

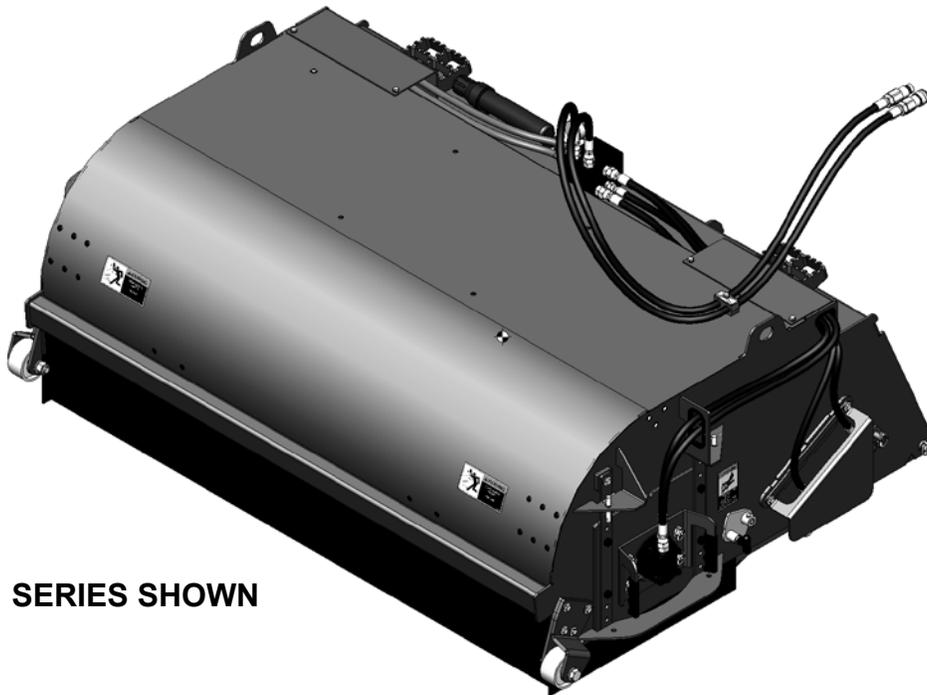


SWEEPSTER

BY PALADIN

OPERATOR'S MANUAL

PICK-UP SWEEPER 240 / 241 / 242 SERIES



241 SERIES SHOWN

SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: 51-4745

Date: December 2016

Rev. 1

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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 the attachment.

NOTE: The illustrations and data used in this manual were current (according to the information available to us) at the time of printing, however, we reserve the right to redesign and change the attachment as may be necessary without notification.

BEFORE OPERATION

The primary responsibility for safety with 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>.

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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.

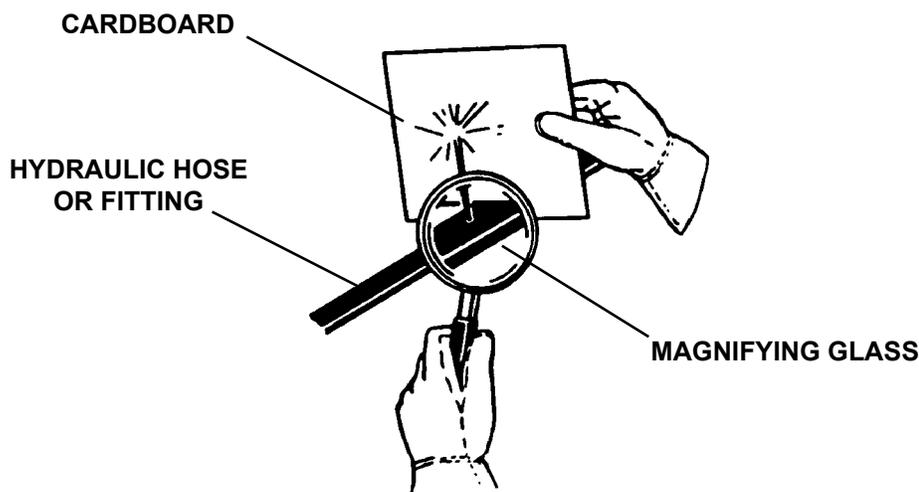
WARNING!



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.

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 SWEEPER

- Do not exceed the lifting capacity of your prime mover.
- Operate only from the operator's station.
- When traveling on rough terrain, reduce speed to avoid "bouncing" the sweeper. Loss of steering can result.
- 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.
- Remove any large objects from the work area that could harm operator or others if thrown by sweeper.

