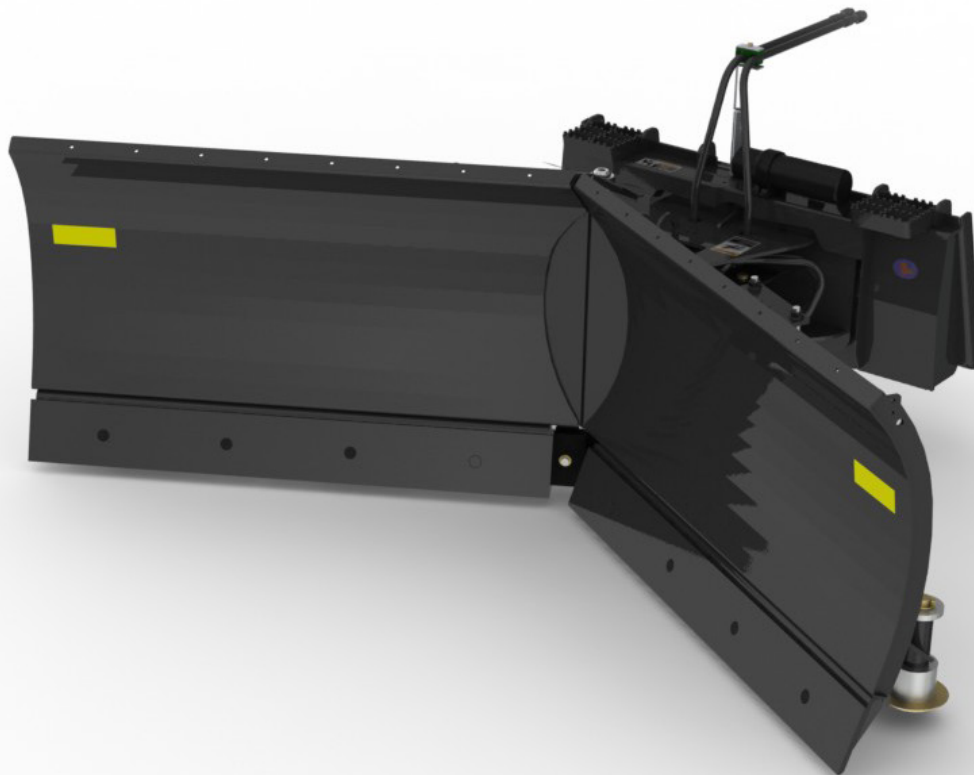




OPERATOR'S MANUAL

V-BLADE 120 Series



SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: 51-4320
Release Date: July 2018
Serial Number: 1052001 & Up
Rev. 4

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PREFACE

GENERAL COMMENTS

Congratulations on the purchase of your new 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>.

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.

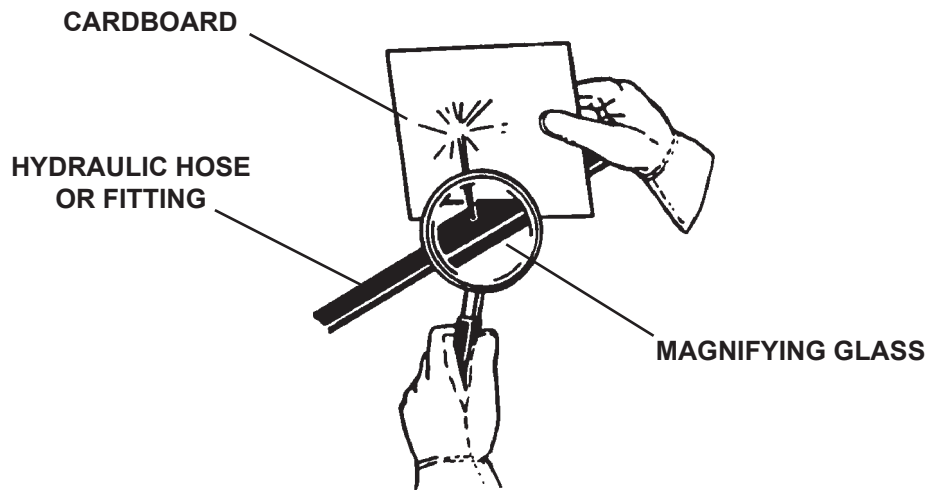
WARNING!



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 V-BLADE:

- Do not exceed the lifting capacity of your prime mover.
- Operate only from the operator's station.
- When operating on slopes, drive up and down, not across. Avoid steep hillside operation which could cause the prime mover to over turn.
- 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, apply the brakes, turn off the prime mover's engine and remove the key.

EQUIPMENT SAFETY PRECAUTIONS



TRANSPORTING THE V-BLADE:

- 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 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, excavation, etc. cave in could result.



MAINTAINING THE V-BLADE:

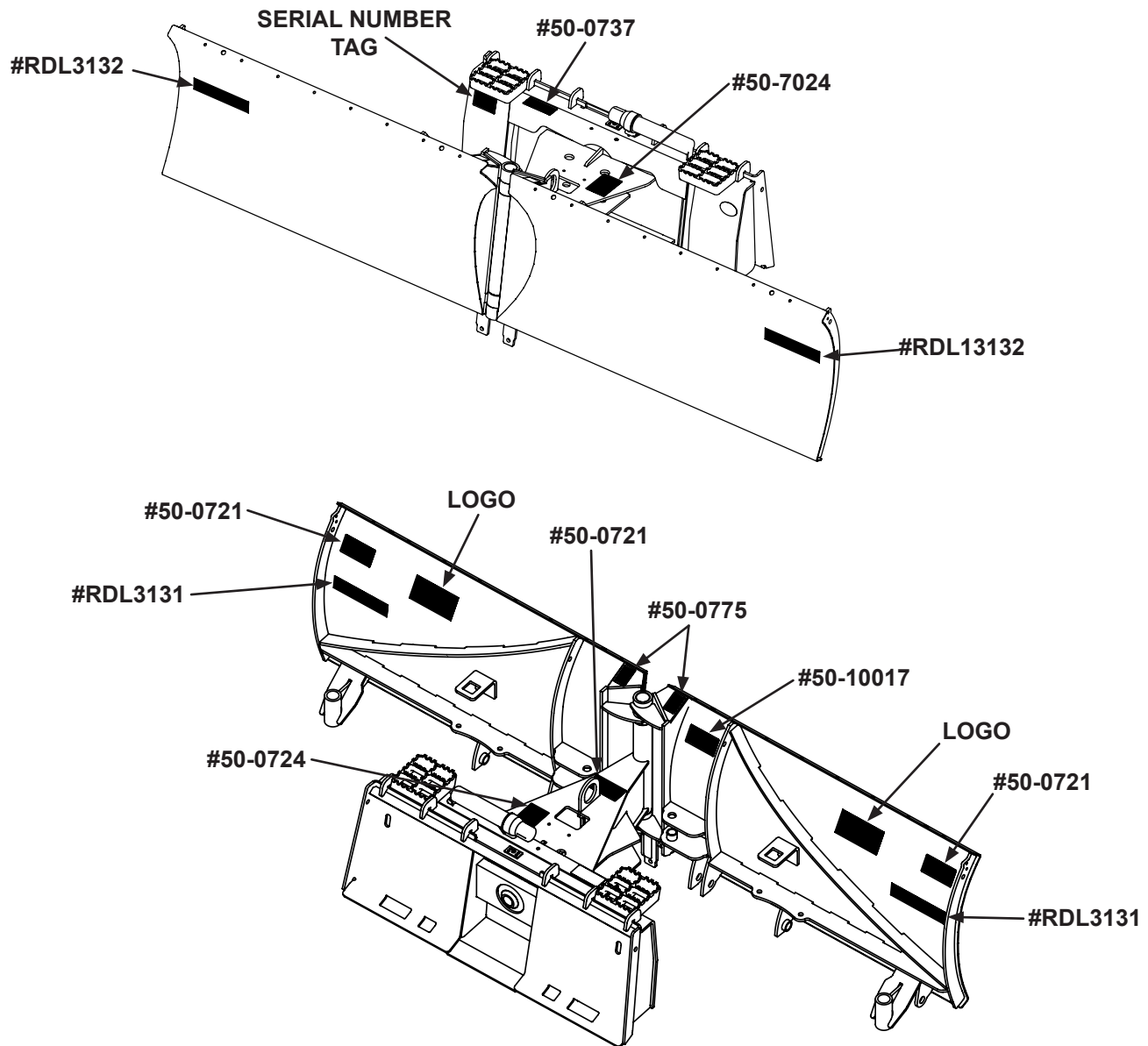
- Before performing maintenance (unless otherwise specified) lower the attachment to the ground, apply the brakes, turn off the engine and remove the key.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator service manual's before any 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 system is under pressure. Serious personal injury or death could result.
- Never work under a raised attachment.

