SWEEPSTER BY PALADIN

OPERATOR'S MANUAL

ANGLE SWEEPER
S26/S30 – 222, 225 & 226 Series – MRHL/CTC

FOR
TRACTOR LOADERS,
COMPACT TOOL CARRIERS

SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: 51-4179
Date: December 2018
Serial Number: 0906001 & Up
Rev. 5

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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.

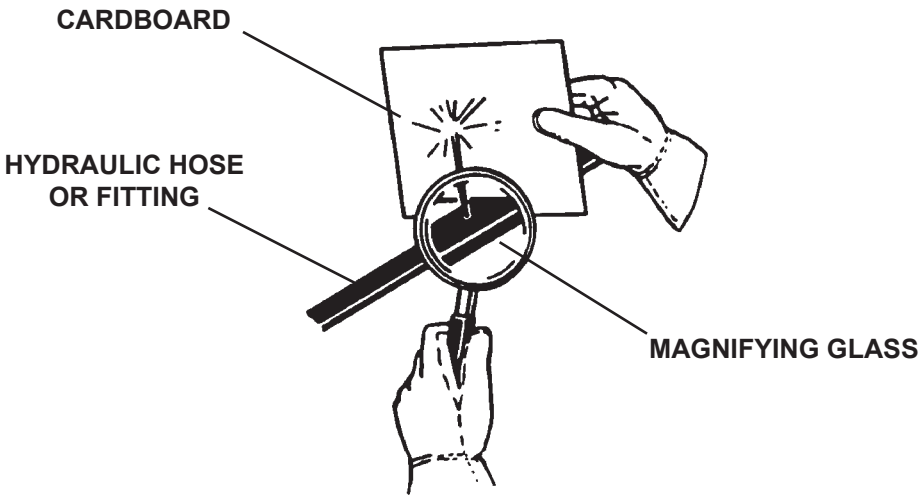
WARNING! LOWER OR SUPPORT RAISED EQUIPMENT

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 performing maintenance lower the attachment to the ground, apply the brakes, turn off the engine and remove the key.
- Never lift the lowest portion of the attachment plate higher than 5' above the ground.
- Do not lock the auxiliary hydraulics of your prime mover in the "ON" position.

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

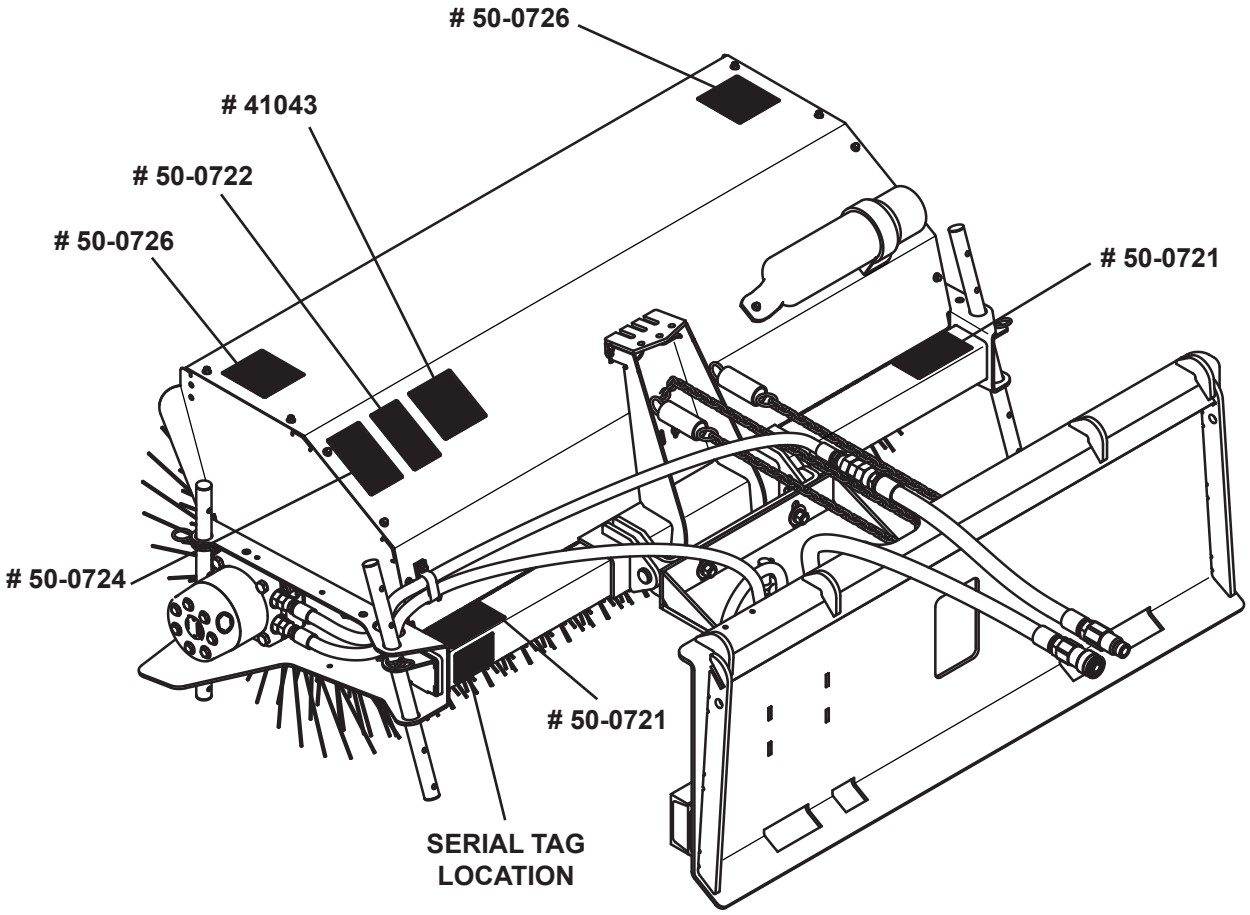
- Before performing maintenance lower the attachment to the ground, apply the brakes, turn off the engine and remove the key.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator service manuals before any repair is made. After completing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

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.



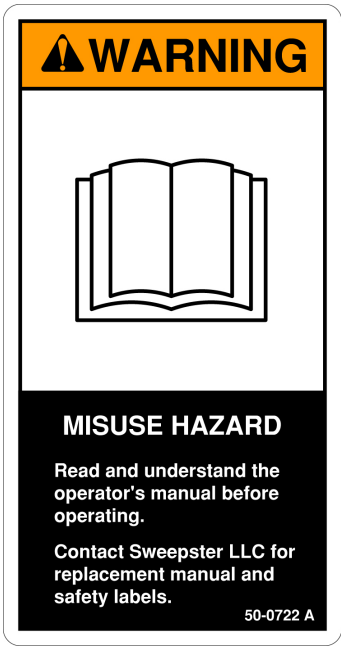
IMPORTANT: Keep all safety decals clean and legible. Replace all missing, illegible, or damaged safety decals. When replacing parts with safety decals attached, the safety decals must also be replaced. Safety decals are available, free of charge, from your local dealer or Paladin.

