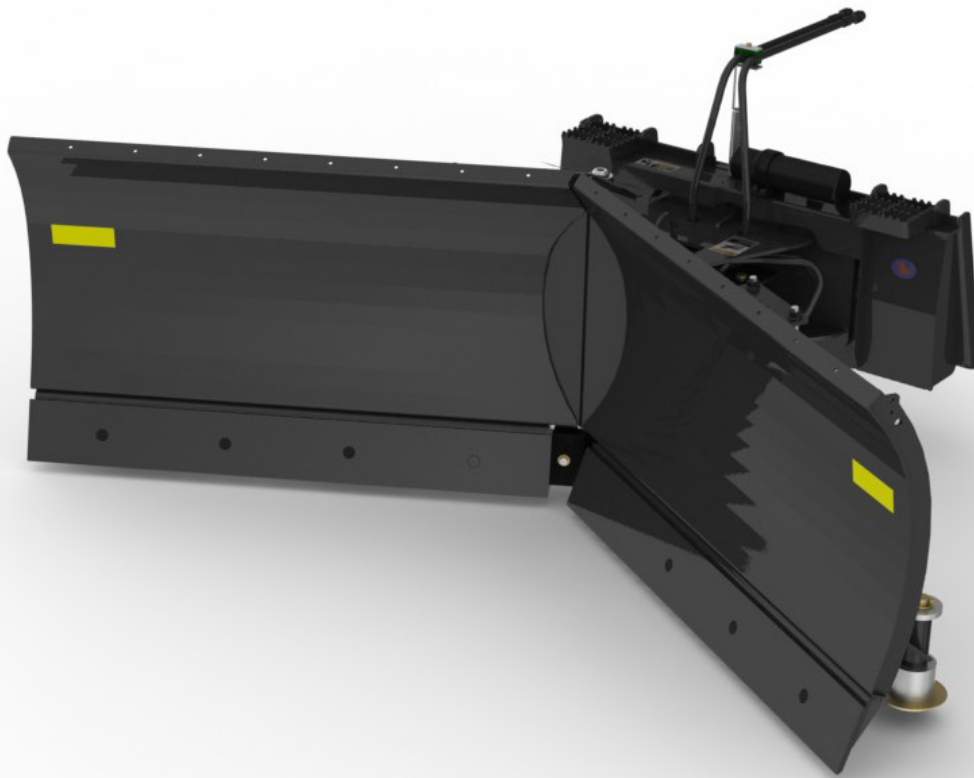




OPERATOR'S AND PARTS MANUAL

V-SNOW BLADE



Model Number _____

Serial Number _____

Manual Number: 51-4320
Release Date: June 2014
Serial Number 1052001 and Up
Rev. 2

Notes

TABLE OF CONTENTS

PREFACE.....	4
SAFETY STATEMENTS.....	5
GENERAL SAFETY PRECAUTIONS.....	5-7
EQUIPMENT SAFETY PRECAUTIONS	8
SAFETY DECALS & LABELS	9
INSTALLATION	10-11
OPERATION.....	12-22
MAINTENANCE	23-29
TROUBLESHOOTING	30-31
PARTS & ILLUSTRATIONS.....	32-42
PRODUCT SPECIFICATIONS	44-45
BOLT TORQUE SPECIFICATIONS	46
HYDRAULIC TORQUE SPECIFICATIONS.....	47-48
WARRANTY	49

PREFACE

GENERAL INFORMATION

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.

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 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 manufacturer to obtain further assistance. Keep this manual available for reference. Provide this manual to any new owners and/or operator’s

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 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 impossible 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.paladinbrands.com/patents.asp>.

SAFETY STATEMENTS

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.

THIS SYMBOL BY ITSELF OR USED 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.

GENERAL SAFETY PRECAUTIONS

WARNING!



READ MANUAL PRIOR TO INSTALL

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 MOVERS MANUAL.**

WARNING!



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 assure 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 and hard to read.

WARNING!



PROTECT AGAINST FLYING DEBRIS

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

GENERAL SAFETY PRECAUTIONS

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 onto blocks. Lower booms and attachments to the ground before leaving the cab or operator's station.

WARNING! USE CARE WITH HYDRAULIC FLUID PRESSURE

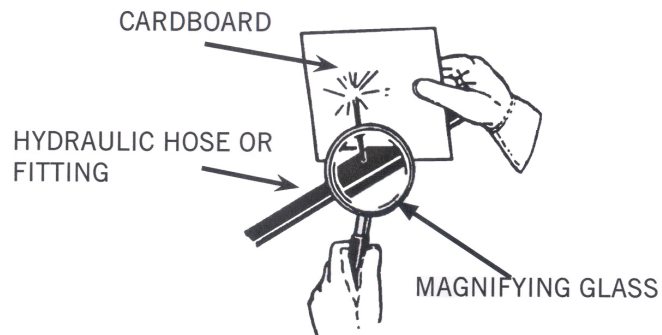


Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death. Hydraulic leaks under pressure may not be visible. Before connecting or disconnecting hydraulic hoses, read your prime movers operator's manual for detailed instructions on connecting and disconnecting hydraulic 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 immediately to determine proper treatment.
- Wear safety glasses, protective clothing, and use a sound piece of cardboard or wood when searching for hydraulic leaks.

DO NOT USE YOUR HANDS!

SEE ILLUSTRATION.



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 System) equipment or device. Any modifications must be authorized in writing by the manufacturer.

GENERAL SAFETY PRECAUTIONS

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 tool 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.

WARNING! 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 prime movers 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 operators position.
- Never leave equipment unattended with the engine running or with this attachment in a raise 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! 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.

EQUIPMENT SAFETY PRECAUTIONS

Operating the V-Snow 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.

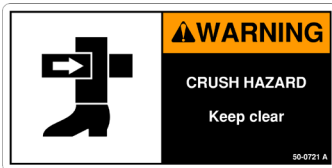
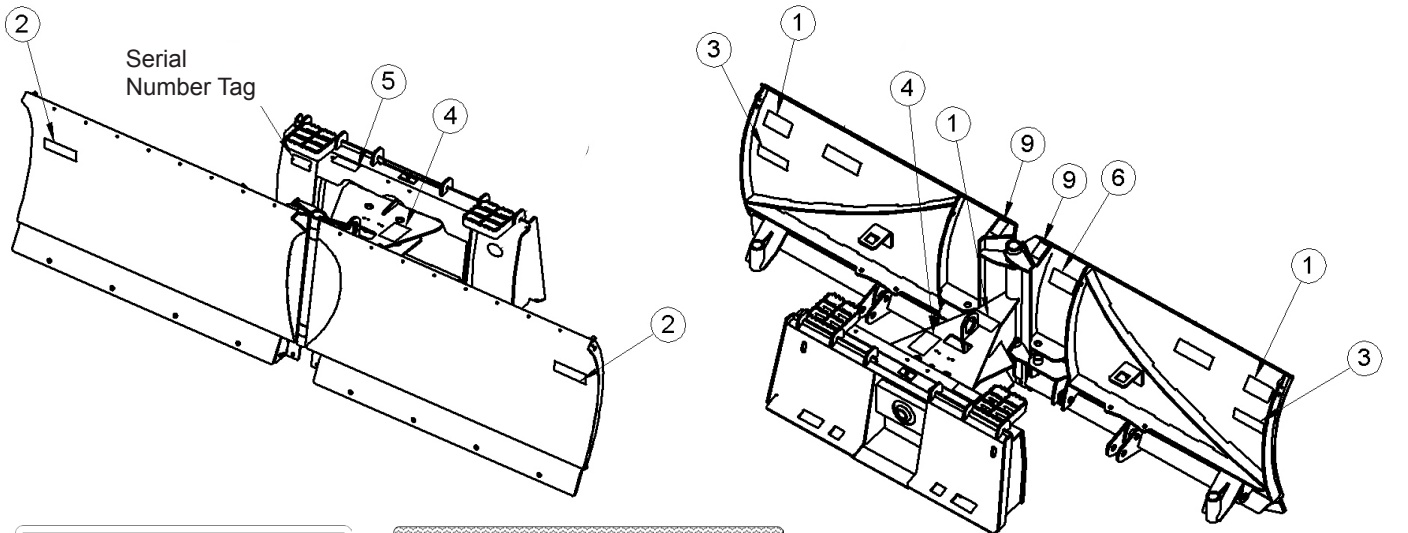
Transporting the V-Snow Blade:

- 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.

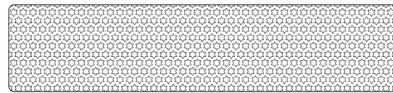
Maintaining the V-Snow Blade:

- 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 FFC.
- Never make hydraulic repairs while system is under pressure. Serious personal injury or death could result.
- Never work under a raised attachment.

SAFETY DECALS & LABELS



1. 50-0721



2. & 3. RDL3132 & RDL3131



5. 50-0737



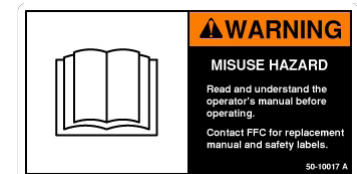
4. 50-0724



9. 50-0775

Item	Part	Qty	Description
------	------	-----	-------------

1.	50-0721	3	Label, Warning, Crush Hazard
2.	RDL3132	2	Label, Amber, Reflective Tape, 2 x 9
3.	RDL3131	2	Label, Red, Reflective Tape, 2 x 9
4.	50-0724	1	Label, Warning, High Pressure Fluid
5.	50-0737	1	Label, Warning, Pinch Point Hazard
6.	50-10017	1	Label, Warning, Avoid Serious Injury
9.	50-0775	2	Label, Warning, Crush Hazard



6. 50-10017

Use part numbers 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 longevity.

Placement or replacement of Safety Signs

1. Clean the area of application with nonflammable solvent, and then wash the same area with soap and water.
2. Allow the surface to fully dry.
3. Remove the backing from the safety sign, exposing the adhesive surface.
4. Apply the safety sign to the position shown in the diagram above and smooth out any bubbles.

Instructions

1. Keep all safety signs clean and legible.
2. Replace all missing, illegible, or damaged safety signs.
3. Replacement parts, for parts with safety signs attached, must also have safety signs attached.
4. Safety signs are available, free of charge, from your dealer or from SWEEPSTER.

INSTALLATION

V-Snow Blade Installation

WARNING!  **Improper attachment of V-Snow Blade could result in injury or death.** Do not operate this machine until you have positive indication that the attachment is securely mounted.

1. Position the blade on a level surface.
2. Enter the prime mover.
3. Fasten the safety restraints.
4. Start the engine.
5. Disengage the parking brake.
6. Align the attachment mechanism with the mounting on the blade and attach it to the prime mover. Follow the attaching procedure in the prime mover owner's manual.
7. Engage the parking brake and shut down the prime mover. Relieve all pressure to the auxiliary hydraulic lines.
8. Unfasten safety restraints and exit the prime mover.
9. Ensure that the hydraulic quick couplers are clean. Connect hydraulic lines for the blade to the prime mover. Twist the collar of the quick couplers one quarter of a turn, to secure the hydraulic connection.
10. While the loader arms are lowered, visually inspect the attachment mechanism to ensure that it is securely mounted.
11. Enter prime mover, fasten safety restraints and start prime mover.
12. Carefully raise the loader and cycle the rollback/dump cylinders to check clearances, that limiting stops make proper contact and verify that all mounting procedures have been successfully completed. Contact FFC for instructions if the limiting stops do not contact properly.

INSTALLATION

Removing the V-Snow Blade

WARNING!



Serious injury or death may result from disengaging the blade when the blade is in an unstable position. Place blade on a firm, level surface in a stable position before disengaging.

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). Never disengage the blade when it is in the “V” position.
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.
6. Unfasten safety restraints and exit prime mover.
7. Disconnect the blades hydraulic lines from the prime mover and connect the quick couplers together to keep them clean.
8. Disengage attachment locking mechanism (consult prime mover manual).
9. Enter prime mover, fasten safety restraints and start the prime mover.
10. Disengage the parking brake and back away the blade.

WARNING!



AFTER BACKING AWAY BE SURE BLADE MOUNTING IS CONTACTING THE GROUND. If not in contact with ground, blade will be unstable and serious injury or death may occur.

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.

CAUTION!



A V-SNOW BLADE IS A DEMANDING MACHINE. Only fully trained operators or trainee operators under supervision of a fully trained person should use this machine.