DECALS

DECALS PLACEMENT

GENERAL INFORMATION

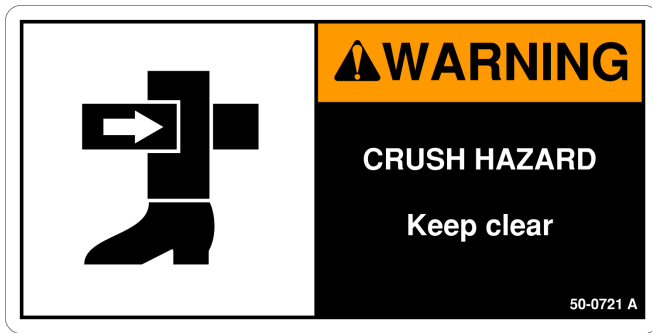
The diagram on this page shows the location of the decals used on your attachment. The decals are identified by their part numbers, with reductions of the actual decals located on the following page. Use this information to order replacements for lost or damaged decals. Be sure to read all decals before operating the attachment. They contain information you need to know for both safety and product 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. Safety decals are available, free of charge, from your local dealer or Paladin.

REPLACING SAFETY DECALS: Clean the area of application with nonflammable solvent, then wash the same area with soap and water. Allow the surface to fully 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.

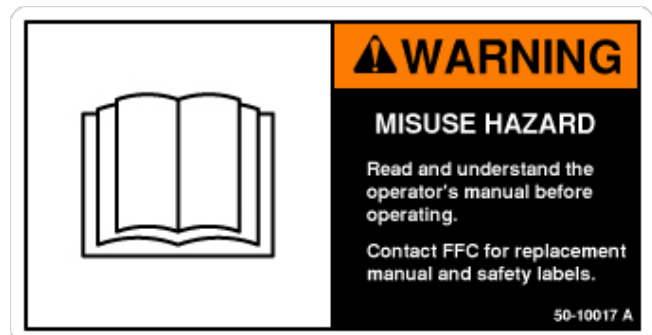
DECALS



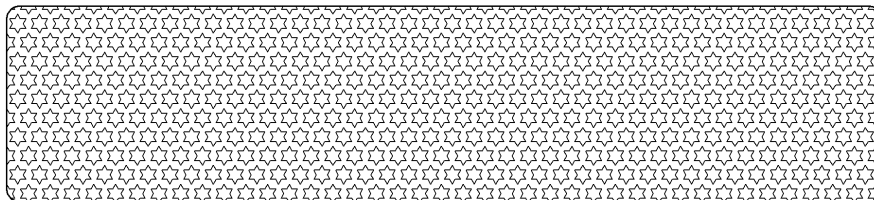
#50-0721
WARNING! CRUSH HAZARD



#50-0737
WARNING! PINCH POINT HAZARD



#50-10017
WARNING! AVOID SERIOUS INJURY



#RDL3132
REFLECTIVE TAPE AMBER

#RDL3131
REFLECTIVE TAPE RED



#50-0724
WARNING! HIGH PRESSURE FLUID



#50-0775
WARNING! CRUSH HAZARD

NOTE: CONTACT YOUR LOCAL DEALER FOR MODEL NUMBER AND LOGO DECALS

INSTALLATION

INSTALLATION

1. Position the broom on a level surface.
2. Remove any attachment from the front of the prime mover.
3. 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.
4. Lower the unit to the ground and relieve pressure to the auxiliary hydraulic lines.
5. Following the safety shut down procedure for your prime mover, shut down and exit the prime mover.
6. 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.
7. While the loader arms are lowered, visually inspect the attachment mechanism to ensure that it is securely mounted.

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.



8. 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.
9. Carefully raise the loader and cycle the rollback/dump cylinders to check clearances. Verify that all mounting procedures have been successfully completed.
10. Attachment installation is complete.

INSTALLATION

DETACHING

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.



Notice! Hoses for the blade must be removed before the quick attach is disengaged. Pulling the blade with the hoses could result in damage to the prime mover or to the blade.

1. Position the blade on a level surface.
2. Configure the blade in either the “scoop” or “straight” position (for positions refer to angling instructions in operations). Detaching the blade when it is in the “V” position will make reattachment difficult.
3. Lower the blade to the ground.
4. Tilt the blade until the mounting is on the ground.
5. Engage the parking brake and shut off the prime mover. Relieve the pressure to the auxiliary hydraulic lines.
4. Disconnect power and return hoses from the auxiliary hydraulics.
5. Connect hydraulic couplers together or install caps to prevent contaminants from entering the hydraulic system. Store hoses off of the ground to help prevent damage.
6. Follow your prime mover operator’s manual for detaching (removing) an attachment.

OPERATION

INTENDED USE:

This blade is designed solely for the use in snow removal. This blade is not designed to move dirt, loose soil or gravel. Use in any other way is considered contrary to the intended use. Compliance with and strict adherence to operation, service and repair conditions as specified by the manufacturer, are also essential elements of the intended use.

BEFORE OPERATING BLADE

Before any snowfall, inspect the site where your V-Blade is to be used. Locate any obstructions (i.e. curbs, sidewalks, parking bumpers, pipes, shrubs, fences, etc.) and any variations in elevation (i.e. retaining walls, slopes, holes, etc.) so that these elements can be avoided during the snow plowing operation.

- Learn blade and prime mover controls in an off-road location.
- Be sure that you are in a safe area, away from traffic or other hazards.
- Check all hardware holding the blade to the prime mover, making sure it is tight.
- Remove from the plowing area all property that could be damaged by flying debris or impacts from the blade.
- Be sure all persons not operating the blade are clear of the area being cleared.
- Always wear personal protective equipment (PPE); such as safety glasses, goggles or a face shield and ear protection.

DANGER! Avoid electrical shock. Stay away from overhead wires.



WHILE OPERATING BLADE:

Carry the V-Blade low to the ground for good visibility and stability. Avoid any sudden movements.

- When operating the blade, adhere to all government rules, local laws and other professional guidelines for your plowing application.
- Only operate the blade while you are in the seat of the prime mover. The seat belt must be fastened while you operate the prime mover. Only operate the controls while the engine is running. Protective glasses must be worn while you operate the prime mover and while you operate the blade.
- While you operate the blade slowly in an open area, check for proper operation of all controls and all protective devices. Note any repairs needed during operation of the blade. Report any needed repairs.

OPERATION

ANGLING INSTRUCTIONS

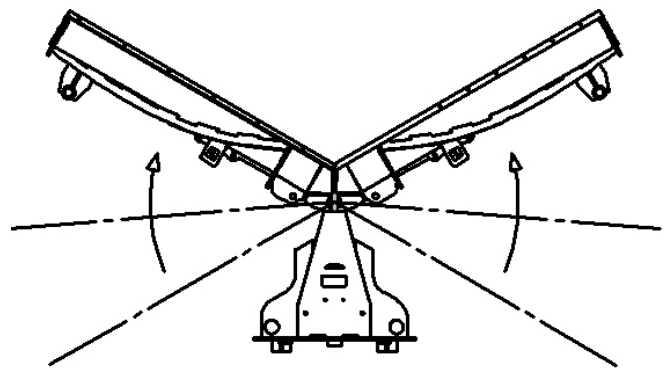
Adjusting V-Blade:

1. Start the prime mover at idle and raise the blade.
2. Adjust the blade to the desired angle (refer to valve-specific instructions below) and then lower to the ground.
3. Adjust blade until it is level to the ground (refer to "Leveling Instructions").
4. Increase prime mover engine RPM to operating speed.

Electro-Hydraulic Valve Angling

All Positions:

- a. Press toggle switch and hold flow to move one blade to the desired position.
- b. Release switch and flow.
- c. Pull toggle switch and hold flow to move other blade to the desired position.
- d. Release switch and flow.

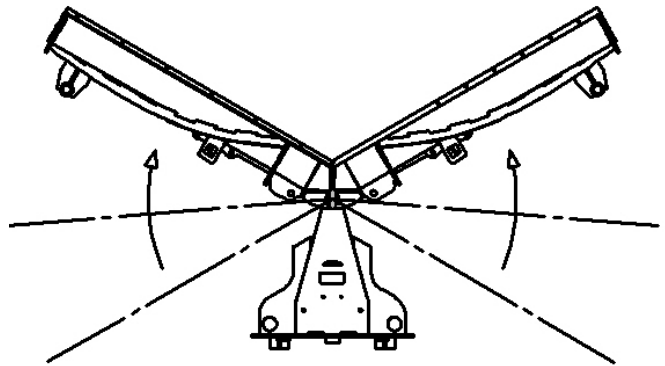


ALL POSITIONS

Hydraulic Sequencing Valve Angling

Scoop Position:

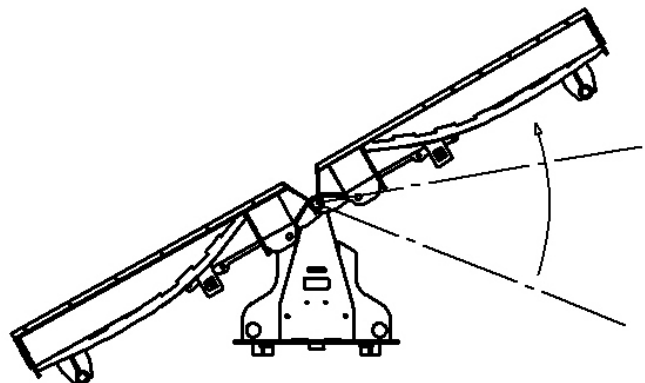
- a. Hold hydraulic flow until both blades extend and stop.