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

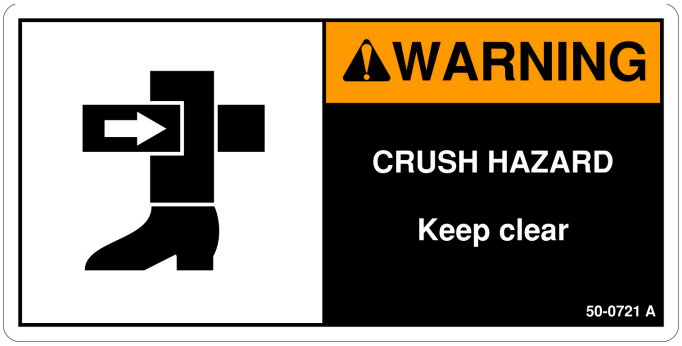
 # 41043 WARNING! HAZARDOUS DUST

 # 50-0724 WARNING! HIGH PRESSURE FLUID HAZARD



 # 50-0722 WARNING! MISUSE HAZARD

 # 50-0726 WARNING! FLYING OBJECTS & ENTANGLEMENT



 # 50-0721 WARNING! CRUSH HAZARD

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. The sweeper uses the quick-attach system for ease of installation. Therefore, 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.

NOTICE! S26/S30 Series sweepers are designed to fit tractors and loaders that meet the specifications outlined in the Specifications section.

INSTALLATION

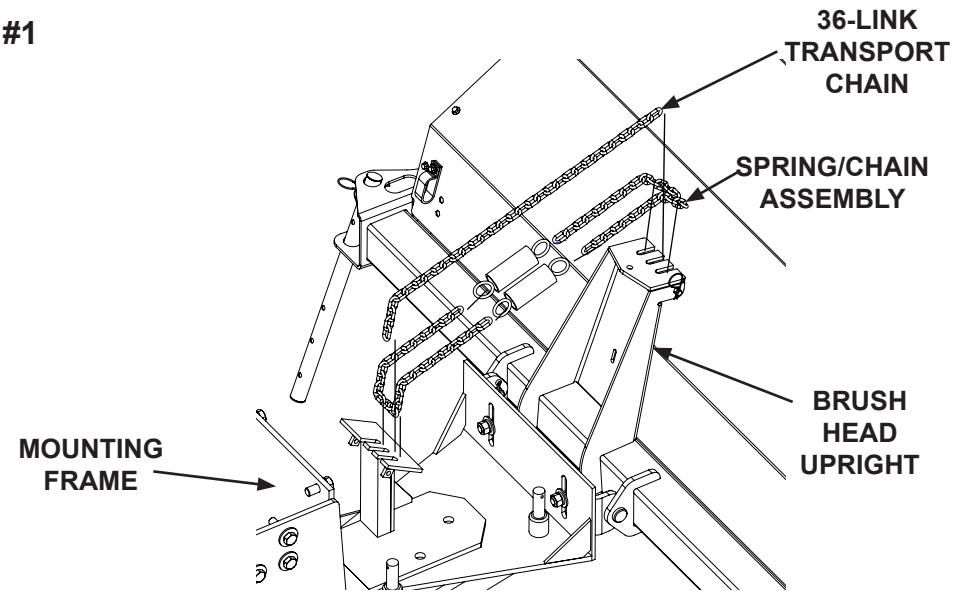
1. Remove any attachment from the front of the prime mover.
2. Center the mounting/swing assembly in front of the prime mover.
3. Following all standard safety practices and the instructions for installing an attachment in your prime mover operator's manual, install the mounting/swing assembly onto your loader.
4. Level the mounting/swing assembly with the prime mover's tilt cylinders. Then, adjust the loader height until the assembly is 12" (305 mm) above the ground.

NOTICE! The mounting/swing assembly must be level for the sweeper to operate properly when angled.

WARNING! To avoid serious personal injury, make sure mounting/swing assembly is securely latched to the attachment mechanism of your unit.

5. Position the brush head assembly in front of the mounting/swing assembly.
6. Attach the brush head assembly to the front of the swing plate with two .50" carriage bolts, flat washers, lock washers and nuts.
7. Install the spring-chain assembly. See Figure #1
   a. Connect a spring to each end of one 26-link chain.
   b. Connect the ends of the remaining 26-link chain to the other ends of the springs.
   c. Loop one of the 26-link chains through the bracket on the mounting frame.
   d. Loop the other end of the spring-chain assembly over the outside slots on the brush head upright.

FIGURE #1



8. Install the 36-link transport chain by placing one end in the center slot of the brush head upright and the other end on the bracket on the mounting frame.
9. 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.
10. 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.
11. Attachment installation is complete.
12. Refer to “LEVELING”.

MRHL POWER PACK

The hydraulic tank can be mounted in 1 of 2 positions:

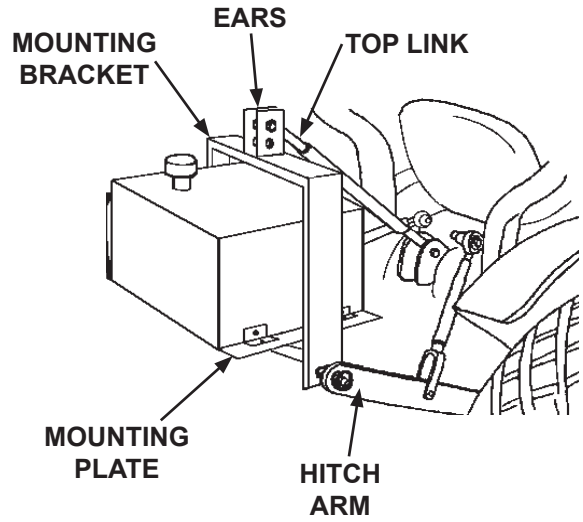
1. On 3-point arms
2. Above the 3-point hitch attachment

Mount the tank onto the 3-point arms unless you are using another 3-point attachment. Then mount the tank above the 3-point hitch attachment.

ON 3-POINT HITCH ARMS. SEE FIGURE #2

1. Connect the mounting bracket to the hitch arms with hitch pins. Secure with ring pins.
2. Connect the hitch’s top link to ears on the mounting bracket.
3. Fasten the two tank mounting plates to the mounting bracket’s bottom channel. Use two, .50” carriage bolts, flat washers, lock washers and nuts.

FIGURE #2



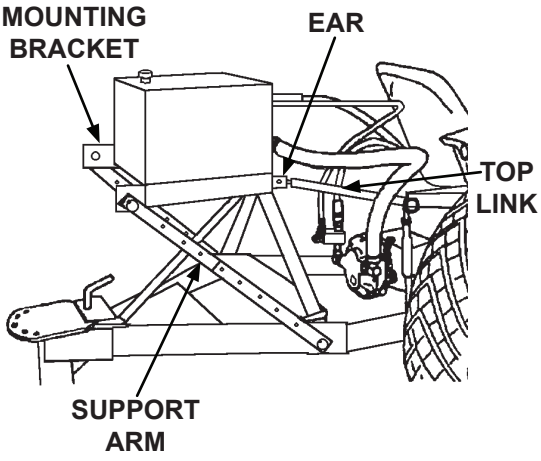
INSTALLATION

4. Place the tank on top of the mounting plates and bolt in place with four, .38” carriage bolts, lock washers and nuts.
5. Go to “Pump & Hoses”.

ABOVE 3-POINT HITCH. SEE FIGURE #3

1. Connect the attachment, the mounting bracket ears and the hitch’s top link.
2. Assemble the support arms using four, .38” cap screws, flat washers, lock washers and nuts.
3. Connect support arms to the hitch arms (with pins used on the hitch) and to the mounting bracket.
4. Level mounting bracket from front to back and from left to right by adjusting the support arms.
5. Install the tank on the mounting bracket with four carriage bolts.
6. Go to “Pump & Hoses”.