Before operating blade

- 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 host machine, making sure it is tight.
- Replace any damaged or fatigued hardware with properly rated fasteners.
- Make sure all hydraulic hardware and hydraulic fittings are tight.
- Replace any damaged or fatigued fittings or hoses.
- 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 proper apparel; such as safety glasses, goggles or a face shield and ear protection.

While operating blade:

- When operating the blade, adhere to all government rules, local laws and other professional guidelines for your plowing application.
- Before leaving the operators area for any reason, lower the blade to the ground. Stop the prime mover engine, set the brakes and remove the key from the ignition.
- Keep hands, feet, hair and other loose clothing away from all moving parts.
- Leave all shields and safety equipment in place when operating the blade.
- Be aware of extra weight and width a blade adds. Reduce travel speed accordingly.
- When operating on rough terrain, reduce speed to maintain control of steering.
- Never plow toward people, buildings, vehicles or other objects that can be damaged by flying debris.

OPERATION

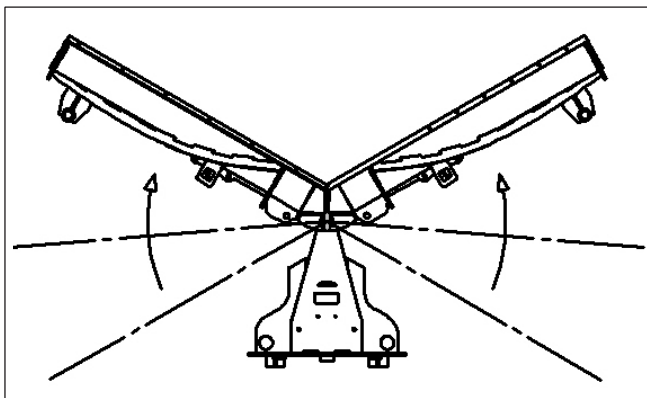
- Only operate the blade while you are in the seat of the prime mover. The seat belt must be fastened while you operate the prime mover. Only operate the controls while the engine is running. Protective glasses must be worn while you operate the prime mover and while you operate the blade.
- While you 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.

Hydraulic Sequencing Model

Adjusting V-Blade:

1. Start the prime mover at idle and raise the blade.
2. Adjust the blade to the desired angle (refer to “angling instructions”) 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.

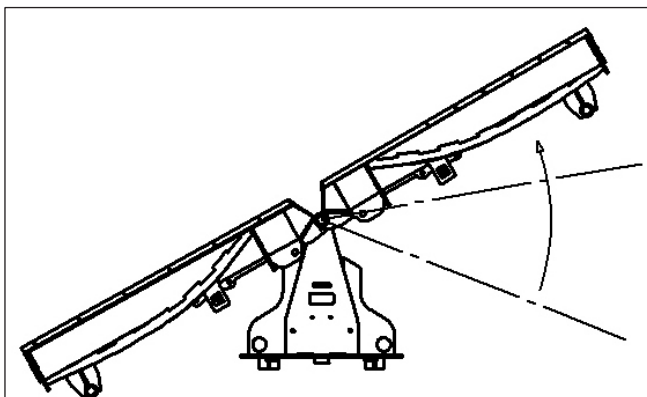
Angling Instructions:



SCOOP

Scoop Position:

Hold hydraulic flow until both blades extend and stop.

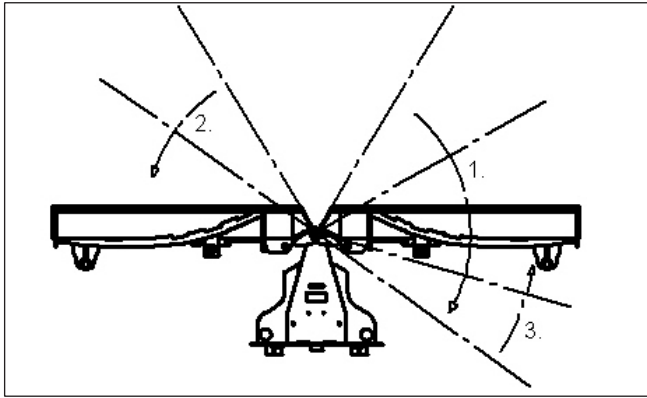


LEFT ANGLE

Left Angle Position:

If starting in “V” position, hold hydraulic flow until right blade extends and stops.

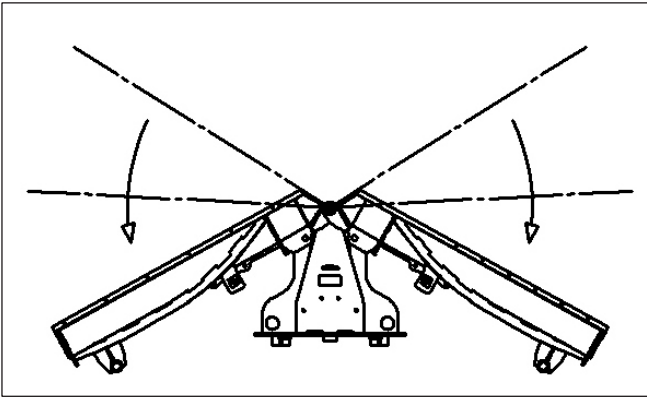
OPERATION



STRAIGHT

Straight Position:

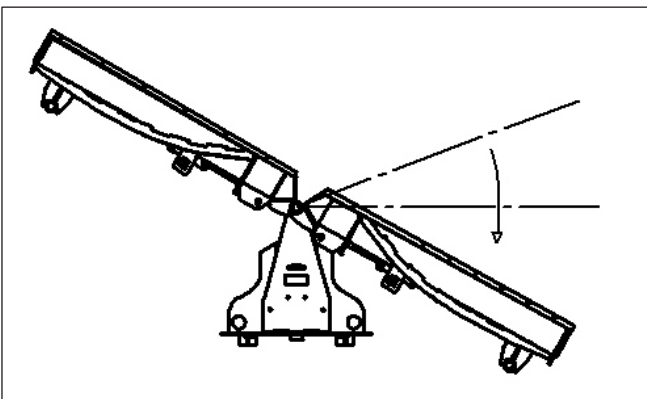
1. If starting from the scoop position, reverse flow until right blade completely retracts.
2. While still reversing flow, retract left blade until it is in the straight position.
3. Use normal flow to extend right blade until it is parallel to left blade.



V

V Position:

Reverse flow until both blades retract and stop.



RIGHT ANGLE

Right Angle Position:

If starting from the Scoop position, reverse flow until right blade retracts and stops.

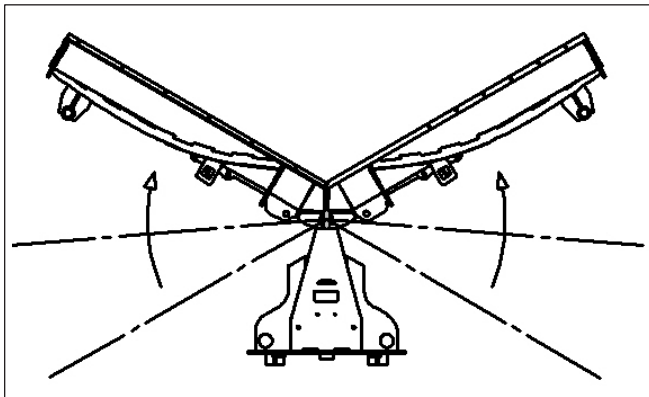
OPERATION

Electro-Hydraulic Model

Adjusting V-Blade:

1. Start the prime mover at idle and raise the blade.
2. Adjust the blade to the desired angle (refer to “angling instructions”) 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.

Angling Instructions:



1. Press toggle switch and hold flow to move one blade to the desired position.
2. Release switch and flow.
3. Pull toggle switch and hold flow to move other blade to the desired position.
4. Release switch and flow.

OPERATION

Leveling Instructions

NOTICE! *A LEVEL UNIT SHOULD HAVE NO VISIBLE SPACES BETWEEN CUTTING EDGES AND PLOWING SURFACE.*

Scoop Position

If the front corners of the attachment are contacting the plowing surface and a gap is visible towards the center of the attachment (figure 2):

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

If the rear center of the attachment is contacting the plowing surface and a gap is visible towards the outer sides of the attachment (figure 3):

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

V Position

If the front corner of the attachment is contacting the plowing surface and a gap is visible towards the outer sides of the attachment (figure 2):

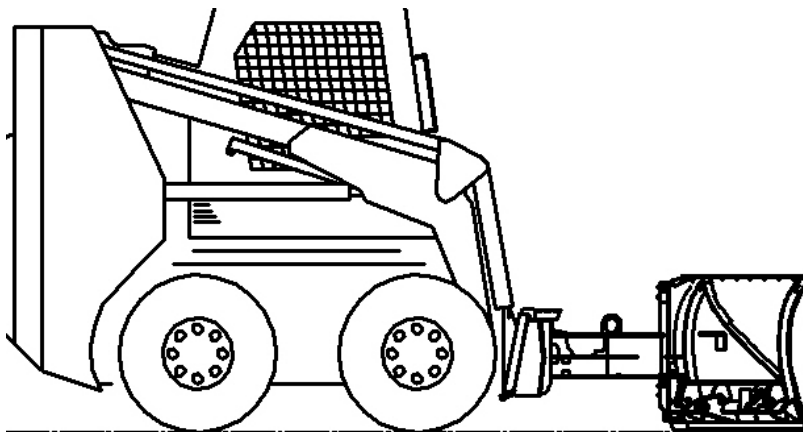
1. Lift attachment
2. Roll attachment backwards
3. Lower back to ground
4. Continue until level.

If the outer sides of the attachment are contacting the plowing surface and a gap is visible towards the center of the attachment (figure 3):

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

OPERATION

Scoop Position Shown



Level

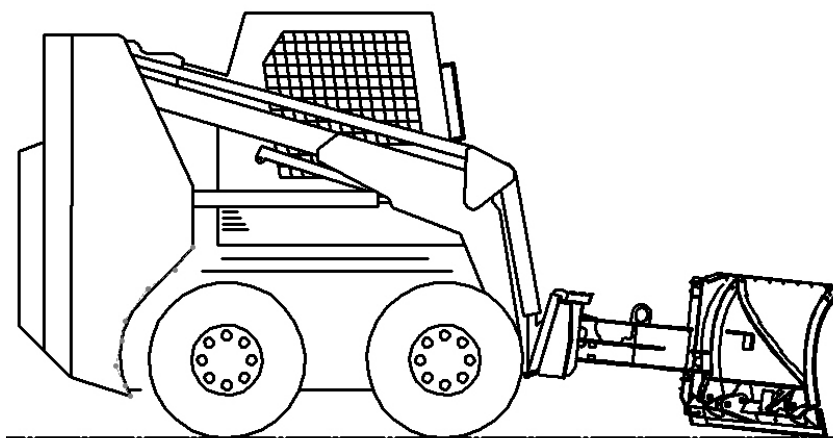


figure 2

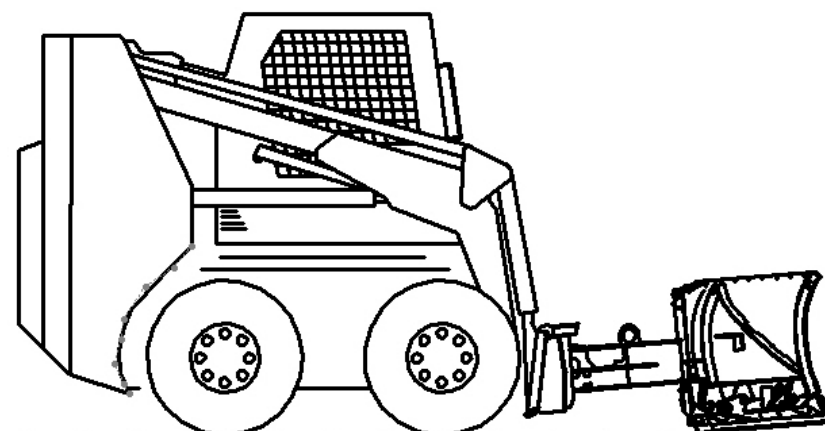


figure 3

OPERATION

1. Move prime mover to a level surface with the blade properly attached.
2. Place the prime mover in “Park” and engage the parking brake.
3. Lower the blade onto the level surface.
4. Shut off prime mover engine, remove key and relieve all pressure from the hydraulic lines.
5. Check spring specifications on chart below.

