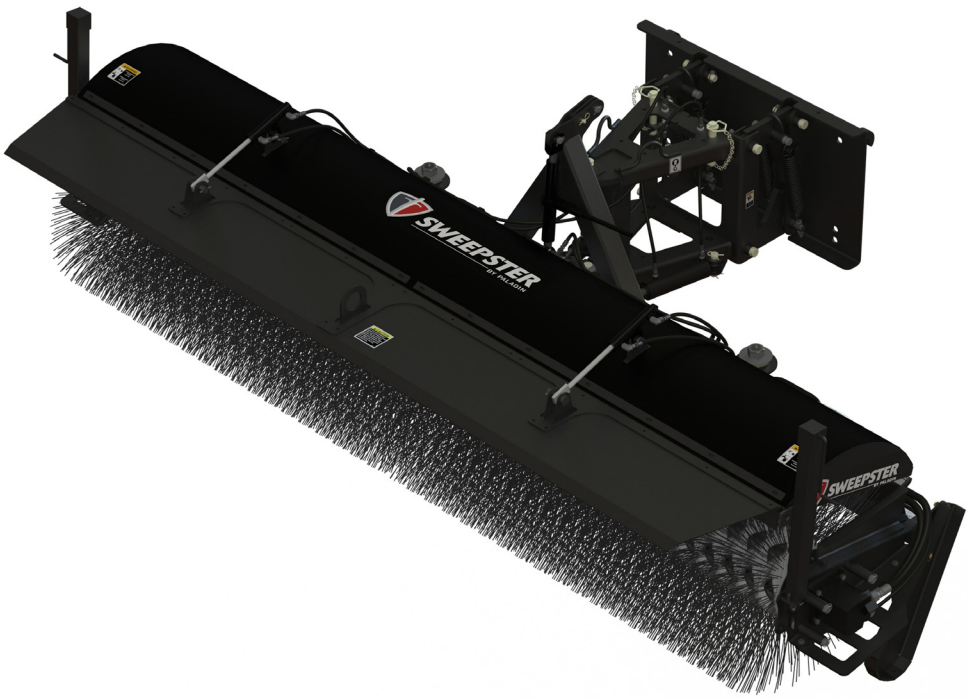
SWEEPSTER BY PALADIN

OPERATOR'S MANUAL

ANGLE SWEEPER — HIGH SPEED
214 Series

FOR
TRUCKS, WHEEL LOADERS & LARGE TRACTORS



SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: 51-4063
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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.

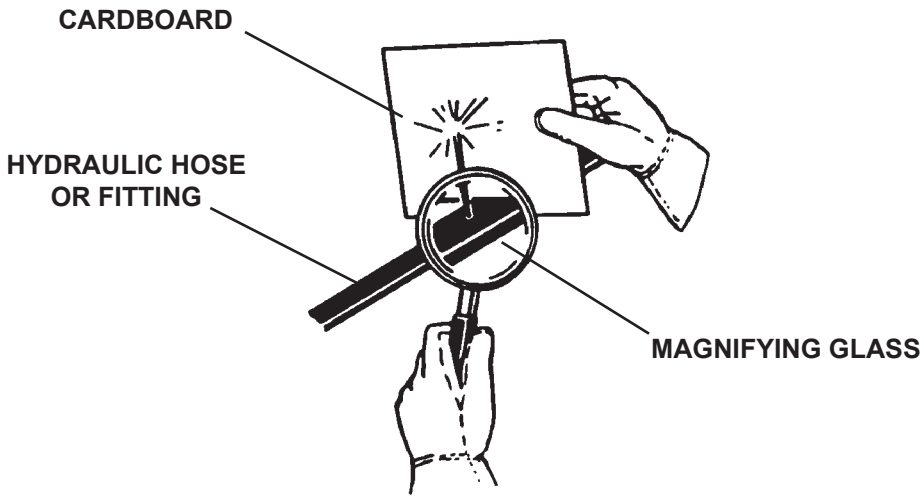
WARNING! **LOWER OR SUPPORT RAISED EQUIPMENT**

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

- 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 overturn.
- Reduce speed when driving over rough terrain, on a slope, or turning, to avoid overturning the vehicle.
- An operator must not use drugs or alcohol, which can change his or her alertness or coordination. An operator taking prescription or over-the-counter drugs should seek medical advice on whether or not he or she can safely operate equipment.
- Before exiting the prime mover, lower the attachment to the ground, apply the brakes, turn off the prime mover’s engine and remove the key

EQUIPMENT SAFETY PRECAUTIONS

TRANSPORTING THE ATTACHMENT

- 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 ATTACHMENT

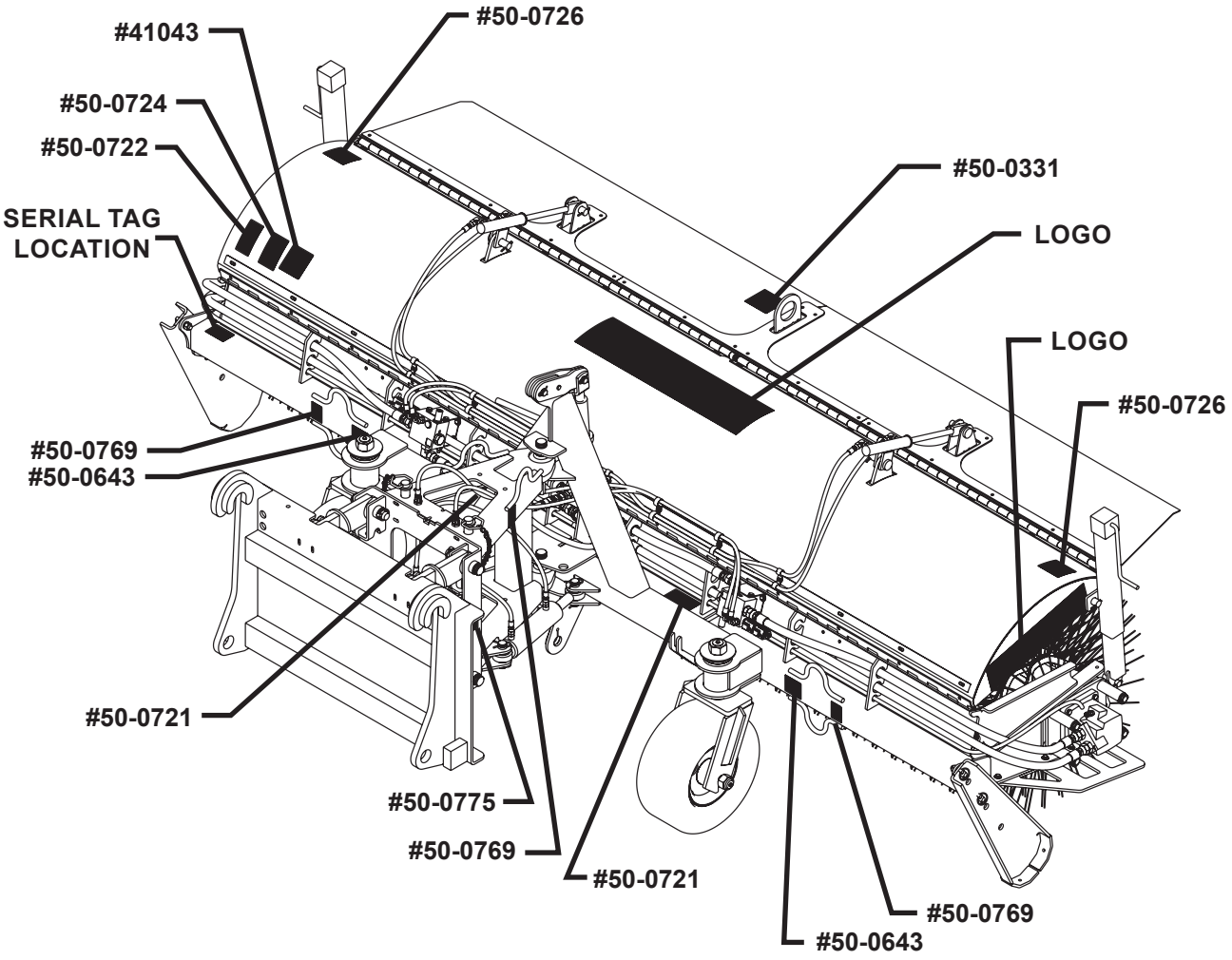
- Before performing maintenance lower the attachment to the ground, apply the brakes, turn off the engine and remove the key.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator service manuals before any repair is made. After completing maintenance or repair, check for correct functioning of the 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.

DECALS

DECAL PLACEMENT

GENERAL INFORMATION

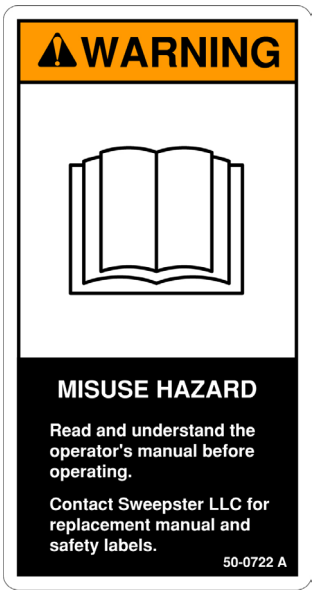
The diagram on this page shows the location of the decals used on your attachment. The decals are identified by their part numbers, with reductions of the actual decals located on the following page. Use this information to order replacements for lost or damaged decals. Be sure to read all decals before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



IMPORTANT: Keep all safety decals clean and legible. Replace all missing, illegible, or damaged safety decals. When replacing parts with safety decals attached, the safety decals must also be replaced. Safety decals are available, free of charge, from your local dealer or Paladin.

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

DECALS



#50-0722 WARNING! MISUSE HAZARD

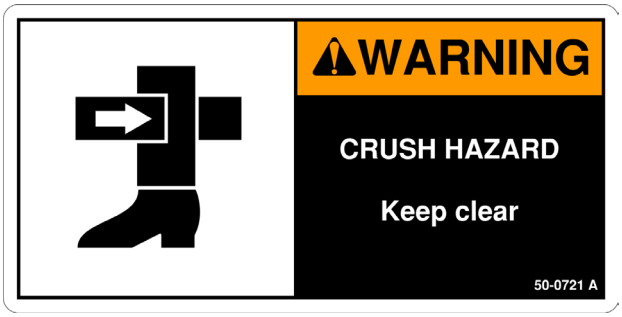
#50-0724 WARNING! HIGH PRESSURE FLUID

#41043 WARNING! HAZARDOUS DUST

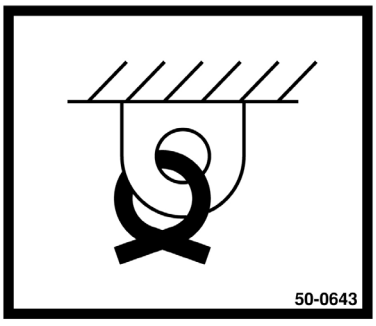
#50-0775 WARNING! CRUSH HAZARD

#50-0726 WARNING! FLYING OBJECTS

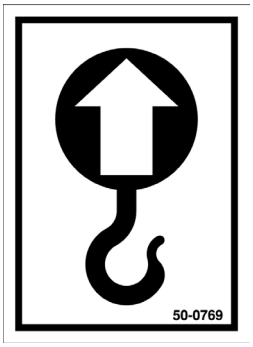
#50-0331 CAUTION! DO NOT USE EYELET TO LIFT



#50-0721 WARNING! CRUSH HAZARD



#50-0643 TIE DOWN POINT



#50-0769 LIFT POINT

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

INSTALLATION

GENERAL INFORMATION

The following instructions will help you to mount your sweeper onto your prime mover. If you know how to attach your loader bucket, attaching the sweeper 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.

