blade pivot ..... 78,888 lbs.
Approximate Attachment Weight ..... 1122 lbs

Cylinder Specifications
- Bore Diameter ..... 5.00”
- Rod Diameter ..... 2.50”
- Stroke ..... 14.25”

Specifications and design are subject to change without notice and without liability therefor.

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Limited Warranty

Except for the Excluded Products as described below, all new products are warranted to be free from defects in material and/or workmanship during the Warranty Period, in accordance with and subject to the terms and conditions of this Limited Warranty.

1. Excluded Products. The following products are excluded from this Limited Warranty:

(a) Any cable, part that engages with the ground (i.e. sprockets), digging chain, bearing, teeth, tamping and/or demolition head, blade cutting edge, pilot bit, auger teeth and broom brush that either constitutes or is part of a product.

(b) Any product, merchandise or component that, in the opinion of Paladin Light Construction[1], has been (i) misused; (ii) modified in any unauthorized manner; (iii) altered; (iv) damaged; (v) involved in an accident; or (vi) repaired using parts not obtained through Paladin Light Construction.

2. Warranty Period. The Limited Warranty is provided only to those defects that occur during the Warranty Period, which is the period that begins on the first to occur of: (i) the date of initial purchase by an end-user, (ii) the date the product is first leased or rented, or (iii) the date that is six (6) months after the date of shipment by Paladin Light Construction as evidenced by the invoiced shipment date (the "Commencement Date") and ends on the date that is twelve (12) months after the Commencement Date.

3. Terms and Conditions of Limited Warranty. The following terms and conditions apply to the Limited Warranty hereby provided:

(a) Option to Repair or Replace. Paladin Light Construction shall have the option to repair or replace the product.

(b) Timely Repair and Notice. In order to obtain the Limited Warranty, (i) the product must be repaired within thirty (30) days from the date of failure, and (ii) a claim under the warranty must be submitted to Paladin Light Construction in writing within thirty (30) days from the date of repair.

(c) Return of Defective Part or Product. If requested by Paladin Light Construction, the alleged defective part or product shall be shipped to Paladin Light Construction at its manufacturing facility or other location specified by Paladin Light Construction, with freight PRE-PAID by the claimant, to allow Paladin Light Construction to inspect the part or product.

Claims that fail to comply with any of the above terms and conditions shall be denied.

LIMITATIONS AND EXCLUSIONS.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY BASED ON A COURSE OF DEALING OR USAGE OF TRADE.

IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES.