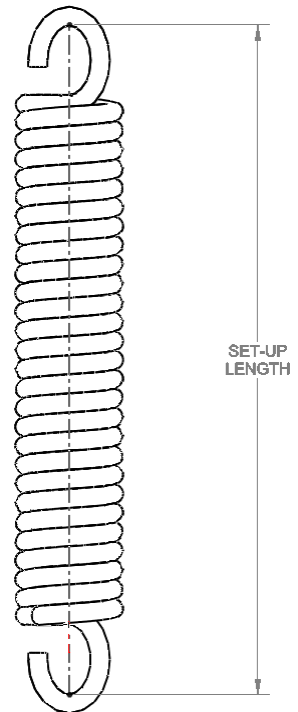
RECOMMENDED SPRING SET-UP LENGTHS							
Blade Width	50 in	60 in	72 in	84 in	96 in	108 in	120 in
Recommended Spring Set-up Length*	14.38 inches						
Maximum Length Permitted	15.33 inches						

***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.

6. Test snow blade. If edges trip too easily, perform the following steps:
 - a. Repeat the above steps 1 through 4.
 - b. Tighten the spade (or eye) bolts to lengthen the springs.

WARNING!  **LENGTHENING THE SPRINGS BEYOND THE MAXIMUM LENGTH PERMITTED CAN RESULT IN DAMAGE TO THIS PRODUCT.**

- c. Test your blade again. If edges still trip too easily contact FFC.



OPERATION

Skid Shoe Set-Up

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

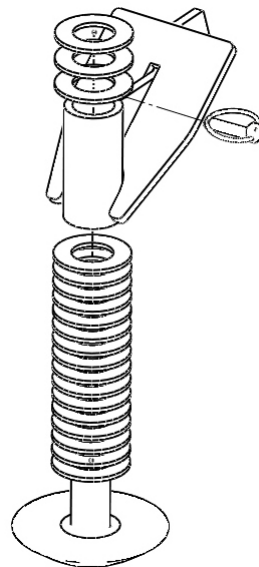
If the surface is hard and smooth, like concrete or asphalt, the skid shoe placement as shipped from the factory is correct. (3 spacers on top, 16 on bottom)

If the surface is soft or uneven, then lower the shoe to the desired position (see directions and diagram below).

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 2.5 to 3 inches off the level surface.
3. Place prime mover in "Park" and engage parking brake.
4. Shut off the prime mover's engine, remove the key and relieve all pressure from hydraulic lines.
5. Remove the lynch pin securing the skid shoe.
6. Adjust the positioning of the spacers to raise or lower the skid shoe.
7. Re-secure the lynch pin.
8. Repeat for the other skid shoe.

NOTICE! **WHEN ADJUSTING THE SKID SHOE, ALL SPACERS MUST BE USED.**



Factory Settings
(3 on Top, 16 on Bottom)

OPERATION

Service & Repair

CAUTION ! **DO NOT MODIFY THE V-SNOW BLADE IN ANY WAY.** Personal injury could result. If you have questions, contact your dealer or FFC.



Repair or adjust the blade in a safe area, away from traffic and other hazards.

Before adjusting or servicing, lower the blade to the ground, set parking brake, shut down the prime mover and remove the key from the ignition.

When working on or around the blade, safely secure it from falling or shifting.

Service & Repair - Hydraulic Safety

Stop the prime mover engine and release hydraulic pressure before servicing or adjusting blade hydraulic systems.

WARNING! **Escaping hydraulic fluid can have enough pressure to penetrate the skin, causing serious personal injury.**



Check lines, tubes and hoses carefully. Do not use your hand to check for leaks. Use a board or cardboard to check for leaks. Tighten all connections to the recommended torque.

Do not bend high pressure lines. Do not strike high pressure lines, Do not install bent lines, bent tubes, or kinked hoses. Do not install damaged lines, tubes, or hoses.

Repair loose lines, tubes, and hoses. Replace damaged lines, tubes, and hoses. Leaks can cause fires. See your dealer for repair or replacement parts.

Replace the parts if any of the following conditions are present:

- The end fittings are damaged or leaking.
- The outer covering is chafed or cut.
- The reinforcing wire layer is exposed.
- The outer covering is ballooning locally.
- The hose is kinked or crushed.
- The hose has been pulled or stretched.

Make sure that all clamps, guards, and shields are installed correctly.

OPERATION

General Storage:

NOTICE! *Do not store in direct sunlight. Materials will deteriorate prematurely if stored in direct sunlight. Do not store near intense heat.*

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.
- Inflate tires to recommended tire pressure.
- Fill fuel tank and hydraulic oil tank to maximum.
- Check antifreeze properties and drain fluids as appropriate.

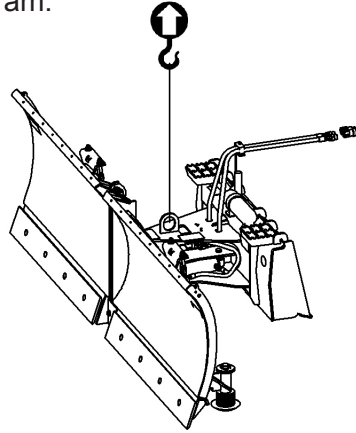
Removal from Storage:

- Remove cover.
- 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:

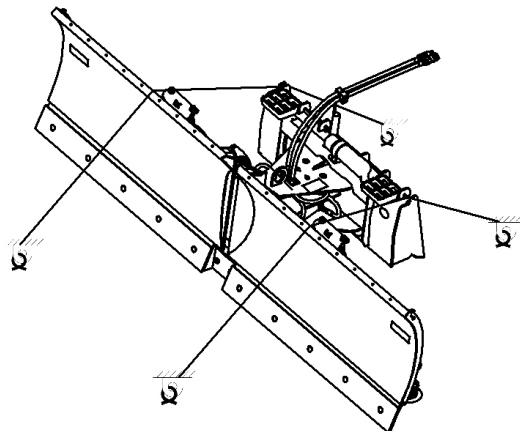


- Attach lifting accessories to unit at recommended lifting points.
- Bring lifting accessories together to a central lifting point.
- Lift gradually, maintaining the equilibrium of the unit.

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.**

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.**

MAINTENANCE SCHEDULE

Maintenance Schedule

Procedure	Before Each Use	After Each Use
Fittings/Hoses, Hydraulic - Check for leaks/Tighten Check for damage	✓	
Fittings, Zerk - Grease (See lubrication points)	✓	
Oil, Hydraulic - Check level	✓	
Hardware - Check for tightness	✓	

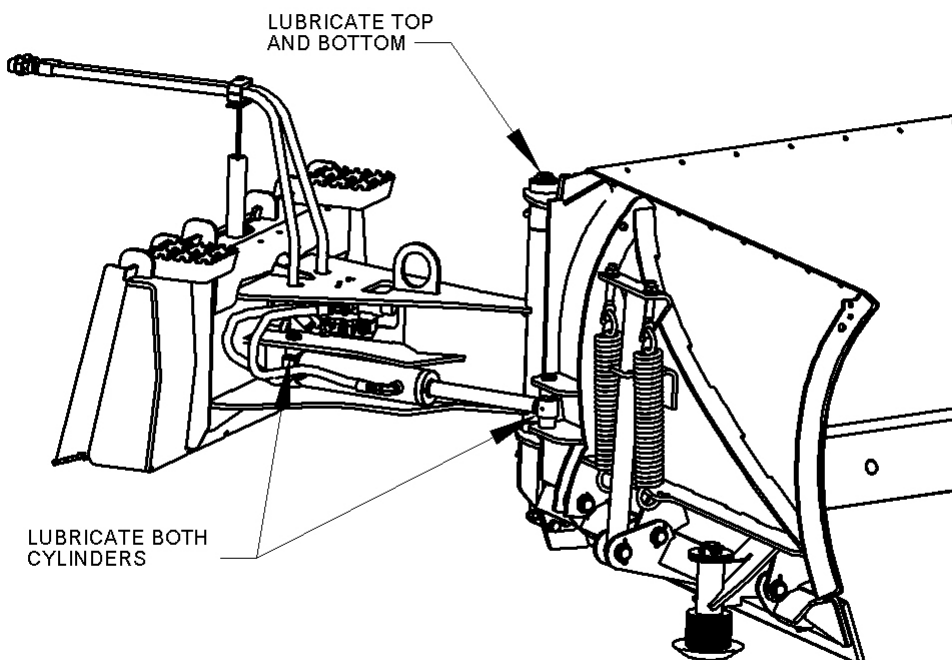
Oil Cleanliness Requirements

NOTICE! All hydraulic fluid shall be filtered before use in any FFC product to obtain the ISO cleanliness standard of 17-14 or better, unless explicitly specified otherwise.

Lubrication Points

The following grease fittings should be greased before each use. See figure for locations.

1. Cylinders (2 fittings per cylinder)
2. Center Pin (2 fittings)
3. Ball Joint (B-Design, 1 fitting)



MAINTENANCE RECORD

[illegible]

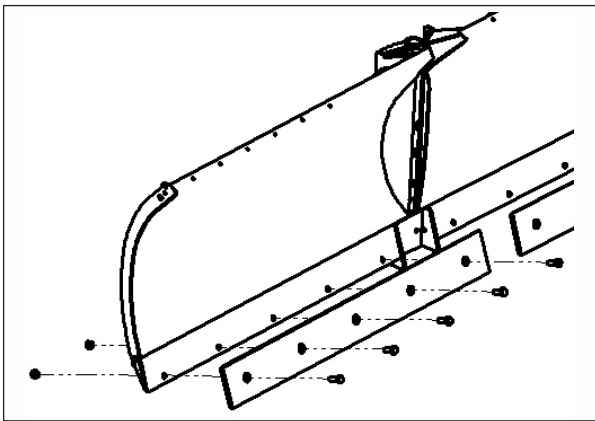
MAINTENANCE

Inverting Front Wear Edges (Steel or Polyurethane)

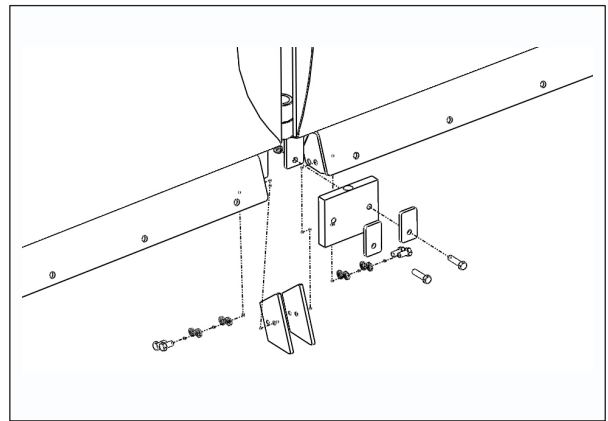
NOTICE! *All nuts and bolts must be installed using proper torque specifications (refer to Bolt Torque Specifications).*

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 level 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 level surface.
6. Support the other end, remove the nut and bolt and lower to the level 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.
12. Center rubber wear edge and plates must also be inverted with wear edges.

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.*



Front Wear Edges



Center Wear Edges

MAINTENANCE

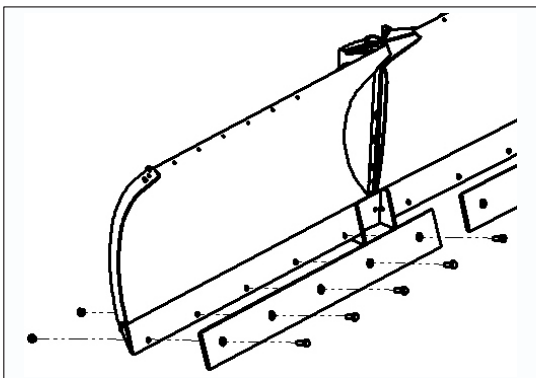
Installing New Front Wear Edges

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

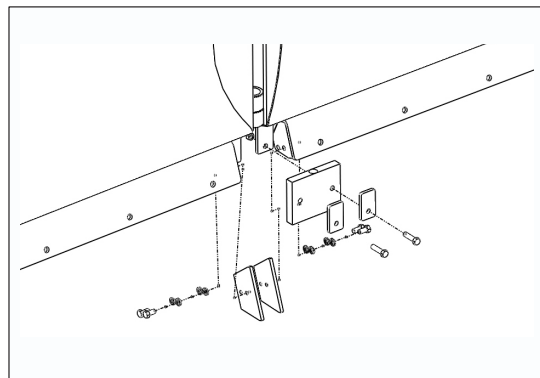
1. Park prime mover on a firm, level surface with blade properly attached.
2. Place primer mover in "Park" and engage parking brake.
3. Lower the blades cutting edge onto a sturdy wood or metal blocking, positioned under the pivoting assembly, to safely hold the wear edge 6 to 8 inches above the level surface.
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 level surface.
6. Support the other end, remove the nut and bolt and lower to the level 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.