SCOOP

Left Angle Position:

- a. Starting in "V" position, hold hydraulic flow until right blade extends and stops.

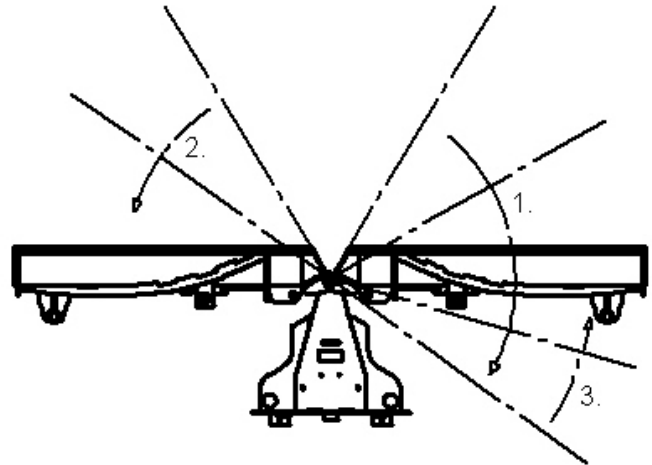


LEFT ANGLE

OPERATION

Straight Position:

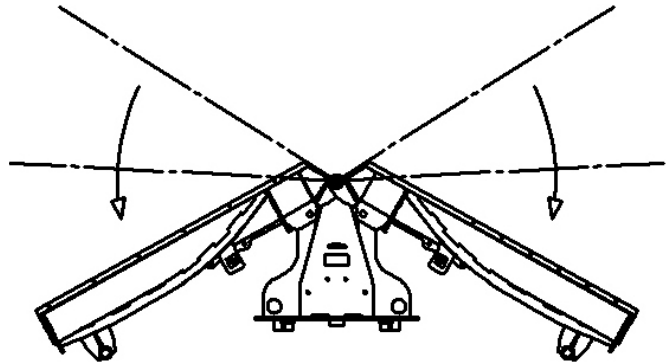
- a. Starting from the scoop position, reverse flow until right blade completely retracts.
- b. While still reversing flow, retract left blade until it is in the straight position.
- c. Use normal flow to extend right blade until it is parallel to left blade.



STRAIGHT

"V" Position:

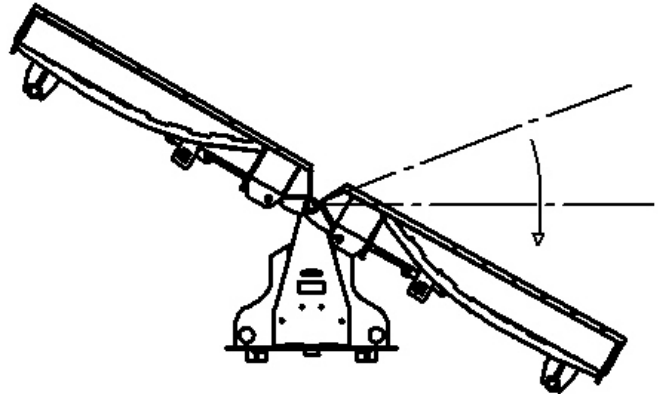
- a. Reverse flow until both blades retract and stop.



"V" POSITION

Right Angle Position:

- a. Starting from the Scoop position, reverse flow until right blade retracts and stops.



RIGHT ANGLE

OPERATION

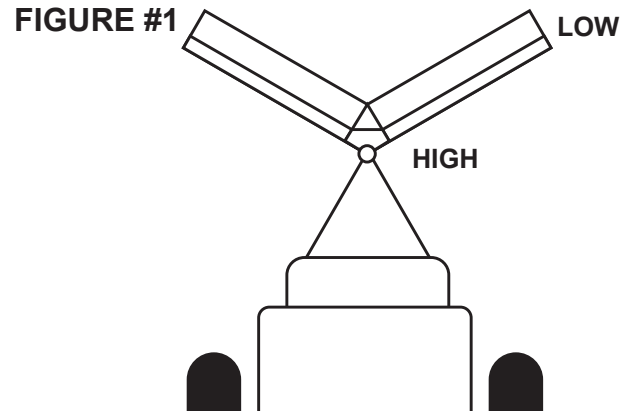
LEVELING INSTRUCTIONS

Notice! A level blade should have no visible spaces between cutting edges and plowing surface.

Scoop Position

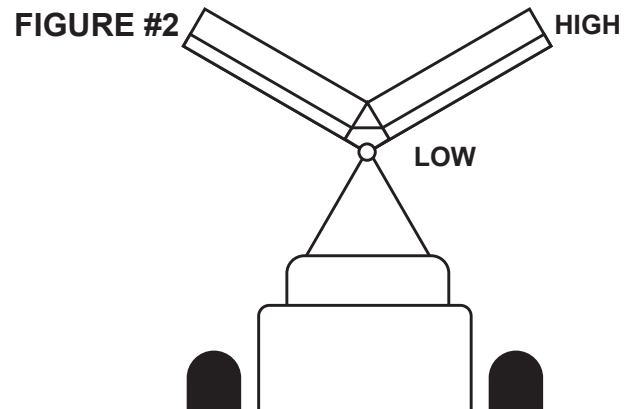
If the outer sides of the attachment are contacting the plowing surface and a gap is visible towards the center of the attachment
See Figure #1:

1. Lift attachment
2. Roll attachment backwards
3. Lower back to ground
4. Continue until level.



If the center of the attachment is contacting the plowing surface and a gap is visible towards the outer sides of the attachment
See Figure #2:

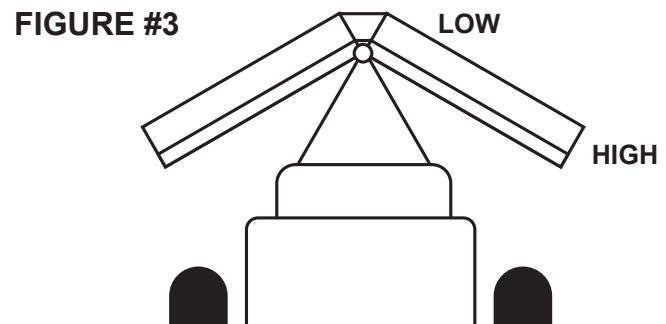
1. Lift attachment
2. Roll attachment forward
3. Lower back to ground
4. Continue until level



“V” Position

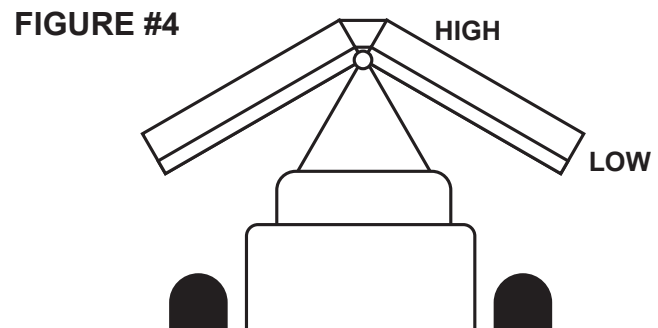
If the center of the attachment is contacting the plowing surface and a gap is visible towards the outer sides of the attachment
See Figure #3:

1. Lift attachment
2. Roll attachment backwards
3. Lower back to ground
4. Continue until level.



If the outer sides of the attachment are contacting the plowing surface and a gap is visible towards the center of the attachment
See Figure #4:

1. Lift attachment
2. Roll attachment forward
3. Lower back to ground
4. Continue until level

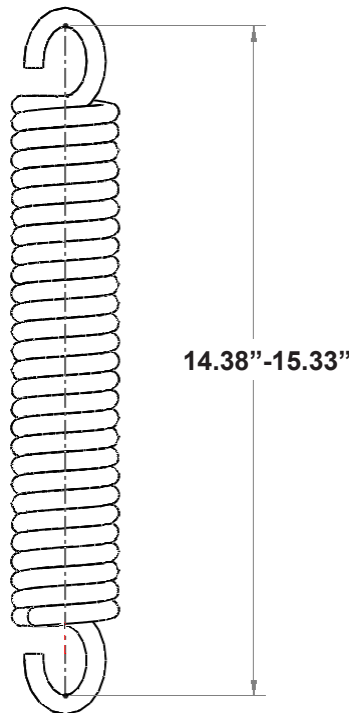


OPERATION

ADJUSTING THE TRIP SPRING

1. Move prime mover to a level surface with the blade properly attached.
2. Lower the blade onto the level surface.
3. Engage the parking brake and shut off the prime mover. Relieve the pressure to the auxiliary hydraulic lines.
4. Measure the length of the spring. The recommended Set-up length is 14.38" and should not exceed 15.33". See Figure #1

FIGURE #1



NOTE: The Spring set-up lengths are measured from the inside of one hook to the inside of the other hook. The relaxed length of the spring is 14 inches.