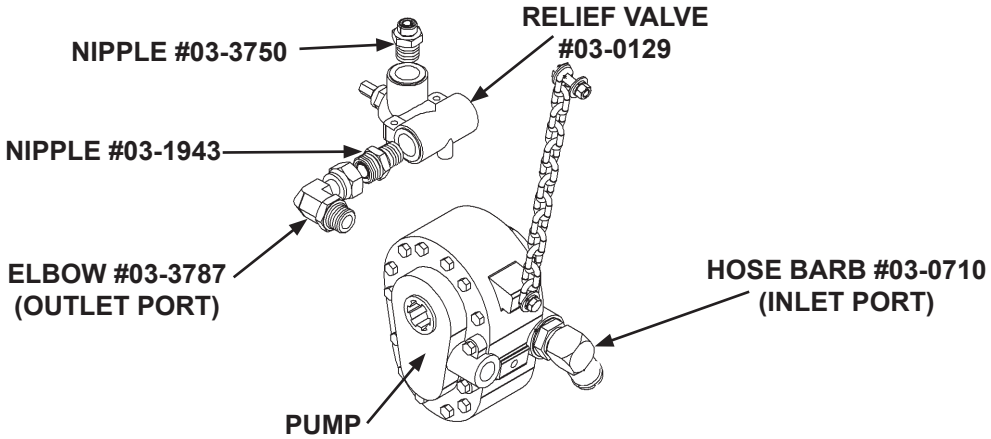
FIGURE #3



PUMP & HOSES

1. Install the relief valve and fittings on the pump. See Figure #4
2. Slide the pump onto the tractor PTO shaft. Make sure that the relief valve is on the left side.

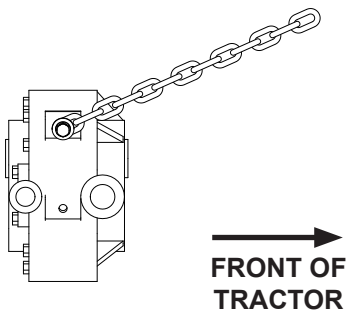
FIGURE #4



3. Fasten the 10-link chain to the bottom threaded hole on the right side of the pump.
   Bolt the other end of the chain to the tractor. The chain must be attached to a position on the tractor that is above and forward of the connection on the pump. The chain must also be taut. See Figure #5

NOTE: This chain holds the pump on the shaft and prevents it from spinning during operation.

FIGURE #5



INSTALLATION

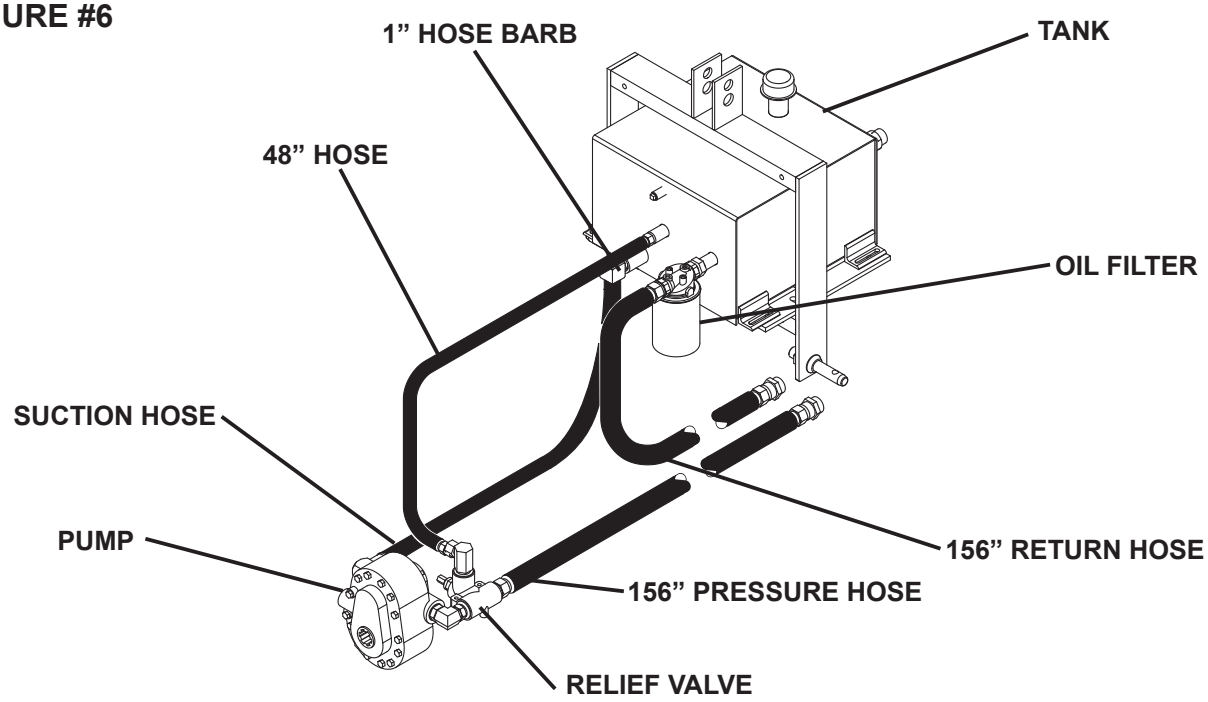
4. Install the 1” hose barb fitting into the port on the side of the tank. See Figure #6
5. Connect the suction hose to the hose barb on the pump inlet port and on the tank. Secure with hose clamps. See Figure #6

NOTICE! If needed, cut the suction hose to length, leaving enough slack to allow the 3-point hitch to move and down.

6. Connect the 48” hose to the center port on the tank and to the nipple on the relief valve.
7. Install nipple to the tank followed by oil filter.

NOTICE: Make sure the arrow on the filter points towards the tank.

FIGURE #6



8. Install the adapter to the oil filter.
9. Connect one of the 156” hoses to the filter assembly
10. Connect the remaining 156” hose to the relief valve.
11. Route both 156” hoses to the front of the tractor.
12. Install couplers on the 156” hoses.
13. Connect hoses included with the swing assembly (120” or 98”) to the hydraulic motor.

DETACHING

1. Before exiting the prime mover, lower the attachment to the ground, apply the parking brake, turn off the 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. Follow your prime mover operator’s manual for detaching (removing) an attachment.
5. Connect hydraulic couplers together or install caps to prevent contaminants from entering the hydraulic system. Store hoses off of the ground to help prevent damage.

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.

STARTING & STOPPING THE ATTACHMENT

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.

MANUAL ANGLE

- Remove the lock pin from links.
- Position the brush head at the desired angle, aligning holes in the inner and outer link.
- Insert and close the lock pin.

HYDRAULIC ANGLE

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

OPERATING THE ATTACHMENT

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.

- Adjust brush pattern for optimum sweeping performance.
- Check to make sure the attachment is securely latched to the attachment mechanism on your prime mover.
- When operating sweeper, adhere to all government rules, local laws and other professional guidelines for your sweeping application.

OPERATION

- Avoid excessive downward pressure on brush sections to prevent excessive wear. A 2” to 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.

DANGER! **AVOID ELECTRICAL SHOCK.** Stay away from overhead wires.

WARNING! **AVOID SERIOUS INJURY.** Check for large objects that could harm operator or others if thrown by sweeper. Remove items before operating.

BASIC SWEEPING OPERATION:

With the sweeper level and the brush pattern adjusted you are ready to begin sweeping.

