



**SPARTAN
EQUIPMENT®**

OPERATOR'S MANUAL

COLD PLANER SERIES II High Flow Planers



SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: MR25664
Models: SELAF5416, SELAF5418,
SELAF5420, SELAF5424,
SELAF5430 & SELAF5436
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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.

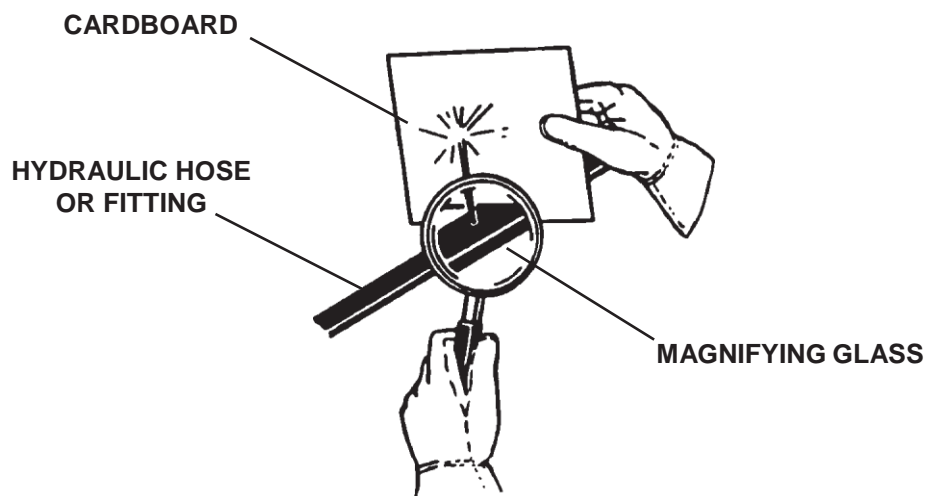
WARNING!



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 ATTACHMENT

- Block off work area from bystanders, livestock, etc.
- Operate only from the operator's station.
- Reduce speed when driving over rough terrain, on a slope, or turning, to avoid overturning the vehicle.
- An operator must not use drugs or alcohol, which can change his or her alertness or coordination. An operator taking prescription or over-the-counter drugs should seek medical advice on whether or not he or she can safely operate equipment.
- Before exiting the prime mover, lower the attachment to the ground, turn off the prime mover's engine, remove the key and apply the brakes.
- Be sure all doors, guards and shields are in their proper position and securely attached before operating the planer.

EQUIPMENT SAFETY PRECAUTIONS



TRANSPORTING THE PLANER

- Travel only with the attachment in a safe transport position to prevent uncontrolled movement. Drive slowly over rough ground and on slopes.
- When transporting on a trailer: Secure attachment at recommended tie down locations using tie down accessories that are capable of maintaining attachment stability.
- When driving on public roads use safety lights, reflectors, Slow Moving Vehicle signs etc., to prevent accidents. Check local government regulations that may affect you.
- Do not drive close to ditches, excavations, etc., cave in could result.
- Do not smoke when refueling the prime mover. Allow room in the fuel tank for expansion. Wipe up any spilled fuel. Secure cap tightly when done.



MAINTAINING THE PLANER

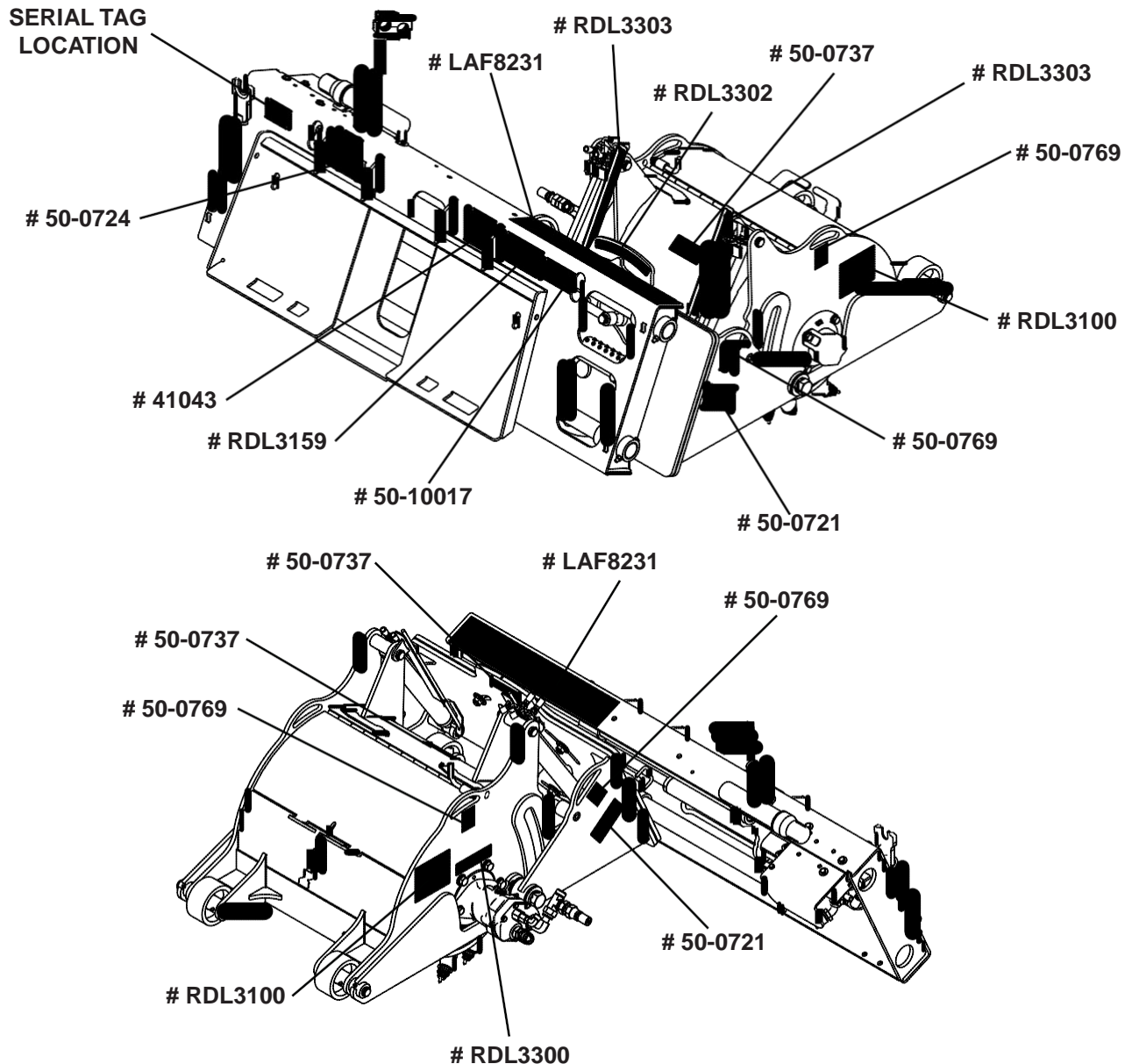
- Before performing maintenance, lower the attachment to the ground, turn off the engine, remove the key and apply the brakes.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator service manual's before any repair is made. After completing maintenance or repair, check for correct functioning of the attachment. If not functioning properly, always tag "DO NOT OPERATE" until all problems are corrected.
- Worn, damaged, or illegible safety decals must be replaced. New safety decals can be ordered from PALADIN.
- Never make hydraulic repairs while the system is under pressure. Serious personal injury or death could result.
- Never work under a raised attachment.
- Do not use blocking made of concrete blocks, logs, buckets, barrels or any other material that could suddenly collapse or shift positions. Do not use wood or steel blocking that shows any signs of material decay. Do not use blocking that is warped, twisted, or tapered.
- If the attachment must be raised, block the machine with blocks or jackstands, NOT lift jacks or hoists. Always block the rear wheels of the planer in a manner that stabilizes the frame.
- The mounting frame and the planer frame pivot freely. Do not place any part of your body between these areas or under this product without stabilizing this pivot point.