5. Test trip edge and if edges trip too easily, tighten the spade bolts to lengthen the springs. If edges still trip too easily contact Paladin.

WARNING! Lengthening the springs beyond the maximum length permitted can result in damage to this product.



OPERATION

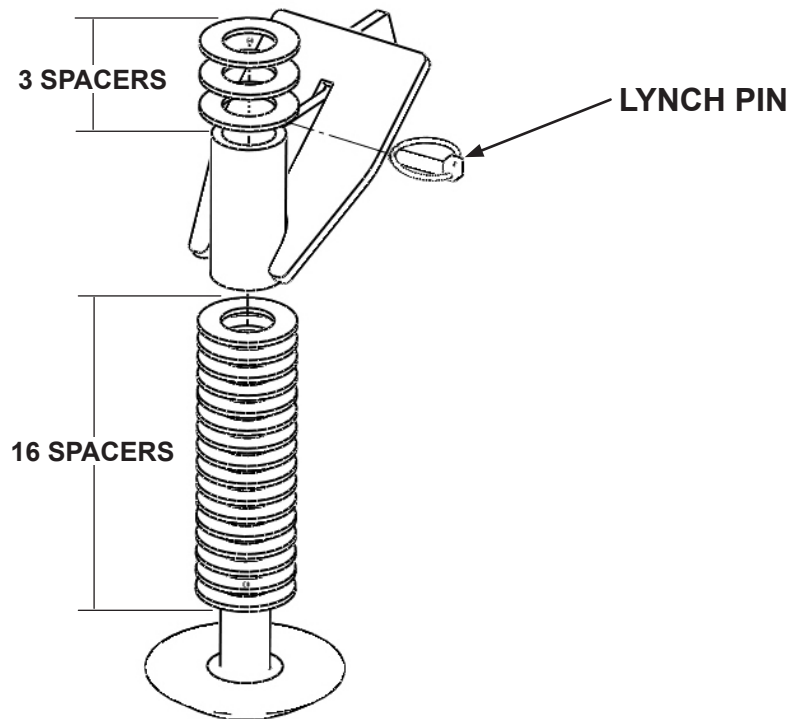
SKID SHOE SET-UP

Determine what type of surface is beneath the snow where your blade is being operated.

If the surface is hard and smooth (concrete, asphalt , etc.) the skid shoe placement as shipped from the factory is correct (3 spacers on top, 16 on bottom.)

If the surface is soft or uneven, then lower the shoe to the desired position. See Figure #1.

FIGURE #1



Notice! When adjusting the skid shoe, all spacers must be used.

Changing the position of the skid shoe:

1. Park the prime mover on a firm, level surface with blade properly attached
2. Lower the blades cutting edge onto a sturdy wood or metal blocking to safely hold the skid shoes 2.50" to 3" off the level surface.
3. Engage the parking brake and shut off the prime mover. Relieve the pressure to the auxiliary hydraulic lines.
4. Remove the lynch pin securing the skid shoe.
5. Adjust the positioning of the spacers to raise or lower the skid shoe.
6. Re-secure the lynch pin.
7. Repeat for the other skid shoe.

OPERATION

STORAGE

- Clean the unit thoroughly, removing all mud, dirt and grease.
- Inspect for visible signs of wear, breakage or damage. Order any parts required and make the necessary repairs to avoid delays upon removal from storage.
- Tighten loose nuts, capscrews and hydraulic connections.
- Coat exposed portions of the cylinder rods with grease.
- Lubricate grease fittings.
- Seal hydraulic system from contaminants and secure all hydraulic hoses off the ground to help prevent damage.
- Store unit in a dry and protected place. Leaving the unit outside will materially shorten its life.

Additional Precautions for Long Term Storage:

- Touch up all unpainted surfaces with paint to avoid rust.

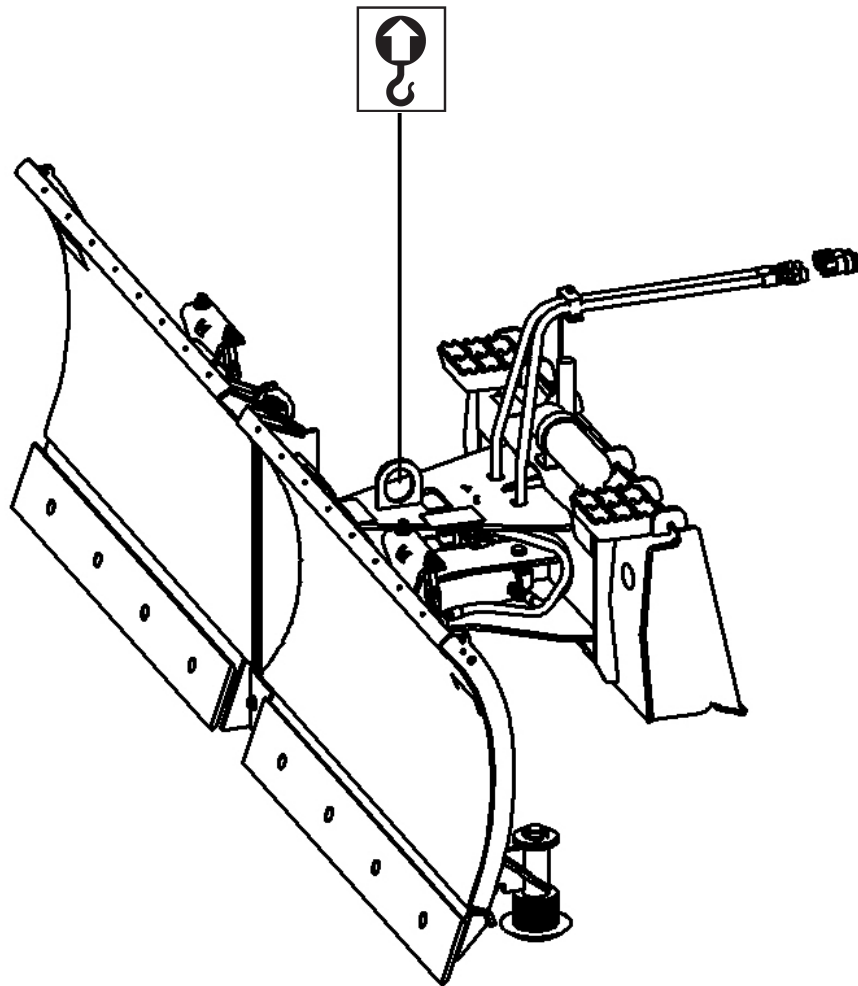
REMOVAL FROM STORAGE

- Remove any coverings.
- Wash unit and replace any damage and/or missing parts.
- Lubricate grease fittings.
- Check hydraulic hoses for damage and replace as necessary.

OPERATION

LIFT POINTS

Lifting points are identified by 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:



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

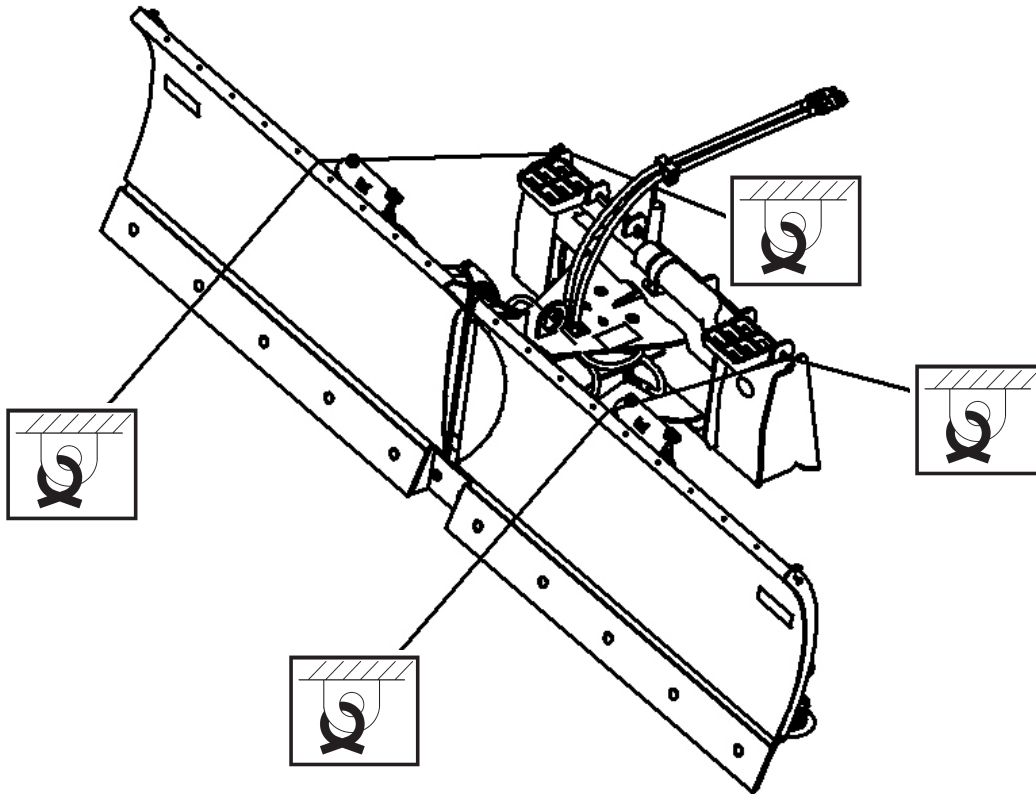
WARNING! Use lifting accessories (chains, slings, ropes, shackles and etc.) That are capable of supporting the size and weight of your attachment. Secure all lifting accessories in such a way to prevent unintended disengagement. Failure to do so could result in the attachment falling and causing serious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