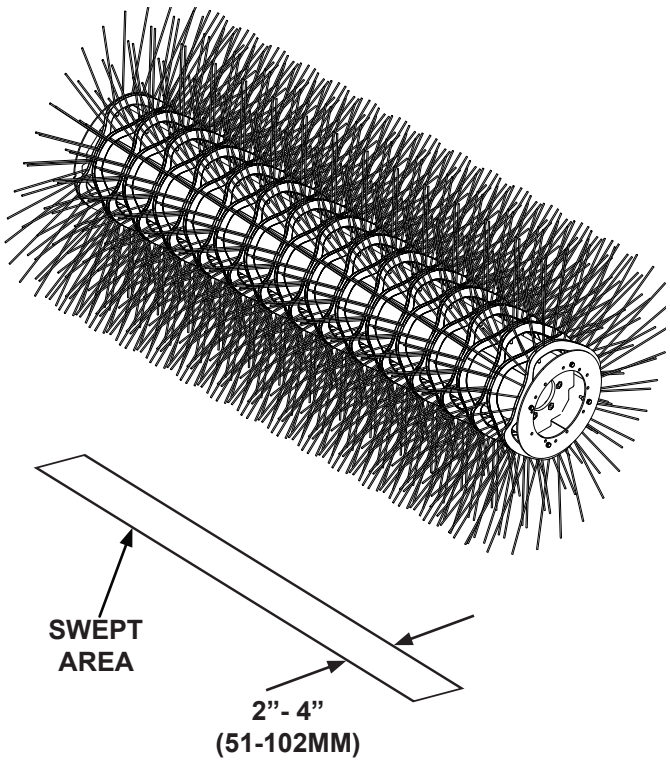
1. Swing the brush head assembly in the direction that you want to direct debris.
2. Start the prime mover at an idle and raise the brush.
3. Engage the brush head and then lower it to the ground.
4. Increase prime mover engine RPM. Using the lowest speed needed to complete the job at hand.
5. Begin forward travel at 5 MPH (8 kph) or less.

BRUSH PATTERN ADJUSTMENT

A properly leveled brush offers the best sweeper performance.

1. Move the sweeper to a dusty, flat surface.
2. Set the prime mover’s parking brake. Leave the engine running.
3. Start the sweeper at a slow speed; then, lower it completely to the surface 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” wide, running the length of the brush. See Figure #1
5. If necessary, adjust the brush pattern with the spring-chain assembly. See Figure #2

FIGURE #1

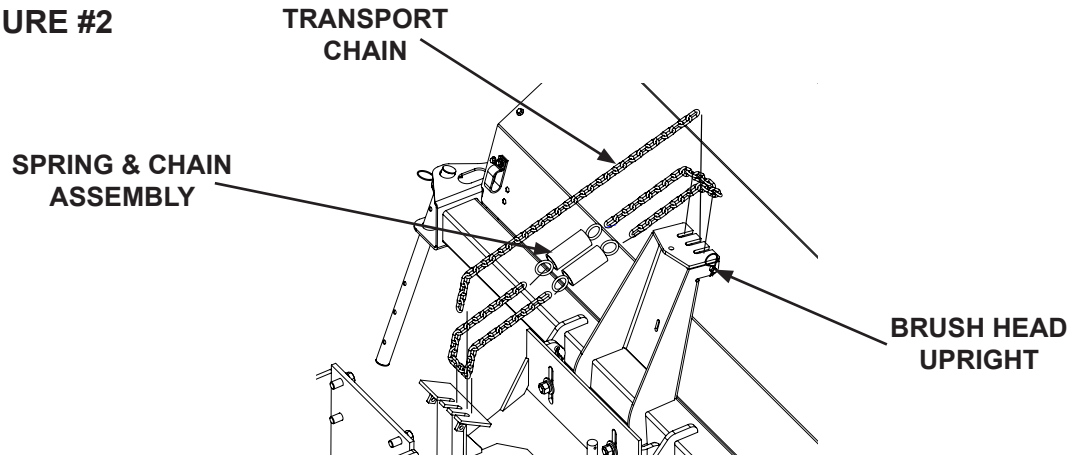


OPERATION

a. Raise the sweeper.
b. Tighten the transport chain See Figure #2 or lift cable and lower the sweeper so it supports weight.
c. Move the spring-chain forward in the swing assembly chain holder to lower the brush head assembly or backward in the holder to raise it.

6. Repeat steps 1-5 until the brush pattern is 2” - 4” wide

FIGURE #2



TRANSPORT CHAIN

The transport chain supports the weight of the brush head assembly during transport between work sites and during adjustment of the spring-chain assemblies. It should remain slack during sweeping.

To adjust the transport chain:

1. Raise the sweeper.
2. Tighten the transport chain.
3. Lower the sweeper so the transport chain supports the weight of the sweeper.

OPERATING TIPS

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

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 3/4 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 be 21” (533mm) 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.

OPERATION

DIRT & GRAVEL

To keep dust at a minimum, use the optional dust suppression kit or 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.

HEAVY DEBRIS

For 2” (51mm) or more of heavy debris, a maximum brush speed in the low range and ground speeds of less than 5 mph (8 kph) are recommended.

THATCH

Low brush speeds and low prime mover speeds do the best thatching job.

To prevent the brush from pulling itself into the ground, adjust the spring-chain assembly so the bristle tips barely touch the grass.

If the brush pulls into the grass and stalls while sweeping, use the lift to raise the brush.
Do not increase throttle to override a stall out.

Use a combination of brush speeds and ground speeds that rolls up a neat windrow.

To keep thatch from blowing back into a swept area, sweep with the wind at your back or in the direction the brush is angled.

WARNING! Never raise the sweeper more than a few feet off the ground. The sweeper can tip back or the prime mover can tip over causing death or serious injury.

NOTICE! Do not store the sweeper with weight on the brush. Weight will deform the bristles, destroying the sweeping effectiveness. 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.

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.
- Lubricate grease fittings.

OPERATION

- 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 live.

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.

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

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

TIE DOWN POINTS

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

- 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 town points and any equipment safety precautions at the front of this handbook when transporting your attachment.

MAINTENANCE

GENERAL INFORMATION

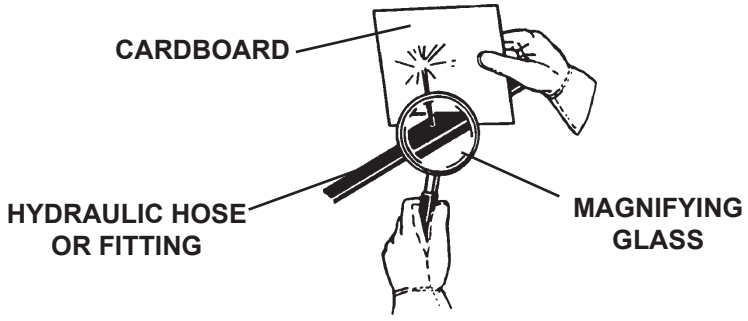
Regular maintenance is the key to long equipment life and safe operation. Maintenance requirements have been reduced to the absolute minimum. However, it is very important that these maintenance functions be performed as described below.

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

Procedure	Daily (Every 8 Hours)	Weekly (Every 40 Hours)	Monthly (Every 80 Hours)	Yearly (Every 500 Hours)
Check brush pattern (See Brush Pattern Adjustment)	✔			
Check for missing or loose hardware. Replace or tighten if necessary. (See Bolt Torque Specifications)	✔			
Check for missing or damaged safety decals and replace as necessary.	✔			
Visually inspect the machine for worn parts or cracked welds, and repair as necessary	✔			
Check hydraulic system for leaks and tighten as necessary. Check for damage and replace as needed.	✔			
Check prime mover hydraulic system to ensure an adequate level and cleanliness of hydraulic oil.	✔			
Grease Swing Plate with EP2 or equivalent lubricant.		✔		
Change Hydraulic Filter Element.			✔	
Change hydraulic oil; Use ISO VG-46 oil.				✔

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.