DECALS

DECAL PLACEMENT

GENERAL INFORMATION

The diagrams on this page show 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 DECALS



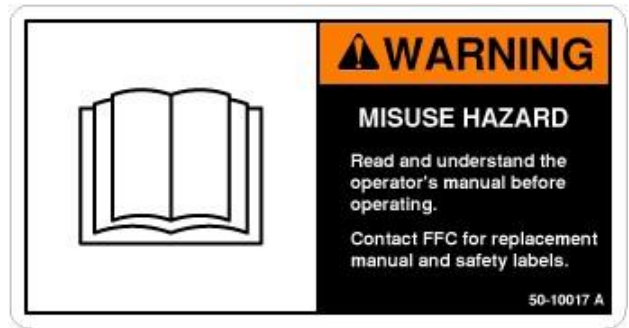
41043 WARNING! HAZARDOUS DUST



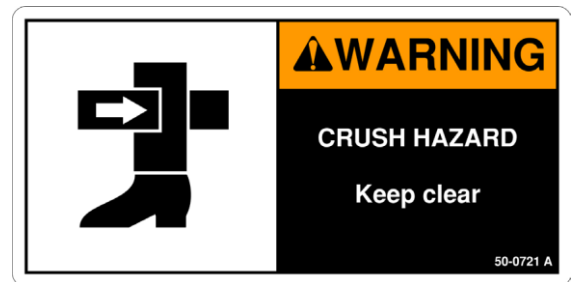
RDL3100 WARNING! STAND CLEAR



RDL3159 CAUTION! FLYING DEBRIS



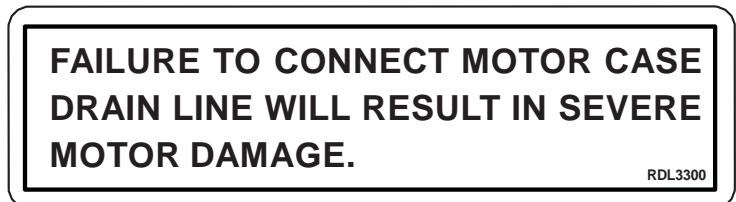
50-10017 WARNING! READ MANUAL



50-0721 WARNING! CRUSH HAZARD

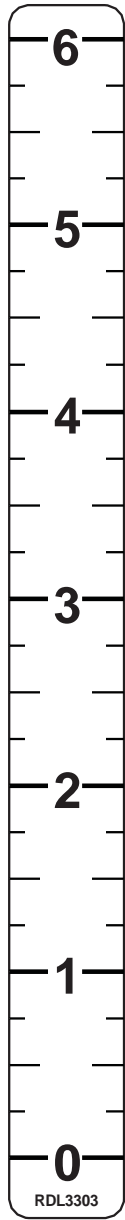


50-0737 WARNING! PINCH POINT

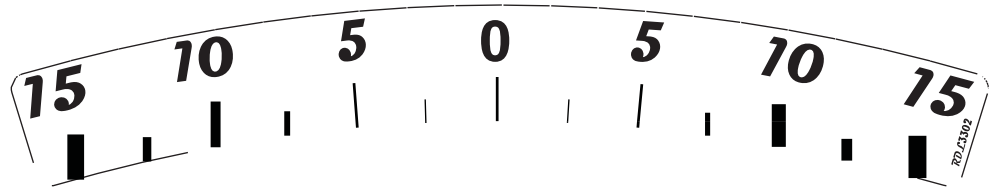


RDL3300 CASE DRAIN

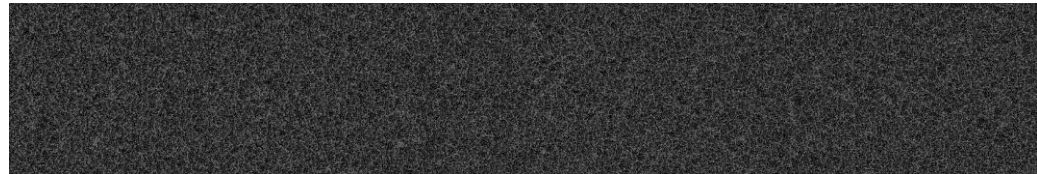
DECALS



RDL3303 DEPTH SCALE



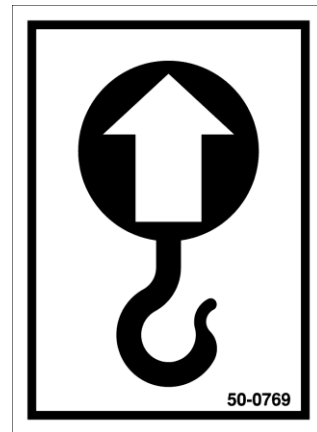
RDL3302 TILT INDICATOR



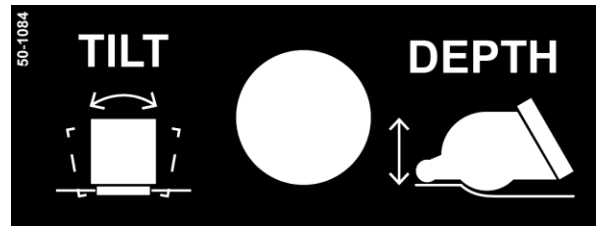
LAF8231 NON-SKID TAPE



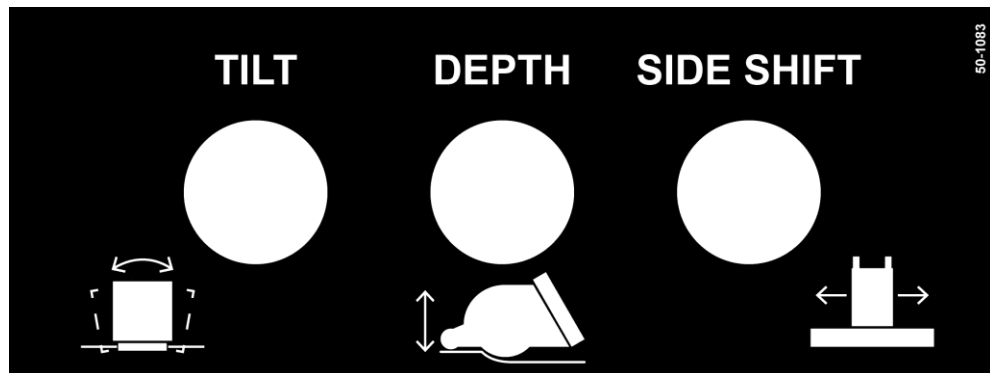
50-0724 WARNING! HIGH PRESSURE FLUID



50-0769 LIFT POINT



50-1084 CONTROL BOX: 5-LINE (LOCATED ON CONTROL BOX, IF SO EQUIPPED)



50-1083 CONTROL BOX: 3-LINE (LOCATED ON CONTROL BOX, IF SO EQUIPPED)

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

PREOPERATION

SKID STEER

The SPARTAN EQUIPMENT Series II High Flow Cold Planers are designed for use on high flow prime movers. Cold planer and prime mover compatibility is determined by the recommended lifting capacity and hydraulic output of your prime mover.

WARNING! Do NOT attach or operate any attachment that exceeds the recommended



lifting capacity of your prime mover.

Prime movers **MUST** be equipped with high flow auxiliary boom hydraulics, case drain and either a Paladin electrical control box assembly or an auxiliary electrical connector on the front of the prime mover.

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



This attachment is designed to plane (mill) rock, concrete and asphalt, causing high levels of dust. It is recommended to use dust suppression, dust collection and if necessary personal protective equipment during the operation of the planer or of any attachment that may cause high levels of dust!

IMPORTANT

Concrete and masonry products contain silica sand. Quartz, which is a form of silica and the most common mineral in the earth's crust, is associated with many types of rock.

Some activities that silica dust may be present in the air include demolition, sweeping, loading, sawing, hammering, drilling or planing of rock, concrete or masonry.

It is recommended to use dust suppression (such as water), dust collection (such as a vacuum) along with personal protective equipment if necessary during the operation of any attachment that may cause high levels of silica dust.

OPTIONS

Specialized Picks
2.5" (Slot Cutter) Drum
4.0" (Slot Cutter) Drum

Contact Dealer
#LAF5404-0000
#LAF5405-0000

INSTALLATION

GENERAL INFORMATION

The following instructions will help you to mount your planer onto your prime mover. The planer uses the quick-attach system for ease of installation. Therefore, if you know how to attach your loader bucket, attaching the cold planer should prove no problem.

Remember to read all safety warnings, decals and operating instructions before operating the attachment. If there is any portion of this manual that you do not understand, contact your dealer.

WARNING! THE HIGH FLOW PLANERS ARE DESIGNED FOR USE ON HIGH FLOW HYDRAULIC SYSTEMS. DO NOT ATTACH OR OPERATE ANY ATTACHMENT THAT EXCEEDS THE RECOMMENDED LIFTING CAPACITY OF YOUR PRIME MOVER.



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).**

INSTALLATION

NOTICE! Lubricate all grease fittings before connecting this product to your prime mover's hydraulic system. Refer to Lubrication section and follow the instructions.

1. Place this product on a firm, level surface that is large enough to safely accommodate this product, your prime mover and all workers involved in the mounting process.
2. Following all standard safety practices and the instructions for installing an attachment in your prime mover operator's manual, install the attachment onto your loader.

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



3. Relieve any pressure from the auxiliary hydraulic system. After making sure that there is not any foreign matter on the hydraulic couplers connect the case drain coupler to the case drain on your skid steer loader. NOTE: The case drain line must be connected first, then the power and return hoses. When disconnecting the hoses, it is recommended to disconnect the case drain line last.
4. Connect the power and return couplers to the high flow auxiliary hydraulic system of your skid steer loader. Route the hoses in such a fashion as to avoid pinching or chafing.

CAUTION! BE SURE CASE DRAIN COUPLER IS COMPLETELY ENGAGED. Immediate hydraulic motor seal failure and planetary damage will occur if case drain is not successfully connected.



INSTALLATION

5. Connect the electrical wire harness from the cold planer to the auxiliary electrical connector on the front of the skid steer (if so equipped). If your prime mover is not equipped with an electrical connector and you are using the Paladin control box see the following instructions for installing power to the control box and then connect the wiring harness from the planer to the control box located inside of the operator's station.
6. Cycle the hydraulic cylinders on this product several times from fully retracted to fully extended until all air has been completely removed from the cylinders.
7. Carefully raise the loader and cycle the tilt cylinders to check clearances and to verify that all mounting procedures have been successfully completed.