HOSE REQUIREMENTS

Power, return & case drain hoses must be purchased from your dealer to install the sweeper onto your prime mover. The hoses must be long enough not to bind or pinch during operation and the hoses must be rated for the maximum hydraulic pressure of your prime mover's hydraulic system. Hose diameter should be such to prevent pressure drop on the oil entering the attachment and backpressure on the oil returning to the prime mover. Contact your dealer for size requirements for pressure, return & case drain lines.

INSTALLATION

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

1. Remove any attachment from the front of the prime mover.
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 prime mover.

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

3. Lower the unit to the ground and relieve pressure to the auxiliary hydraulic lines.
4. Following the safety shut down procedure for your prime mover, shut down and exit the prime mover.
5. Raise jack stands and secure in operating position.
6. After making sure that the hydraulic couplers are free from any foreign material or contaminants, connect the couplers to the auxiliary hydraulic system of your prime mover.
7. Following the standard start up procedure for your prime mover, start the prime mover and run all cylinders on the attachment to purge any air from the system. Check for proper hydraulic connection, hose routing and hose length.
8. Attachment installation is complete.

INSTALLATION

DETACHING

1. Before exiting the prime mover, lower the attachment to the ground, apply the brakes, turn off the prime mover's engine, and remove the key.
2. Follow prime mover operator's manual to relieve pressure in the hydraulic lines.
3. Disconnect power and return hoses from the auxiliary hydraulics.
4. Lower jack stands to storage position.
5. Follow your prime mover operator's manual for detaching (removing) an attachment.
6. 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
CONTROLS

STARTING AND STOPPING THE SWEEPER

The sweeper uses the prime mover hydraulic flow to operate. To start the brush, turn on the prime mover auxiliary hydraulics. To stop the brush, turn off the auxiliary hydraulic flow. To avoid motor damage, do not stop the sweeper at high engine speed. Decrease engine RPM before turning off the hydraulic flow.

TRAVEL DIRECTION

Travel should be in the forward direction and brush rotation always away from the operator.

BRUSH SPEED

To increase brush speed, increase prime mover RPM. Use the LOWEST speed needed to complete the job at hand. In general, half throttle provides the necessary engine speed.

RUN, SWING AND LIFT CONTROLS

Run, swing and lift functions vary according to how the unit is equipped. The sweeper controls are activated by switches on the control box. Refer to operation decal on control box.

ANGLING THE SWEEPER

Use the angle feature to control the direction debris exits the sweeper. Angling the brush head the same direction as the wind also helps reduce the amount of material that blows onto the operator and the surface swept.

- Start the prime mover.
- Engage the hydraulics.
- Position the brush head at the desired angle.

OPERATION

INTENDED USE:

This sweeper is designed solely for use in construction cleanup, road maintenance and similar operations. Use in any other way is considered contrary to intended use. Compliance with and strict adherence to operation, service and repair conditions as specified by the manufacturer, are essential elements of intended use.

MOTOR BREAK-IN

The hydraulic drive motors run off the auxiliary circuit of the prime mover. To assure best motor life, the sweeper should run with a normal sweeping pattern in a stationary position for approximately one hour before application to a full load. Be sure motor is filled with fluid prior to any load applications.

BEFORE OPERATION

- Adjust brush pattern for optimum sweeping performance.
- Learn sweeper and prime mover controls in an off-road location.
- Be sure you are in a safe area, away from traffic or other hazards.
- Perform daily maintenance as indicated in the maintenance schedule.

NOTICE! Adjust the four-bar linkage before each operation to avoid sweeper damage.

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

WHILE OPERATING

- Avoid excessive downward pressure on brush sections to prevent excessive wear. A 2”–4” (5-10 cm) wide pattern is sufficient for most applications. Ensure that the sweeper is level to prevent uneven wear pattern.
- Minimize flying debris - use slowest rotating speed that will do the job.
- Keep in mind the center of gravity changes when an attachment is installed.
- Never sweep toward people, buildings, vehicles or other objects that can be damaged by flying debris.
- Operate sweeper slowly in open area, check for proper operation of all controls and all protective devices. Report any needed repairs.

OPERATION

Carry the sweeper low to the ground so the operator has good visibility and stability. Avoid any sudden movements.

Observe wind direction. Sweeping with the wind makes sweeping more effective and helps keep debris off the operator.

The terms *swing* and *angle* are used interchangeably.

OPERATION

Basic Sweeping Operation:

With the mounting aligned and the brush pattern adjusted you are ready to begin sweeping.

1. Swing the brush head assembly in the direction that you want to direct debris.
2. Start the prime mover at an idle and raise the brush.
3. Engage the brush head and then lower it to the ground.
4. Increase prime mover engine RPM. Using the lowest speed needed to complete the job at hand.
5. Begin forward travel at 25 MPH (40 kph) or less.

MOUNTING ALIGNMENT

The mounting incorporates a four-bar linkage system that allows the sweeper to move up and down independent of the prime mover lift arms. This feature is very important because it permits the sweeper to follow the contours of the ground.

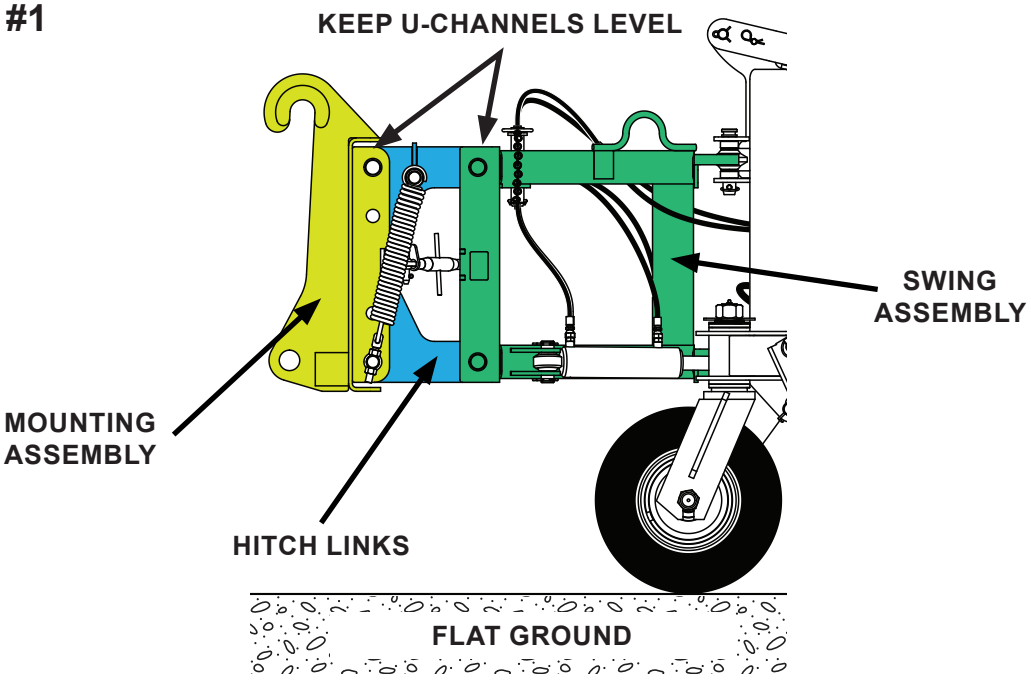
NOTICE! Adjust the four-bar linkage before each operation to avoid sweeper damage.

Sweeping with a properly adjusted mounting offers efficient performance, while sweeping with mounting out of adjustment can cause severe damage to the sweeper and can result in a poor sweep. If the prime mover lift arms are positioned too low, the sweeper must support the prime mover lift arms, with the added of weight far greater than the sweeper is designed to carry. If the prime mover lift arms are too high, the sweeper cannot sweep low areas.

To adjust the mounting:

1. Drive the prime mover and sweeper to a flat surface.
2. Lower the sweeper so the casters sit on the surface.
3. Adjust the prime mover lift arms so the top of the U-Channels on the swing frame and mounting plate are even and the hitch links are parallel with the ground. See Figure #1.
4. Adjust the brush height according to Brush Pattern Adjustment.