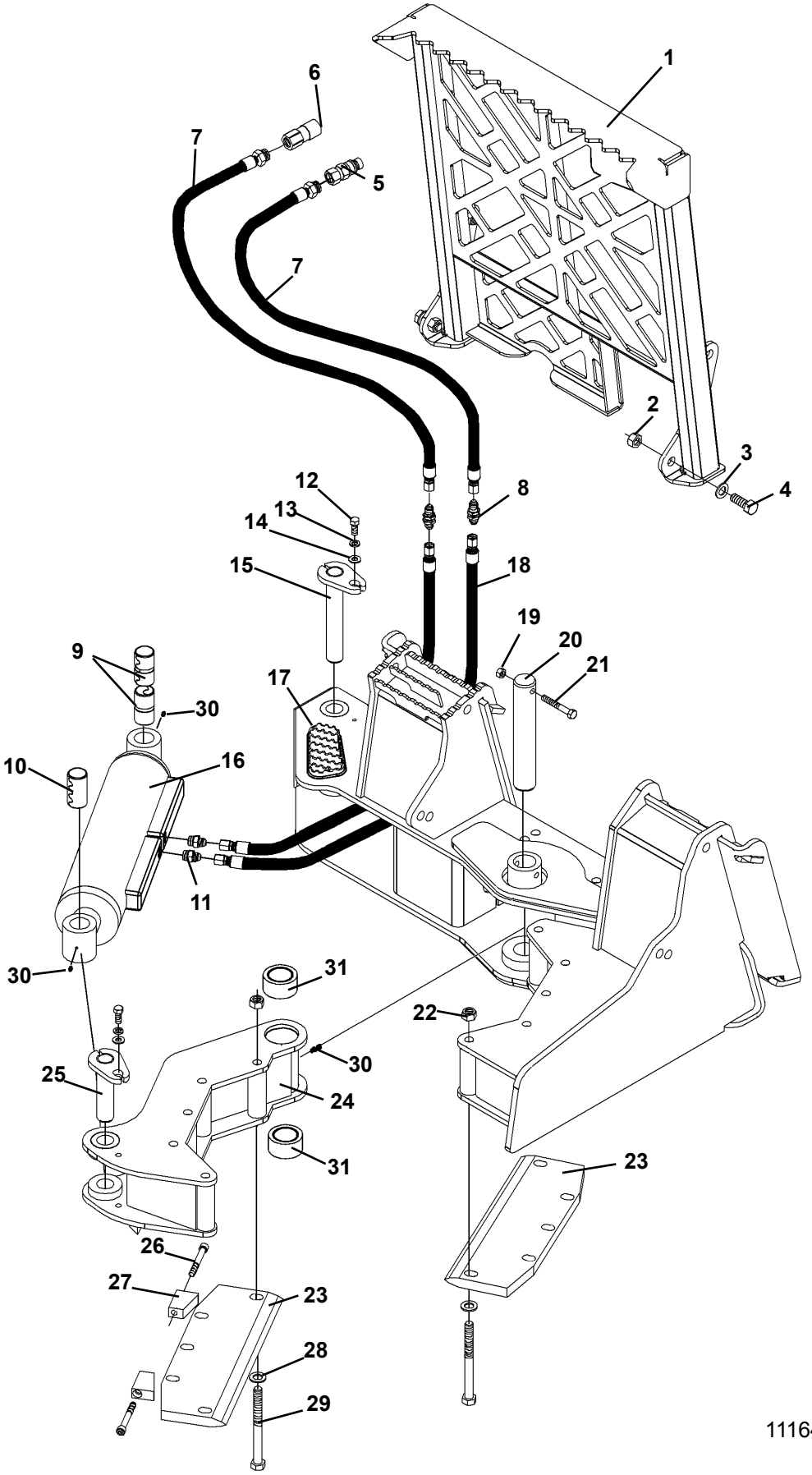
IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR ANY LOSS OR CLAIM IN AN AMOUNT IN EXCESS OF THE PURCHASE PRICE, OR, AT THE OPTION OF PALADIN LIGHT CONSTRUCTION, THE REPAIR OR REPLACEMENT, OF THE PARTICULAR PRODUCT ON WHICH ANY CLAIM OF LOSS OR DAMAGE IS BASED. THIS LIMITATION OF LIABILITY APPLIES IRRESPECTIVE OF WHETHER THE CLAIM IS BASED ON BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE OR OTHER CAUSE AND WHETHER THE ALLEGED DEFECT IS DISCOVERABLE OR LATENT.

[1]Attachment Technologies Inc., a subsidiary of Paladin Brands Holding, Inc. (PBHI) is referred to herein as Paladin Light Construction.

February 10, 2010

TREE SHEAR ASSEMBLY

10” SINGLE ACTION TREE SHEAR #111533



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TREE SHEAR ASSEMBLY

10” SINGLE ACTION TREE SHEAR #111533

ITEM	REQ’D	PART NO.	DESCRIPTION
1	1	112225*	Push Over Bar / Brush Guard
2	4	1936*	.75” UNC Deformed Lock Nut
3	4	1649*	.75” Hard Flat Washer
4	4	1139*	.75” UNC X 2.00” Hex Capscrew
5	1	19630	Male Coupler 10 FBo .50” Body
6	1	24002	Female Coupler 10 FBo .50” Body
7	2	38619	Hose .50” X 73” 8JFX-10MBo
8	2	3275	Straight Bulkhead Fitting 8MJ-8MJ
9	2	31251	Bushing
10	1	31251	Bushing
11	2	3270	Straight Connector 10MBo-8MJ
12	2	1089	.50” UNC X 1.25” Hex Capscrew
13	2	1505	.50” Lock Washer
14	2	1527	.50 Flat Washer
15	1	111570	Cylinder Pin
16	1	111327	Cylinder Assembly
	-	46013	Replacement Seal Kit
17	1	111534	Mainframe
18	2	37005	Hose .50” X 36” 8FJX-8FJX
19	1	1841	.50” UNC Deformed Lock Nut
20	1	111569	Pivot Pin
21	1	1098	.50” UNC X 3.50” Hex Capscrew
22	10	1936	.75” UNC Deformed Lock Nut
23	2	111568	Cutter Blade
24	1	111561	Arm (Includes two 112375 Bushings.)
25	1	111573	Cylinder Pin
26	2	10207	.50” UNC X 4.00” Sockethead Capscrew
27	2	112482	Adjuster Wedge
28	10	1649	.75” Hard Flat Washer
29	10	1155	.75” UNC X 8.00” Hex Capscrew
30	3	6616	Grease Fitting
31	2	112375	Bushing

NOTE: Replacement Push Bar / Brush Guard Assembly #112230 includes all parts marked with an asterisk (*).

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