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.*



Front Wear Edges



Center Wear Edges

MAINTENANCE

Installing New Polyurethane Wear Edges

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.*

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 level surface.
3. Place prime 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 level surface.
6. Support the other end, remove the nut and bolt and lower to the level 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.

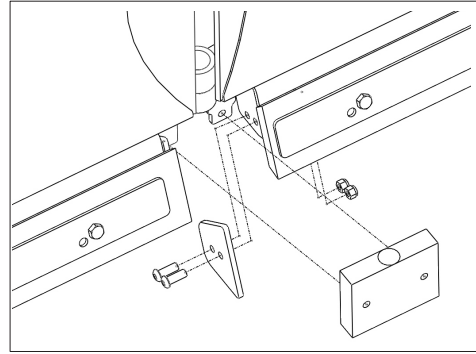
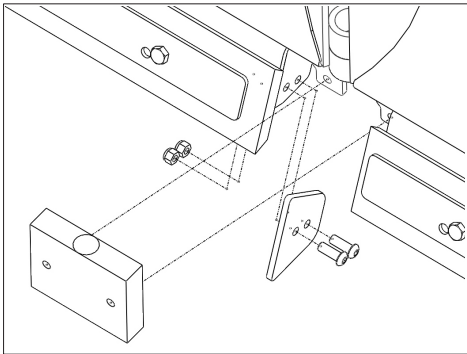
NOTES

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

Wear Edges

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

Trip Edges

Problem	Possible Cause	Possible Solution
Edges trip too easily	Tension spring not set properly	Refer to "Spring Setup Lengths"
Edges do not trip	Tension spring not set properly	Refer to "Spring Setup Lengths"

Pivot Assembly

Problem	Possible Cause	Possible Solution
Blade does not pivot side to side or back and forth	Debris is not allowing movement	Remove debris
	Pivot assembly is damaged	Contact dealer

TROUBLESHOOTING

Hydraulic Manifold Only

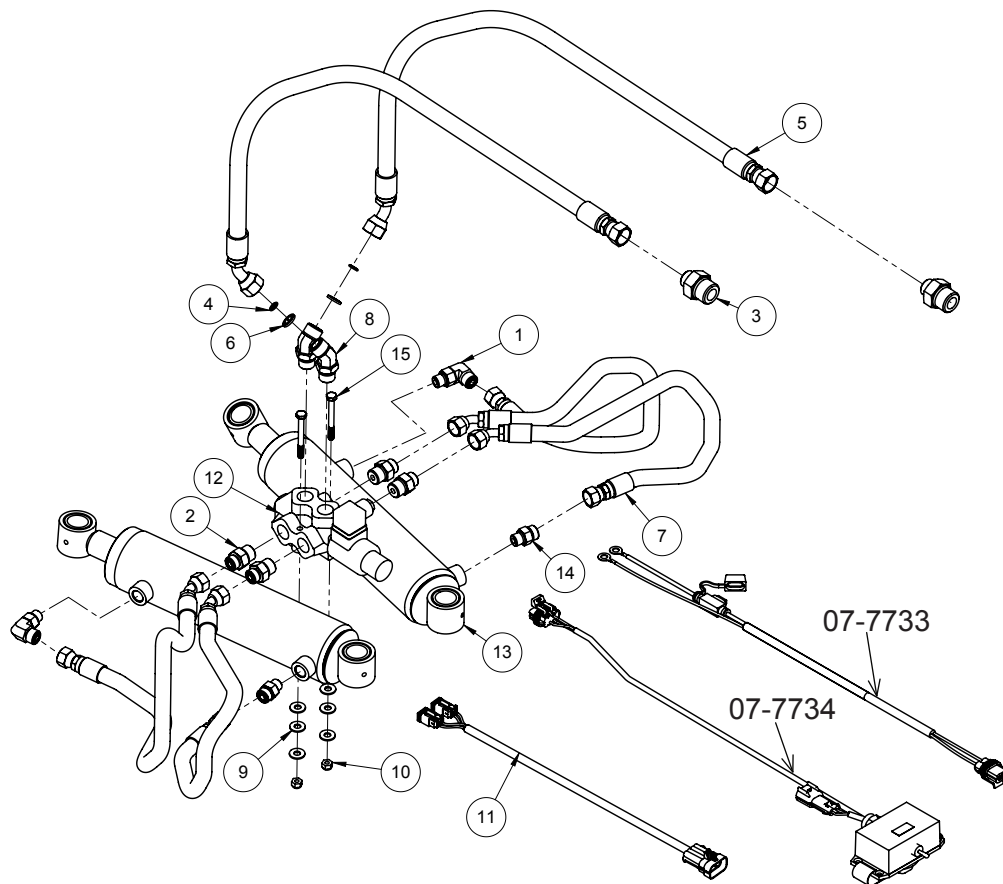
Problem	Possible Cause	Possible Solution
Hydraulic cylinder neither extends nor retracts	Hoses or fittings are loose or disconnected	Tighten hoses and fittings
	Restriction in hoses	Remove bends in hoses, Remove obstructions in hoses
Cylinders are fighting each others movements	Hoses may be installed 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

Electric/Hydraulic Manifold Only

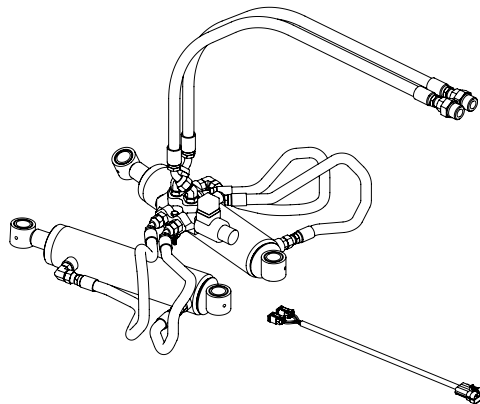
Problem	Possible Cause	Possible Solution
Both cylinders do not extend nor retract	Hoses or fittings are loose or disconnected	Tighten hoses and fittings
	Restriction in hoses	Remove bends in hoses, Remove obstructions in hoses
While one cylinder moves the other cylinder also moves	Manifold has malfunctioned and is stuck between functions	Toggle electrical control switch
		Turn off prime mover, relieve hydraulic pressure and then restart
		Check fuse on electrical harness
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

HOSE ASSEMBLY

Hydraulic/Electric Hose Routings

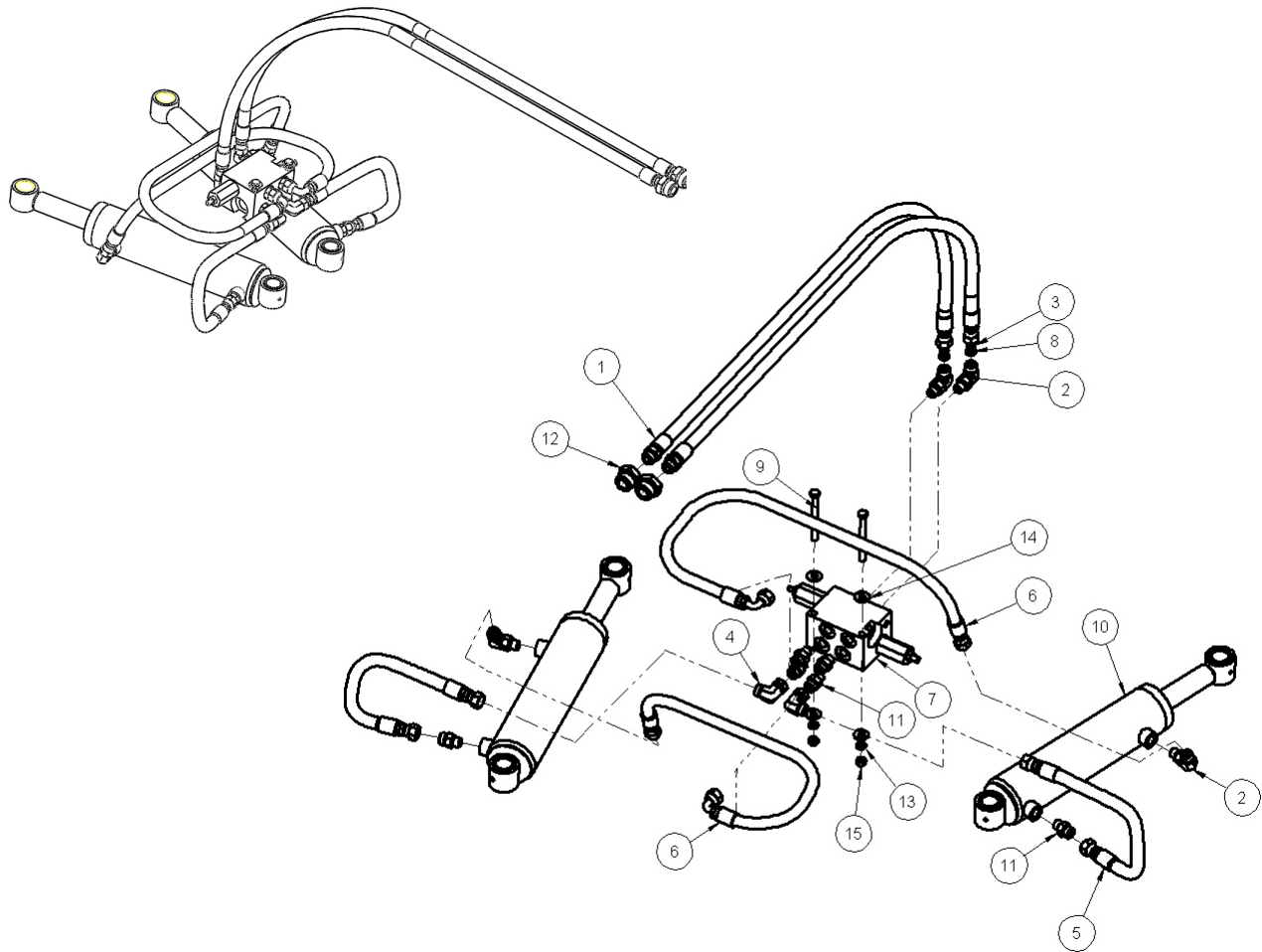


Item	Part	Qty	Description
1.	03-2092	2	Elbow, 90°, 6MB-6MF
2.	03-2278	4	Fitting, 6MF-8MB
3.	03-3515	2	Fitting, 12MB-8MF
4.	03-3537	2	O-Ring, #8 Face Seal
5.	03-4912	2	Hose, .38 x 72, 8FF-8FF45, 100R2
6.	03-6074	2	Plate, Orifice, #8, O-Ring Face Seal
7.	03-6244	4	Hose, .38 x 24, 6FF-6FF45, 3K
8.	03-6293	2	Fitting, Elbow, 45°, 8MB-8MF
9.	07-4032	6	Washer, Flat, Gr8, 1/4
10.	07-4033	2	Nut, Hex, nylock, 1/4-20, Gr8
11.	07-7737	1	Wire, Harness, 108 inches
12.	19687	1	Valve, Electro-Hydraulic Selector
13.	88921	2	Cylinder Assembly
14.	LAF4229	2	Fitting, 6MB-6MF
15.	RHW1043	2	Screw, HHC, .25-20 x 2.5, Gr8