WARNING! Do not lock the auxiliary hydraulics of your prime mover in the "ON" position. Failure to obey this warning could result in death or serious injury.



ELECTRIC CONTROL BOX INSTALLATION

MATERIALS NEEDED: Nylon cable ties.

1. Attach the control box to a location convenient for the operator to control the planer without hindering operation of the prime mover. Use the magnet on the back of the control box to secure the control box with the toggle switches on top.

CAUTION! Failure to obey the following procedures may result in personal injury. To avoid electric shock during the wiring harness installation, remove the ground cable from the battery of your prime mover.



DANGER! BATTERY ACID CAUSES SEVERE BURNS. Batteries contain sulfuric acid. Avoid contact with skin, eyes or clothing. Antidote: EXTERNAL - flush with water. INTERNAL - drink large quantities of water or milk. Follow with milk of magnesia, beaten eggs or vegetable oil. Call physician immediately. EYES - flush with water for 15 minutes and get prompt medical attention.



WARNING! When working around batteries, remember that all of the exposed metal parts are "live". Never lay a metal object across the terminals because a spark or short circuit may result.



2. Disconnect the prime mover's battery.
3. Remove the nut from the positive cable clamp and slide the red (positive) wire ring terminal from the wiring harness over the cable clamp bolt. Secure the ring terminal with the nut.
4. Remove the nut from the negative cable clamp and slide the black (negative) wire ring terminal from the wiring harness over the cable clamp bolt.
5. Route & secure the wiring harness from the control box to the battery with nylon cable ties.

INSTALLATION

NOTICE! Route wires away from hot and/or moving parts to avoid wire damage.

6. Verify wiring is correct and reconnect the battery.
7. Feed the wiring harness cable from the control box to the rear of the prime mover, past the load arm's hinge point by following the hydraulic hoses where possible.
8. Continue routing down the loader arm, following the hydraulic hoses.
9. Secure the male connector to the hydraulic lines next to the quick couplers.
10. Straighten the cable and secure it to the hydraulic lines using nylon cable ties, working towards the rear.
11. Secure the cable to the prime mover below the hinge point and back to the control box.

NOTICE! Ensure there is sufficient slack in the cable to allow for a full range of motion of the loader arms.

12. Connect the female electrical connector from the attachment to the male connector on the prime mover.

DETACHING

1. Center the planer on the sideshift frame.
2. Adjust depth and tilt setting to "0".
3. Set cold planer on a firm level surface.
4. 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.
5. Follow prime mover operator's manual to relieve pressure in the hydraulic lines.
6. Disconnect the power, return & case drain hoses from the auxiliary hydraulics; disconnecting the case drain last.
7. Disconnect the electrical wire harness from the auxiliary electrical connector or Paladin control box and after turning the ball valve to the shut off position, disconnect the water line at the couplers.
8. Following all standard safety practices & the instructions for disconnecting an attachment in your prime mover operator's manual, disconnect the planer from your prime mover.
9. 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.

OPERATION

INTENDED USE:

The SPARTAN EQUIPMENT Series II High Flow Cold Planers are designed to plane / mill horizontal surfaces consisting of rock, concrete and asphalt. Use in any other way is considered contrary to the intended use.

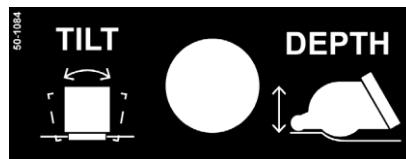
GENERAL INFORMATION

The planer attaches to the toolbar/quick-attach mechanism of your prime mover. Due to this arrangement, thorough knowledge of the prime mover controls is necessary for machine operation. Read and understand your prime mover operator's manual for information regarding prime mover operation before attempting to use the planer.

Check the surface to be planed. The standard all purpose picks can be used to mill both asphalt and concrete. There are optional concrete picks that are recommended if the planer is to be used extensively for concrete. These picks do not perform as well when milling asphalt, especially in warmer weather.

Review the job at hand and determine the required depth and tilt of the cut and also the side shift position of the planer. Best performance is obtained when the cold planer is in the center position. Side shift should be used when visibility is a determining factor such as milling around manholes or when milling next to an obstacle such as a building.

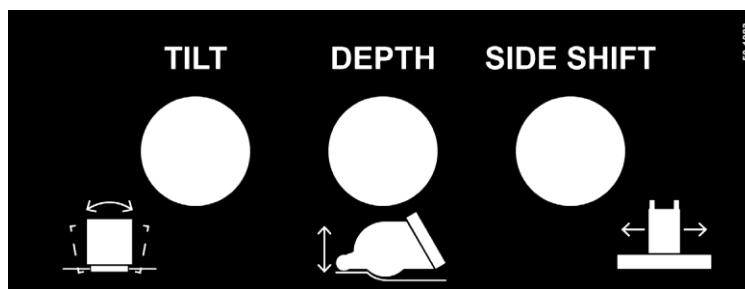
3-LINE HYDRAULIC ASSEMBLY - PALADIN CONTROL BOX



TILT: Tilts the planer to the left and right. Taper cuts may be used when adding or joining new paved surfaces to existing paving. Holding the switch in the TILT position will tilt the planer to the left or right depending on the direction of hydraulic flow. When the toggle switch is released all movement will stop.

DEPTH: Raises and lowers the left and right skid shoe. Holding the switch in the DEPTH position will raise or lower the planer depending on the direction of hydraulic flow. When the toggle switch is released all movement will stop.

5-LINE HYDRAULIC ASSEMBLY - PALADIN CONTROL BOX



TILT: Tilts the planer to the left and right. Taper cuts may be used when adding or joining new paved surfaces to existing paving. Pushing the toggle switch left or right will tilt the planer to the left or right. When the toggle switch is released all movement will stop.

OPERATION

DEPTH: Raises and lowers the left and right skid shoe. Pushing the toggle switch up or down will raise or lower the planer. When the toggle switch is released all movement will stop.

SIDE SHIFT: Side shifts the planer to the left and right. Used for better visibility when milling around or next to an obstacle or building. Pushing the toggle switch left or right will side shift the planer to the left or right. When the toggle switch is released all movement will stop.

OPERATING

NOTE: It is recommended before milling, especially in cold weather, that the skid steer oil is warmed. Running the loader for approximately 15 minutes before operation will help ensure proper oil flow to the planer.

1. Clear area of all bystanders.
2. Position the planer at the desired starting point.
3. **3-LINE COLD PLANERS:** To begin the cut, Raise the planer so the drum is slightly above the ground and engage the hydraulic system to start the drum. Adjust the depth cylinders to the desired depth.

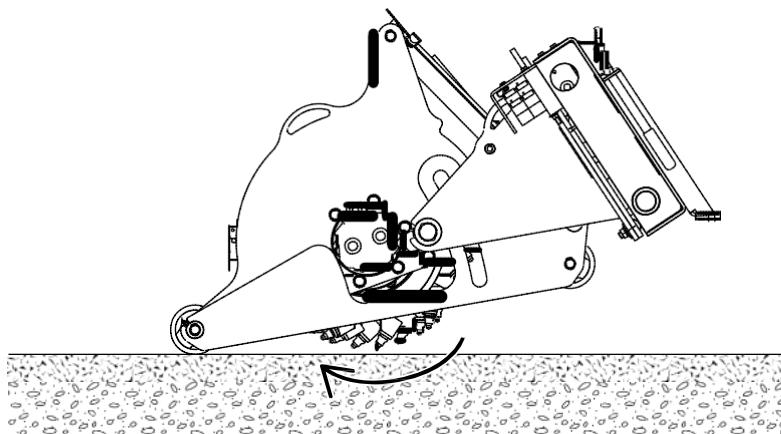
5-LINE COLD PLANERS: To begin a cut, adjust the depth cylinders to the desired depth with the planer slightly above the ground. Engage the hydraulic system to start the drum.

NOTE: Maximum depth of each cut is determined by the type of material, the horsepower of the skid steer being used and the size of the planer.

NOTE: Hydraulic cylinders tilt the planer, adjust the depth, and also shift the planer to the left or right.