OPERATION

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:



1. Attach tie down accessories to unit as recommended.
2. 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.



TRANSPORTING

“Follow all local government regulations that may apply along with recommended tie down points and any equipment safety precautions at the front of this manual when transporting your attachment.”

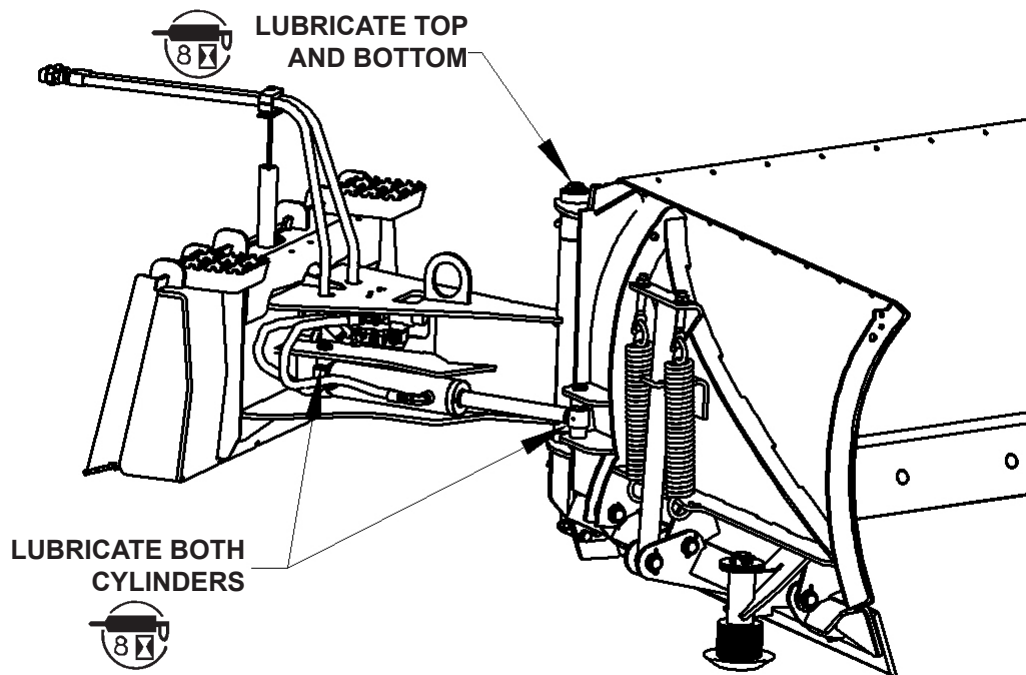
LUBRICATION

LUBRICATION

All parts provided with grease fittings should be lubricated as indicated. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.



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



1. Cylinders (2 fittings per cylinder)
2. Center Pin (2 fittings)

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

MAINTENANCE

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.

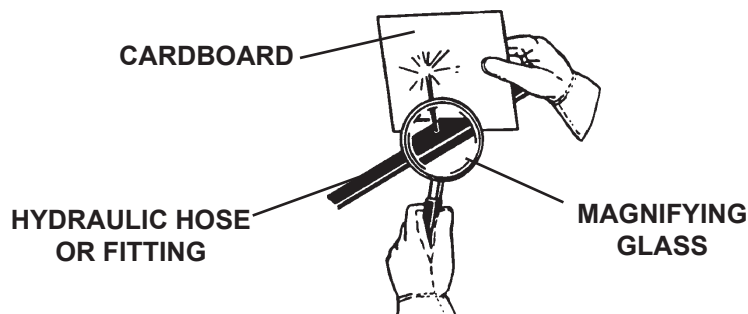
Procedure	Daily (Every 8 Hours)
Check hydraulic system for leaks and tighten as necessary. Check for damage and replace as needed.	✓
Lubricate grease fittings.	✓
Check prime mover hydraulic system for adequate oil levels.	✓
Check for missing or loose hardware. Replace or tighten if necessary. (See Bolt Torque Specifications)	✓
Check for missing or damaged safety decals and replace as necessary.	✓

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.



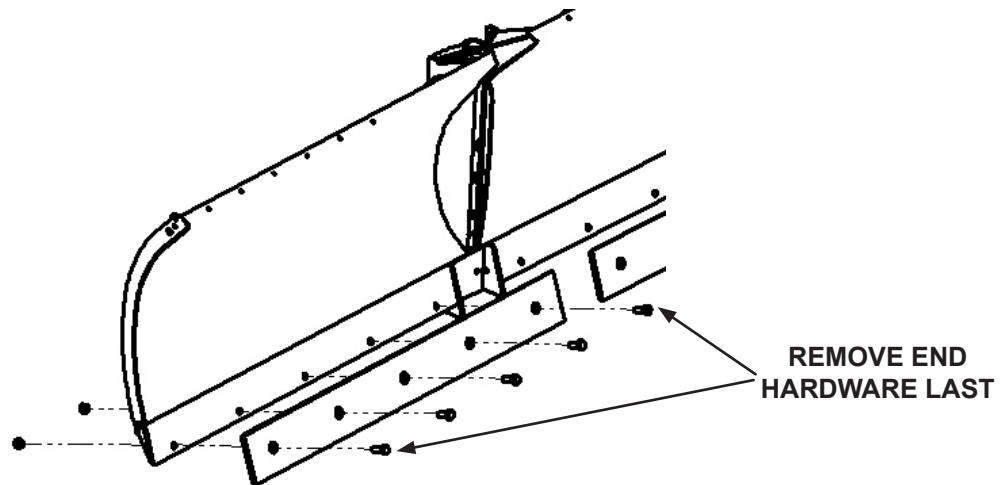
MAINTENANCE

INVERTING FRONT WEAR EDGES (STEEL OR POLYURETHANE)

NOTICE! All nuts and bolts must be installed using proper torque specifications (refer to Bolt Torque Specifications).

1. Park prime mover on a firm, level surface with blade properly attached.
2. Lower the blades cutting edge onto a sturdy wood or metal blocking positioned under the pivoting assembly, to safely hold the wear edge 6 to 8 inches above the surface.
3. Place primer mover in "Park" and engage parking brake.
4. Remove and retain all nuts and bolts but the ones at each end of the wear edge.
5. Support one end of the wear edge, remove the nut and bolt, then lower it to the surface.

FIGURE #1

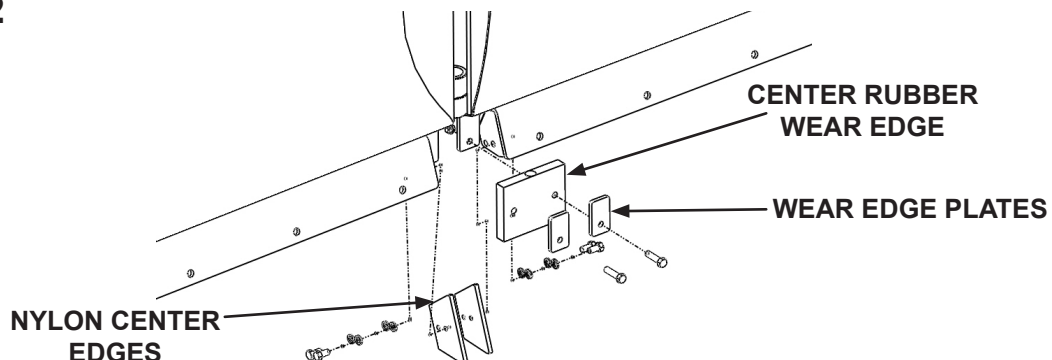


6. Support the other end, remove the nut and bolt and lower to the surface.
7. Flip the edge over so the worn side is facing up. If using a polyurethane edge, ensure steel plates remain sandwiching the edge.
8. Support one end of the wear edge and re-install nut and bolt.
9. Support the other end and re-install nut and bolt
10. Re-install all nuts and bolts.
11. Repeat steps 4-10 for other wear edge.