INSTALLATION

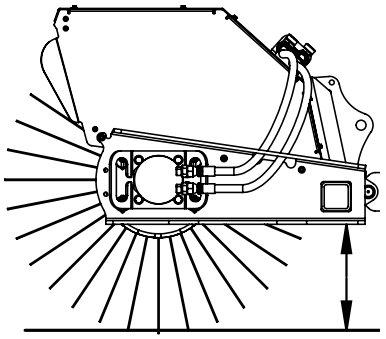
LEVELING

Level the sweeper for even brush wear and effective use.

CAUTION! Avoid injury. Before adjusting, always turn off the sweeper and the prime mover engine and remove the key.

1. Move the sweeper to a flat, paved surface.
2. Lower the brush head assembly so the brush is 2” (51 mm) above the ground.
3. Engage the parking brake and shut down the prime mover. Be sure to relieve pressure to the auxiliary hydraulic lines.
4. Unfasten safety restraints and exit prime mover.
5. Check if the swing assembly is level by using a bubble level. To make corrections: Adjust tilt cylinders. If the front of the swing assembly is high, extend tilt cylinders. If low, retract cylinders.
6. Position the brush head assembly straight ahead. On each side, measure from the brush frame to the ground See Figure #1.

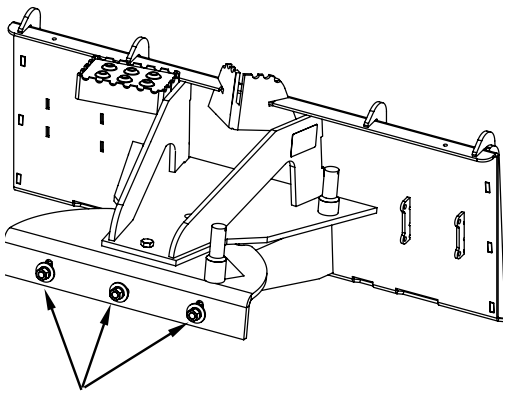
FIGURE #1



If measurements are not equal:

Loosen hardware that attaches the swing plate to the brush head assembly; lower the high side of the brush head until both sides are an equal distance above the ground. Tighten the hardware. See Figure #2.

FIGURE #2



7. Swing the brush head to the right. Measure from each side of the brush frame to the ground (Figure #1). Then, swing the brush head to the left and measure from the brush frame to the ground again. If measurements are equal, the sweeper is level.

MAINTENANCE

FIGURE #3

If the measurements resemble Figure #3
Extend tilt cylinders.

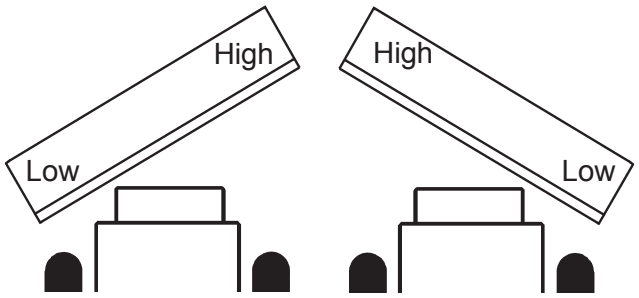


FIGURE #4

If the measurements resemble Figure #4
Retract tilt cylinders.

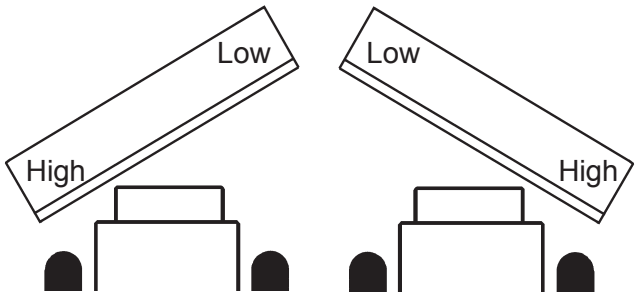


FIGURE #5

If the measurements resemble Figure #5
Loosen hardware that attaches the swing assembly to the brush head plate; lower the left side of the brush head until both sides are an equal distance above the ground. Tighten the hardware.

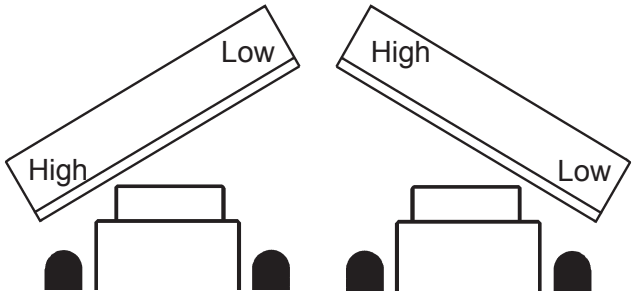
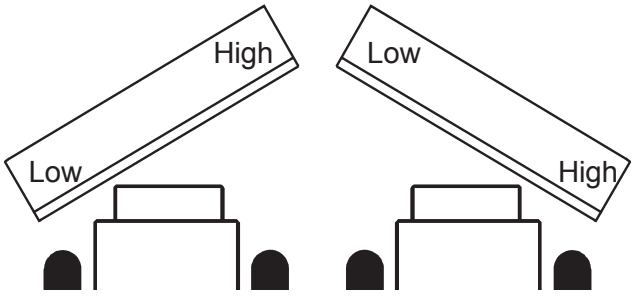


FIGURE #6

If the measurements resemble Figure #6
Loosen hardware that attaches the swing assembly to the brush head plate; lower the right side of the brush head until both sides are an equal distance above the ground. Tighten the hardware.

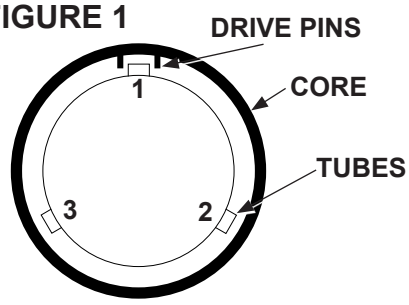


MAINTENANCE

REPLACING BRUSH SECTIONS

1. Remove motor mount lynch pins. Retain pins for reinstallation. Remove motor mount.
2. Remove motor assembly from core. Do not tangle hoses.
3. Remove bearing mount lynch pins. Retain pins for reinstallation.
4. Remove core from brush head assembly.
5. Remove retaining plate from core assembly.
6. Remove old sections.
7. Install new sections by doing the following:
   a. Number the drive locations on the core as 1, 2, and 3. See Figure #1
   b. Slide the first section onto the core with the drive pins on either side of the tube 1 See Figure #1. Make sure that the drive pins face up.
   c. Place the second section on the core with the drive pins on either side of tube 2. Be sure the drive pins face down. See Figure #2
   d. Put the third section on with the drive pins around tube 3. Be sure the drive pins face up.
   e. Slide sections on until the core is full, making sure to alternate the tubes used and the direction of the drive pins.

FIGURE 1



FIRST SECTION

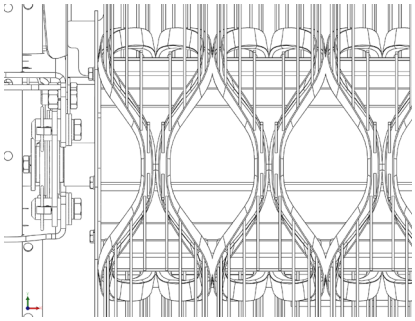
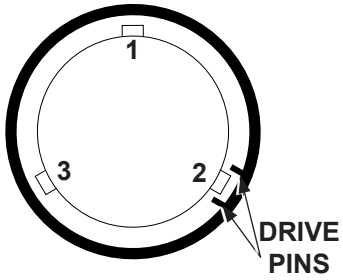


FIGURE 2



SECOND SECTION

8. Re-attach the section retaining plate.
9. Place the core back into the brush frame.
10. Slide motor assembly back into the core taking care not to tangle hoses.
11. Re-attach motor mount with pins removed in step 1.
12. Re-attach the bearing plate with pins removed from step 3.