FIGURE #1



OPERATION

BRUSH STRIPPER ADJUSTMENT

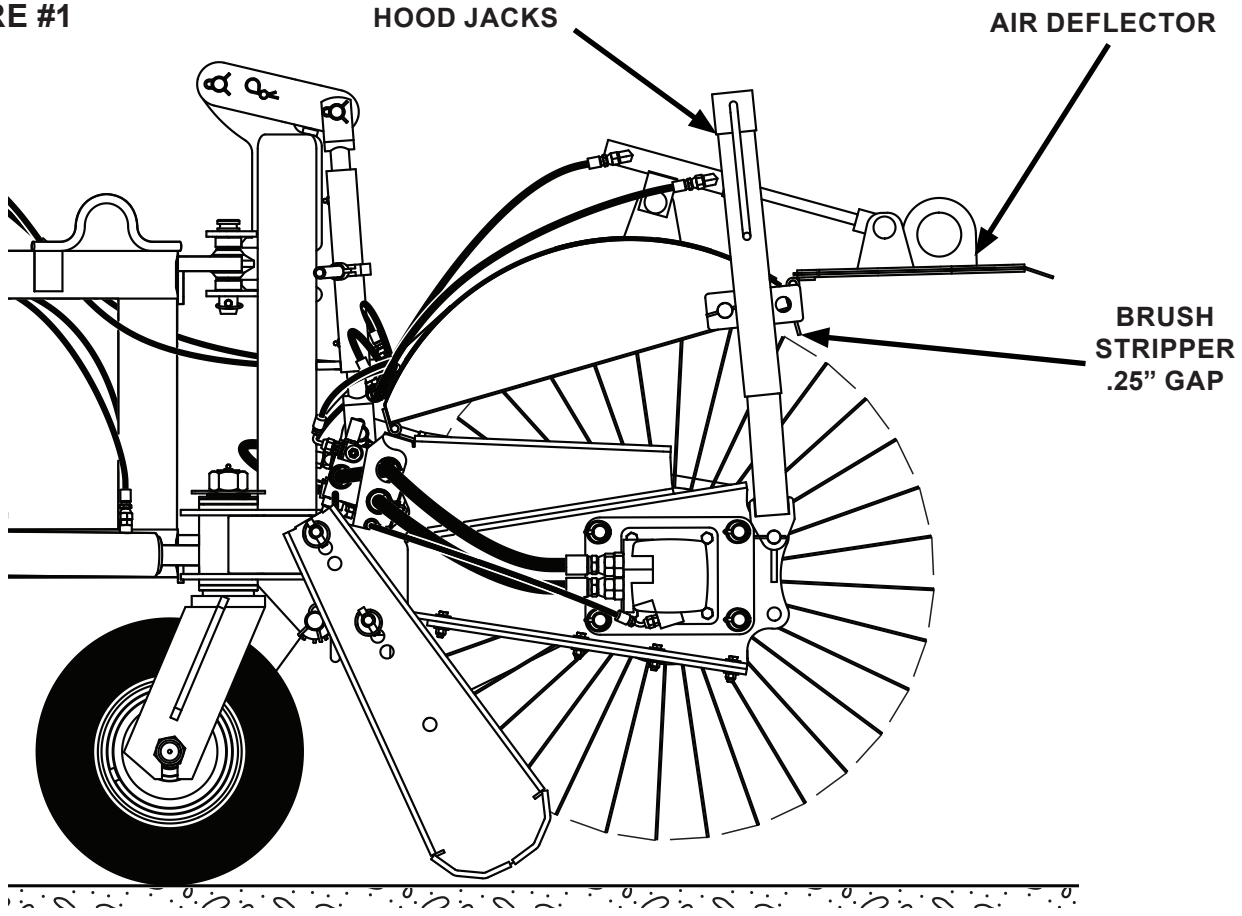
The sweeper hood is equipped with an adjustable brush stripper that can be adjusted for uneven brush wear. The stripper is in two halves, each can be independently adjusted. These parts can be easily replaced in case of wear from brush contact.

The brush stripper is installed on the front edge of the hood that runs along the brush. It is designed to direct the air flow along with the material away from the brush. This prevents the material from being carried over and falling behind the brush. The brush stripper also prevents buildup of snow and ice under the hood.

NOTICE! Improper adjustment could cause snow and ice to build up. This build up under the hood will add weight to the brush head causing excessive wear and possible damage to the unit.

The brush stripper is adjusted by the hood jacks located at each end of the hood. As the brush wears, the jacks must be lowered. The brush stripper should be adjusted to within .25” (6 mm) from the tips of the brush bristles. See Figure #1

FIGURE #1



To make a final check of the brush stripper, start the unit and run the brush. The tips of the brush bristles should just miss the brush stripper.

WARNING! Stay clear of the brush when it is running.

OPERATION

AIR DEFLECTOR

The air deflector is the adjustable flap located on the front of the hood. This flap must be adjusted for the sweeping conditions. Hydraulic cylinders mounted on the hood provide for this adjustment.

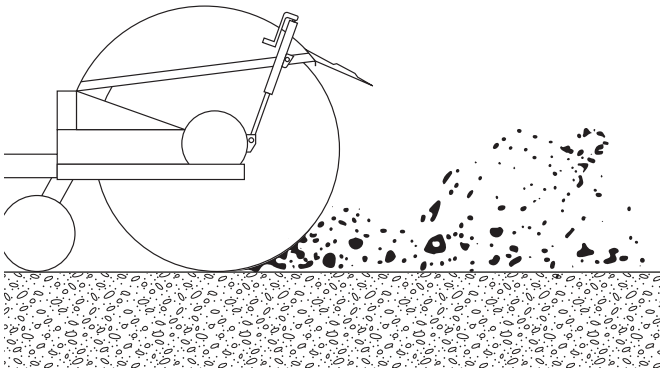
Always sweep as much as possible with the deflector in the raised position.

If the brush lift switch is in the raise position, the deflector will come up, but will not go down. Be sure the brush lift switch is in the center position before operating air deflector switch.

Sand & Gravel

When sweeping sand, gravel and other light debris, the air deflector should be lowered. This will direct the air flow down toward the ground and help prevent the dust and debris from being blown up into the air. See Figure #2

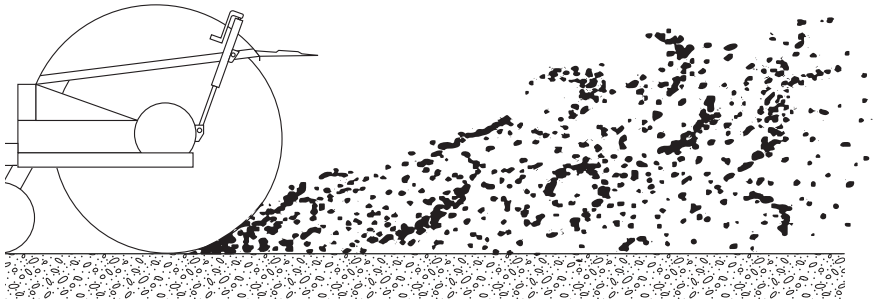
FIGURE #2



Light Snow

When sweeping light snow the air deflector should be between the lowered to middle position. This will keep the air flow low to the ground and will help prevent carry over and deposit of the light snow behind the brush. See Figure #3

FIGURE #3

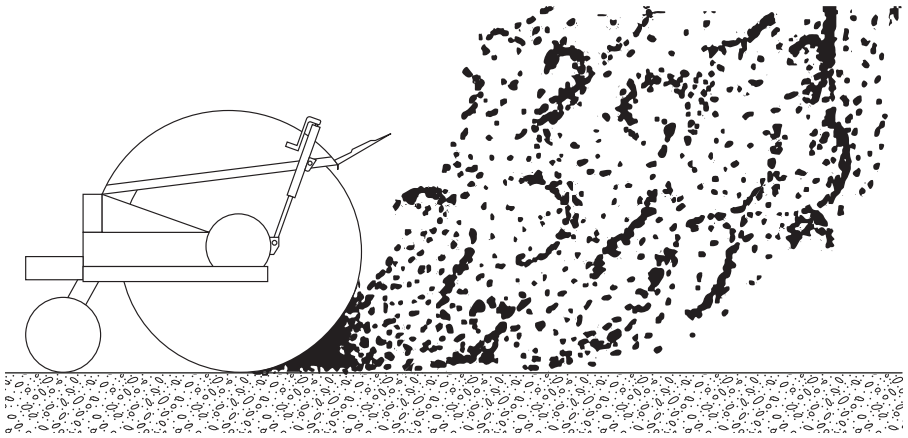


OPERATION

Heavy Snow & Slush

When sweeping heavy snow and/or slush, the air deflector should be in the raised position. This will allow the material to be thrown away from the brush and out of the sweeping path. This will also help prevent carry over and buildup of snow and ice under the hood. See Figure #4

FIGURE #4

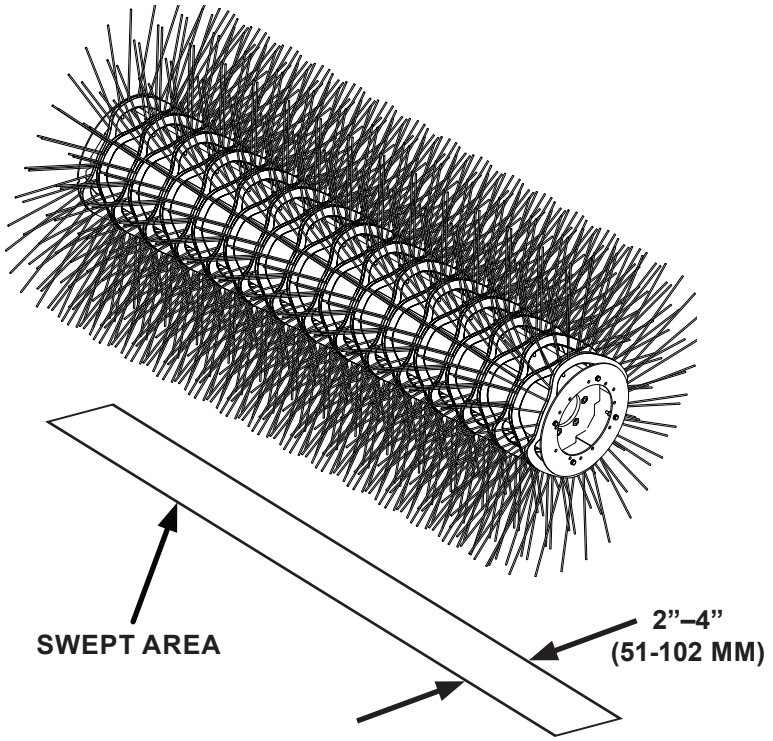


BRUSH PATTERN ADJUSTMENT

A properly adjusted brush offers the best sweeper performance. To check the brush pattern:

1. Move the sweeper to a dusty, flat surface.
2. Set the prime mover's parking brake and leave the engine running.
3. Start the sweeper at a slow speed: lower it so the bristle tips touch the ground. Run the sweeper in a stationary position for 10 seconds.
4. Raise the sweeper and back away; switch off the engine and remove the key. The brush pattern left in the dust should be 2"–4" (51-102 mm) wide, running the length of the brush. (Compare the swept area with Figure #1.)

FIGURE #1



5. Lengthen the toplink to lower the brush head and make a larger pattern or shorten the toplink to raise it and make a smaller pattern. The ratchet direction can be changed by flipping the switch at the base of the handle.

Note: Sections should be replaced when exposed bristle length is 6 inches or less. See Replacing Brush Sections.

OPERATING TIPS

Vary brush, engine and travel speeds to match sweeping conditions.

NOTICE! Do not ram into piles. Use a dozer blade for this type of job.

LARGE AREAS

When sweeping a large area, such as a parking lot, make a path down the middle and sweep to both sides. This reduces the amount of debris that the sweeper must sweep to one side.

SNOW

Fast brush speeds and slow travel speeds are needed to sweep snow effectively. Start at ¾ throttle and the lowest gear of the prime mover. For wet and/or deep snow, increase to almost full throttle. This helps keep snow from packing up inside the brush hood.

NOTICE: For best sweeping results, we recommend that the swing assembly mounting holes be 12” (305 mm) above the ground. Failure to maintain this distance allows for swept material to be carried over the brush and back onto the swept area.

- In deep snow you may need to make multiple passes to get down to a clean surface.
- Always sweep with the wind at your back.

NOTICE! Do not allow snow to build up on top of hood. Too much weight could cause hood to bend causing attachment damage.

DIRT & GRAVEL

To keep dust at a minimum, plan sweeping for days when it is overcast and humid or after it has rained.

Low brush speeds and moderate travel speeds work best for cleaning debris from hard surfaces. Brush speeds that are too fast tend to raise dust.

To sweep gravel, use just enough brush speed to “roll” the gravel, not throw it.