EQUIPMENT SAFETY PRECAUTIONS



TRANSPORTING THE SWEEPER

- 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 SWEEPER

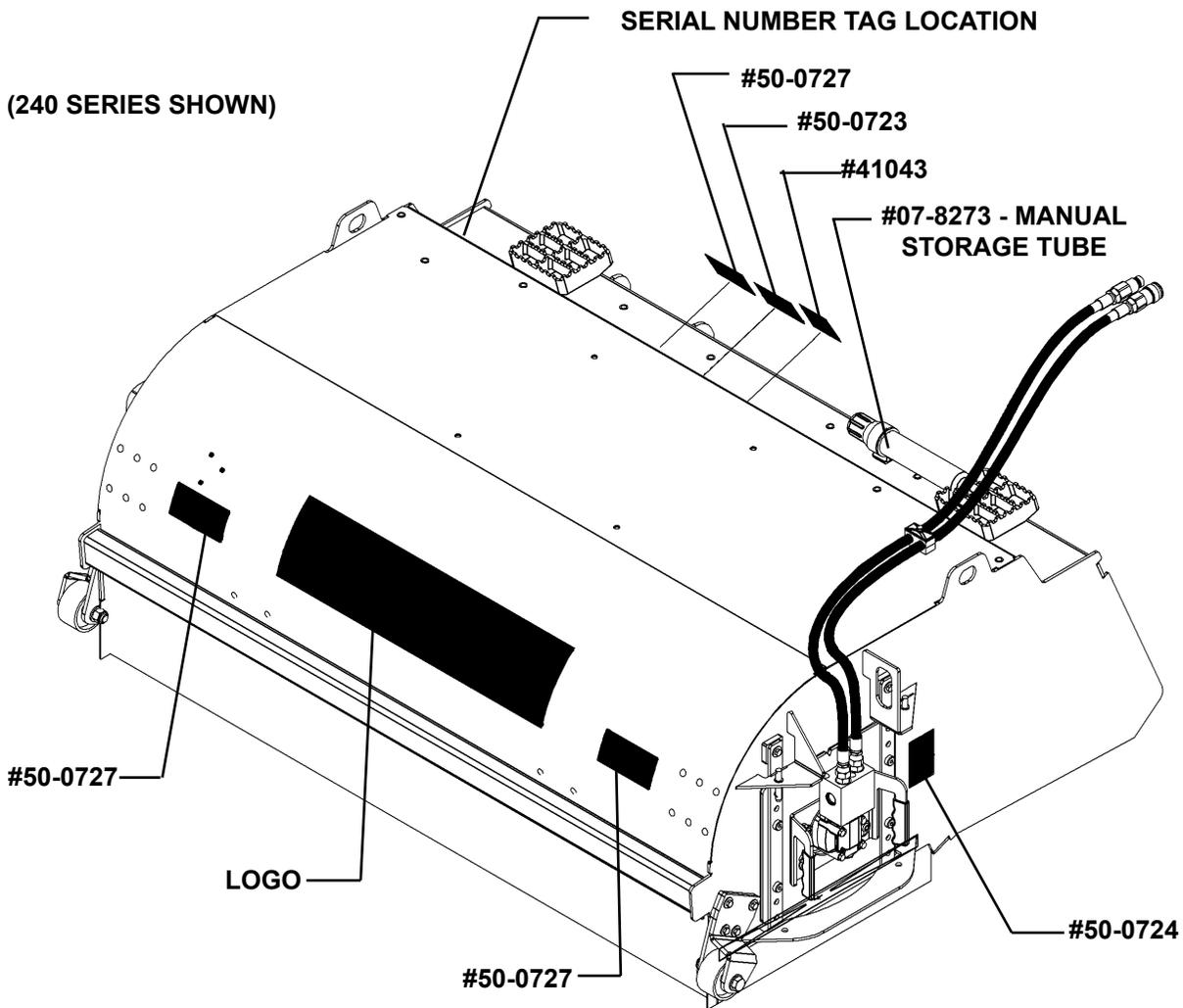
- Before performing maintenance, lower the attachment to the ground, apply the brakes, turn off the engine and remove the key.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator service manuals before any repair is made. After completing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

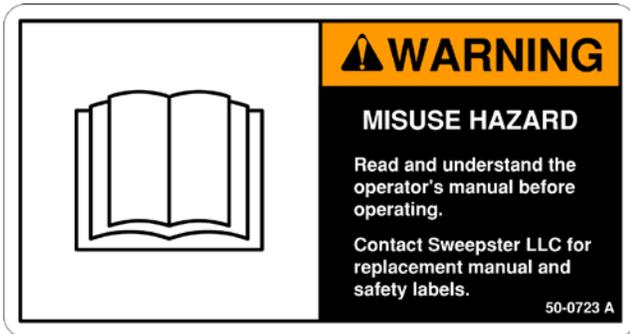
The diagram on this page shows the location of the decals used on your attachment. The decals are identified by their part numbers, with reductions of the actual decals located on the following page. Use this information to order replacements for lost or damaged decals. Be sure to read all decals before 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



WARNING! MISUSE HAZARD
PART #50-0723



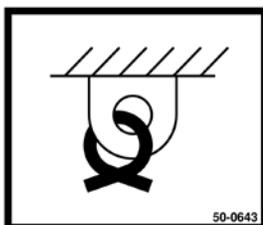
WARNING! HIGH PRESSURE FLUID
PART #50-0724



WARNING! FLYING OBJECTS
PART #50-0727



WARNING! HAZARDOUS DUST
PART #41043



TIE DOWN POINT DECAL
PART #50-0643

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

INSTALLATION

GENERAL INFORMATION

The following instructions will help you to mount your Pick-Up Sweeper onto your prime mover. The Pick-Up Sweeper uses the quick-attach system for ease of installation. Therefore, if you know how to attach your loader bucket, attaching the Pick-Up 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.

INSTALLATION

1. Remove any attachment from the front of the loader.
2. Following all standard safety practices and the instructions for installing an attachment in your prime mover operator's manual, install the attachment onto your loader.

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



3. 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. 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.
6. Following the standard start up procedure for your prime mover, start the loader and run all cylinders (if so equipped) on the attachment to purge any air from the system. Check for proper hydraulic connection, hose routing and hose length.
7. Attachment installation is complete.

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. 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.

VOLUMIZER

The 241 and 242 Series Pick-Up Sweepers are equipped with the patented Volumizer Feature. The Volumizer is designed to allow the level of debris to be controlled in the hopper and to prevent carry over of material.

As brush sections wear, the volumizer can be adjusted by pulling the “T” handle quick pin and moving it down one notch.

NOTE: Sweepers equipped with the Volumizer cannot reverse brush direction without removing the Volumizer and an internal check valve from the manifold. (See Maintenance and Service)

ADJUSTING THE SWEEPER BRUSH PATTERN

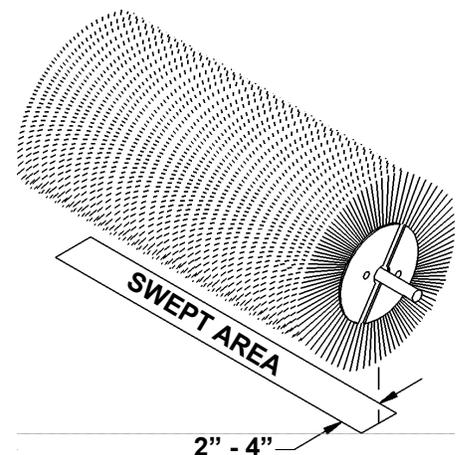
A properly adjusted brush offers the best sweeping performance. The sweepers are shipped with the “T” handle quick pins in the uppermost position.