4. Increase engine RPM and with the drum turning you can make any necessary adjustments to the side shift. Do not side shift the cold planer during milling operation. Once the desired side shift position has been achieved you are ready to begin. The drum will not cut in a side to side motion.
5. With the engine at full RPM and the attachment rolled forward, lower the planer bringing the front wheels onto the ground. See Figure #1

FIGURE #1

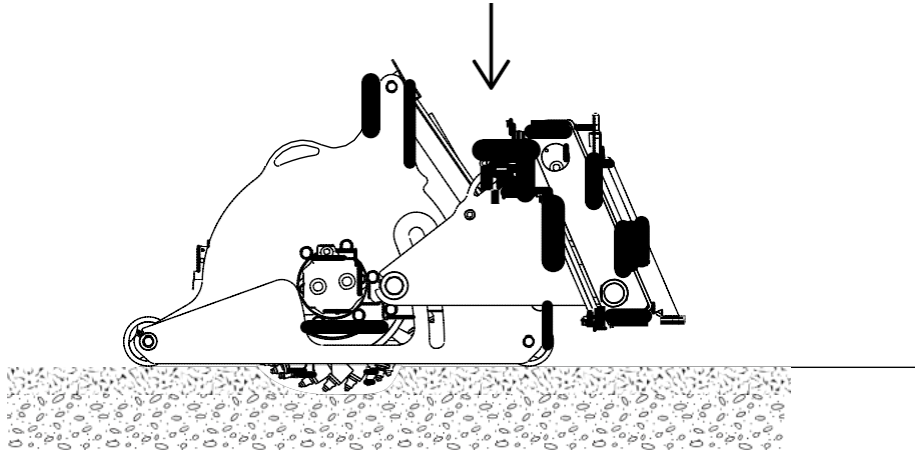


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OPERATION

- Continue lowering the loader arms until the rear wheels are on the ground and the drum is milling the material. Slowly roll out the planer until the weight of the planer is resting on all four wheel assemblies. Continue to exert down pressure for stable operation. (As you gain experience with the operation of this attachment you will be able to “feel” when you have achieved sufficient down pressure for optimum performance.) See Figure #2

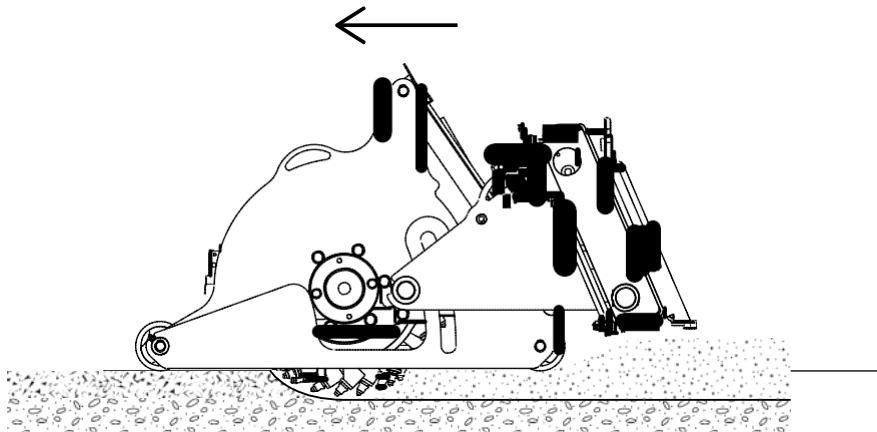
FIGURE #2



NOTE: It is recommended to try a sample cut until the desired depth is achieved.

- Slowly advance forward.

FIGURE #3



NOTE: If drum stalls you have been traveling too fast or cutting too deep. Back out of the cut until the drum restarts (make necessary adjustments) and continue operation.

NOTE: If the drum tends to ride up out of the cut, decrease travel speed, be sure the planer is level (front to back) and exert down pressure until the planer is riding on the wheel assemblies. For optimal cutting and reduced vibration, maintain down pressure on the planer when cutting.

OPERATION

NOTE: Avoid side to side movement while planing as this may cause excessive drum wear or planetary failure.

WARNING! DO NOT OPERATE WITH FRONT COVER OPEN.



- When you have reached the end of the pass, stop the skid steer and raise the planer out of the cut. Reposition for the next cut and repeat steps 4, 5, 6 & 7. If you are not starting a new cut, raise the planer and retract the drum into the planer housing using the depth control cylinders. Do not transport the planer with drum turning.

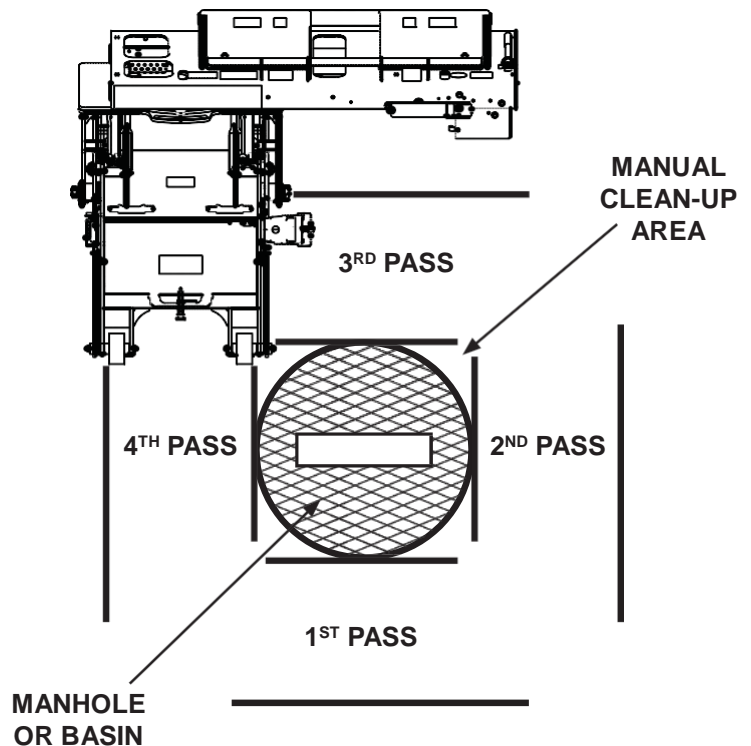
WARNING! Travel only with the attachment in a safe transport position and as low as possible for the terrain. Do not lift attachment to a height where visibility is obstructed.



OPERATING TIPS

Milling Around Manholes

For best visibility when milling around manholes it is recommended that the planer be shifted to the right. The planer is not designed to mill around tight corners, therefore it is recommended that four to six passes be made on each side of the manhole. **NOTE: The more passes the less amount of manual clean-up required.**



Deep Cuts

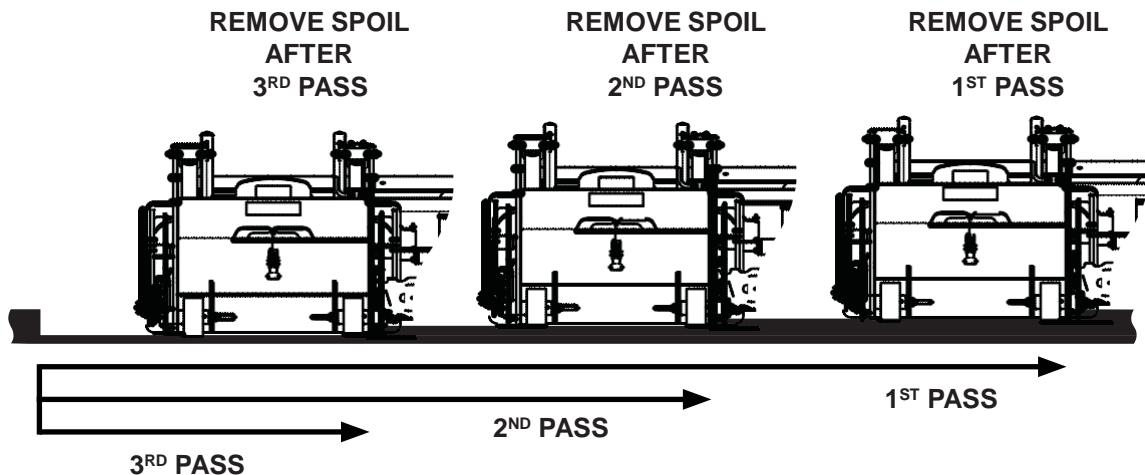
To achieve a deep cut the width of the drum, set the depth of the planer (up to 6"). This may need to be adjusted depending on the material being milled, the desired depth, the horsepower of the skid steer and the size of the planer. If full depth cannot be accomplished in one pass, position the planer at the beginning of the pass and reset depth to achieve the desired depth. **Example: Make the first cut with the depth controls set at 2" and then set the depth control at 4" for the second pass to obtain a 6" depth when it cannot be achieved in one pass.** See Figure #1

OPERATION

To achieve a 6" cut of a large area it is recommended to cut the entire area at the recommended depth. Clear the spoil from the area before making any additional cuts. Removing the spoil between cuts will enhance the productivity of the planer and maintain an even cut.

If trying to achieve a critical cutting depth it is recommended that the spoil from one cut be cleared away before making another pass. This will eliminate the possibility of the planer riding on and off the spoil and creating an uneven surface.

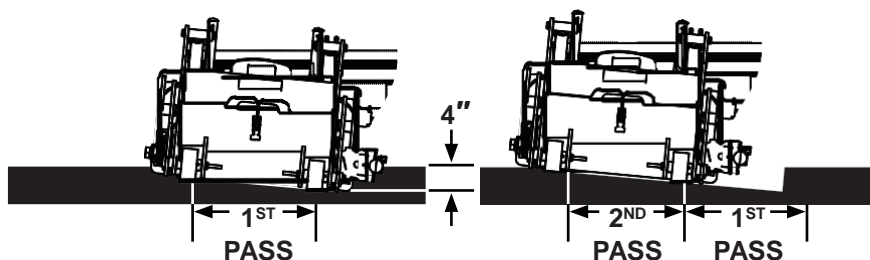
FIGURE #1



Milling Taper Cuts

When adding to or joining new paved surfaces to existing paving, a taper cut may be required at the interacting joints so the new paving would appear seamless. **Example: To achieve a taper cut from 0" to 4" over a 4' distance with a 24" wide cold planer it is recommended that tilt the planer 4° and lower the planer so that the deeper side is cutting the 4" for the first pass. Then make a second pass with the planer still set at 4° and cut in 2".** See Figure #2

FIGURE #2



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.