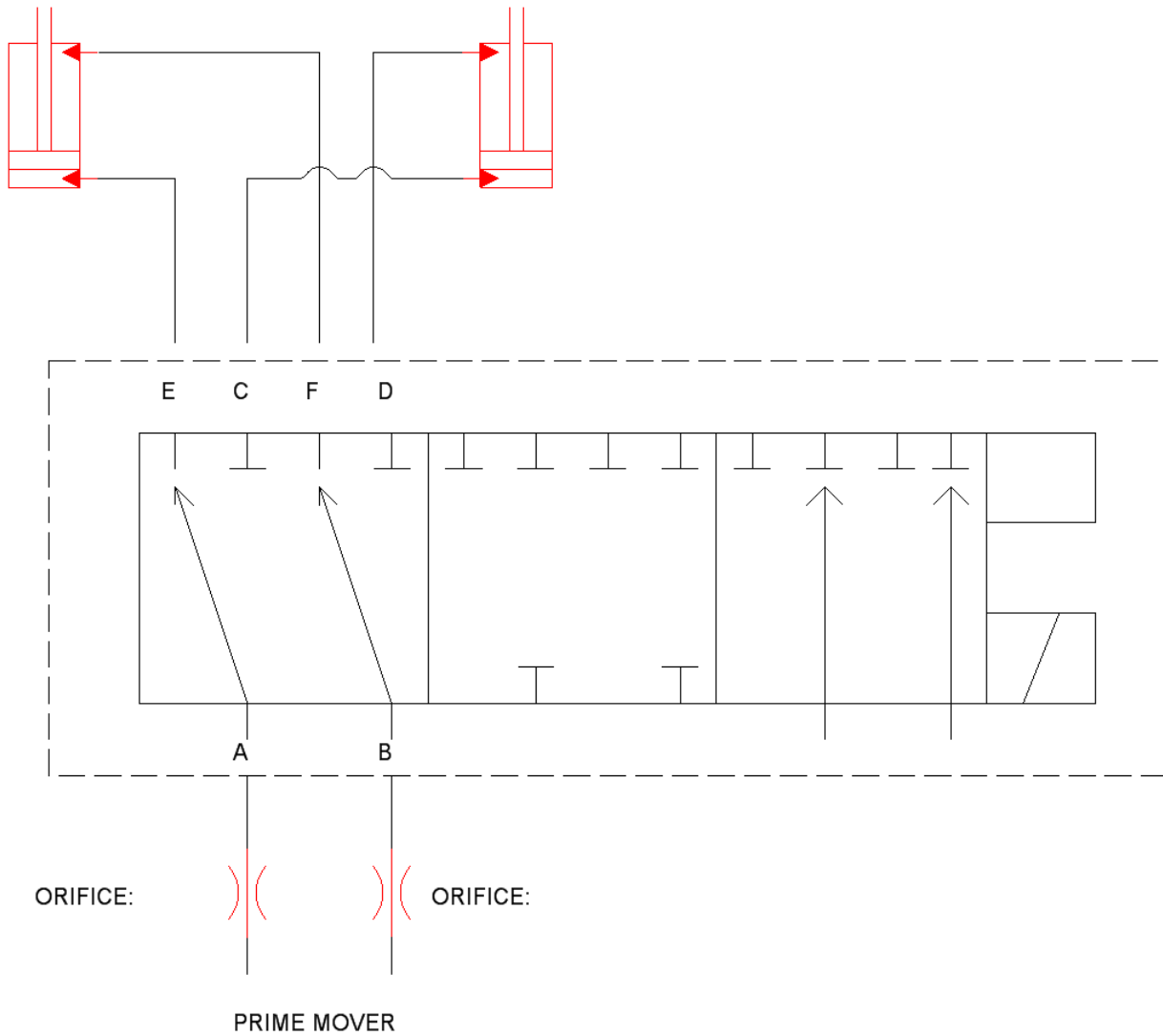
HOSE ASSEMBLY

Hydraulic Hose Routings

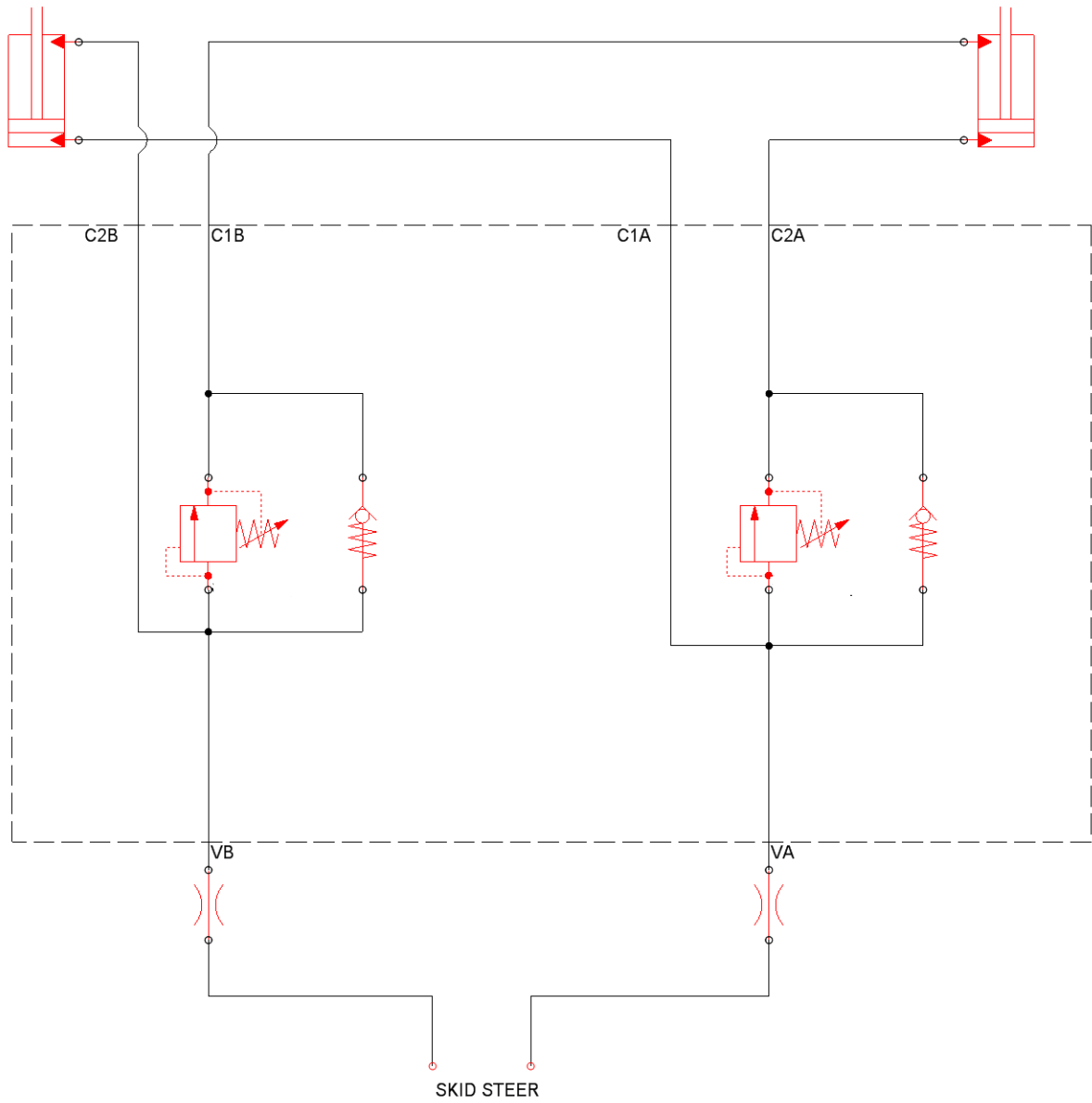


Item	Part	Qty	Description
1.	03-10111	2	Hose, .38 x 78, 6FF-8MB, 100R2
2.	03-2092	4	Elbow, 90°, 6MB-6MF
3.	03-3573	2	O-Ring, Face Seal, 3/8, SAE #6
4.	03-3689	2	Elbow, 90°, 6FF-6MF
5.	03-4704	2	Hose, .38 x 27, 6FF-6FF, 3K
6.	03-5236	2	Hose, .38 x 42, 6FF-6FF90, 3K
7.	03-5903	1	Manifold
8.	03-6248	2	Plate, Hydraulic, Orifice, #6 ORFS
9.	07-3652	2	Screw, HHC, Gr8, 5/16-18 x 3 1/2
10.	88921	2	Cylinder Assembly
11.	LAF4229	6	Fitting, 6MB-6MF
12.	LAF4271	2	Fitting, 8FB-12MB
13.	P851105	2	Washer, Lock, 5/16
14.	RHW5162	4	Washer, Flat, .31, Gr5
15.	RHW7101	2	Nut, Hex, .31-18, Gr5

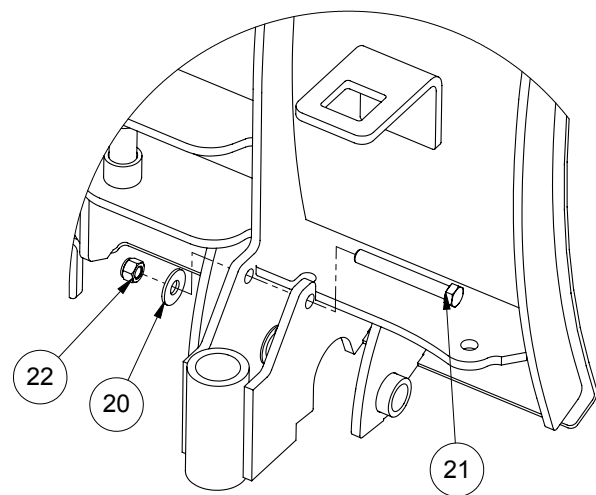
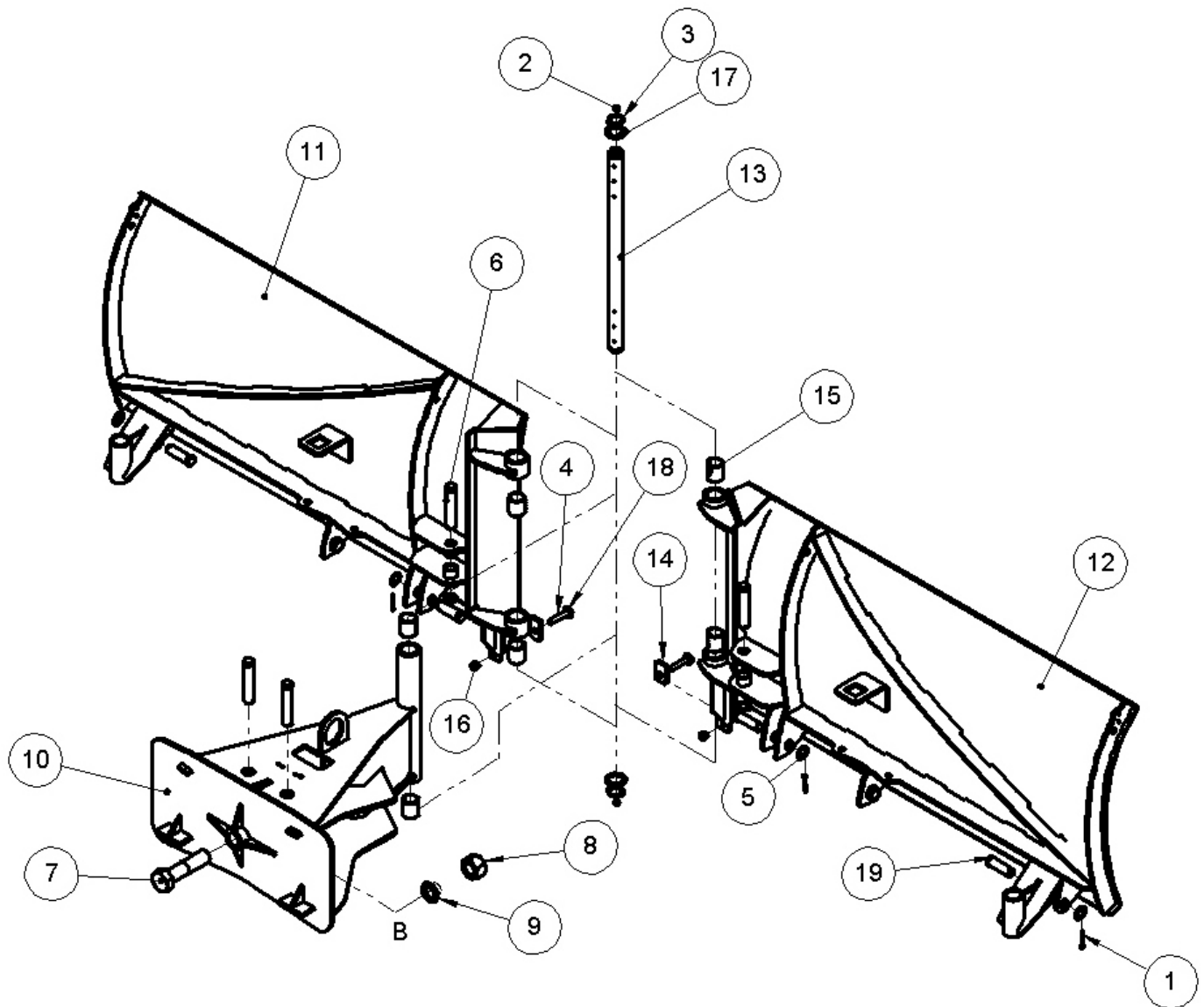
HYDRAULIC/ELECTRIC MANIFOLD SCHEMATIC