There are two positions available on the top set of holes and two positions available on the bottom set for adjusting your brush pattern. For special applications or as the brushes wear it may be necessary to adjust the brush pattern.

Setting the “T” handle quick pins in the lowest position will give you approximately a 10” brush pattern for hard to sweep material or cold planer applications. Removing the T” handle quick pins (installing them in their storage position) will allow the brushes to float over rough terrain. Placing the sweeper in the float position should give you approximately a 4’-5” brush pattern. Remember, the wider the brush pattern the quicker the brushes will wear.

To check the brush pattern:

1. Move the sweeper to a dusty, flat surface.
2. Set the prime movers parking brake and leave the engine running.
3. Start the sweeper at a slow speed and lower it so the boom arms bottom out. Run the sweeper in a stationary position for 10-15 seconds.
4. Raise the sweeper and back away. Lower the sweeper to the ground, apply the brakes, turn off the prime mover’s engine and remove the key. The brush pattern left in the dust should be 2” - 4” wide, running the full length of the brush.
5. Adjust the brush pattern as necessary.
 - a. If the brush pattern is too wide, pull the “T” handle quick pins and move them up one notch on both sides.
 - b. If the brush pattern is too narrow, pull the “T” handle quick pins and move them down one notch on both sides.
6. Repeat steps 1-5 until the brush pattern is 2” - 4” wide.



OPERATION

STARTING AND STOPPING THE SWEEPER

The Pick-Up Sweepers use 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. The 240 Series standard Pick-Up sweeper can reverse the brush rotation for end of pass pile clean up or stuck on material.

NOTICE: Reversing the hydraulic flow on 241 and 242 Series Sweepers will extend the cylinders on the high dump floor, therefore dumping the collected material.

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.

BRUSH ADJUSTMENT

The caster wheels feature allows the sweeper to follow ground contours. The sweeper brushes should be adjusted for the terrain and material being collected. Placing the brush in the “float position” should only be used for rough and uneven terrain. (See “ADJUSTING THE SWEEPER BRUSH PATTERN” for more information.)

END OF PASS - PILE CLEAN UP (240 SERIES STANDARD SWEEPER ONLY)

During normal sweeping operation, a small pile of material is pushed along in front of the sweeper. End of pass clean up is one of the two reasons the brush rotation can be reversed on 240 Series Standard Sweepers ONLY. Using reverse mode for normal sweeping will NOT clean as well and will result in premature wear.

NOTICE: Reversing the hydraulic flow on 241 and 242 Series Sweepers will extend the cylinders on the high dump floor, therefore dumping the collected material.

To clean up this pile at the end of the sweeping pass, throttle down the prime mover, drop the bucket cutting edge to the ground, and change the hydraulic flow (reversing brush rotation) and inch forward. This will wisp the small pile of debris into the bucket (similar to that of a broom and dust pan). **NOTE: Do not forget to lift the bucket approximately 1” and change broom rotation to the forward direction after pile clean up.**

OPERATION

DUMPING

(240 SERIES STANDARD SWEEPER ONLY) Empty the bucket by raising the sweeper above the container, then dump using the prime mover tilt controls.

(241 & 242 SERIES PRO SWEEPERS ONLY) The 241 and 242 Series sweepers are equipped with a high dump floor. Empty the debris by raising the sweeper directly above the container and reversing the auxiliary hydraulic flow to the sweeper. This will extend the cylinders on the high dump floor, therefore dumping the collected material.

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



BEFORE OPERATING SWEEPER:

- Adjust brush pattern for optimum sweeping performance.
- Be sure you are in a safe area, away from traffic or other hazards.
- Check to make sure the attachment is securely latched to the attachment mechanism on your prime mover.
- Complete daily maintenance checklist. (See Maintenance & Service Section)
- Remove all property that could be damaged by flying debris from sweeping area.
- Be sure all persons not operating the sweeper are clear of sweeper discharge area.
- Always wear proper apparel and PPE (personal protective equipment) for your work site.

WHILE OPERATING SWEEPER:

- When operating sweeper, adhere to all government rules, local laws and other professional guidelines for your sweeping application.
- Avoid excessive downward pressure on brush sections to prevent excessive wear. A 2 to 4 inch (5-10 cm) wide pattern is sufficient for most applications. Ensure that motor and bearing plates are equally adjusted to prevent uneven wear pattern.
- 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.
- Minimize flying debris - use slowest rotating speed that will do the job.
- Keep hands, feet, hair and other loose clothing away from all moving parts.
- Leave all shields and safety equipment in place when operating sweeper and prime mover.
- Be aware of the extra weight and width a sweeper adds. Reduce travel speed accordingly. Keep in mind the center of gravity changes when an attachment is installed.
- When traveling on rough terrain, reduce speed to avoid "bouncing" the sweeper. Loss of steering can result.
- Never sweep toward people, buildings, vehicles or other objects that can be damaged by flying debris.
- Only operate sweeper from the operator's station of the prime mover. Seat belt fastened and protective glasses worn. Only operate controls while the engine is running.
- Operate sweeper slowly in open area, check for proper operation of all controls and all protective devices. Report any needed repairs.

OPERATION

OPERATING TIPS

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

STUCK ON MATERIAL

(240 SERIES STANDARD SWEEPER ONLY) When encountering stuck on material that cannot be removed by the rotating brush alone, the operator may simply back over the material and lower the bucket cutting edge to the ground and scrape the material loose. The brush direction may then be reversed to assist in collecting this material. **NOTE: Do not forget to lift the bucket approximately 1” and change brush rotation to the forward direction after removal of stuck on material.**

NOTICE: *Reversing the hydraulic flow on 241 and 242 Series Sweepers will extend the cylinders on the high dump floor, therefore dumping the collected material.*

(241 & 242 SERIES PRO SWEEPERS ONLY) When encountering stuck on material that cannot be removed by the normal operation, lower the brushes by setting the “T” handle quick pins in the lowest position. This will allow for additional down pressure to be applied for hard to sweep material.

SNOW

High brush speeds and slow ground 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.

In deep snow you may need to make more than one pass to get down to a clean surface.