OPERATION

- Lubricate grease fittings.
- Seal hydraulic system from contaminants and secure all hydraulic hoses off the ground to help prevent damage.
- Replace decals that are damaged or in unreadable condition.
- Store unit in a dry and protected place. Leaving the unit outside will materially shorten its life.

Additional Precautions for Long Term Storage:

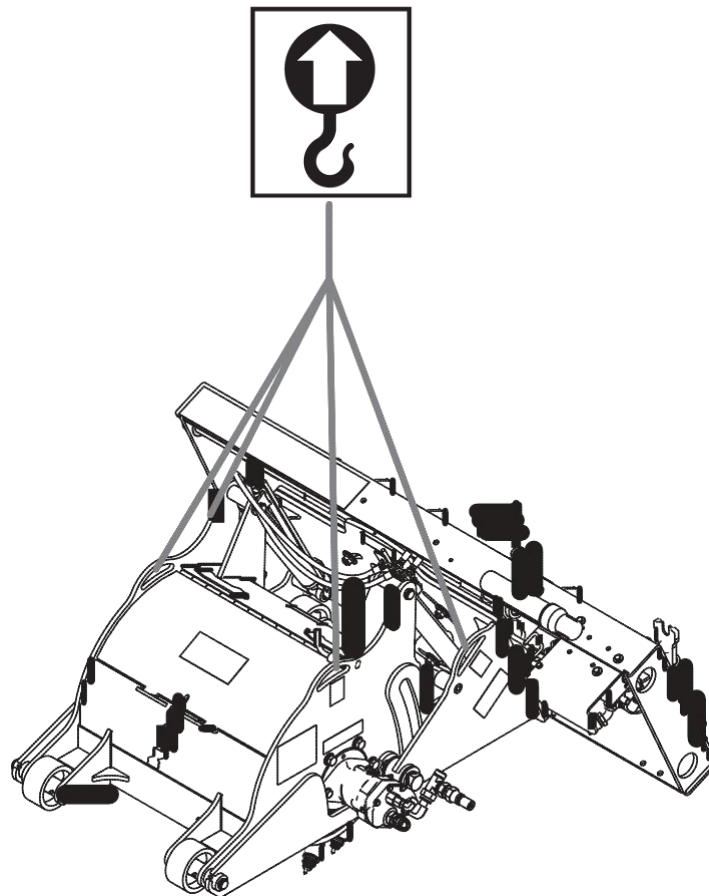
- Touch up all unpainted surfaces with paint to prevent rust.

REMOVAL FROM STORAGE

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

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.

OPERATION

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.

- 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.




TRANSPORTING

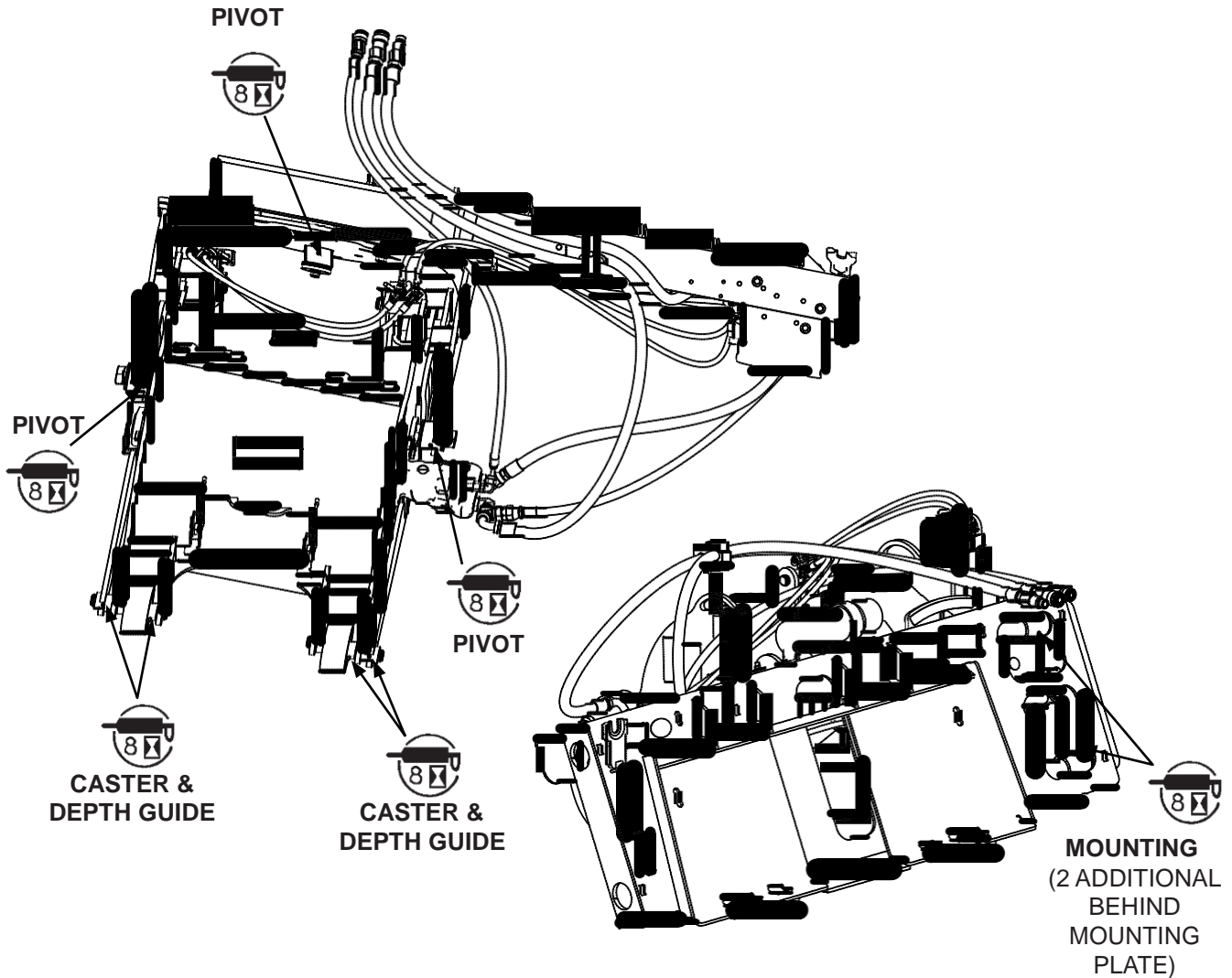
Follow all local government regulations that may apply along with recommended tie down points and any equipment safety precautions at the front of this handbook when transporting your attachment.

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.



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

GEARBOX

NOTE: Initial oil change should be after 50 hours of operation. Subsequent oil change should be every 1000 hours of operation or annually, whichever comes first.

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.

WARNING! Never do any maintenance to the planer while it is running. Exercise the **MANDATORY SAFETY SHUTDOWN PROCEDURE BEFORE** working on or around the planer.



Procedure	Every 8 Hours (Daily)	After First 50 Hours	Every 1000 Hours (Yearly)
Case Drain Coupler - Check for complete engagement of coupler.	a		
Check for kinked or pinched hoses. Reroute as required.	a		
Hydraulic Oil - Check prime mover hydraulic system for adequate oil levels.	a		
Hardware - Check for tightness (see Bolt Torque Specifications)	a		
Hardware - Replace any missing or damaged bolts or nuts with approved replacement parts.	a		
Hydraulic System - Check for leaks and tighten as necessary. Check for damage and replace as needed.	a		
Decals - Check for missing or damaged safety decals and replace as necessary.	a		
Check picks for freedom of rotation, flat spots and wear. Replace worn or missing picks or any picks that are not moving freely or have flat spots.	a		
Inspect attachment for any worn parts or cracked welds. Repair as required.	a		
Lubricate grease fittings.	a		
Retract all possible cylinder rods after use.	a		
Change oil in gearbox.		a	a

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

MAINTENANCE

WARNING! Do not use blocking made of concrete blocks, logs, buckets, barrels or any other material that could suddenly collapse or shift positions. Do not use wood or steel blocking that is warped, twisted, or tapered. Failure to obey this warning could result in death or serious injury.



CAUTION! Picks become hot during operation: Wait for picks to cool before replacing. Do not hammer on carbide point when replacing picks. The carbide can break and cause injury.



PICK REPLACEMENT

Picks should be replaced if you are changing to a different application; or they are broken, worn, flat or are seized in the pick holder and do not rotate freely.

NOTE: The edge picks wear faster and require more frequent replacement.

Proper pick maintenance is essential to the productive use of your planer. Failure to perform regular pick maintenance can result in severely decreased performance and expensive repairs to your planer drum. A missing pick must be replaced immediately, as a missing pick will cause the surrounding picks to wear faster.