NOTICE! When installing nuts and bolts on center rubber wear edge, DO NOT tighten to specified torque. Tighten until the retaining plate has slightly compressed the rubber.

12. Center rubber wear edge and plates must also be inverted with wear edges.

FIGURE #2



MAINTENANCE

INSTALLING NEW FRONT WEAR EDGES

NOTICE! All nuts and bolts must be installed using proper torque specifications (refer to Bolt Torque Specifications).

1. Park prime mover on a firm, level surface with blade properly attached.
2. Place primer mover in "Park" and engage parking brake.
3. Lower the blades cutting edge onto a sturdy wood or metal blocking, positioned under the pivoting assembly, to safely hold the wear edge 6 to 8 inches above the surface.
4. Remove and retain all nuts and bolts but the ones at each end of the wear edge. See Figure #1
5. Support one end of the wear edge, remove the nut and bolt, then lower it to the surface.
6. Support the other end, remove the nut and bolt and lower to the surface.
7. Discard used wear edge and all nuts and bolts.
8. Support one end of the new wear edge and install with a new nut and bolt.
9. Support the other end and install a new nut and bolt
10. Install all new nuts and bolts.
11. Repeat steps 4-10 for other wear edge.
12. Install center rubber wear edge and plates with new nuts and bolts. See Figure #2

NOTICE! When installing new center wear edges, 2 lock washers must be used on each bolt for proper spacing to prevent premature wear.

NOTICE! When installing nuts and bolts on center rubber wear edge, DO NOT tighten to specified torque. Tighten until the retaining plate has slightly compressed the rubber.

INSTALLING NEW POLYURETHANE WEAR EDGES

1. Park prime mover on a firm, level surface with blade properly attached.
2. Lower the blades cutting edge onto a sturdy wood or metal blocking, positioned under the pivoting assembly, to safely hold the wear edge 6 to 8 inches above the surface.
3. Place primer mover in "Park" and engage parking brake.
4. Remove and retain all nuts and bolts but the ones at each end of the wear edge.
5. Support one end of the wear edge, remove the nut and bolt, then lower it to the surface.
6. Support the other end, remove the nut and bolt and lower to the surface.
7. Store wear edges and all nuts and bolts for possible future use.
8. For each blade, insert the provided bolts through the first steel strip, the polyurethane edge, the second steel strip and the trip edge. Secure the bolts with the provided nuts.

NOTICE! All nuts and bolts must be installed using proper torque specifications (refer to Bolt Torque Specifications).

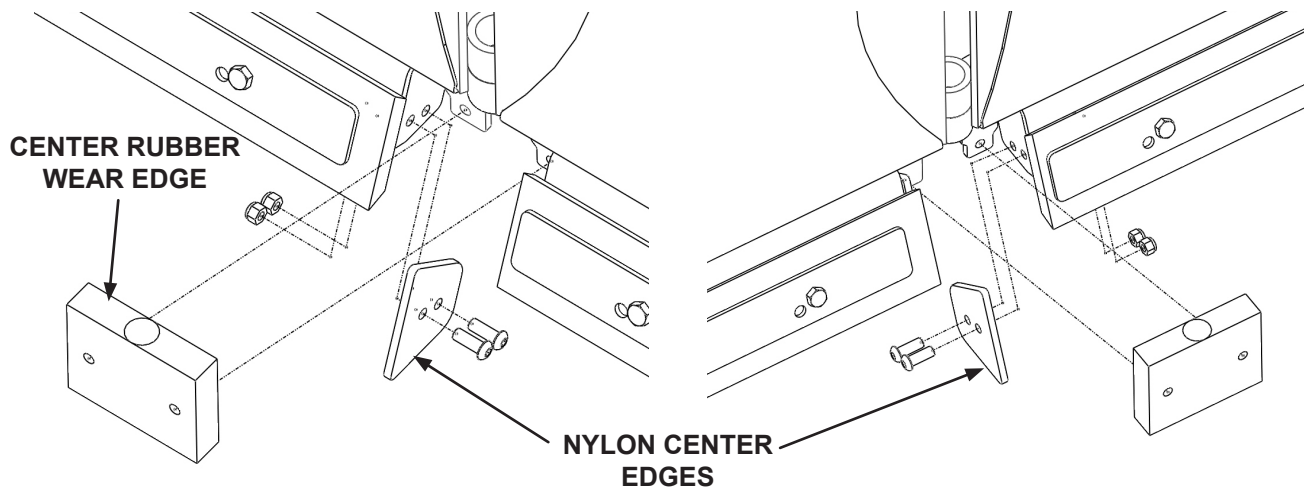
NOTICE! Improper installation of edges will result in damage to plowing surface and premature wearing of edges.

MAINTENANCE

INSTALLING CENTER NYLON AND RUBBER WEAR EDGES

1. Remove all hardware and the original steel center edges and rubber center edge. Retain all for use with original steel wear edges.
2. Install new center rubber wear edge and nylon center edges.

NOTICE! Use only 20 ft. lbs. of torque on button head bolts for nylon center edges.



INVERTING THE CENTER NYLON AND RUBBER WEAR EDGES

1. Remove hardware from rubber center edge and nylon center edges.
2. Flip over the center rubber edge and center nylon edges.
3. Re-install center rubber and nylon edges.

NOTICE! Use only 20 ft. lbs. of torque on button head bolts for nylon center edges.