To keep snow from blowing back onto a swept area, always sweep so the wind is at your back or so it follows the brush angle.

DIRT & GRAVEL

To keep dust at a minimum, plan your sweeping for days when it is overcast and humid or after it has rained. Also, sweep so the wind blows at your back or in the direction the brush head is angled.

Low brush speeds and moderate ground speeds work best for cleaning debris from hard surfaces. Brush speeds that are too fast tend to raise dust because of the aggressive sweeper action.

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

HEAVY DEBRIS

For 2 inches (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.

OPERATION

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.

WATERLESS DUST ABATEMENT SYSTEM (VACUUM)

The Waterless Dust Abatement System (Vacuum Attachment) is not available on the 240 Series, optional on the 241 Series and standard equipment on the 242 Series Pick-Up Sweepers.

The Waterless Dust Abatement System (Vacuum Attachment) requires that the sweepers skirting (flaps) are properly installed.

OPERATION

Shut the vacuum fan off (using the control lever on the vacuum attachment motor assembly) when operating in wet or damp conditions or when shaking the filter.

NOTICE: Running the shaker while the vacuum fan is ON will embed dirt into the filter. This will cause extra maintenance and possible damage to the filter.

SHAKING FILTER

The filter needs to be shaken before dumping debris or when obstruction occurs and allows dust to escape. **To shake filter:**

- a. Stop brush rotation
- b. Shut the fan OFF
- c. Operate the shaker motor for 5-10 seconds by holding down the electric control box switch on the wire harness.

NOTICE: Debris build up between the filter basket and the body may prevent the filter from shaking. Place a 1" support between the filter basket and body and remove debris.

CLEANING FILTER

After extended use or from certain material being collected it may be necessary to remove and clean the filter element. **To clean filter:**

- a. Lift the cover and remove filter from filter box.
- b. Place in a position that will allow the use of a garden hose to remove debris. **DO NOT USE A PRESSURE WASHER OR COMPRESSED AIR.**
- c. Allow filter to dry before re-installing.

NOTICE: Do not operate the sweeper or the vacuum fan without a filter installed.

NOTICE: This system is not designed for use with portland cement, lime and grain collection. Contact Sweepster for additional information.

OPERATION

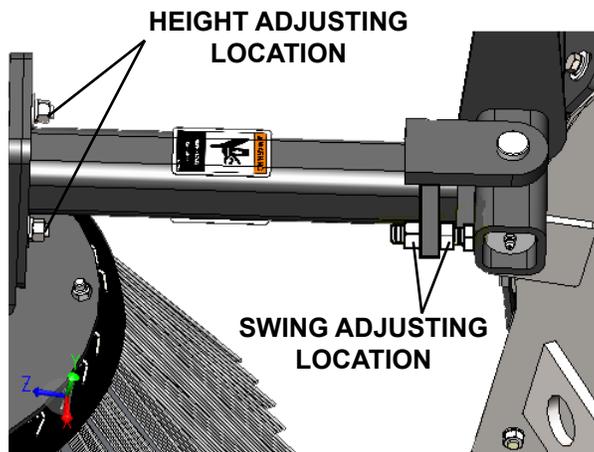
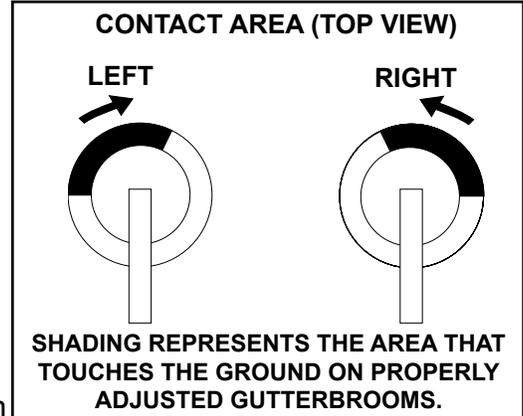
OPTIONAL GUTTERBROOM OPERATION

The gutterbrooms are designed for sweeping forward only. When sweeping next to curbs or walls with a gutterbroom, only the bristle tips should touch the vertical surface. When the gutterbroom height is properly adjusted, bristles contact the ground as shown.

To adjust the gutterbroom height:

1. Lower the gutterbroom to the ground.
2. Loosen the hardware holding the gutterbroom motor mounting plate.
3. Turn the motor mounting plate to the left or right.
4. Adjust the tension chain so it holds the gutterbroom in place.
5. Tighten the hardware holding the motor mounting plate.

A properly adjusted gutterbroom extends the main brush's sweeping path, leaving no streaks between the two paths. For this to happen the inside edge of the gutterbroom brush pattern must line up with the outside edge of the sweeper brush pattern.



To adjust gutterbroom swing:

1. Loosen the nut.
2. Adjust the capscrew (turn it in for more swing or out for less swing).
3. Tighten the nut.

When not using the gutterbroom for a short period of time, adjust the tension chain until the gutterbroom is raised 1" - 2" off the ground. When not using the gutterbroom for extended periods of time, unhook the hydraulic hoses from the gutterbroom motor, remove the gutterbroom assembly and connect the hydraulic hoses to run only the main sweeper.

OPTIONAL DUST SUPPRESSION

The dust suppression systems are available for a 12 Volt or 24 Volt system and both contain a 25 gallon water tank and enough nozzles and hose to use with or without the optional gutterbrooms.

OPERATION

STORAGE

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

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 snow, dirt and grease.
- Inspect for visible signs of wear, breakage or damage. Order any parts required and make the necessary repairs to avoid delays upon removal from storage.
- Tighten loose nuts, capscrews and hydraulic connections.
- Coat exposed portions of the cylinder rods with grease (if so equipped).
- Lubricate grease fittings.
- Seal hydraulic system from contaminants and secure all hydraulic hoses off the ground to help prevent damage.
- Do not store unit with weight on brushes. Place the unit on blocks or use storage stands.
- Store unit in a dry and protected place out of direct sunlight. Leaving the unit outside will materially shorten its life.

Additional Precautions for Long Term Storage:

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

REMOVAL FROM STORAGE:

- Remove cover.
- Wash unit and replace any damage 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.