HYDRAULIC MANIFOLD SCHEMATIC



MOLDBOARD ASSEMBLY

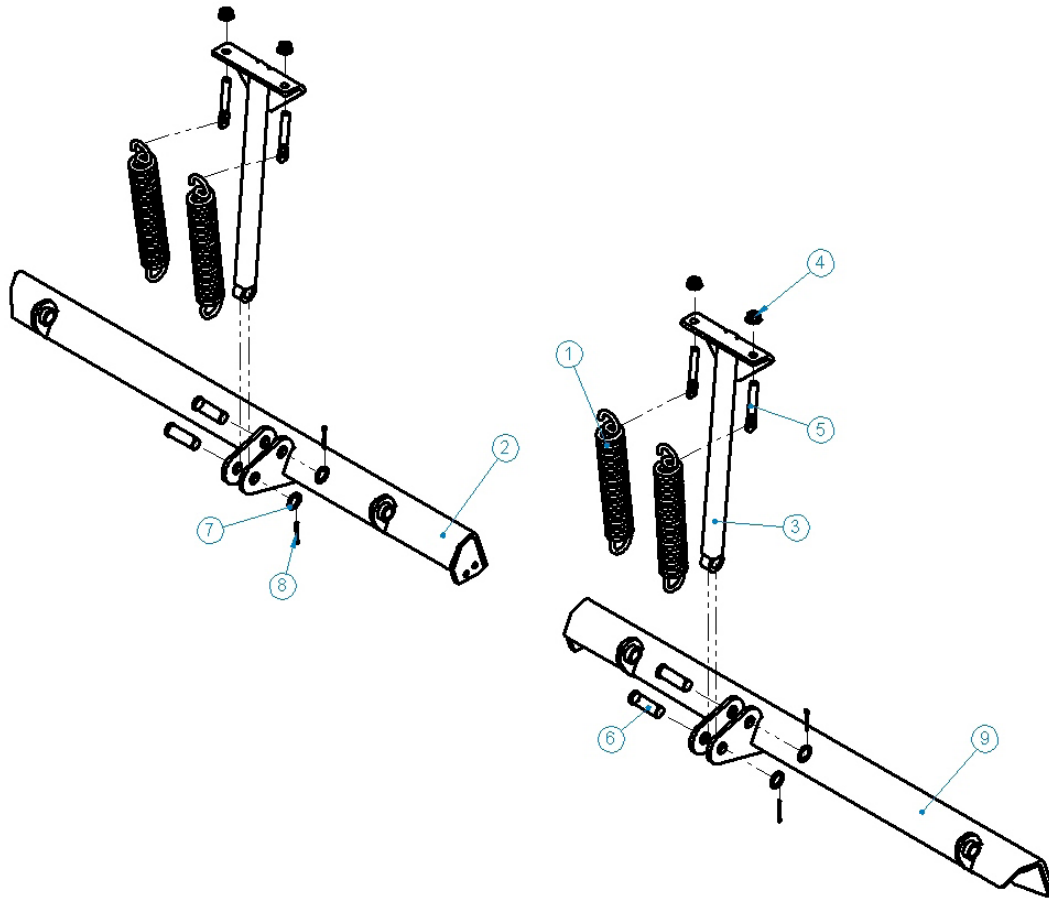


4 ft Only

MOLDBOARD ASSEMBLY

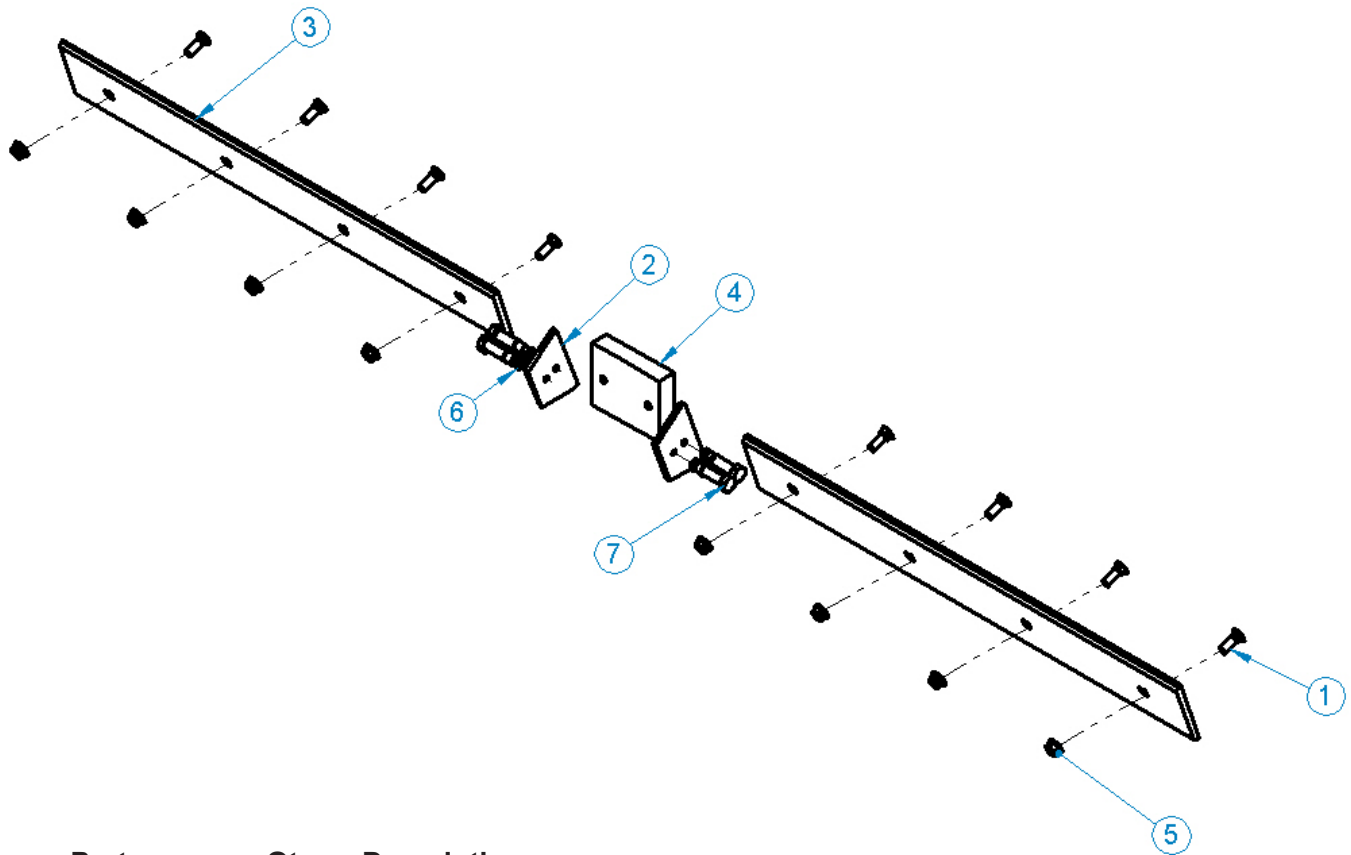
Item	Part	Qty	Description
1.	07-0206	6	Pin, Cotter, Gr2, 3/16 x 2 (4,5 ft)
	07-0206	8	Pin, Cotter, Gr2, 3/16 x 2 (6,7,8,9,10 ft)
2.	07-0223	2	Fitting, Zerk, 1/8NPT
3.	07-3268	2	Snap Ring
4.	07-3674	2	Screw, HHC, Gr8, 1/2-13 x 2 3/4
5.	07-4090	6	Washer, 1 1/2 x 1 x .075 (4,5 ft)
	07-4090	8	Washer, 1 1/2 x 1 x .075 (6,7,8,9,10 ft)
6.	07-6889	4	Pin, Clevis, 1 x 5, 4.7 Grip
7.	07-7838	1	Screw, HHC, Gr8, 1 1/2-6 x 6
8.	07-8083	1	Nut, Gr8, 1 1/2-6
9.	07-8084	1	Washer, Lock, Disk, 1 1/2
10.	13-17420	1	Pivoting Assembly
11.	13-17426-50	1	Weld, Left, Moldboard (4 ft)
	13-17426-60	1	Weld, Left, Moldboard (5 ft)
	13-17426-72	1	Weld, Left, Moldboard (6 ft)
	13-17426-84	1	Weld, Left, Moldboard (7 ft)
	13-17426-96	1	Weld, Left, Moldboard (8 ft)
	13-17426-108	1	Weld, Left, Moldboard (9 ft)
	13-17426-120	1	Weld, Left, Moldboard (10 ft)
12.	13-17430-50	1	Weld, Right, Moldboard (4 ft)
	13-17430-60	1	Weld, Right, Moldboard (5 ft)
	13-17430-72	1	Weld, Right, Moldboard (6 ft)
	13-17430-84	1	Weld, Right, Moldboard (7 ft)
	13-17430-96	1	Weld, Right, Moldboard (8 ft)
	13-17430-108	1	Weld, Right, Moldboard (9 ft)
	13-17430-120	1	Weld, Right, Moldboard (10 ft)
13.	13-17442	1	Shaft, 1.5 x 27.125
14.	13-17662	2	Plate, 3/8 x 2 x 3.5, with Hole
15.	LAF9602	6	Spring Bushing/Bearing, 1.75 x 1/8 x 2
16.	P158005	2	Nut, Nylock, 1/2-13
17.	P855324	2	Bushing, Machine, 1-1/2 x 14ga
18.	RHW5532	2	Washer, Flat, 9/16, Gr5
19.	RHW8222	2	Pin, Clevis, 1 x 3 (4,5 ft)
	RHW8222	4	Pin, Clevis, 1 x 3 (6,7,8,9,10 ft)
20.	07-0156	2	Washer, Flat, Gr8, 1/2
21.	07-2360	2	Screw, HHC, Gr8, 1/2-13 x 4
22.	07-4037	2	Nut, Hex, Nylock, Gr8, 1/2-13

TRIP EDGE ASSEMBLY



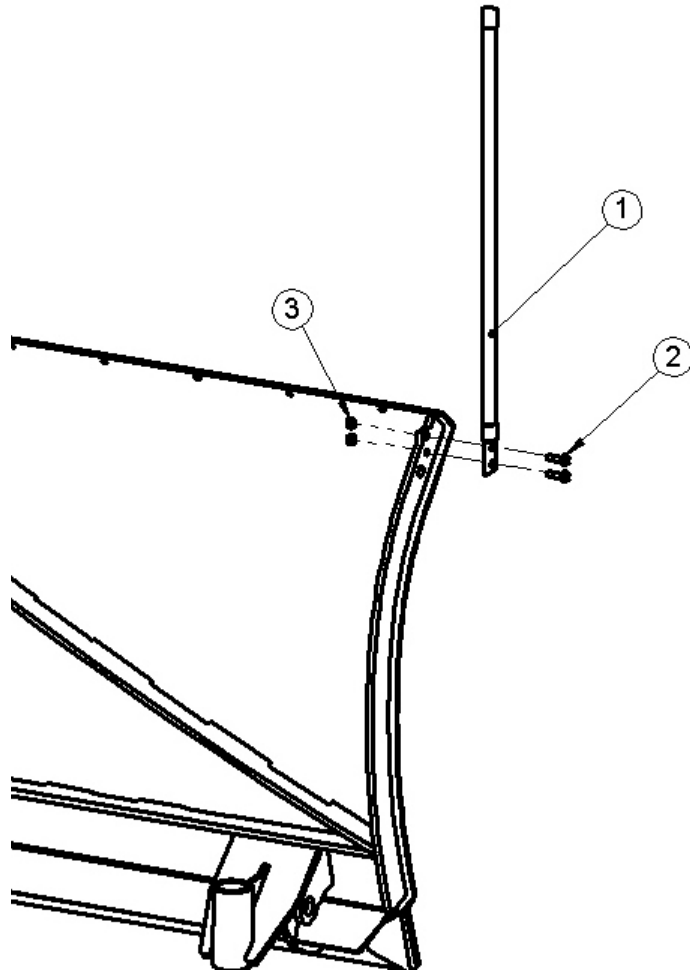
Item	Part	Qty	Description
1.	LAF6405	4	Trip Spring, .393 x 14 x (26.25)
2.	13-17406-50	1	Weld, Left, Trip Edge (4 ft)
	13-17406-60	1	Weld, Left, Trip Edge (5 ft)
	13-17406-72	1	Weld, Left, Trip Edge (6 ft)
	13-17406-84	1	Weld, Left, Trip Edge (7 ft)
	13-17406-96	1	Weld, Left, Trip Edge (8 ft)
	13-17406-108	1	Weld, Left, Trip Edge (9 ft)
	13-17406-120	1	Weld, Left, Trip Edge (10 ft)
3.	13-51846	2	Weld, Trip Spring Arm
4.	RHW7607	4	Nut, Flange, Top Lock, .63-11, Gr8
5.	RHW8065	4	Bolt, Spade, .62 x 3.25
6.	RHW8222	4	Pin, Clevis, 1 x 3
7.	07-4090	4	Washer, 1 1/2 x 1 x .075
8.	07-0206	4	Pin, Cotter, Gr2, 3/16 x 2
9.	13-17411-50	1	Weld, Right, Trip Edge (4 ft)
	13-17411-60	1	Weld, Right, Trip Edge (5 ft)
	13-17411-72	1	Weld, Right, Trip Edge (6 ft)
	13-17411-84	1	Weld, Right, Trip Edge (7 ft)
	13-17411-96	1	Weld, Right, Trip Edge (8 ft)
	13-17411-108	1	Weld, Right, Trip Edge (9 ft)
	13-17411-120	1	Weld, Right, Trip Edge (10 ft)