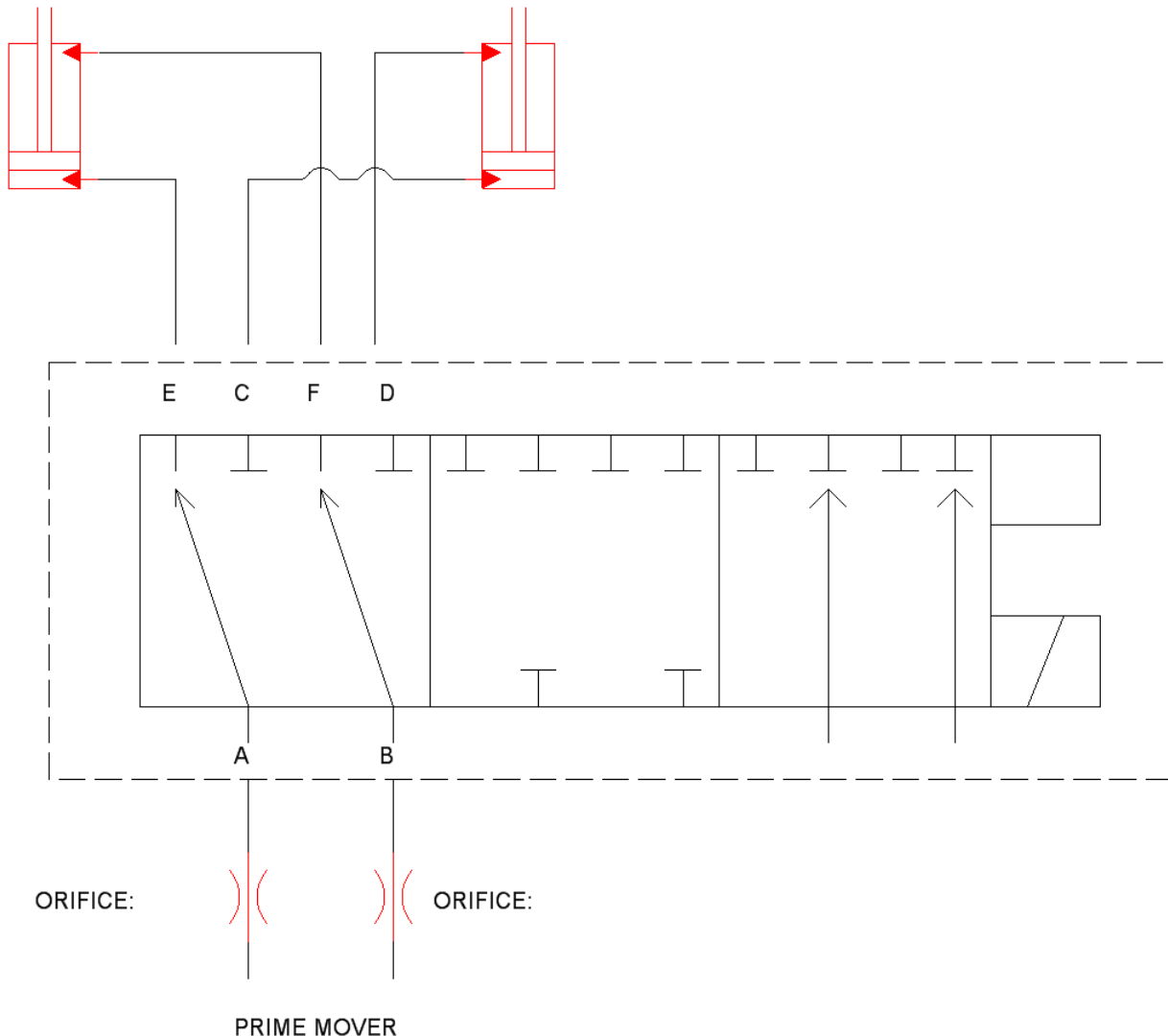
TROUBLESHOOTING

Problem	Possible Cause	Possible Solution
Steel or Poly edges are wearing unevenly	Blade is not level during operation	Make sure blades are level
A noticeable trail of snow is being left when plowing.	Blades are not level	Level blades
	Wear edges are worn	Flip or replace wear edge
	Center wear edge is worn	Flip or replace center wear edge
Edges trip too easily	Tension spring not set properly	Refer to “Adjusting the Trip Spring”
Edges do not trip	Tension spring not set properly	Refer to “Adjusting the Trip Spring”
Blade does not pivot side to side or back and forth	Debris is not allowing movement	Remove debris
	Pivot assembly is damaged	Contact dealer
Hydraulic cylinder neither extends nor retracts	Hoses or fittings are loose or disconnected	Tighten hoses and fittings
	Restriction in hoses	Remove bends in hoses, remove obstructions in hoses
Cylinders are fighting each others movements	Hoses may be installed improperly	Re-install hoses correctly
While one cylinder moves the other cylinder also moves	Orifice plug in manifold is missing	Obtain replacement
	Relief is set too low	Loosen jam nut and turn set screw in until it stops, then turn back out 6 turns
One side moves and the other does not	Restriction in hoses	Remove bends in hoses, remove obstructions in hoses
Cylinders extend but do not retract	Hoses may be installed improperly	Re-install hoses correctly
Both cylinders do not extend nor retract	Hoses or fittings are loose or disconnected	Tighten hoses and fittings
	Restriction in hoses	Remove bends in hoses, remove obstructions in hoses
While one cylinder moves the other cylinder also moves	Manifold has malfunctioned and is stuck between functions	Toggle electrical control switch
		Turn off prime mover, relieve hydraulic pressure and then restart
		Check fuse on electrical harness

TROUBLESHOOTING

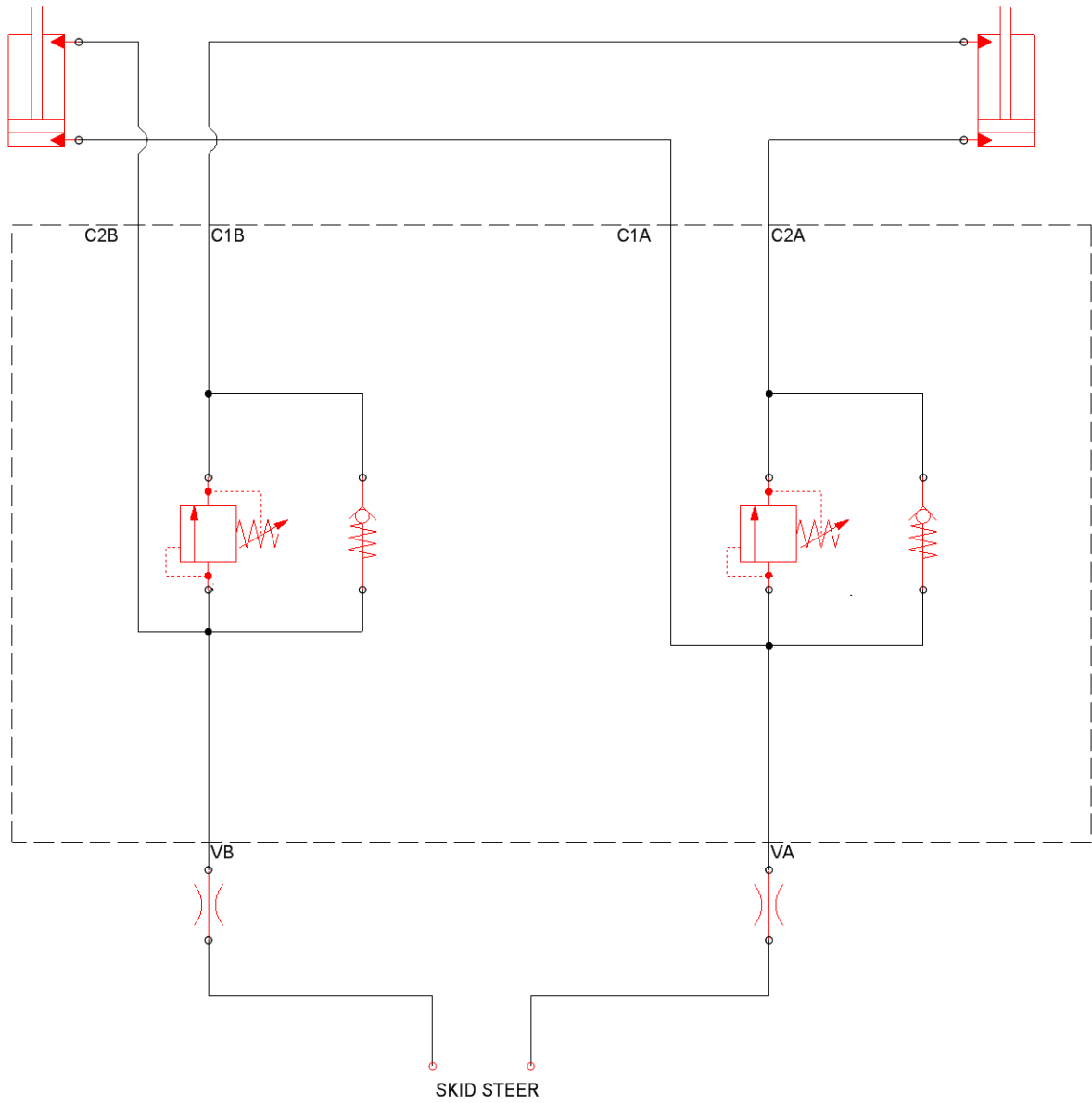
Problem	Possible Cause	Possible Solution
One cylinder moves and the other does not	Electrical harness not connected	Check harness and connect
	Switch has not been activated	Toggle switch to control other side
	Fuse has been damaged	Replace fuse
	Restriction in hoses	Remove bends in hoses, remove obstructions in hoses
Cylinders extend but do not retract	Hoses may be installed improperly	Re-install hoses correctly