OPTIONAL DUST SUPPRESSION

The sprinkler system kit and water tank contains enough nozzles and hose to install on the top of the brush head. Refer to supplied instructions.

OPERATION

STORAGE

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

IMPORTANT: When detaching your unit for short or long term storage be sure to follow the Detaching Instruction in the Installation Section of this manual.

NOTICE! Do not store the sweeper with weight on the brush. Weight will deform the bristles, destroying the sweeping effectiveness. To avoid the problem, place the sweeper on blocks or use storage stands.

NOTICE! Do not store polypropylene brushes in direct sunlight. The material can deteriorate and crumble before the bristles are worn out. Keep polypropylene brush material away from intense heat or flame.

- Clean the unit thoroughly, removing all mud, dirt, snow, 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.
- 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

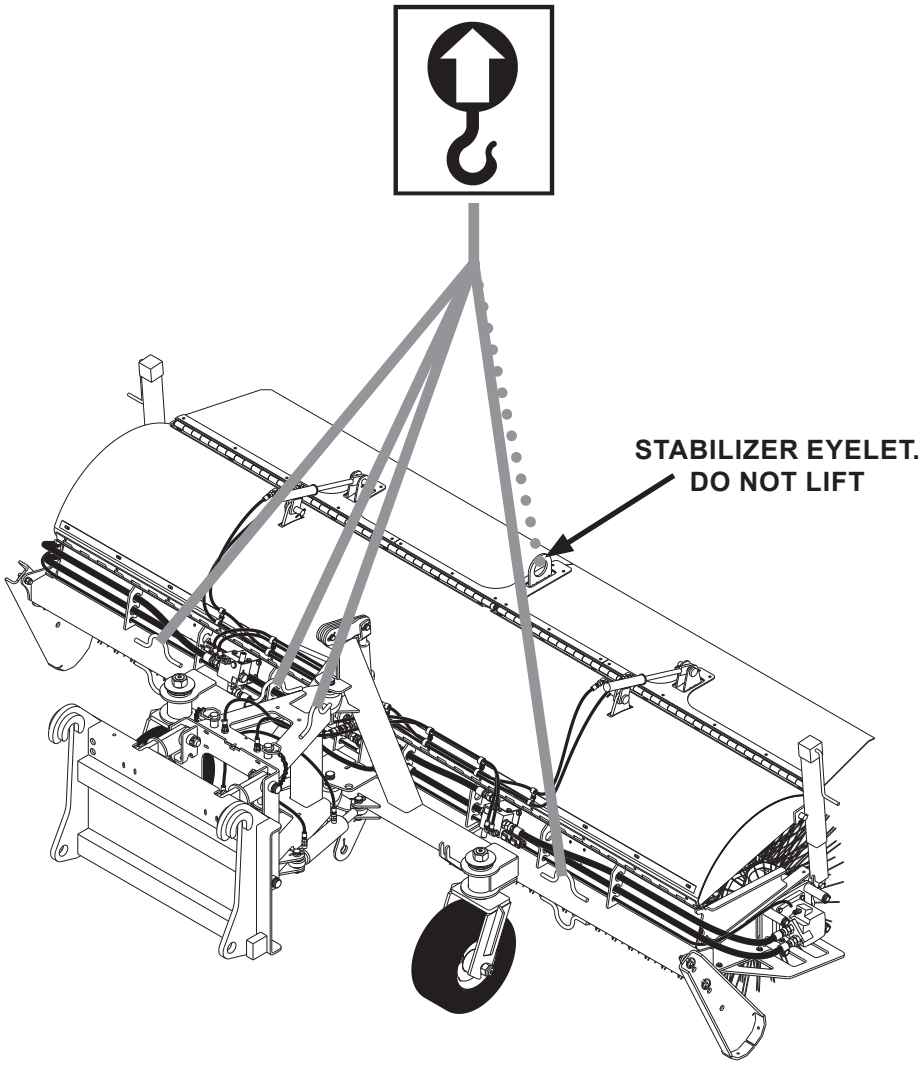
- Wash unit and replace any damaged and/or missing parts.
- Lubricate grease fittings.
- Check hydraulic hoses for damage and replace as necessary.

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.**

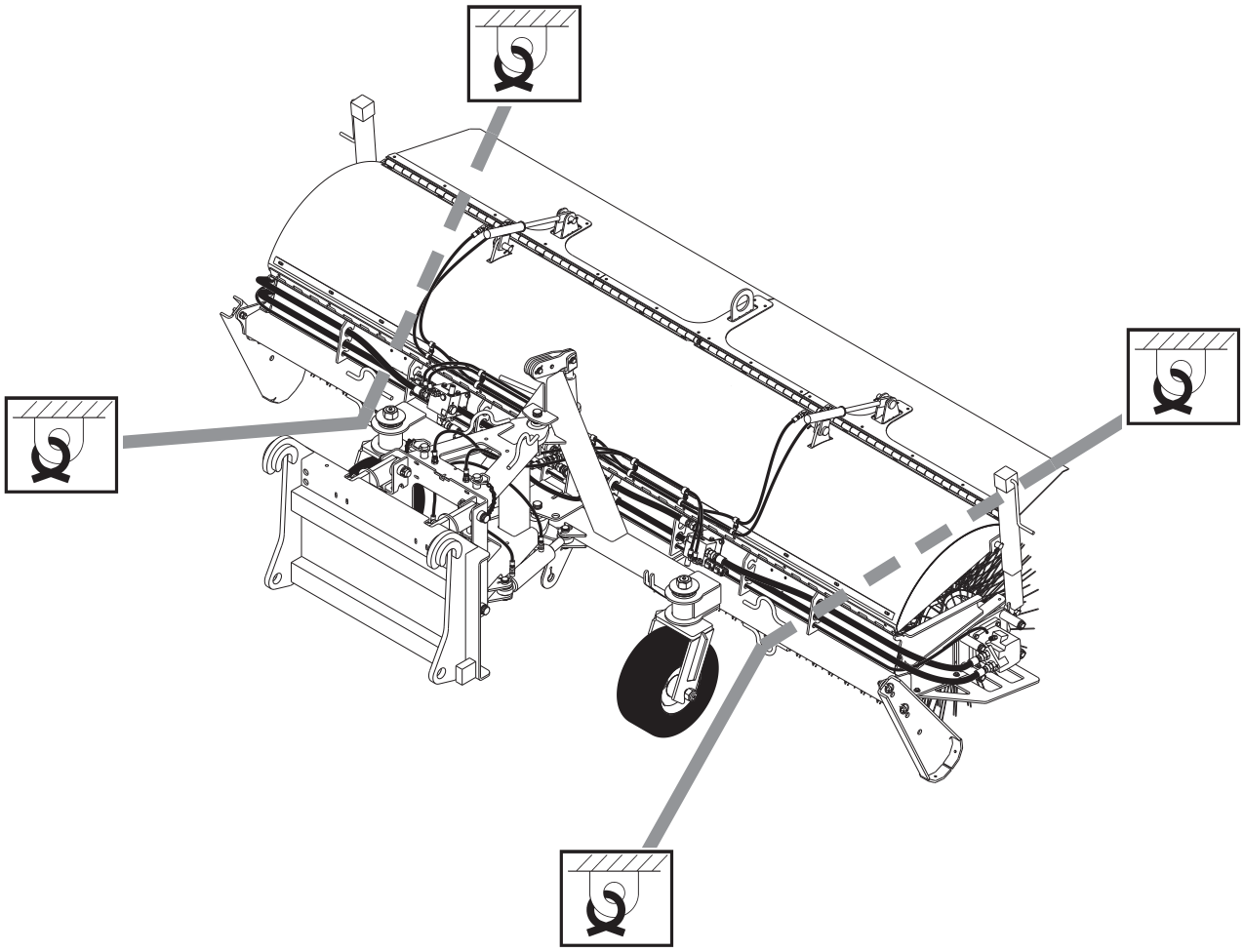
CAUTION! **DO NOT USE STABILIZER EYELET TO LIFT BRUSH HEAD. Use only to maintain center of balance when lifting brush head with lift chain and to secure air deflector during maintenance.**

OPERATION

TIE DOWN POINTS

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

- 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.

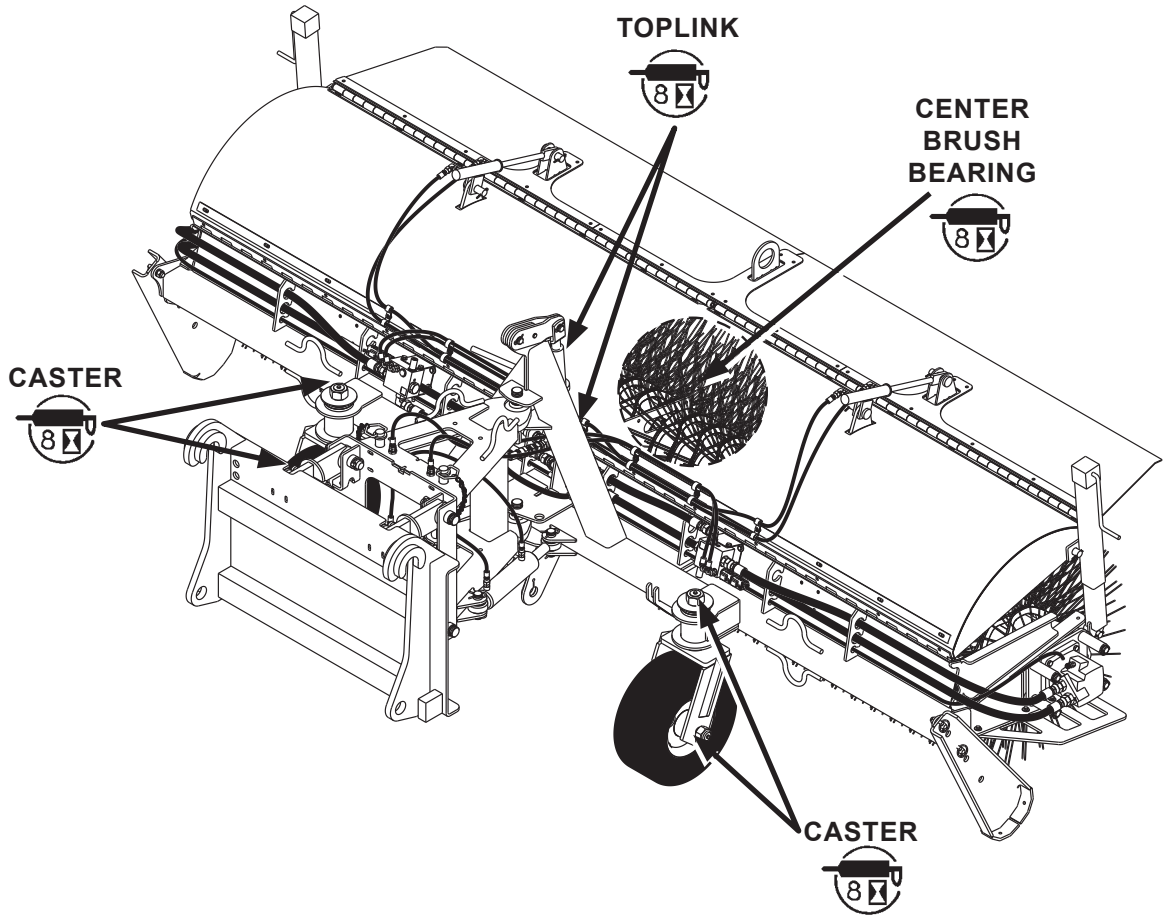
TRANSPORTING

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

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.