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 AND SERVICE

CYLINDER SEAL REPLACEMENT

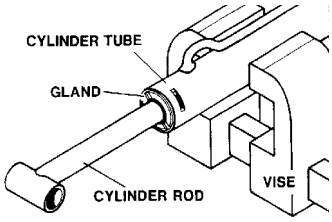
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic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

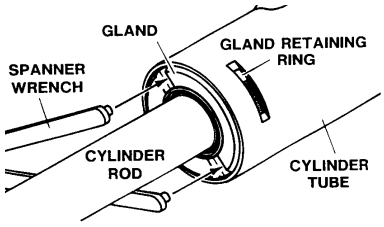
DISASSEMBLY PROCEDURE

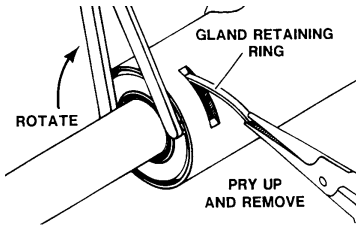
IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

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.

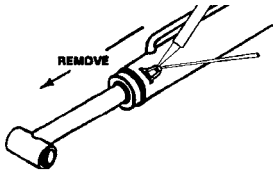


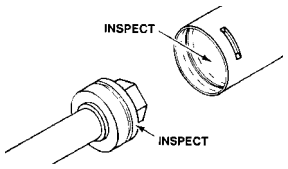


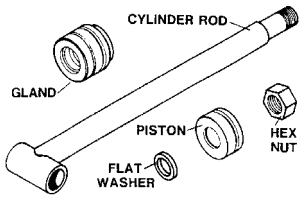


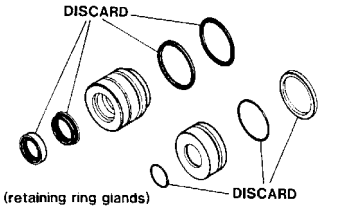
Pry up the end of the gland retaining ring with a pointed tool. Rotate the gland with a spanner wrench while removing the retaining ring. **NOTE: The gland and piston seal(s) can be pulled out and cut as they appear in the milled slot during disassembly. After cutting, pull them on out through the milled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

3. Pull the cylinder rod from the cylinder tube.







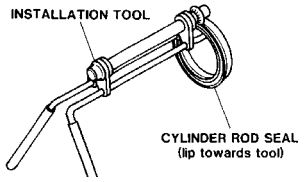


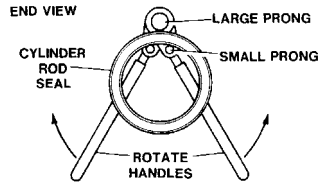
4. Inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston and cylinder tube must be replaced.
5. Remove the hex nut, piston, flat washer or spacer tube (if so equipped), and gland from the cylinder rod. If the cylinder rod is rusty, scratched, or bent,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

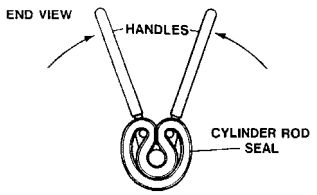
ASSEMBLY PROCEDURE

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 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.







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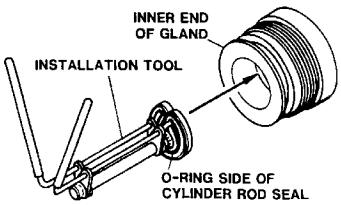
MAINTENANCE AND SERVICE

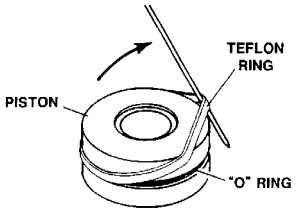
Now insert the seal into the gland from the inner end. Position the seal in its groove, and release and remove the tool. Press the seal into its seat the rest of the way by hand.



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.

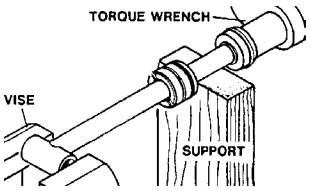
3. Slide the gland onto the cylinder rod being careful not to damage the rod wiper. Then install the spacer, or flat washer (if so equipped), small O-ring, piston, and hex nut onto the end of the cylinder rod.

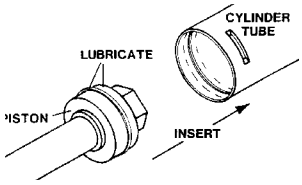


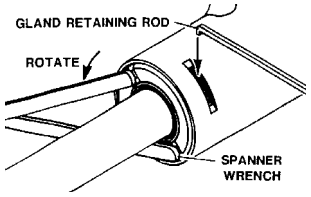
4. Secure the cylinder rod (mounting end) in a vise, with a support at its center. Torque the nut to the value shown on the chart for the thread diameter of the cylinder rod.

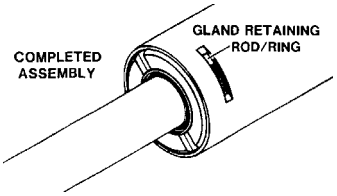
Thread Diameter	POUNDS - FEET
7/8"	150-200
*1"	230-325
1-1/8"	350-480
1-1/4"	490-670
1-3/8"	670-900

*** 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.**

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TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
BRUSH ROTATES WRONG DIRECTION	Hoses installed incorrectly.	Switch hoses at brush head tubes.
BRUSH SLOWS OR STOPS WHEN SWEEPING	Brush pattern too wide.	Adjust brush pattern to 2”-4” (51-102mm) wide, see: Brush Pattern Adjustment.
	Travel speed too fast.	Travel no more than 5 mph (8 kph) while sweeping
	Trying to sweep too much material at once.	Make several passes with sweeper.
	Relief pressure set too low.	Set relief pressure to 2000 psi (138.0 bars).
	Pump has failed.	Contact dealer to repair or replace.
	Filter plugging.	Change or clean filter.
	Hydraulic motor is failing.	Test hydraulic system, see: Hydraulic Problems in this section.
BRUSH HEAD ASSEMBLY “BOUNCES” DURING SWEEPING	Spring-chain assembly too loose.	Adjust spring-chain assembly, see: Transport Chain.
	Travel speed too fast and/or brush speed too slow.	Find correct combination of ground and brush speeds: do not travel at more than 5 mph (8 kph).
	Core is bent.	Replace core.
BRUSH WEARS INTO CONE SHAPE	Sweeper is not level.	Level sweeper before each use, see: Leveling.
	Tires on prime mover at different pressures or are different sizes.	Check tire sizes and rating: make corrections as necessary.
BRUSH WEARS VERY QUICKLY	Brush pattern too wide.	Adjust pattern to 2”-4” (51-102mm) wide, see: Brush Pattern Adjustment.
SPRINGS ON SPRING-CHAIN ASSEMBLIES STRETCHING	Transport chain too loose when traveling between job sites.	Adjust according to Transport Chain.
	Travel speeds too fast when sweeping.	Do not travel at speeds over 5 mph (8kph).
HYDRAULIC SYSTEM OVERHEATS	Hydraulic oil level too low.	Add hydraulic oil to tank until it comes to 2” (51mm) from top.
	Restriction in hoses.	Remove bends in hoses. Remove any obstructions inside hoses.
	Host pump flow rate exceeds maximum gpm rating for broom. Back pressure exceeds BTU removal by heat exchanger.	Contact prime mover manufacturer for proper flow control method.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
HYDRAULIC QUICK COUPLERS LEAK	Quick coupler poppet is unseated.	Reseat poppet; replace quick coupler if poppet is beyond repair.
HYDRAULIC MOTOR SEALS LEAK	Flow rate exceeds maximum gpm rating for broom. Hydraulic pressure exceeds maximum psi rating for broom.	Contact Paladin.
	Motor is failing. One or more seals have failed in the motor.	Contact dealer to replace seals or motor.
HYDRAULIC OIL FLOWS FROM BREATHER CAP ON HYDRAULIC TANK	Hydraulic tank too full.	Drain hydraulic tank until level is 2” (51mm) from top.