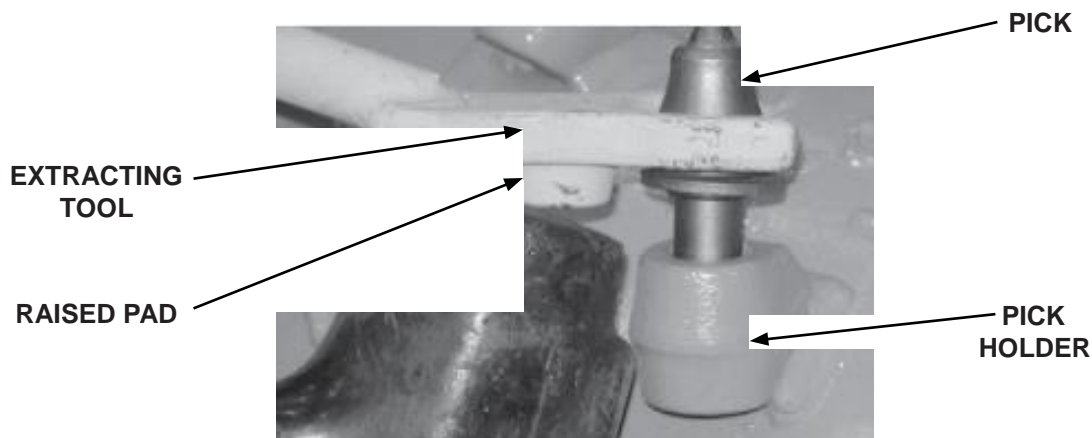
Remove and replace picks using the pick removal tool (LAF9326) and a hammer.

WARNING! Always wear safety glasses with side shields when striking metal. Failure to heed could result in serious injury to the eyes or other parts of the body. Do all pick maintenance through access door. DO NOT attempt to check the picks with the planer in a raised position without first blocking the planer. Before exercising the MANDATORY SAFETY SHUTDOWN PROCEDURE find an elevated surface to set the planer on or have a second person block the planer in place before shutting down the machine.



1. Open front access door.
2. Rotate the drum until the pick to be removed is conveniently accessible.
3. Hold the extracting tool (pick puller) in one hand and place the jaws in the groove of the pick, with the offset handle pointing away from the pick holder.
4. Using a lead hammer or rubber-headed mallet, hit the raised pad on the tool until the pick starts to move. Continue tapping until the pick is removed. See Figure #1

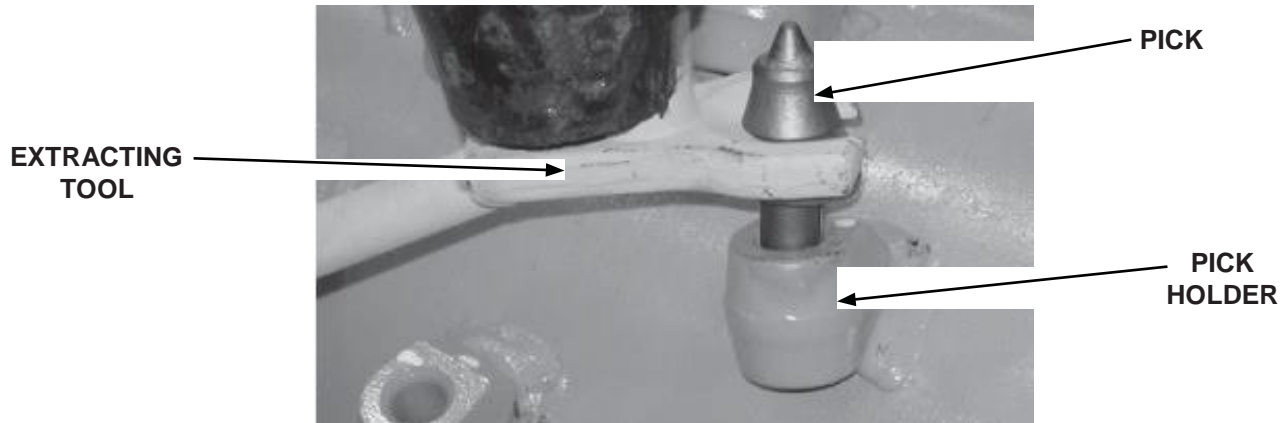
FIGURE #1



MAINTENANCE

5. Insert the new pick into the jaws of the extracting tool (pick puller) so that the raised pad of the tool is pointing in the same direction as the pick point. See Figure #2
6. Position the new pick in the pick holder on the drum and with a lead hammer or rubber-headed mallet, hit the raised pad of the tool to start the pick into the pick holder. (Clean out any foreign material from the pick holder before installing the new pick.)
7. Once the pick is started into the pick holder strike the tool pad one strong blow to pop the pick into the holder. See Figure #2

FIGURE #2



The pick is properly seated when its shoulder is against the face of the pick holder. Check to be sure the pick rotates freely. See Figure #3

FIGURE #3



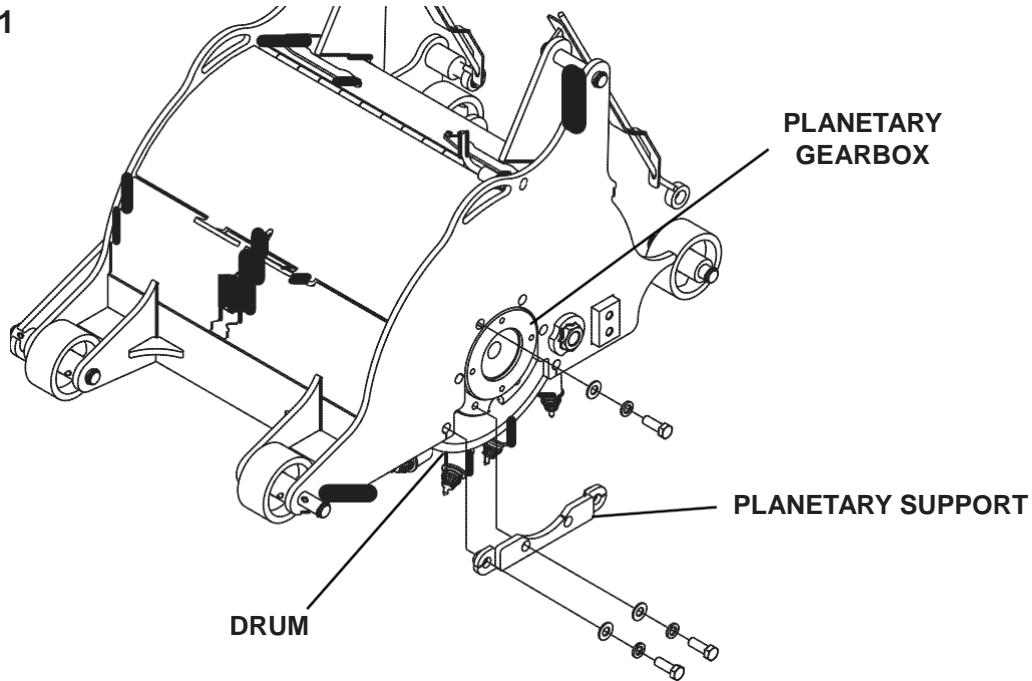
CHANGING THE OIL IN THE GEARBOX

Planetary gearbox is to be half full of oil when the unit is mounted level and horizontal. Use mild extreme pressure lubricant API-GL-5, No. 80 or 90. The capacity of the gearbox is 30 oz.

1. Remove motor. **NOTE: Motor shaft adapter is loose and can fall from planetary.**
2. Remove pivot mount along with attachment, keep close and do not stretch hoses.
3. Remove depth cylinders. Hydraulic lines can be left attached.
4. Remove two skid retainers.
5. Remove the planetary support & bearing mount from the frame. See Figure #1

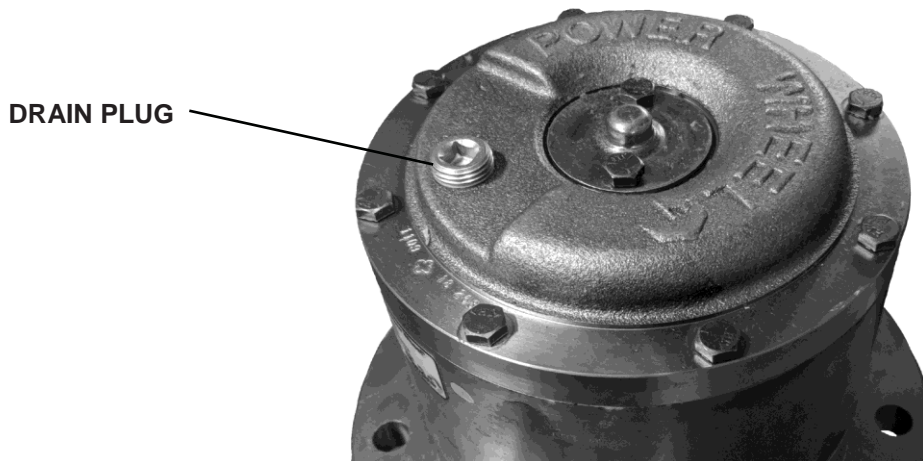
MAINTENANCE

FIGURE #1



6. Using the lift point on the frame, raise the frame off of the drum.
7. Remove the gearbox.
8. Remove drain plug from the gearbox. See Figure #2

FIGURE #2



9. Drain oil from gearbox.
10. Fill gearbox with oil. The oil level must be at the bottom of the threads with the hole level. Do not tip the gearbox, as the oil can run out of the gearbox before the motor is installed.
11. Clean any debris from the drain plug and apply pipe thread sealant to the threads.
12. Install the gearbox in the drum.
13. Install the drum in the frame. Install the depth skids, pivot assembly, and depth cylinders.
14. Complete the reassembly of your planer. (See Parts Illustrations & Lists and Torque Specifications for reference during reassembly.)