MAINTENANCE

GENERAL INFORMATION

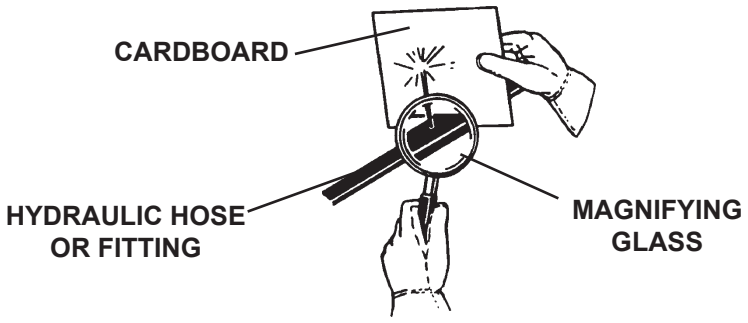
Regular maintenance is the key to long equipment life and safe operation. Maintenance requirements have been reduced to an absolute minimum. However it is very important that these maintenance functions be performed as described below.

Procedure	Every 8 Hours (Daily)
Check prime mover hydraulic system to ensure an adequate level and cleanliness of hydraulic oil.	✔
Check for missing or loose hardware. Replace or tighten as necessary. See Bolt Torque Specifications	✔
Check hydraulic system for leaks and tighten as necessary. Check for damage and replace as needed.	✔
Check for missing or damaged safety decals and replace as necessary.	✔
Check tire pressure. (refer to tire)	✔
Inspect attachment for any worn parts or cracked welds. Repair as required.	✔
Lubricate grease fittings.	✔
Lubricate & retract cylinder rods.	✔

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

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

Stop the engine and relieve pressure before connecting or disconnecting lines. Tighten all connections before starting engine or pressurizing lines.

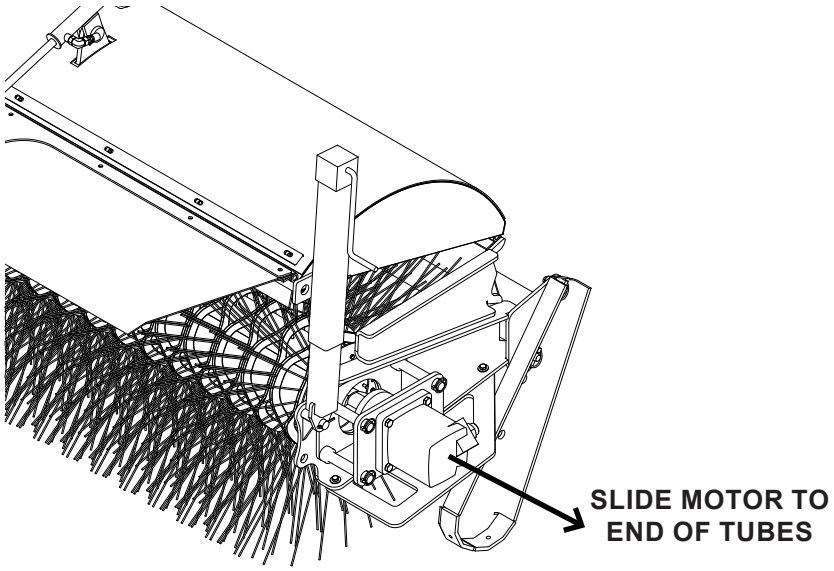


MAINTENANCE

REPLACING BRUSH SECTIONS

1. With the broom resting on the ground, remove the motor mount lynch pins and the motor mount tubes from the left and right side of your broom. Reinstall the pins, retain the tubes for reinstallation
2. Slide the motor/bearing assemblies away from the core taking extra care not to tangle hoses. See Figure #1

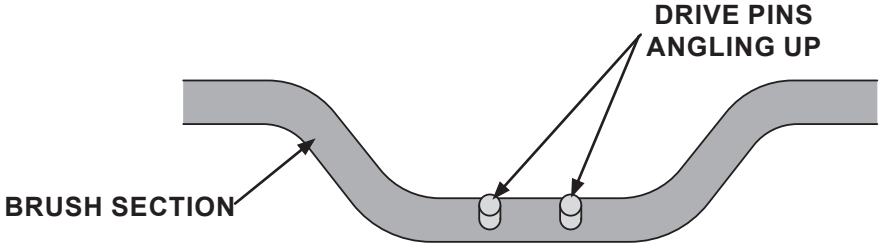
FIGURE 1



3. Slide the two cores apart and remove the right core assembly, leaving the left & bearing assembly.
4. Remove the bearing hardware and retain it for reinstallation.
5. Slide the left core from the brush head assembly with the bearing still attached to the core.
6. Remove retaining plate from the core assembly.
7. Remove old brush sections.
8. Stand the core on end and install new brush sections by doing the following:

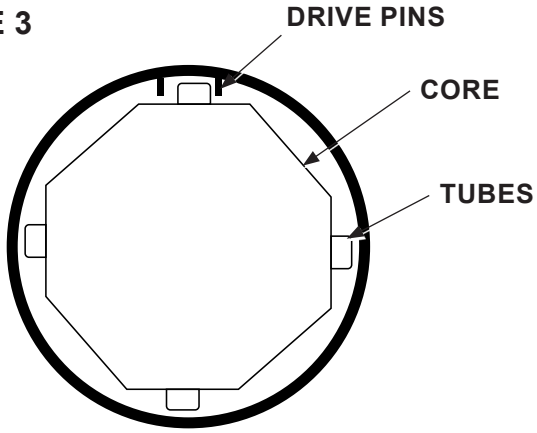
Note: Drive pin direction can be difficult to determine. Inspect your sections to determine up and down directions. See Figure #2

FIGURE 2



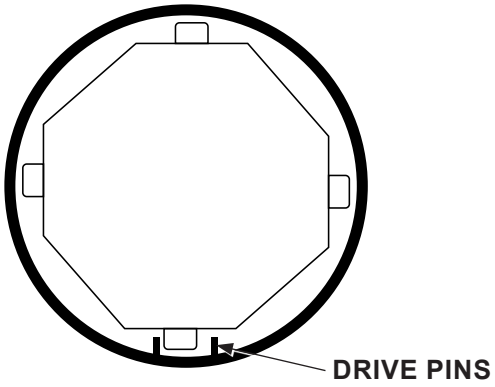
a. Slide the first section onto the core with the drive pins on each side of a tube. Make sure that the drive pins angle up. See Figure #3
b. Install the second section with drive pins angled down and positioned on each side of the tube located 180° from the first section. See Figure #4

FIGURE 3



FIRST SECTION

FIGURE 4



SECOND SECTION

c. Continue installing sections, rotating each section 180°, and alternating the direction of the drive pins until the core is full.

9. Reinstall the retaining plate onto the core assembly using the existing hardware.
10. Lay the core back onto the ground and re-position for installation into the brush frame assembly.
11. Repeat steps 6-10 for the other core.
12. Position the left core assembly, with bearing still attached into the brush frame.
13. Reattach bearing with existing hardware.
14. Install the right core and slide both cores together while aligning shafts.
15. Slide motor and/or bearing assemblies back into the core taking care not to tangle hoses.
16. Secure in place using the existing tubes removed in step #1 and lynch pins.

Worn Section Standard				**Reference Information**	
Section OD, New	Ring ID	Section OD, Worn	Exposed Bristle, Worn	Bristle Length	Exposed Bristle, New
24	6.38	17	3.8	8.50	7.5
26	8.00	18	4.0	9.00	8.0
32	10.00	22	5.0	11.00	10.0
36	10.00	24	6.0	13.00	12.0
36	10.63	25	6.0	12.69	11.4
46	19.38	34	6.0	13.31	12.1

MAINTENANCE

CYLINDER SEAL REPLACEMENT

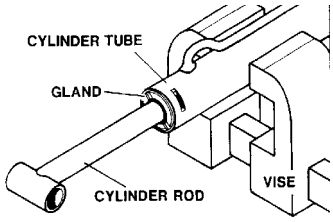
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic 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.

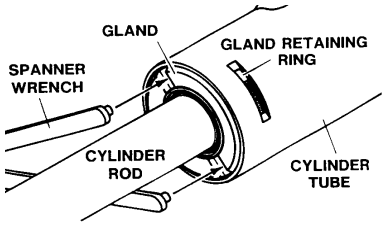
DISASSEMBLY PROCEDURE

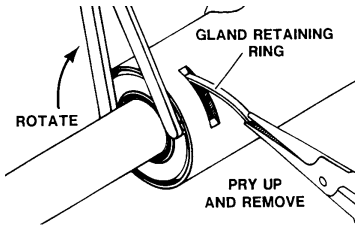
IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

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.

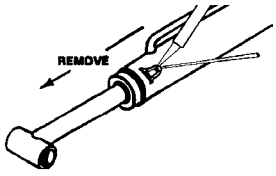


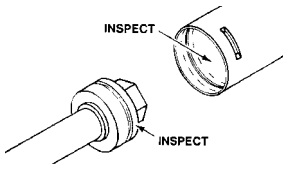


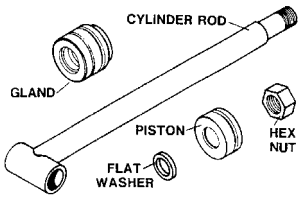


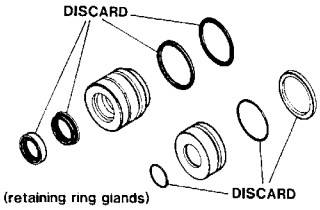
Pry up the end of the gland retaining ring with a pointed tool. Rotate the gland with a spanner wrench while removing the retaining ring. **NOTE: The gland and piston seal(s) can be pulled out and cut as they appear in the milled slot during disassembly. After cutting, pull them on out through the milled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

3. Pull the cylinder rod from the cylinder tube.







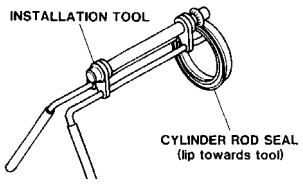


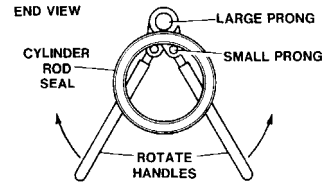
4. Inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston and cylinder tube must be replaced.
5. Remove the hex nut, piston, flat washer or spacer tube (if so equipped), and gland from the cylinder rod. If the cylinder rod is rusty, scratched, or bent,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

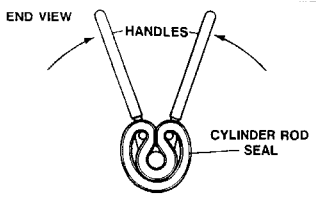
ASSEMBLY PROCEDURE

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 carefull 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.