**WHEN LIFTING DECALS ARE NOT PRESENT, VERIFY THAT
LIFTING ACCESSORIES ARE SECURELY ATTACHED AND UNIT IS STABLE
BEFORE LIFTING.**

OPERATION

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



TIE DOWN POINTS

Tiedown points are identified by tiedown 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 tiedown 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.”

MAINTENANCE AND SERVICE

GENERAL INFORMATION

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

Procedure	Daily	Every 40 Hours
Check all bolts and nuts for tightness.	✓	
Replace any missing bolts or nuts with approved replacement parts.	✓	
Check hydraulic system for hydraulic oil leaks. See procedure below.	✓	
Visually inspect the machine for worn parts or cracked welds, and repair as necessary.	✓	
Check for missing or illegible Safety / Warning Decals.	✓	
Check filter on vacuum assembly (if so equipped).	✓	

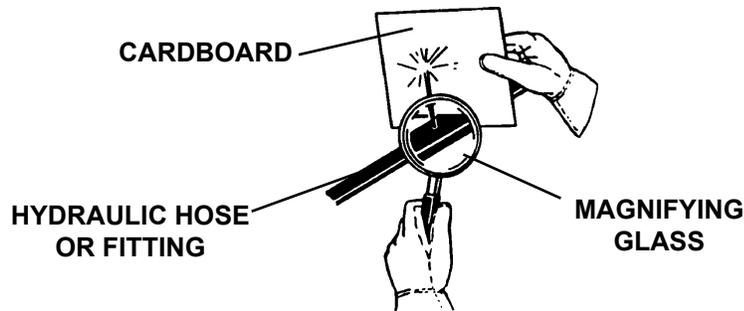
WARNING! Escaping hydraulic / diesel fluid under pressure can penetrate the skin causing serious injury. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands to search for suspected leaks.



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.

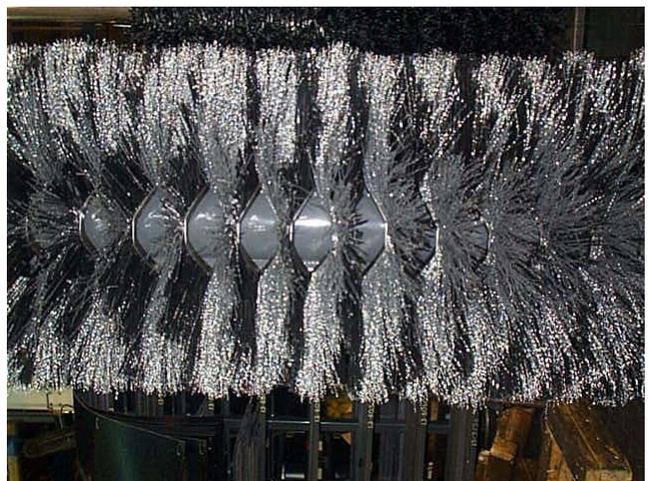
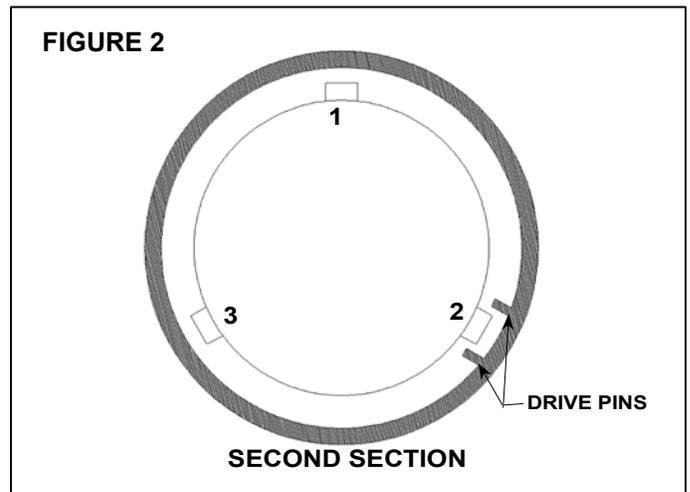
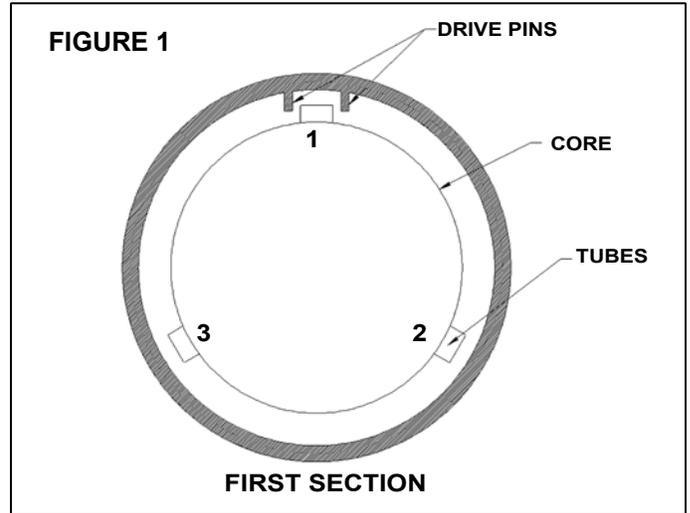
Tighten all connections before starting engine or pressurizing lines.