MAINTENANCE AND SERVICE

CYLINDER SEAL REPLACEMENT

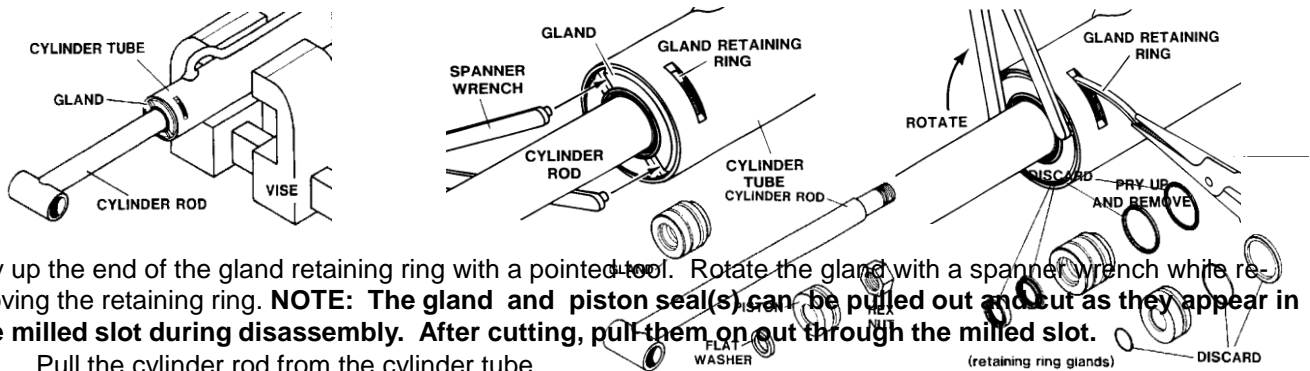
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic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

DISASSEMBLY PROCEDURE

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

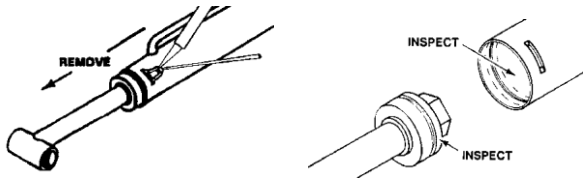
RETAINING RING TYPE GLAND

1. Mount the cylinder tube securely in a vise. **NOTICE:** Do not clamp too tight and distort the tube.
2. Rotate the gland with a spanner wrench (available from your dealer), until the gland retaining ring appears in the milled slot.



Pry up the end of the gland retaining ring with a pointed tool. Rotate the gland with a spanner wrench while removing the retaining ring. **NOTE: The gland and piston seal(s) can be pulled out and cut as they appear in the milled slot during disassembly. After cutting, pull them on out through the milled slot.**

3. Pull the cylinder rod from the cylinder tube.

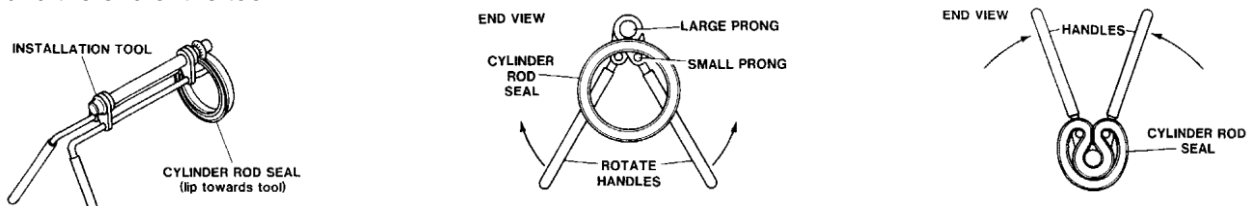


4. Inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston and cylinder tube must be replaced.
5. Remove the hex nut, piston, flat washer or spacer tube (if so equipped), and gland from the cylinder rod. If the cylinder rod is rusty, scratched, or bent, it must be replaced.
6. Remove and discard all old seals.

ASSEMBLY PROCEDURE

IMPORTANT: Replace all seals even if they do not appear to be damaged. Failure to replace all seals may result in premature cylinder failure.

1. Install the cylinder rod seal in the gland first. Be careful not to damage the seal in the process as it is somewhat difficult to install. A special installation tool is available to help with installing the seal. Simply fit the end of the tool over the seal so that the large prong of the tool is on the outside of the seal, and the two smaller prongs on the inside. The lip of the seal should be facing towards the tool. Rotate the handles on the tool around to wrap the seal around the end of the tool.



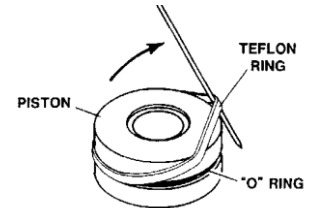
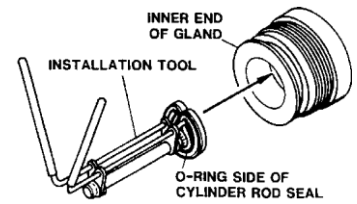
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MAINTENANCE AND SERVICE

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

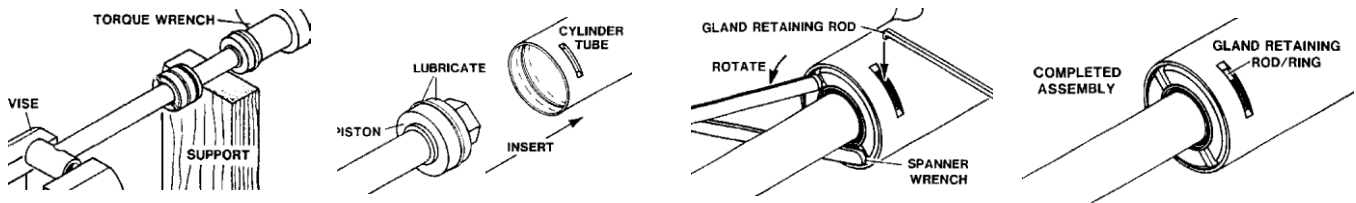
NOTE: Threaded gland is shown in diagram for reference only.

2. Install the new piston ring, rod wiper, O-rings, and backup washers, if applicable, on the piston. Be careful not to damage the seals. Caution must be used when installing the piston ring. The ring must be stretched carefully over the piston with a smooth, round, pointed tool.
3. Slide the gland onto the cylinder rod being careful not to damage the rod wiper. Then install the spacer, or flat washer (if so equipped), small O-ring, piston, and hex nut onto the end of the cylinder rod.
4. Secure the cylinder rod (mounting end) in a vise, with a support at its center. Torque the nut to the value shown on the chart for the thread diameter of the cylinder rod.



Thread Diameter	POUNDS - FEET
7/8"	150-200
*1"	230-325
1-1/8"	350-480
1-1/4"	490-670
1-3/8"	670-900

* 1" Thread Diameter WITH 1.25" Rod Diameter
Min. 230 ft. lbs. Max. 250 ft. lbs.



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

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

5. Apply a lubricant (such as Lubriplate #105) to the piston and teflon ring. Insert the cylinder rod assembly into the cylinder tube.
6. Rotate the gland with a spanner wrench until the hole (drilled into the retaining slot of the gland) appears in the milled slot of the cylinder tube. Insert the hooked end of the gland retaining rod into the hole.

Rotate the gland until the gland retaining rod forms a ring between the gland and the cylinder tube. When complete, the bent end of the gland retainer ring should be hidden (not turned so it is exposed in the slot) to prevent it from popping out.

WARNING!