STEEL WEAR EDGE ASSEMBLY



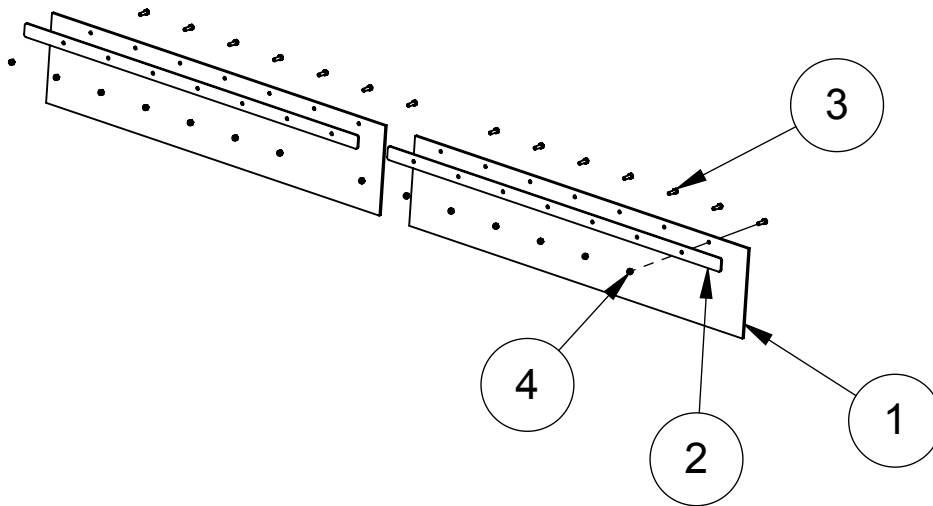
Item	Part	Qty	Description
1.	RHW2663	4	Bolt, Plow, .63-11 x 1.75, Gr8 (4,5 ft)
	RHW2663	6	Bolt, Plow, .63-11 x 1.75, Gr8 (6,7 ft)
	RHW2663	8	Bolt, Plow, .63-11 x 1.75, Gr8 (8,9 ft)
	RHW2663	10	Bolt, Plow, .63-11 x 1.75, Gr8 (10 ft)
2.	13-17488	2	Plate, 3/8 x 3.5 x 6.36
3.	13-17412-50	2	Wear Edge, 6 x .5 (4 ft)
	13-17412-60	2	Wear Edge, 6 x .5 (5 ft)
	13-17412-72	2	Wear Edge, 6 x .5 (6 ft)
	13-17412-84	2	Wear Edge, 6 x .5 (7 ft)
	13-17412-96	2	Wear Edge, 6 x .5 (8 ft)
	13-17412-108	2	Wear Edge, 6 x .5 (9 ft)
	13-17412-120	2	Wear Edge, 6 x .5 (10 ft)
4.	07-7837	1	Rubber, 6.9 x 5.5, with Holes
5.	RHW7607	4	Nut, Flange, Top Lock, .63-11, Gr8 (4,5 ft)
	RHW7607	6	Nut, Flange, Top Lock, .63-11, Gr8 (6,7 ft)
	RHW7607	8	Nut, Flange, Top Lock, .63-11, Gr8 (8,9 ft)
	RHW7607	10	Nut, Flange, Top Lock, .63-11, Gr8 (10 ft)
6.	P851108	8	Washer, Lock, 1/2
7.	P100804	4	Screw, HHC, 1/2-13 x 1, Gr5

OPTIONAL MARKER KIT



Item	Part	Qty	Description
1.	103066	2	Marker, Orange, 28 inches
2.	RHW1105	4	Screw, HHC, Gr5, .31-18 x 1
3.	RHW7103	4	Nut, Lock, Gr5, .31-18

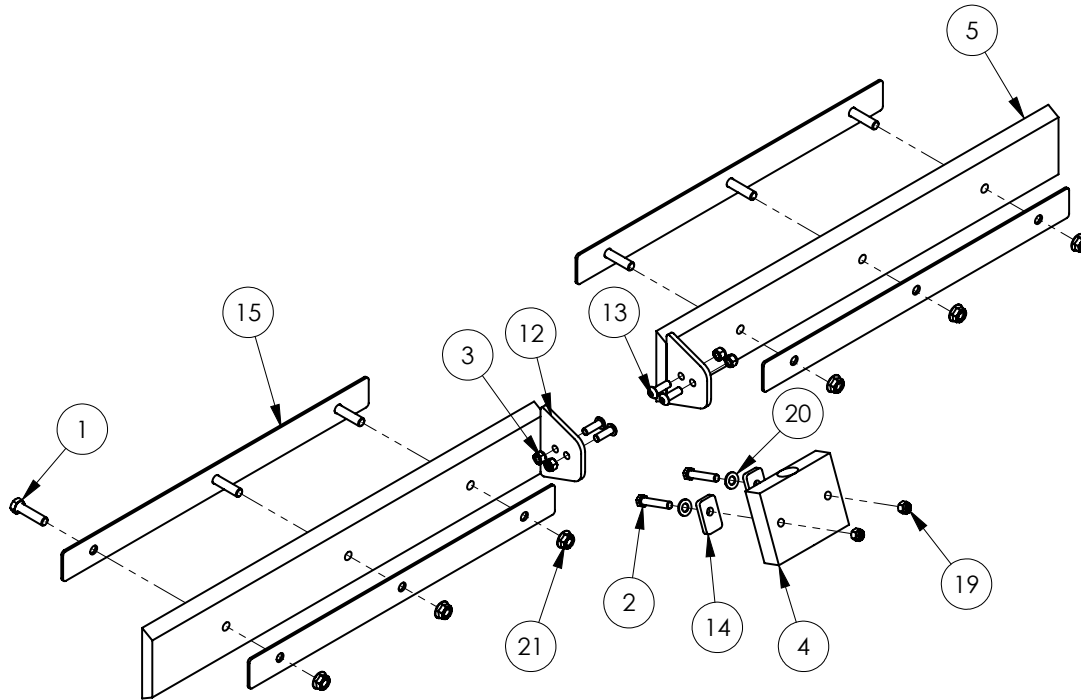
OPTIONAL DEFLECTOR KIT



NOTE: SHORTER DIMENSION IS TOWARDS CENTER OF V-BLADE

Item	Part	Qty	Description
1.	13-17805-50	2	Deflector, Rubber, 2 Ply, 1/4 x 10 x 21.75 (4ft)
	13-17805-60	2	Deflector, Rubber, 2 Ply, 1/4 x 10 x 26.75 (5ft)
	13-17805-72	2	Deflector, Rubber, 2 Ply, 1/4 x 10 x 32.75 (6ft)
	13-17805-84	2	Deflector, Rubber, 2 Ply, 1/4 x 10 x 38.75 (7ft)
	13-17805-96	2	Deflector, Rubber, 2 Ply, 1/4 x 10 x 44.75 (8ft)
	13-17805-108	2	Deflector, Rubber, 2 Ply, 1/4 x 10 x 50.75 (9ft)
	13-17805-120	2	Deflector, Rubber, 2 Ply, 1/4 x 10 x 56.75 (10ft)
2.	13-17806-50	2	Plate, 7ga x 1.5 x 21.75, Deflector Retainer (4ft)
	13-17806-60	2	Plate, 7ga x 1.5 x 26.75, Deflector Retainer (5ft)
	13-17806-72	2	Plate, 7ga x 1.5 x 32.75, Deflector Retainer (6ft)
	13-17806-84	2	Plate, 7ga x 1.5 x 38.75, Deflector Retainer (7ft)
	13-17806-96	2	Plate, 7ga x 1.5 x 44.75, Deflector Retainer (8ft)
	13-17806-108	2	Plate, 7ga x 1.5 x 50.75, Deflector Retainer (9ft)
	13-17806-120	2	Plate, 7ga x 1.5 x 56.75, Deflector Retainer (10ft)
3.	RHW1105	6	Screw, HHC, Gr5, .31-18 x 1 (4ft)
	RHW1105	8	Screw, HHC, Gr5, .31-18 x 1 (5ft)
	RHW1105	10	Screw, HHC, Gr5, .31-18 x 1 (6ft)
	RHW1105	12	Screw, HHC, Gr5, .31-18 x 1 (7ft)
	RHW1105	14	Screw, HHC, Gr5, .31-18 x 1 (8ft)
	RHW1105	16	Screw, HHC, Gr5, .31-18 x 1 (9ft)
	RHW1105	18	Screw, HHC, Gr5, .31-18 x 1 (10ft)
4.	07-3270	6	Nut, Hex, Nylock, Gr8, 5/16-18 (4ft)
	07-3270	8	Nut, Hex, Nylock, Gr8, 5/16-18 (5ft)
	07-3270	10	Nut, Hex, Nylock, Gr8, 5/16-18 (6ft)
	07-3270	12	Nut, Hex, Nylock, Gr8, 5/16-18 (7ft)
	07-3270	14	Nut, Hex, Nylock, Gr8, 5/16-18 (8ft)
	07-3270	16	Nut, Hex, Nylock, Gr8, 5/16-18 (9ft)
	07-3270	18	Nut, Hex, Nylock, Gr8, 5/16-18 (10ft)