MAINTENANCE AND SERVICE

REPLACING BRUSH SECTIONS

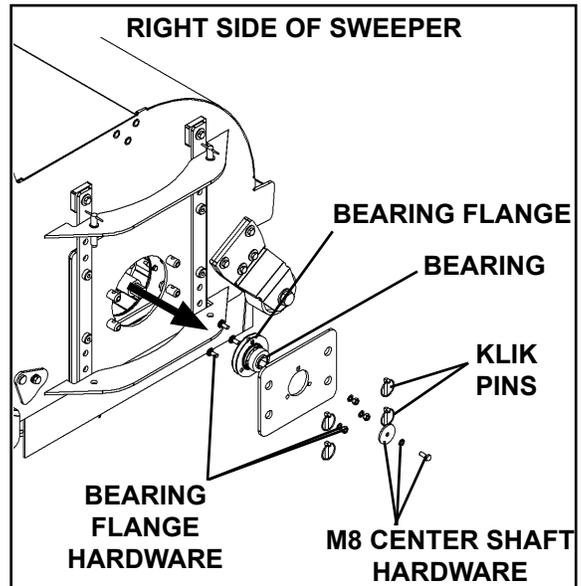
1. Remove four motor mount studs and klik pins. Retain hardware for reinstallation. Remove motor bucket mount with motor and the hex receiver plate.
2. Remove bearing assembly: Remove four bearing mounting studs and klik pins, center capscrew and bolt on idler shaft. Retain hardware for reinstallation.
3. Lift sweeper body leaving core on ground.
4. Remove the core retainer plate. Retain hardware for reinstallation.
5. Remove old sections.
6. Install new sections:
 - a. Number the tubes on the core as 1,2 and 3 (FIGURE 1).
 - b. Slide the first section onto the core with the drive pins on either side of tube 1. Make sure that the drive pins angle up (FIGURE 1).
 - c. Place the second section on the core with the drive pins on either side of tube 2. Be sure the drive pins angle down (FIGURE 2).
 - d. Put the third section on with the drive pins around tube 3. Be sure the drive pins angle up.
 - e. Slide sections on until the core is full, making sure to alternate the tubes used and the direction of the drive pins.
7. Re-attach the core retainer plate.
8. Lay core on ground. Lower body over core.
9. Re-attach the bearing assembly with hardware previously removed in step #2.
10. Attach receiver plate and motor bucket mount with hardware removed in step #1.



MAINTENANCE AND SERVICE

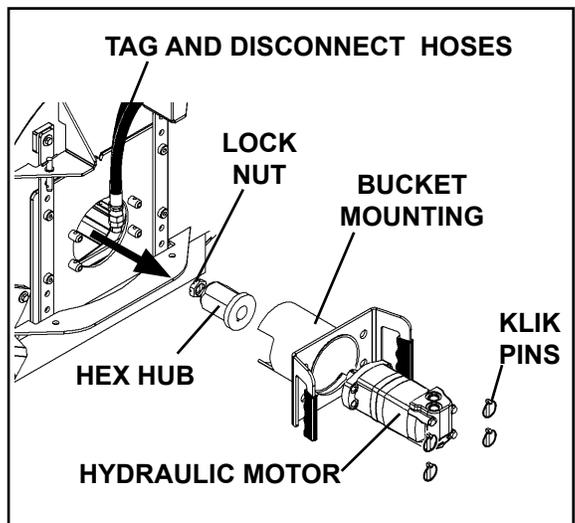
REPLACING BEARING

1. Remove the center M8 capscrew and the klik pins securing the bearing mounting plate to the bearing assembly and side of sweeper.
2. Remove bearing flange from the mounting plate.
3. Press out existing bearing and replace with new.
4. Reinstall the bearing flange to the mounting plate using existing hardware.
5. Reinstall by reversing steps #1 through #4.



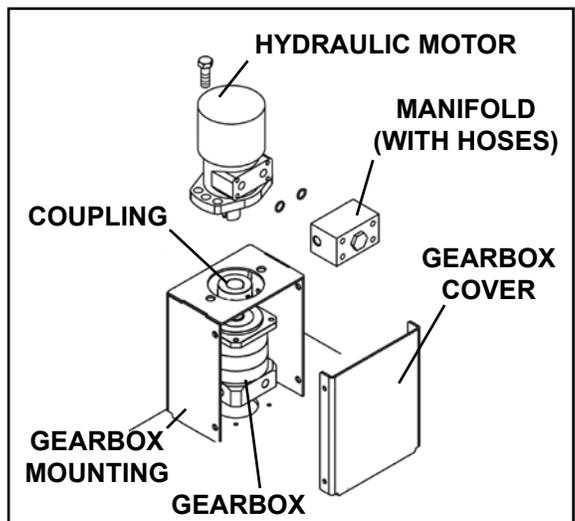
REPLACING HYDRAULIC MOTOR ON SWEEPER

1. Tag and disconnect hydraulic hoses from the hydraulic motor.
2. Remove klik pins securing the motor assembly to the sweeper.
3. Slide the motor assembly out of the sweeper while leaving the hex receiver plate attached to the core.
4. Remove the lock nut from the end of the motor shaft and unbolt the hydraulic motor from the motor bucket mounting.
5. Replace the motor with the new hydraulic motor and reverse steps #1 through #4 to reinstall motor assembly.



REPLACING HYDRAULIC MOTOR (VACUUM SYSTEM)

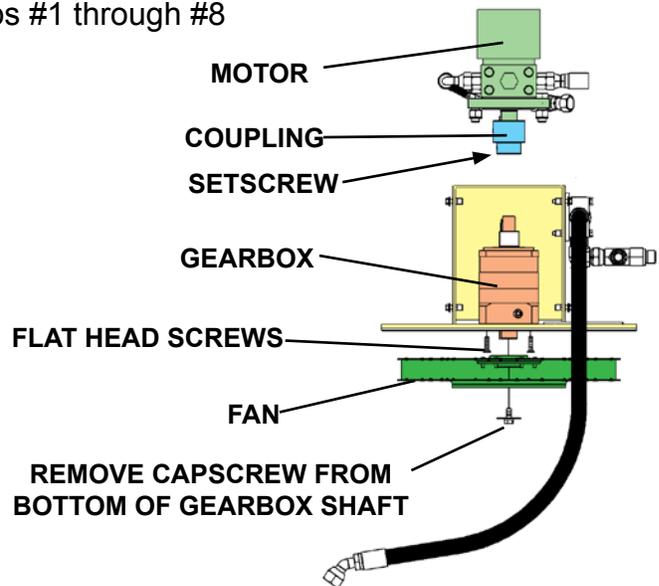
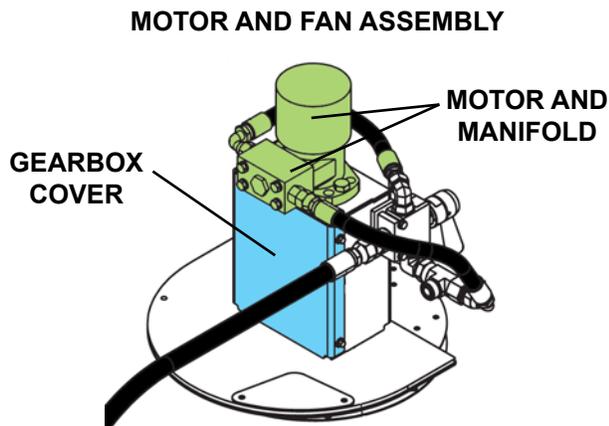
1. Disconnect hydraulic manifold with hoses from the hydraulic motor.
2. Remove gearbox cover.
3. Loosen set screw on top coupling to motor.
4. Remove bolts securing the motor to the gearbox mounting and remove motor.
5. Reverse steps #1 through #4 to install new motor.