MAINTENANCE

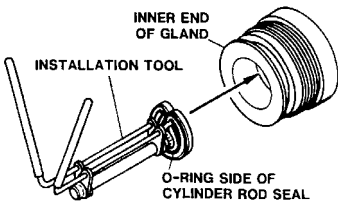
Now insert the seal into the gland from the inner end. Position the seal in its groove, and release and remove the tool. Press the seal into its seat the rest of the way by hand.

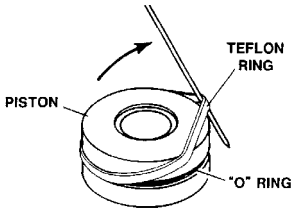
NOTE: Threaded gland is shown in diagram for reference only.

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.

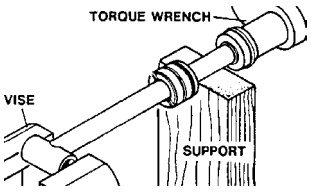
4. Secure the cylinder rod (mounting end) in a vise, with a support at its center. Torque the nut to the value shown on the chart for the thread diameter of the cylinder rod.

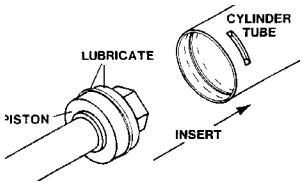


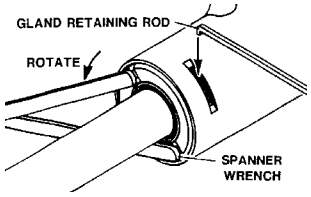


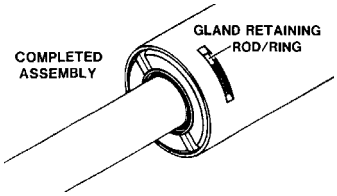
Thread Diameter	POUNDS - FEET
7/8"	150-200
*1"	230-325
1-1/8"	350-480
1-1/4"	490-670
1-3/8"	670-900

*** 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.**

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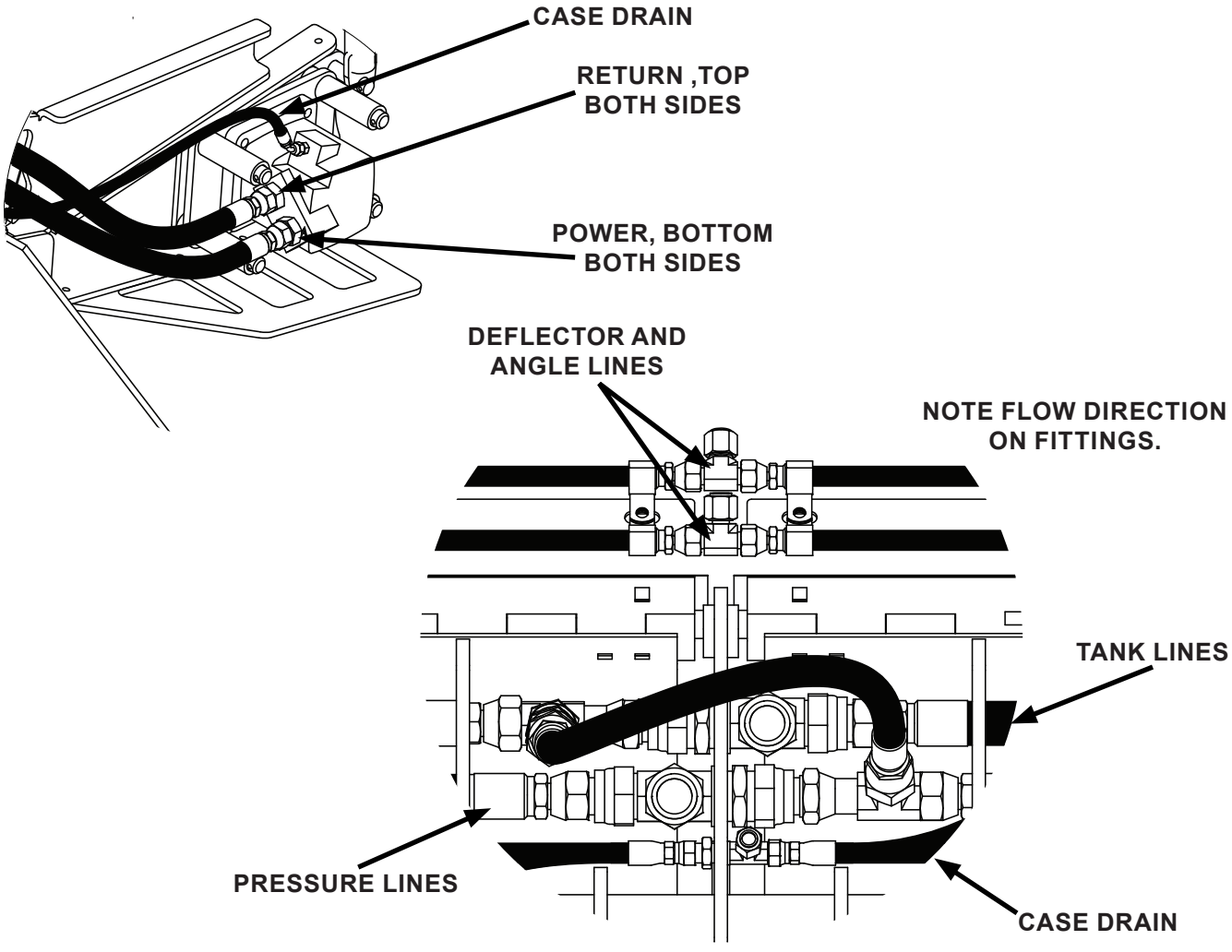
TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
BRUSH ROTATES IN WRONG DIRECTION	Hoses installed incorrectly.	Switch hoses at brush head.
BRUSH WEARS UNEVENLY	Tires at different pressure or different size.	Check tire sizes and rating. Repair or replace as necessary.
BRUSH SLOWS OR STOPS WHEN SWEEPING	Brush pattern too wide.	Adjust brush pattern to 2”–4” (51-102 mm) wide. See Brush Pattern Adjustment
	Travel speed too fast.	Reduce travel speed while sweeping.
	Trying to sweep too much material at once.	Make several passes with sweeper.
	Filter plugging.	Change or clean hydraulic filter.
BRUSH WEARS VERY QUICKLY	Brush pattern is too wide.	Adjust brush pattern to 2”–4” (51-102 mm) wide. See Brush Pattern Adjustment
HYDRAULIC CYLINDER NEITHER EXTENDS NOR RETRACTS	No power from controls because wires are broken or disconnected.	Reconnect or replace wires.
	No power from controls because switch is broken.	Replace switch.
	Hydraulic oil level too low.	Refer to prime mover Operator’s Manual to fill tank.
	Hoses or fittings loose or disconnected.	Tighten hoses and fittings.
	Restriction in hoses.	Remove obstructions or replace hoses.
HYDRAULIC CYLINDER ONLY EXTENDS OR ONLY RETRACTS	Dirt or debris in spools.	Contact Paladin.
HYDRAULIC MOTOR SEALS LEAK	Back pressure exceeds 500 PSI.	Contact Paladin.
	Motor is failing.	Contact Paladin.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
HYDRAULIC SYSTEM OVERHEATS	Hydraulic oil level too low.	Refer to prime mover Operator's Manual to fill tank.
	Restriction in hoses.	Check hose routing and remove any kinks or bends. Remove obstructions and replace as needed.
	Prime mover pump flow rate exceeds maximum rate of attachment.	Refer to prime mover Operator's Manual.
	Trying to sweep too much material at once.	Make several passes with sweeper.
	Brush pattern too wide.	Adjust brush pattern to 2"–4" (51-102 mm) wide. See Brush Pattern Adjustment