OPTIONAL POLYURETHANE EDGE KIT

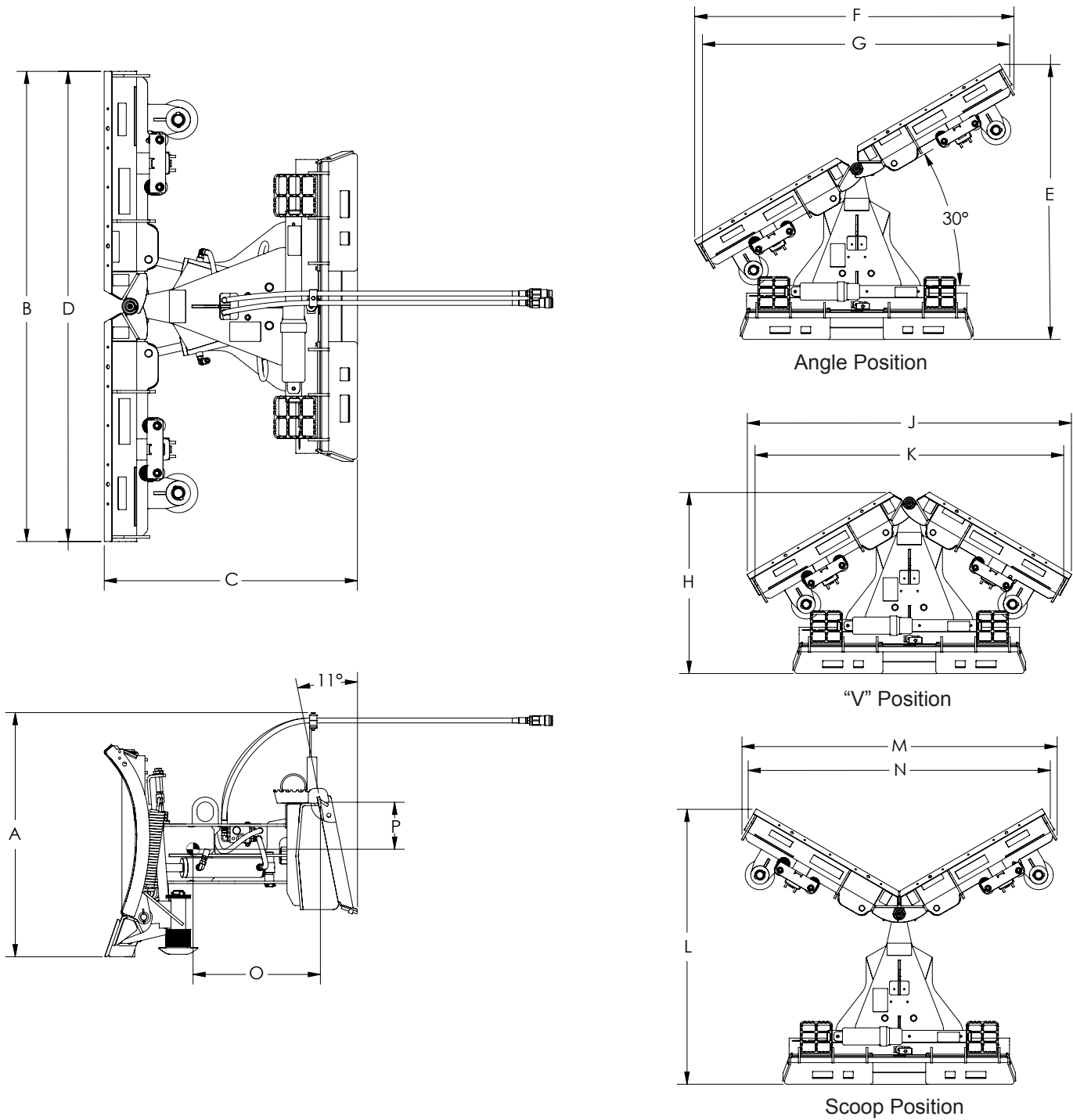


Item	Part	Qty	Description
1.	07-2855	4	Screw, HHC, Gr8, 5/8-11 x 2 1/2 (4,5ft)
	07-2855	6	Screw, HHC, Gr8, 5/8-11 x 2 1/2 (6,7ft)
	07-2855	8	Screw, HHC, Gr8, 5/8-11 x 2 1/2 (8,9ft)
	07-2855	10	Screw, HHC, Gr8, 5/8-11 x 2 1/2 (10ft)
2.	07-3674	2	Screw, HHC, Gr8, 1/2-13 x 2 3/4
3.	07-4037	4	Nut, Hex, Nylock, Gr8, 1/2-13
4.	07-7837	1	Rubber Center Filler
5.	07-7889-50	2	Poly Edge, 50 inches (4ft)
	07-7889-60	2	Poly Edge, 60 inches (5ft)
	07-7889-72	2	Poly Edge, 72 inches (6ft)
	07-7889-84	2	Poly Edge, 84 inches (7ft)
	07-7889-96	2	Poly Edge, 96 inches (8ft)
	07-7889-108	2	Poly Edge, 108 inches (9ft)
	07-7889-120	2	Poly Edge, 120 inches (10ft)
12.	07-7925	2	Poly Side Plate
13.	07-8074	4	Screw, BHC, Gr8, 1/2-13 x 1 1/2
14.	13-17662	2	Plate, 3/8 x 2.5 x 1.5 with Hole
15.	13-18037-20	4	Plate, 20 inch Spacer (4,5 ft)
	13-18037-30	4	Plate, 30 inch Spacer (6,7ft)
	13-18037-42	4	Plate, 42 inch Spacer (8,9ft)
	13-18037-48	4	Plate, 48 inch Spacer (10ft)
19.	P158005	2	Nut, Nylock, 1/2-13
20.	RHW5532	2	Washer, Flat, Gr5, SAE, .56
21.	RHW7607	4	Nut, Top Lock Flange, Gr8, .63-11 (4,5ft)
	RHW7607	6	Nut, Top Lock Flange, Gr8, .63-11 (6,7ft)
	RHW7607	8	Nut, Top Lock Flange, Gr8, .63-11 (8,9ft)
	RHW7607	10	Nut, Top Lock Flange, Gr8, .63-11 (10ft)

Notes

PRODUCT SPECIFICATIONS

Specifications and Model Views



PRODUCT SPECIFICATIONS

	50 inch	60 inch	72 inch	84 inch	96 inch	108 inch	120 inch
A. Overall Height	37.4 inches						
B. Overall Width Straight Position	50 inches	60 inches	72 inches	84 inches	96 inches	108 inches	120 inches
C. Overall Length Straight Position	38.8 inches						
D. Cutting Width Straight Position	50 inches	60 inches	72 inches	84 inches	96 inches	108 inches	120 inches
E. Overall Length Angled Position	50.7 inches	53.3 inches	56.3 inches	59.3 inches	62.3 inches	65.3 inches	68.3 inches
F. Overall Width Angled Position	46.5 inches	54.9 inches	65.3 inches	75.8 inches	86.1 inches	96.6 inches	107 inches
G. Cutting Width Angled Position	43.3 inches	51.9 inches	62.3 inches	72.7 inches	83.1 inches	93.5 inches	103.9 inches
H. Overall Length V Position	37 inches						38 inches
J. Overall Width V Position	47.5 inches	55.9 inches	66.6 inches	76.7 inches	87.1 inches	97.5 inches	107.9 inches
K. Cutting Width V Position	47.1 inches	55.7 inches	66.2 inches	76.5 inches	87 inches	97.3 inches	107.7 inches
L. Overall Length Scoop Position	50.7 inches	53.3 inches	56.3 inches	59.3 inches	62.3 inches	65.3 inches	68.3 inches
M. Overall Width Scoop Position	45.4 inches	54.1 inches	64.5 inches	74.9 inches	85.3 inches	95.7 inches	106.1 inches
N. Cutting Width Scoop Position	39.4 inches	48 inches	58.4 inches	68.8 inches	79.2 inches	89.6 inches	100 inches
O. Center of Gravity - Horizontal	16.7 inches	17.2 inches	17.9 inches	18.6 inches	19 inches	19.5 inches	19.9 inches
Center of Gravity - Vertical	9.3 inches	9.5 inches	9.7 inches	9.7 inches	9.9 inches	9.9 inches	10.1 inches
Weight	850 lbs	880 lbs	935 lbs	990 lbs	1035 lbs	1080 lbs	1130 lbs
Maximum Angle	30 Degrees						

Prime Mover Specifications

DESCRIPTION	SPECIFICATIONS
Weight of Primer Mover without Blade Attachment	13,230 lbs maximum
Hydraulic Pressure Output	3,500 psi Maximum
Rear Ballast	As required to maintain full product stability. (Note the shipping weight on the product specification page, then see the operator's manual(s) for your primer mover, loader and quick attach for your ballasting needs.)

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	GRADE 2  GRADE 5  GRADE 8 
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	

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.		
		

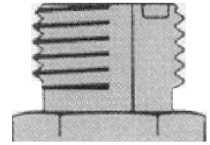
Size of Bolt	Grade No.	Pitch (mm)	Pounds Feet	Newton-Meters	Pitch (mm)	Pounds Feet	Newton-Meters
M6	5.6	1.0	3.6-5.8	4.9-7.9	-	-	-
	8.8		5.8-4	7.9-12.7		-	-
	10.9		7.2-10	9.8-13.6		-	-
M8	5.6	1.25	7.2-14	9.8-19	1.0	12-17	16.3-23
	8.8		17-22	23-29.8		19-27	25.7-36.6
	10.9		20-26	27.1-35.2		22-31	29.8-42
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

NOTE - Nylock nuts are utilized when greater resistance to vibrating loose is required, and greater operating temperatures are not a factor. In addition, like lock nuts, nylock nuts have a safety feature that if the bolt does vibrate loose, the nut will remain on the screw. Install nylock nuts to the standard torque shown above.

HYDRAULIC TORQUE SPECIFICATIONS

Face Seal: Assembly, Tube to Fitting

NOTICE - *Face seal fittings have the most reliable sealing method and therefore, should be used whenever possible.*



Installation

1. Make sure threads and sealing surfaces are free of burrs, nicks, scratches, or foreign materials.
2. Install proper SAE O-ring to end of fitting if not already installed. Ensure O-ring is fully seated and retained properly.
3. Lubricate O-ring with a light coating of clean hydraulic oil.
4. Position tube and nut squarely on face seal of fitting and tighten nut finger tight.
5. Using appropriate torquing device, tighten to given torque rating from the table below.

Torque Values

SAE Dash Size	Tube Side Thread Size	In-lbs	Ft-lbs
-4	9/16 - 18	220 ± 10	18 ± 1
-6	11/16 - 16	320 ± 25	27 ± 2
-8	13/16 - 16	480 ± 25	40 ± 2
-10	1 - 14	750 ± 35	63 ± 3
-12	1 3/16 - 12	1080 ± 45	90 ± 4
-16	1 7/16 - 12	1440 ± 90	120 ± 8
-20	1 11/16 - 12	1680 ± 90	140 ± 8
-24	2 - 12	1980 ± 100	165 ± 8

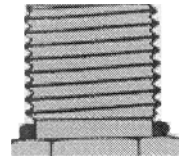
NOTE - ft-lb may be converted to Newton Meters by multiplying by 1.35582.

NOTE - in-lbs may be converted to Newton Meters by multiplying by 0.11298.

HYDRAULIC TORQUE SPECIFICATIONS

Straight Thread O-ring Fitting: Assembly, Fitting to Port

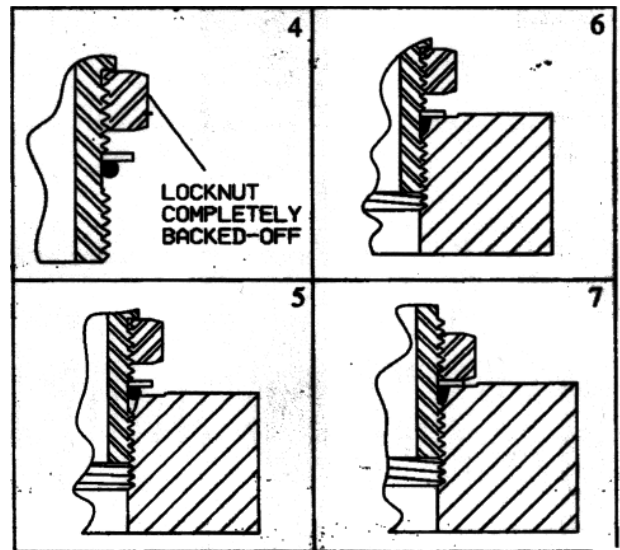
NOTE - Straight thread o-ring fittings are utilized to adapt hydraulic systems to motors, pumps, cylinders, and valves.



Installation (Adjustable Fitting)

1. Make sure threads and sealing surfaces are free of burrs, nicks, scratches, or any foreign materials.
2. Install proper SAE O-ring on port end of fitting if not already installed. Ensure O-ring is fully seated and retained properly.
3. Lubricate O-ring with a light coating of clean hydraulic oil.
4. Back off nut as far as possible and push washer up as far as possible. (figure 4 & 5)
5. Screw fitting into port. Hand tighten fitting until backup washer contacts face of port. (figure 6)
6. To position the fitting, unscrew to desired position, but not more than one full turn.
7. Hold fitting in position with wrench. Using appropriate torquing device, tighten nut to given torque rating from table. (figure 7)

Fitting Size	SAE Port Thread Size	In-lbs	Ft-lbs
-4	7/16 - 20	190 ± 10	16 ± 1
-6	9/16 - 18	420 ± 15	35 ± 1
-8	3/4 - 14	720 ± 25	60 ± 2
-10	7/8 - 14	1260 ± 50	105 ± 5
-12	1 1/16 - 12	1680 ± 75	140 ± 6
-16	1 5/16 - 12	2520 ± 100	210 ± 8
-20	1 5/8 - 12	3100 ± 150	260 ± 12
-24	1 7/8 - 12	3800 ± 150	315 ± 12



NOTE - ft-lb may be converted to Newton Meters by multiplying by 1.35582.

NOTE - in-lbs may be converted to Newton Meters by multiplying by 0.11298.

WARRANTY

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 Construction¹, 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.

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