MAINTENANCE AND SERVICE

REPLACING GEARBOX (VACUUM SYSTEM)

1. Remove the motor and fan assembly from the top of the vacuum system.
2. Remove gearbox cover.
3. Loosen set screw on bottom of coupling to gearbox shaft.
4. Remove bolts securing the motor to the gearbox mounting and remove motor.
5. Remove capscrew and washer from bottom gearbox shaft.
6. Remove four flat head screws securing the gearbox to the gearbox mounting.
7. Lift the gearbox up and out of the gearbox mounting.
8. Remove the adaptors and couplings from the old gearbox and install onto the new gearbox.
9. Install the new gearbox by reversing steps #1 through #8



REPLACING ELECTRIC MOTOR (VACUUM SYSTEM)

1. Lift the cover on the vacuum assembly. Slide the filter retaining plates over and remove the filter.
2. Disconnect wire harness from the motor.
3. Remove the M8 capscrews securing the motor and motor guard to the filter tray. (Be prepared to support the motor assembly when hardware is removed.)
4. Reinstall new motor by reversing steps #1 through #3.

ADJUSTING BRUSH PATTERN

(See Operation Section)

ADJUSTING VOLUMIZER (241 & 242 SERIES ONLY)

(See Operation Section)

MAINTENANCE AND SERVICE

REMOVING VOLUMIZER (241 & 242 SERIES ONLY)

Sweepers equipped with the patented Volumizer are not designed to reverse the direction of the brushes for End of Pile Clean Up. Reversing the auxiliary hydraulic flow will stop brush rotation and lower the high dump floor.

If End of Pile Clean Up is required for your job at hand the Volumizer will need to be removed and the manifold modified. This will allow the brushes to rotate in reverse while still gently extending the cylinders on the high dump floor which acts as a dust pan for End of Pile Clean Up.

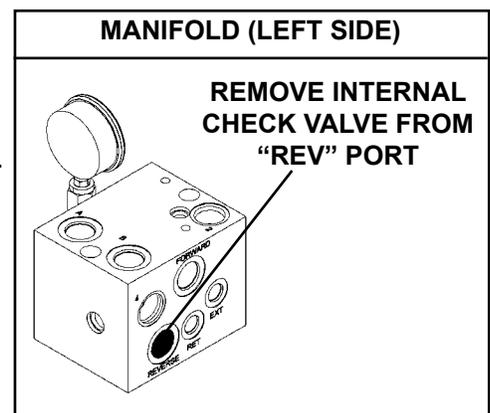
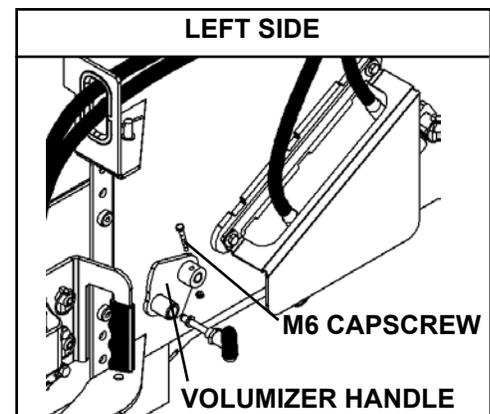
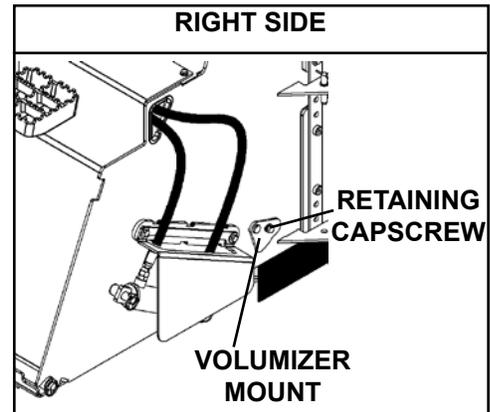
To Remove Volumizer:

1. Relieve pressure in the hydraulic system and disconnect power and turn hoses to the prime mover and block up the sweeper to gain access to the volumizer.
2. Remove the volumizer retaining capscrew from the right side of the sweeper and pull out the volumizer mount.
3. Remove the M6 capscrew from the volumizer handle on the left side of the sweeper and remove the handle.
4. Remove the volumizer assembly from the inside of the sweeper.

To Modify the Manifold:

1. Remove the hose and straight connector from the "REV" port of the manifold block.
2. Remove the internal check valve threaded into the "REV" port of the manifold block. (Store in a clean, dry location for reinstallation.)
3. Reinstall the straight connector and hose back into the "REV" port of the manifold block.
4. Reconnect the power and return hoses to the prime mover. Run the cylinder and brushes while checking for hydraulic leaks and tighten or replace as required.

To reinstall the volumizer and check valve reverse the procedure.