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

MAINTENANCE AND SERVICE

CYLINDER SEAL REPLACEMENT

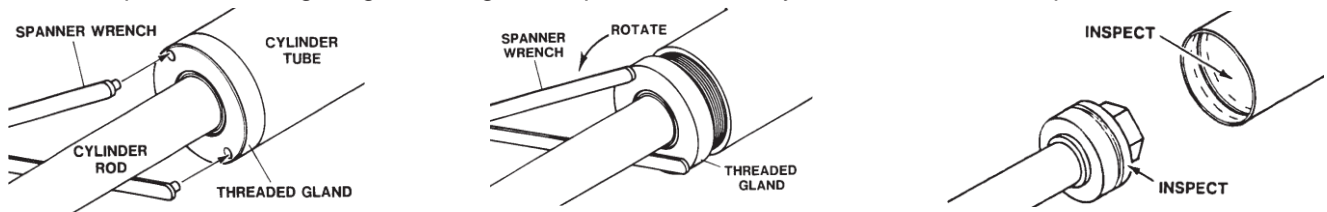
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic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

DISASSEMBLY PROCEDURE

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

THREADED TYPE GLAND

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



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

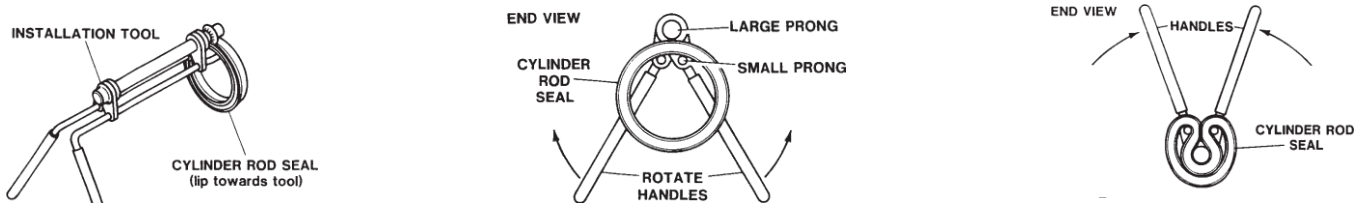


ASSEMBLY PROCEDURE

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

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

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

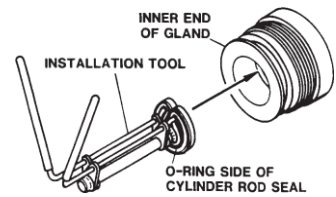


Rotate the handles on the tool around to wrap the seal around the end of the tool.

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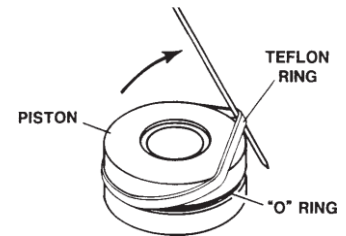
MAINTENANCE AND SERVICE

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



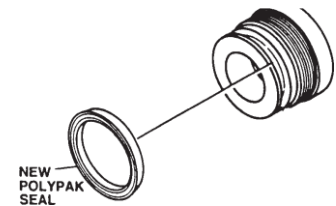
- Install the new piston ring, rod wiper, O-rings and backup washers, if applicable, on the piston.

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



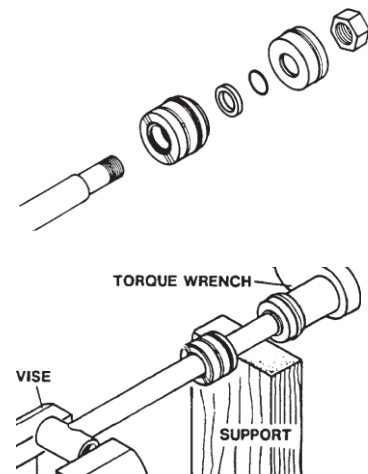
- After installing the rod seal inside the gland, as shown in step #1, install the external seal.

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



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

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



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

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

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

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

WARNING!



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

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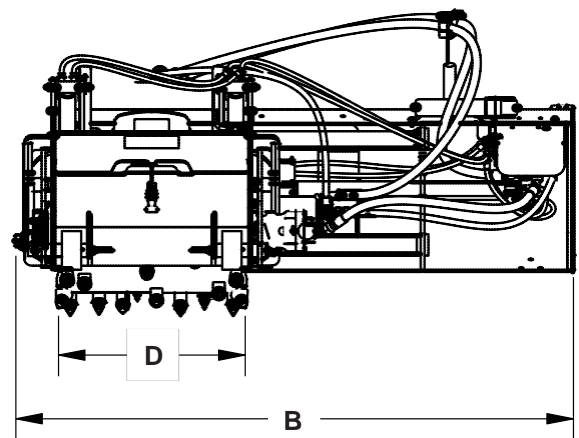
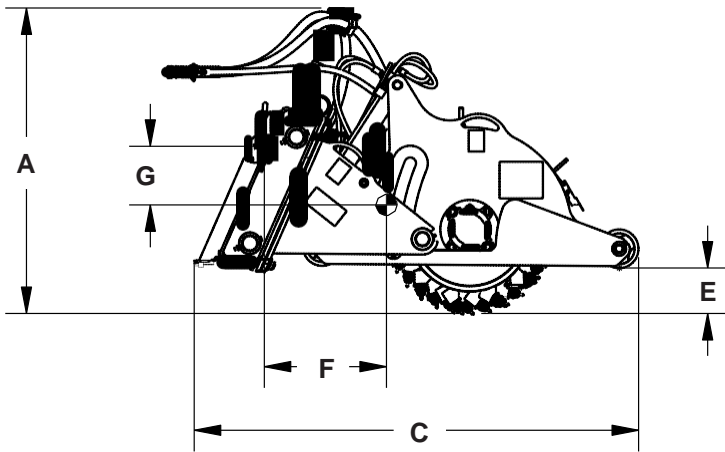
TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
MOTOR ON THE PLANER WILL NOT OPERATE.	Auxiliary hoses not hooked up to the prime mover.	Engage Couplers.
	Obstruction in hydraulic lines.	Remove obstruction and replace hydraulic lines if necessary.
	Hydraulic motor damaged or seals blown.	Call Paladin service department for instructions.
	Prime mover auxiliary valve not engaged.	Engage auxiliary valve.
DRUM ROTATES SLUGGISHLY.	Insufficient hydraulic flow from the prime mover.	Refer to prime mover owners manual.
	Damaged quick coupler.	Repair or replace quick coupler if necessary.
	Hydraulic motor damaged or seals blown.	Call Paladin service department for instructions.
	Oil filter on prime mover is dirty.	Refer to prime mover owners manual.
LEAKING OIL.	Loose or damaged hydraulic line.	Tighten or replace.
	O-Rings on fittings damaged.	Repair or replace fittings if necessary.
	Hydraulic motor damaged or seals blown.	Call Paladin service department for instructions.
	Fittings loose or damaged.	Tighten or replace.
	Cylinder seals damaged.	Replace cylinder seals.
INSUFFICIENT POWER.	Insufficient hydraulic flow from the prime mover.	Refer to prime mover owners manual.
	Relief valve setting adjusted too low.	Refer to prime mover owners manual.
	Hydraulic motor damaged or seals blown.	Call Paladin service department for instructions.
	Oil filter on prime mover is dirty.	Refer to prime mover owners manual.
DRUM ROTATES IN THE WRONG DIRECTION.	Hoses from the valve to the motor incorrectly connected.	Switch hoses at the motor end.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
EXCESSIVE OIL TEMPERATURE.	Hydraulic oil level too low.	Refer to prime mover owners manual.
	Obstruction in hydraulic lines.	Remove obstruction and replace if necessary.
	Hydraulic oil or oil filter in prime mover is dirty.	Refer to prime mover owners manual.
	Relief valve setting adjusted too low.	Refer to prime mover owners manual.
A HYDRAULIC CYLINDER NOT OPERATING.	Insufficient hydraulic flow from the prime mover.	Refer to prime mover owners manual.
	Cylinder rod bent.	Visually inspect the cylinder for damage.
	Cylinder seals damaged.	Repair or replace cylinder seals if necessary.
	Obstruction in hydraulic lines.	Remove obstruction and replace hydraulic lines if necessary.
ALL HYDRAULIC CYLINDERS NOT FUNCTIONING.	Blown fuse on prime mover.	Refer to prime mover owners manual.
	Damaged electrical wiring.	Test and replace if necessary.
HYDRAULIC CYLINDERS ONLY OPERATING IN ONE DIRECTION.	Damaged electrical wiring.	Test and replace if necessary.
EXCESSIVE VIBRATION DURING PLANING OPERATION.	Picks are worn or broken.	Visually inspect the picks and replace as necessary.
	Picks contain flat spots or are not rotating freely.	Visually inspect the picks and replace as necessary.
	Insufficient down force due to incorrect operating procedure.	Refer to the Operating section of this manual.

SPECIFICATIONS



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

DESCRIPTION	16"	18"	20"	24"	30"	36"
A. Overall Height	38.80"	38.80"	38.80"	38.80"	38.80"	38.80"
B. Overall Width	72.50"	72.50"	72.50"	72.50"	77.50"	77.50"
C. Overall Length	57.60"	57.60"	57.60"	57.60"	57.60"	57.60"
D. Cutting Width	16.00"	18.00"	20.00"	24.00"	30.00"	36.00"
E. Maximum Cutting Depth	6.00"	6.00"	6.00"	6.00"	6.00"	6.00"
F. Center of Gravity - Horizontal	15.30"	15.50"	15.70"	16.00"	16.30"	16.70"
G. Center of Gravity - Vertical	7.30"	7.30"	7.30"	7.40"	7.50"	7.60"
Tilt Angle	15°	15°	15°	15°	12.5°	10°
Side Shift	24.00"	24.00"	24.00"	24.00"	24.00"	24.00"
Weight (lbs)	1510#	1560#	1610#	1690#	1855#	2015#
Hydraulic Flow Range (GPM)	24-45	26-45	26-45	28-45	28-45	31-45
Hydraulic Pressure - Continuous						2200 PSI
Hydraulic Pressure - Intermittent						5000 PSI

BOLT TORQUE SPECIFICATION

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

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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.spartanequipment.com. 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:

E-mail
Orders@spartanequipment.com

WARRANTY

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