HYDRAULIC/ELECTRIC MANIFOLD SCHEMATIC

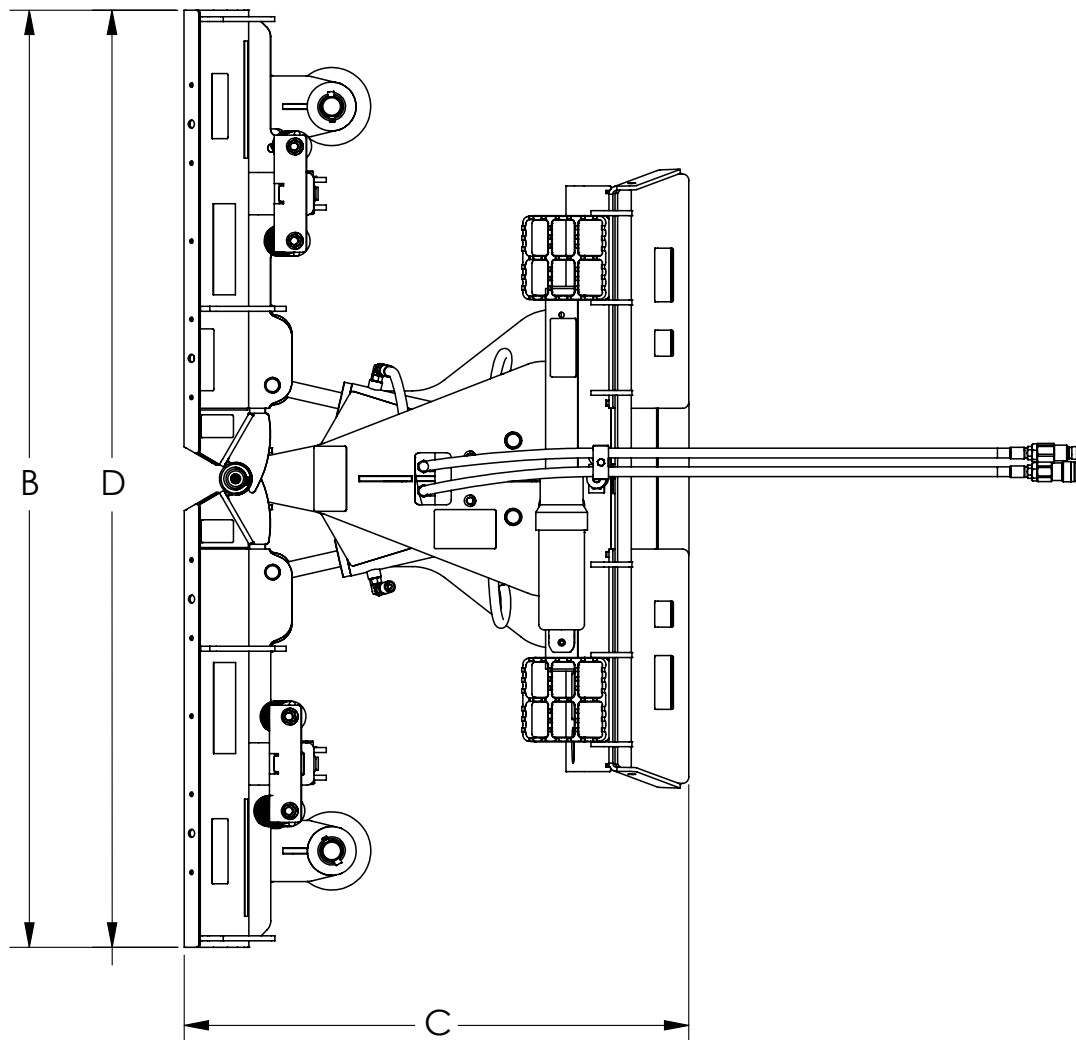
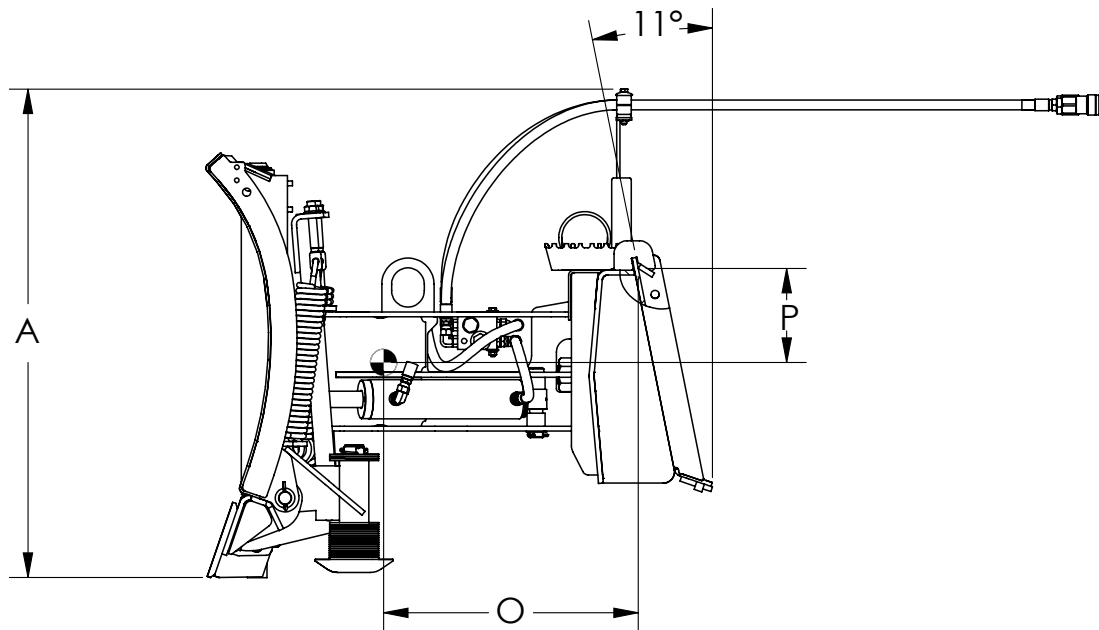


TROUBLESHOOTING

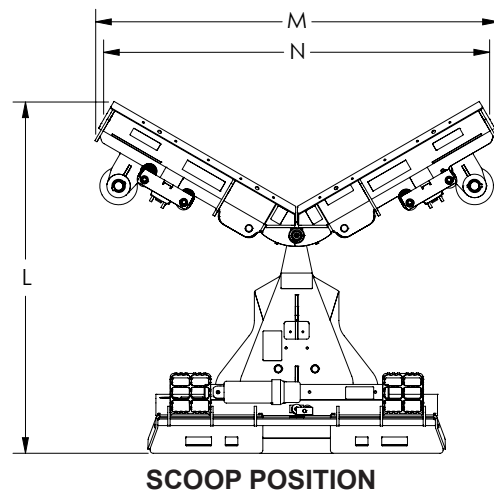
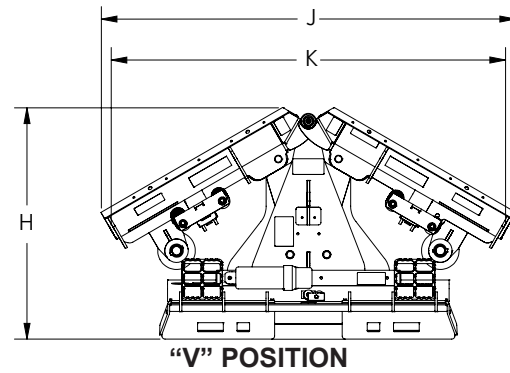
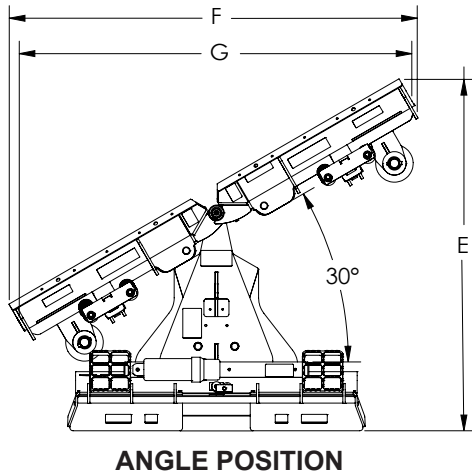
HYDRAULIC MANIFOLD SCHEMATIC



SPECIFICATIONS



SPECIFICATIONS



SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE AND WITHOUT LIABILITY THEREFOR.

DESCRIPTION	50"	60"	72"	84"	96"	108"	120"
A. Overall Height	37.40"	37.40"	37.40"	37.40"	37.40"	37.40"	37.40"
Straight Position							
B. Overall Width	50.00"	60.00"	72.00"	84.00"	96.00"	108.00"	120.00"
C. Overall Length	38.80"	38.80"	38.80"	38.80"	38.80"	38.80"	38.80"
D. Cutting Width	50.00"	60.00"	72.00"	84.00"	96.00"	108.00"	120.00"
Angled Position							
E. Overall Length	50.70"	53.30"	56.30"	59.30"	62.30"	65.30"	68.30"
F. Overall Width	46.50"	54.90"	65.30"	75.80"	86.10"	96.60"	107.00"
G. Cutting Width	43.30"	51.90"	62.30"	72.70"	83.10"	93.50"	103.90"
"V" Position							
H. Overall Length	37.00"	37.00"	37.00"	37.00"	37.00"	37.00"	38.00"
J. Overall Width	47.50"	55.90"	66.60"	76.70"	87.10"	97.50"	107.90"
K. Cutting Width	47.10"	55.70"	66.20"	76.50"	87.00"	97.30"	107.70"
Scoop Position							
L. Overall Length	50.70"	53.30"	56.30"	59.30"	62.30"	65.30"	68.30"
M. Overall Width	45.40"	54.10"	64.50"	74.90"	85.30"	95.70"	106.10"
N. Cutting Width	39.40"	48.00"	58.40"	68.80"	79.20"	89.60"	100.00"
O. Center of Gravity (Horizontal)	16.70"	17.20"	17.90"	18.60"	19.00"	19.50"	19.90"
P. Center of Gravity (Vertical)	9.30"	9.50"	9.70"	9.70"	9.90"	9.90"	10.10"
Weight (lbs)	850#	880#	935#	990#	1035#	1080#	1130#
Maximum Pressure	3500 PSI						
Maximum Prime Mover Weight (without attachment) (lbs).....	13,230#						

BOLT TORQUE SPECIFICATIONS

GENERAL TORQUE SPECIFICATION TABLES

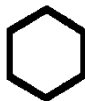
Use the following charts when determining bolt torque specifications, when special torques are not given. Always use grade 5 or better when replacing bolts.

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
		Ft-lbs		Newton-Meter		Ft-lbs		Newton-Meter		
Inches	mm	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.		
		

Bolt Size	Grade No.	Pitch (mm)	Ft-lbs	Newton-Meter	Pitch (mm)	Ft-lbs	Newton-Meter
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

For Fax and E-mail Orders

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.