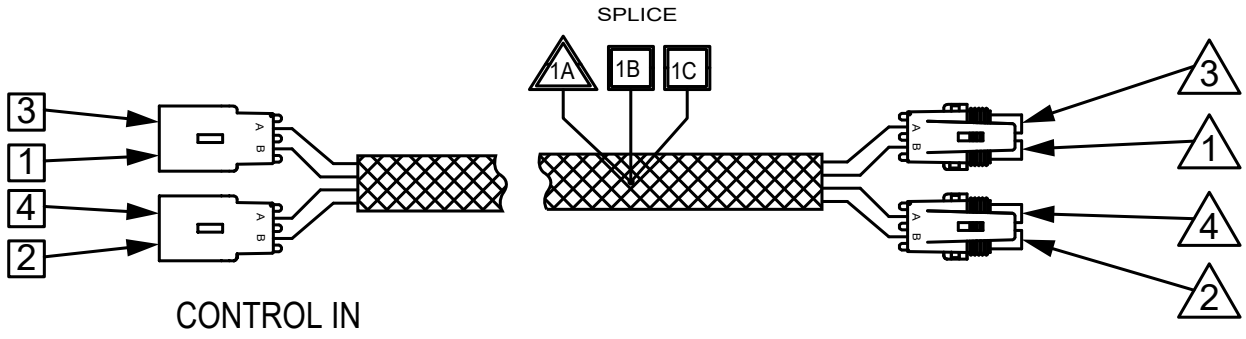
HYDRAULIC HOSE ROUTINGS



TROUBLESHOOTING

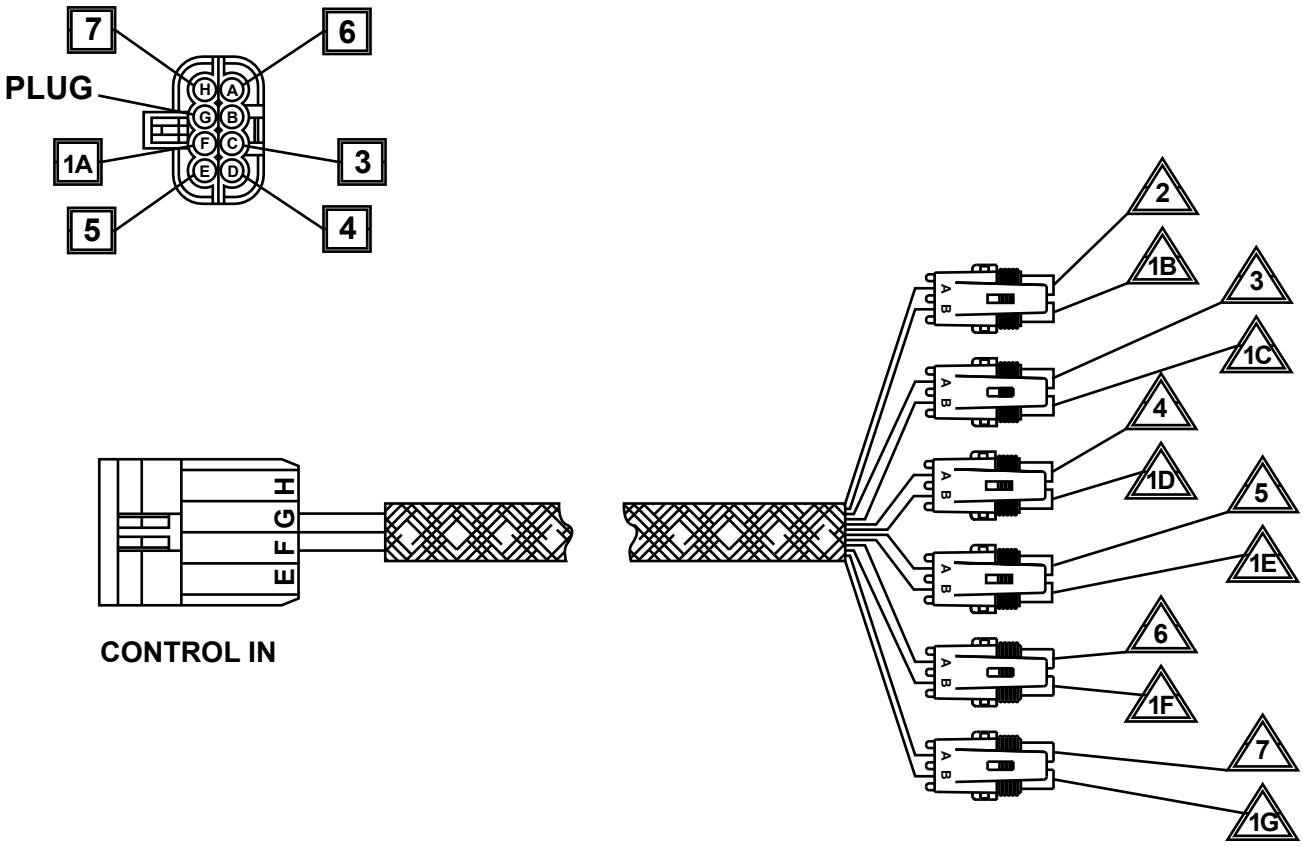
ELECTRICAL DIAGRAMS

WIRE NO.	07-7326 WIRE HARNESS			
	GUAGE	IDENTIFICATION	APPLICATION	
			□ FROM	△
1	16	BLACK	PACKARD 1 PIN B FEMALE	PACKARD 1 PIN B MALE
2	16	BLACK	PACKARD 2 PIN B FEMALE	PACKARD 2 PIN B MALE
3	16	RED	PACKARD 1 PIN A FEMALE	PACKARD 1 PIN B MALE
4	16	YELLOW	PACKARD 2 PIN A FEMALE	PACKARD 2 PIN A MALE



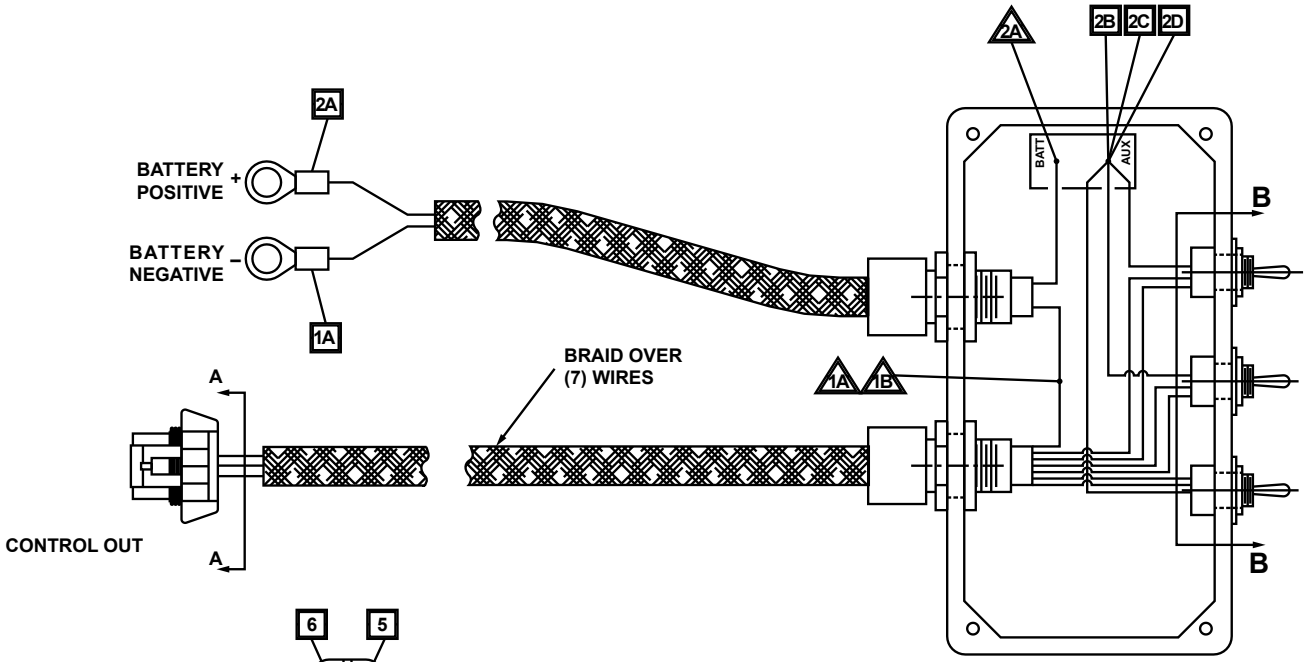
TROUBLESHOOTING

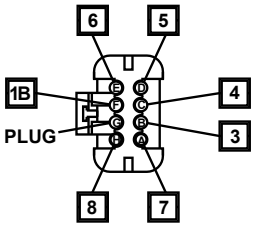
WIRE NO.	07-10014 WIRE HARNESS			
	GUAGE	IDENTIFICATION	APPLICATION	
			☐ FROM	
1A	16	BLACK	PACKARD PIN F	ULTRA SONIC SPLICE
1B	16	BLACK	ULTRA SONIC SPLICE	PACKARD 1 PIN B-DEPTH
1C	16	BLACK	ULTRA SONIC SPLICE	PACKARD 2 PIN B-DEPTH
1D	16	BLACK	ULTRA SONIC SPLICE	PACKARD 3 PIN B-TILT
1E	16	BLACK	ULTRA SONIC SPLICE	PACKARD 4 PIN B-TILT
1F	16	BLACK	ULTRA SONIC SPLICE	PACKARD 5 PIN B-SIDE SHIFT
1G	16	BLACK	ULTRA SONIC SPLICE	PACKARD 6 PIN B-SIDE SHIFT
2	16	NOT USED	PACKARD PIN B	PACKARD 1 PIN A-DEPTH
3	16	YELLOW	PACKARD PIN C	PACKARD 2 PIN A-DEPTH
4	16	BROWN	PACKARD PIN D	PACKARD 3 PIN A-TILT
5	16	GREEN	PACKARD PIN E	PACKARD 4 PIN A-TILT
6	16	BLACK/WHITE	PACKARD PIN A	PACKARD 5 PIN A-SIDE SHIFT
7	16	BLUE	PACKARD PIN H	PACKARD 6 PIN A-SIDE SHIFT



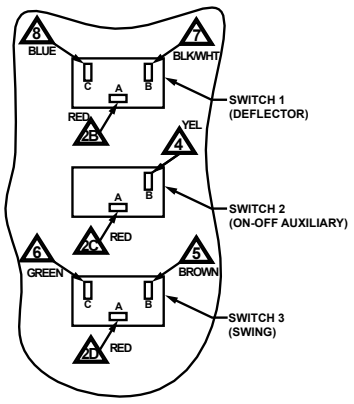
TROUBLESHOOTING

WIRE NO.	07-10013 WIRE HARNESS			
	GUAGE	IDENTIFICATION	APPLICATION	
			□ FROM	△ TO
1A	16	BLACK	BATTERY 12V	SPADE TERMINAL (MALE)
1B	16	BLACK	SPADE TERMINAL (FEMALE)	PACKARD CONN PIN F
2A	16	RED	BATTERY +	SPADE TERMINAL (MALE)
2B	16	RED	CIRCUIT BREAKER 10A - AUX	SWITCH 1-A
2C	16	RED	CIRCUIT BREAKER 10A - AUX	SWITCH 2-A
2D	16	RED	CIRCUIT BREAKER 10A - AUX	SWITCH 3-A
3	16	RED	NOT USED	PACKARD CONN PIN B
4	16	YELLOW	SWITCH 2-B	PACKARD CONN PIN C
5	16	BROWN	SWITCH 3-B	PACKARD CONN PIN D
6	16	GREEN	SWITCH 3C	PACKARD CONN PIN E
7	16	BLACK/WHITE	SWITCH 1B	PACKARD CONN PIN A
8	16	BLUE	SWITCH 1C	PACKARD CONN PIN H





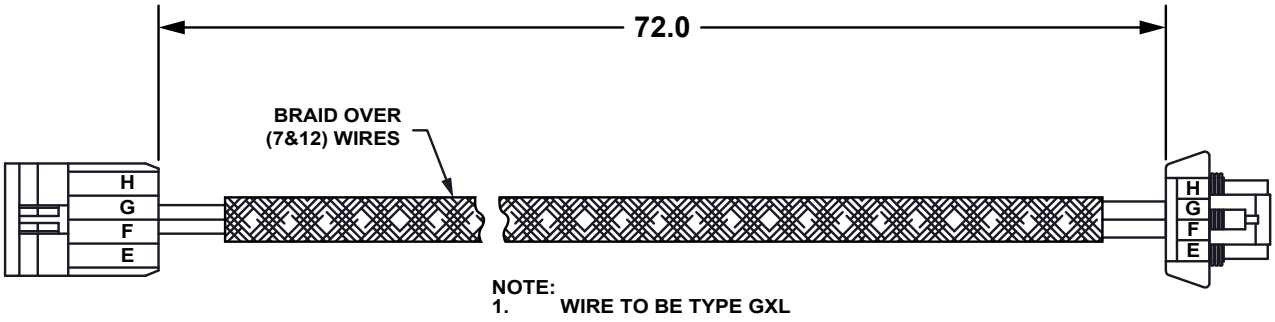
VIEW "A — A"



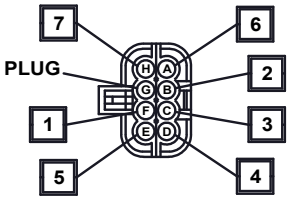
VIEW "B — B"