HYDRAULIC PROBLEMS

If hydraulic problems occur, such as, the brush failing to rotate, the brush slowing or stopping when making contact with the sweeping surface or swing/lift cylinders not functioning, complete all the following checks on the hydraulic system.

WARNING! AVOID SERIOUS INJURY.

Test components must have a minimum rating of 3000 psi (206.0 bars). Otherwise, components could rupture, causing serious injury. Open the gate valve before beginning any tests.

Do not operate the hydraulic system more than 5 seconds with pressure over 2000 psi (138.0 bars). Higher pressures can rupture hydraulic components and cause serious injury.

TESTING RELIEF SETTING

1. Add a flow meter, pressure gauge and gate valve on the pressure side of the sweeper hydraulic system.
2. Raise the sweeper. Then, engage the brush.
3. Shut the gate valve and note the reading on the pressure gauge.

NOTICE! AVOID PUMP DAMAGE. Do not run test for more than 5 seconds.

4. Refer to the prime mover manual for proper relief setting. If the pressure gauge reading does not match manufacturer’s recommendations, take the prime mover to your dealer for repair.

TROUBLESHOOTING

TESTING POWER PACK HYDRAULIC PUMP

Complete the following steps to test the pump on units with a power pack.

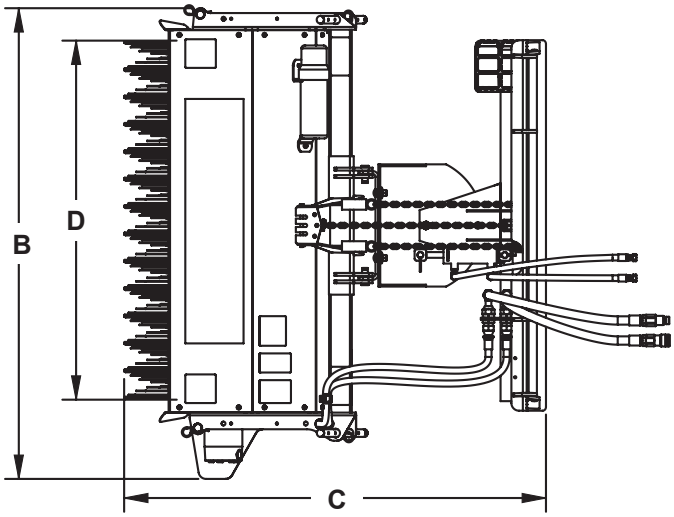
1. Place a pressure gauge, flow gauge and gate valve between the pump and the pressure line on the brush frame.
2. Make sure the prime mover is in Neutral with the parking brake on. Start the prime mover at idle and engage the sweeper.
3. Raise engine speed to normal operating rpm.
4. Note the reading on the flow gauge. Then, shut the gate valve. Note the reading on the pressure gauge.
   - If the flow gauge reads at least 10 gpm (.63 lps) and the pressure gauge reached 2000 psi (138.0 bars), the pump is functioning properly.
   - If the flow and/or pressure did not reach the proper reading, the pump has failed. Take it to your dealer to have it rebuilt or replaced.
5. Remove the pressure gauge, flow gauge and gate valve and reconnect hoses.
6. Go to “Testing Sweeper Motors”.

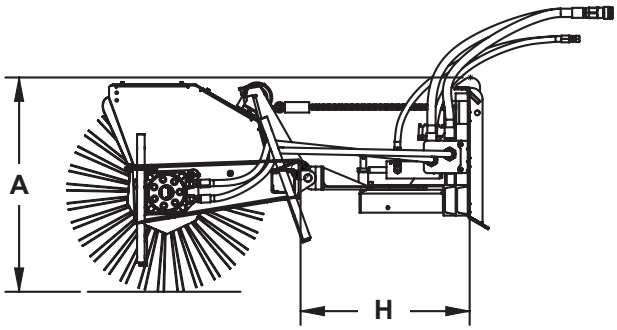
TESTING SWEEPER MOTORS

1. Place a pressure gauge and flow gauge between the sweeper or prime mover hydraulic tank and the return line on the brush frame.
2. Make sure the prime mover is in Neutral with the parking brake on. Start the prime mover at idle and engage the sweeper. Then, adjust the brush to the maximum sweeping pattern.
3. When the brush stalls, note the reading on the flow gauge. If it is 3 gpm (0.19 lps) or more, the motor needs to be replaced.

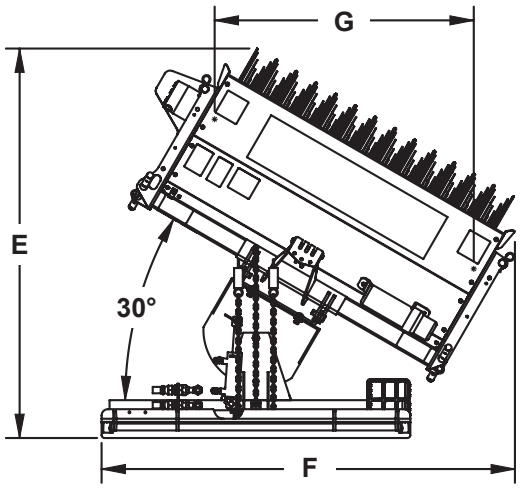
SPECIFICATIONS

S26 / 222 Sweeper





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

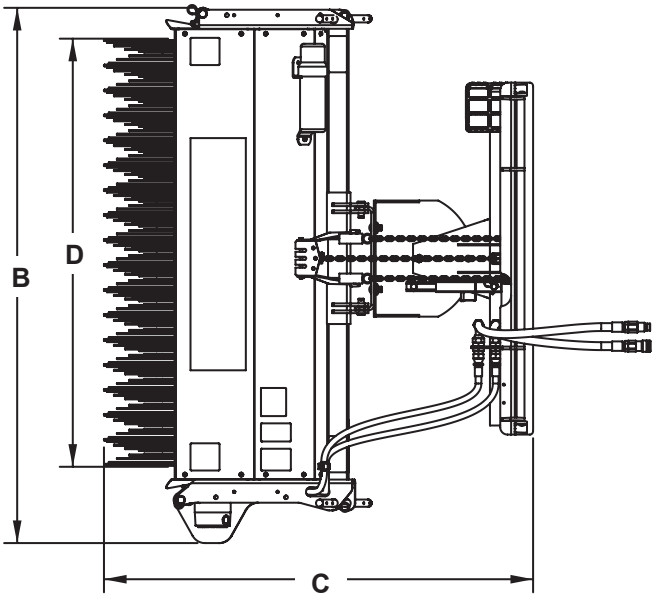


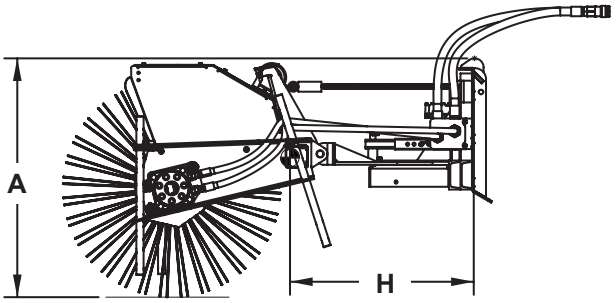
DESCRIPTION	4’	5’	6’
A. Overall Height	28.10”	28.10”	28.10”
B. Overall Width	61.60”	73.60”	85.60”
C. Overall Length	55.20”	55.20”	55.20”
D. Sweeping Width	48.00”	60.00”	72.00”
E. Overall Length @ 30°	61.20”	64.20”	67.20”
F. Overall Width @ 30°	64.90”	70.10”	75.30”
G. Sweeping Width @ 30°	41.50”	52.00”	60.40”
H. Center of Gravity - Horizontal	22.10”	23.50”	24.40”
Weight - Manual Angle/Single 14.5 CID Motor (lbs)	450#	485#	520#
Weight - Manual Angle/Single 17 CID Motor (lbs)	455#	495#	530#