TROUBLESHOOTING

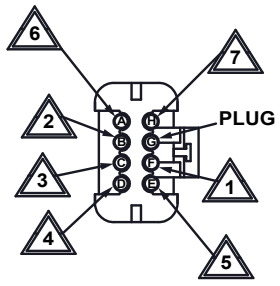
WIRE NO.	WIRE				□ END (LEFT) (BEYOND HARNESS)	△ END (RIGHT) (BEYOND HARNESS)
	GUAGE	IDENTIFICATION	APPLICATION		TERMINAL TYPE	TERMINAL TYPE
			□ FROM	△		
1	16	BLACK	PACKARD PIN F	PACKARD PIN F	PACKARD 12045773 & SEAL	PACKARD 12048074 & SEAL
2	16	RED	PACKARD PIN B	PACKARD PIN B	PACKARD 12045773 & SEAL	PACKARD 12048074 & SEAL
3	16	YELLOW	PACKARD PIN C	PACKARD PIN C	PACKARD 12045773 & SEAL	PACKARD 12048074 & SEAL
4	16	BROWN	PACKARD PIN D	PACKARD PIN D	PACKARD 12045773 & SEAL	PACKARD 12048074 & SEAL
5	16	GREEN	PACKARD PIN E	PACKARD PIN E	PACKARD 12045773 & SEAL	PACKARD 12048074 & SEAL
6	16	BLACK/WHITE	PACKARD PIN A	PACKARD PIN A	PACKARD 12045773 & SEAL	PACKARD 12048074 & SEAL
7	16	BLUE	PACKARD PIN H	PACKARD PIN H	PACKARD 12045773 & SEAL	PACKARD 12048074 & SEAL



NOTE:
1. WIRE TO BE TYPE GXL

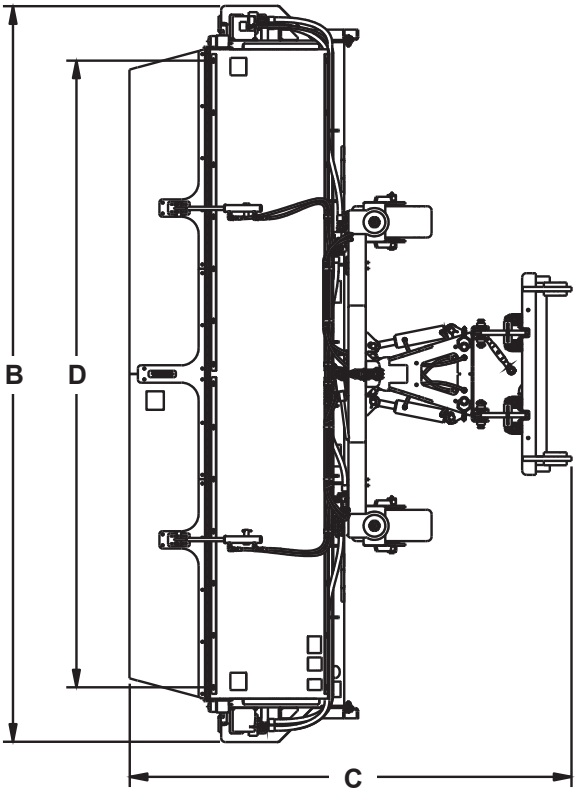


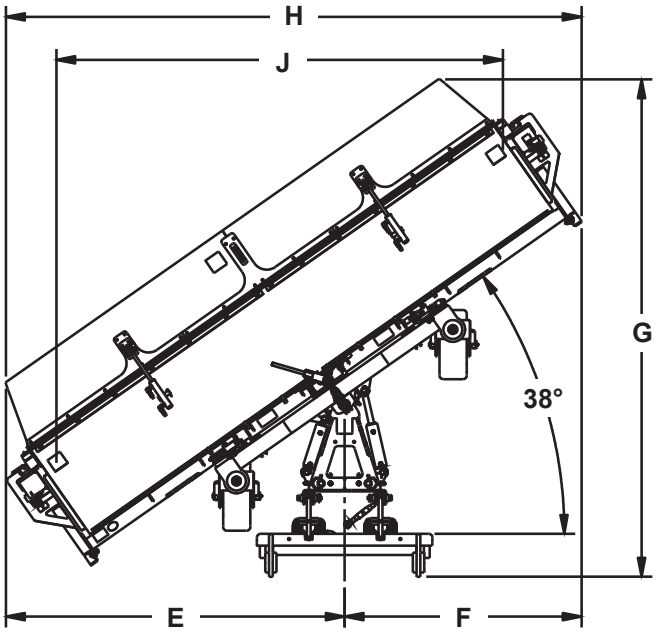
1X - PACKARD HOUSING M-P 150 8-WAY # 12047931
7X - PACKARD TERMINAL MALE # 12045773
7X - PACKARD WIRE SEAL # 12048086 (RED)
1X - PACKARD PLUG SEAL # 12059168 (RED)
1X - PACKARD SECONDARY LOCK # 12186737

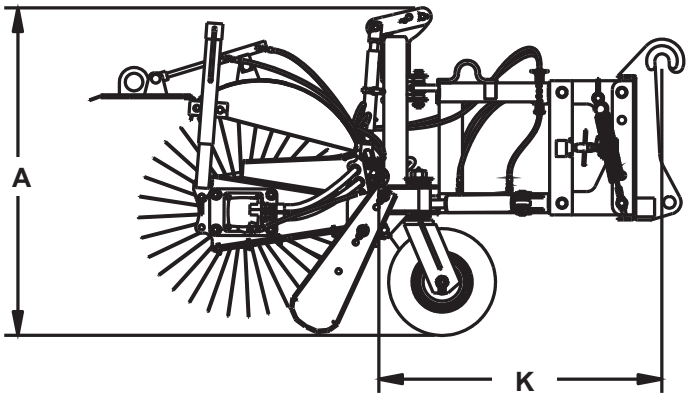


1X - PACKARD HOUSING M-P 150 8-WAY # 12047937
7X - PACKARD TERMINAL FEMALE # 12048074
7X - PACKARD WIRE SEAL # 12048086 (RED)
1X - PACKARD PLUG SEAL # 12059168 (RED)
1X - PACKARD SECONDARY LOCK # 12166304

SPECIFICATIONS







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

SPECIFICATIONS

DESCRIPTION	12’	14’	16’
A. Overall Height	56.20”	56.20”	56.20”
B. Overall Width	169.80”	193.80”	217.80”
C. Overall Length	101.90”	101.90”	101.90”
D. Sweeping Width	144.00”	168.00”	192.00”
E. Offset to Trailing Edge @ 35°	89.90”	99.90”	109.60”
F. Offset to Leading Edge @ 35°	62.90”	72.70”	82.60”
G. Overall Length @ 35°	132.00”	139.20”	145.80”
H. Overall Width @ 35°	152.80”	172.60”	192.20”
J. Sweeping Width @ 35°	118.70”	138.20”	157.80”
K. Center of Gravity - Horizontal	48.60”	49.60”	50.50”
Weight - Dual 11.9 CID Motors (lbs)	2925#	3130#	3290#
Weight - One 11.9 CID Motor & One 23.9 CID Motor (lbs)	2930#	3135#	3295#
Weight - Dual 23.9 CID Motors (lbs)	2935#	3140#	3300#

Hydraulic Flow Range - Dual 11.9 CID Motors	16-40 GPM
Hydraulic Flow Range - One 11.9 CID Motor & One 23.9 CID Motor	20-60 GPM
Hydraulic Flow Range - Dual 23.9 CID Motors	24-80 GPM
Maximum Pressure	3500 PSI
Maximum Back Pressure @ 40 GPM	500 PSI
Back Pressure with Case Drain	over 500 PSI

BOLT TORQUE SPECIFICATION

GENERAL TORQUE SPECIFICATION TABLES

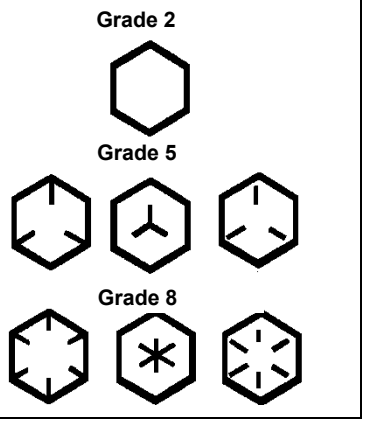
Use the following charts when determining bolt torque specifications, when special torques are not given. Always use grade 5 or better when replacing bolts.

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			
		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

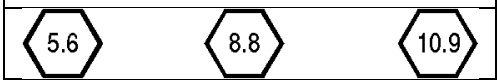
Bolt head identification marks as per grade.
NOTE: Manufacturing Marks Will Vary



METRIC BOLT TORQUE SPECIFICATIONS

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

Bolt head identification marks as per grade.



Bolt Size	Grade No.	Pitch (mm)	Ft-lbs	Newton-Meter	Pitch (mm)	Ft-lbs	Newton-Meter
M6	5.6	1,0	3.6-5.8	4,9-7,9	-	-	-
	8.8		5.8-.4	7,9-12,7		-	-
	10.9		7.2-10	9,8-13,6		-	-
M8	5.6	1,25	7.2-14	9,8-19	1,0	12-17	16,3-23
	8.8		17-22	23-29,8		19-27	25,7-36,6
	10.9		20-26	27,1-35,2		22-31	29,8-42
M10	5.6	1,5	20-25	27,1-33,9	1,25	20-29	27,1-39,3
	8.8		34-40	46,1-54,2		35-47	47,4-63,7
	10.9		38-46	51,5-62,3		40-52	54,2-70,5
M12	5.6	1,75	28-34	37,9-46,1	1,25	31-41	42-55,6
	8.8		51-59	69,1-79,9		56-68	75,9-92,1
	10.9		57-66	77,2-89,4		62-75	84-101,6
M14	5.6	2,0	49-56	66,4-75,9	1,5	52-64	70,5-86,7
	8.8		81-93	109,8-126		90-106	122-143,6
	10.9		96-109	130,1-147,7		107-124	145-168
M16	5.6	2,0	67-77	90,8-104,3	1,5	69-83	93,5-112,5
	8.8		116-130	157,2-176,2		120-138	162,6-187
	10.9		129-145	174,8-196,5		140-158	189,7-214,1
M18	5.6	2,0	88-100	119,2-136	1,5	100-117	136-158,5
	8.8		150-168	203,3-227,6		177-199	239,8-269,6
	10.9		175-194	237,1-262,9		202-231	273,7-313
M20	5.6	2,5	108-130	146,3-176,2	1,5	132-150	178,9-203,3
	8.8		186-205	252-277,8		206-242	279,1-327,9
	10.9		213-249	288,6-337,4		246-289	333,3-391,6

PARTS

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

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

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

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

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

SERVICE DEPARTMENT
(734) 996-9116
(800) 456-7100

For Fax and E-mail Orders
PLC_Sales@paladinattachments.com
(734) 996-9014

WARRANTY

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