Maximum Hydraulic Pressure	2500 PSI
Hydraulic Flow - Single 14.5 CID Motor	8-15 GPM
Hydraulic Flow - Single 17 CID Motor	10-18 GPM

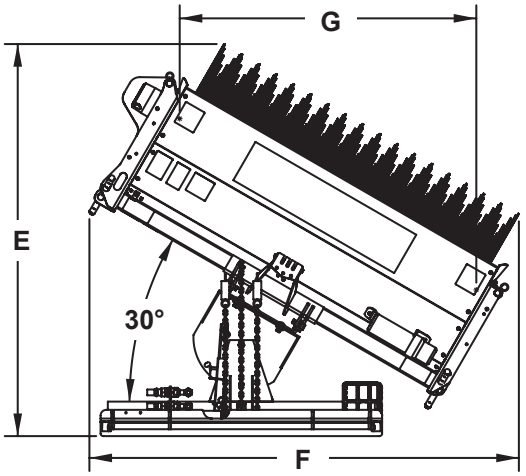
SPECIFICATIONS

S30 / 225 Sweeper





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

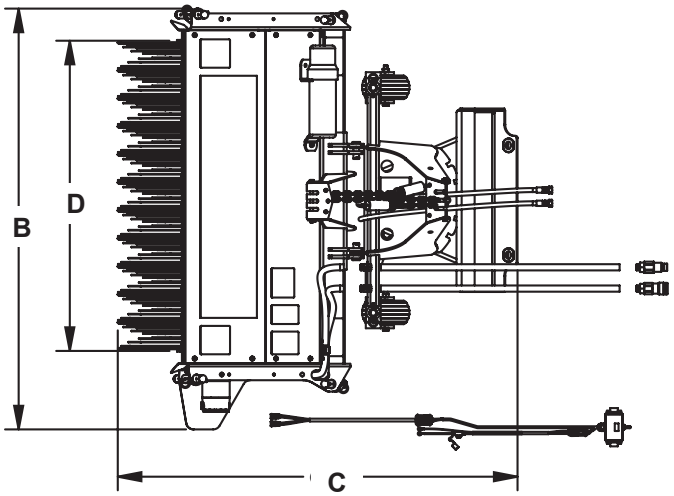


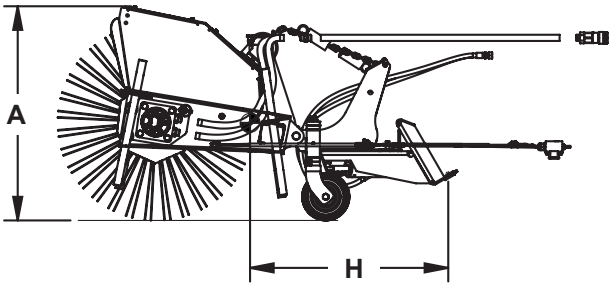
DESCRIPTION	4’	5’	6’	7’
A. Overall Height	32.90”	32.90”	32.90”	32.90”
B. Overall Width	61.80”	73.80”	85.80”	97.80”
C. Overall Length	59.10”	59.10”	59.10”	59.10”
D. Sweeping Width	48.00”	60.00”	72.00”	84.00”
E. Overall Length @ 30°	64.50”	67.50”	70.50”	73.50”
F. Overall Width @ 30°	59.60”	74.00”	84.40”	94.80”
G. Sweeping Width @ 30°	41.60”	52.00”	62.40”	72.80”
H. Center of Gravity - Horizontal	24.00”	25.30”	26.30”	27.00”
Weight - Manual Angle/Single 14.5 CID Motor (lbs)	490#	520#	555#	N/A
Weight - Manual Angle/Single 17 CID Motor (lbs)	495#	525#	565#	610#

Maximum Hydraulic Pressure ..... 3000 PSI
Hydraulic Flow - Single 14.5 CID Motor ..... 8-15 GPM
Hydraulic Flow - Single 17 CID Motor ..... 10-18 GPM

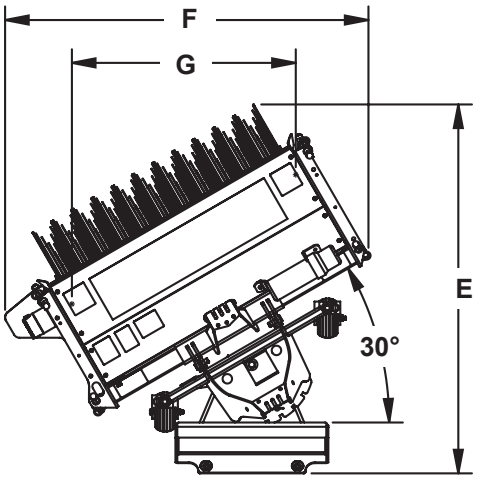
SPECIFICATIONS

S26 / 226 Sweeper





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



DESCRIPTION	42”	48”	60”
A. Overall Height	28.30”	28.30”	28.30”
B. Overall Width	55.60”	61.60”	73.60”
C. Overall Length	52.80”	52.80”	52.80”
D. Sweeping Width	42.00”	48.00”	60.00”
E. Overall Length @ 30°	58.50”	60.00”	63.00”
F. Overall Width @ 30°	57.60”	62.80”	73.20”
G. Sweeping Width @ 30°	36.30”	41.50”	52.00”
H. Center of Gravity - Horizontal	26.20”	26.80”	27.70”
Weight - Manual Angle/Single 8 CID Motor (lbs)	335#	355#	N/A
Weight - Manual Angle/Single 12 CID Motor (lbs)	335#	355#	395#

Maximum Hydraulic Pressure	2500 PSI
Hydraulic Flow - Single 8 CID Motor	4-8 GPM
Hydraulic Flow - Single 12 CID Motor	6-12 GPM

BOLT TORQUE SPECIFICATION

GENERAL TORQUE SPECIFICATION TABLES

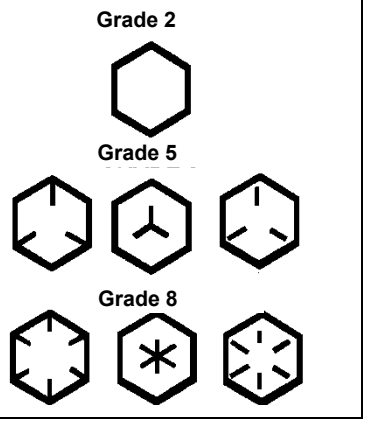
Use the following charts when determining bolt torque specifications, when special torques are not given. Always use grade 5 or better when replacing bolts.

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

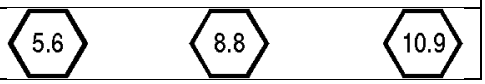
Bolt head identification marks as per grade.
NOTE: Manufacturing Marks Will Vary



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***.