MAINTENANCE AND SERVICE

CYLINDER SEAL REPLACEMENT

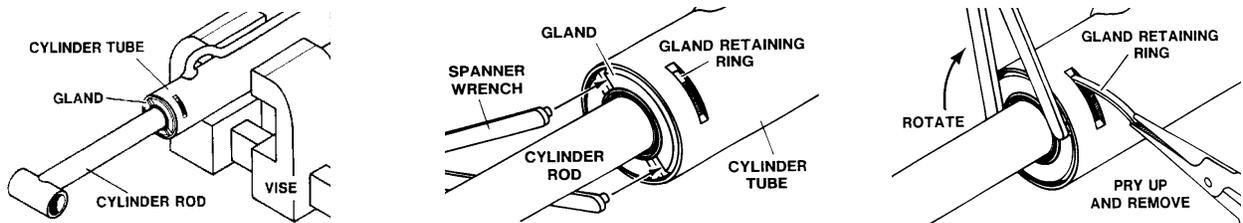
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic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

DISASSEMBLY PROCEDURE

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

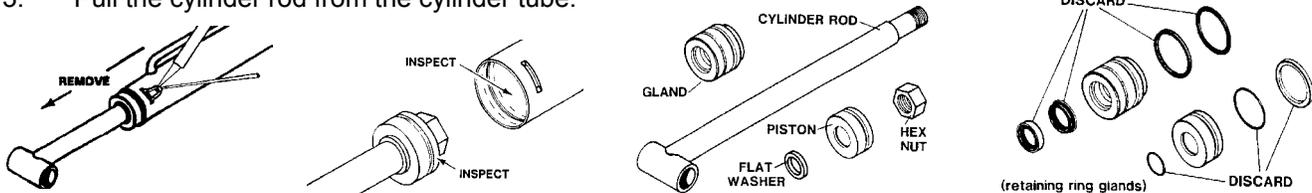
RETAINING RING TYPE GLAND

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



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

3. Pull the cylinder rod from the cylinder tube.

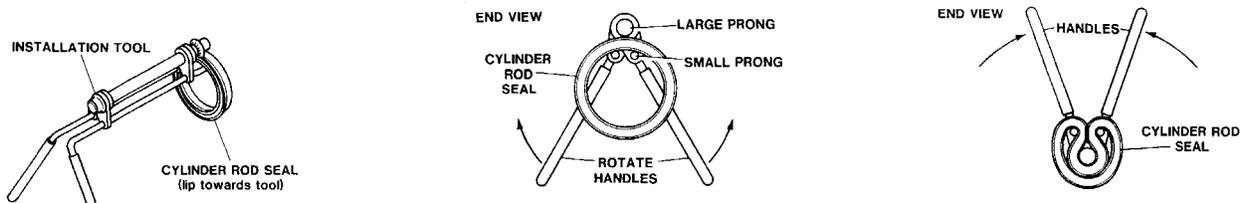


4. Inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston and cylinder tube must be replaced.
5. Remove the hex nut, piston, flat washer or spacer tube (if so equipped), and gland from the cylinder rod. If the cylinder rod is rusty, scratched, or bent,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

ASSEMBLY PROCEDURE

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

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

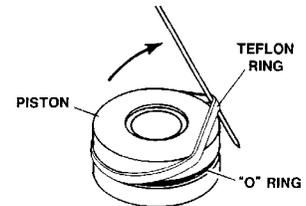
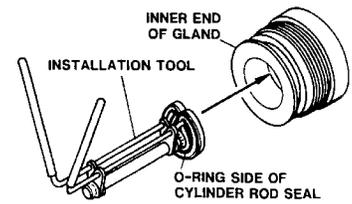


MAINTENANCE AND SERVICE

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.

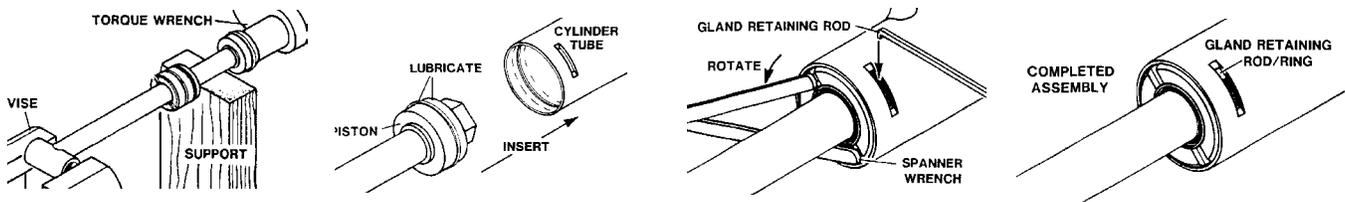
NOTE: Threaded gland is shown in diagram for reference only.

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.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
MOTOR FOR SWEEPER WILL NOT OPERATE.	Auxiliary hydraulics control on prime mover is activated in the wrong position.	Refer to Prime Mover operator's manual.
	Hoses from sweeper to Prime Mover incorrectly connected.	Refer to Prime Mover operator's manual.
	Obstruction in hydraulic line.	Check hose routing. Remove obstruction and replace if necessary.
	Motor failure.	Check for leaks and replace motor if necessary.
SLUGGISH SWEEPER OPERATION	Insufficient oil flow from Prime Mover.	Check compatibility between sweeper hydraulic flow requirements and Prime Mover. Increase throttle.
	Hydraulic motor damaged or seals blown.	Check for leaks and replace motor if necessary.
	Prime Mover hydraulic filter is dirty.	Refer to Prime Mover operator's manual.
MOTOR RUNS BUT BROOM DOES NOT TURN	Sheared motor shaft key.	Replace motor key.
OIL LEAKS FROM MOTOR	Motor seals damaged.	Replace motor shaft seal or motor if necessary.
	Seals on hydraulic fitting damaged.	Replace hydraulic fitting.
	Hydraulic fittings loose or damaged.	Tighten or replace as required.
	Hydraulic lines loose or damaged.	Tighten or replace as require.
BRUSH ROTATES IN THE WRONG DIRECTION	Hoses installed incorrectly.	Switch hoses at the motor end.
BRUSH SLOWS OR STOPS WHEN SWEEPING	Slider plates are jammed.	Check for material buildup and clean as required.
	Travel speed too fast.	Reduce travel speed.
	Too much material.	Reduce travel speed or make smaller/ additional passes.
	Hydraulic motor failure.	Check for leaks and replace if necessary.

TROUBLESHOOTING

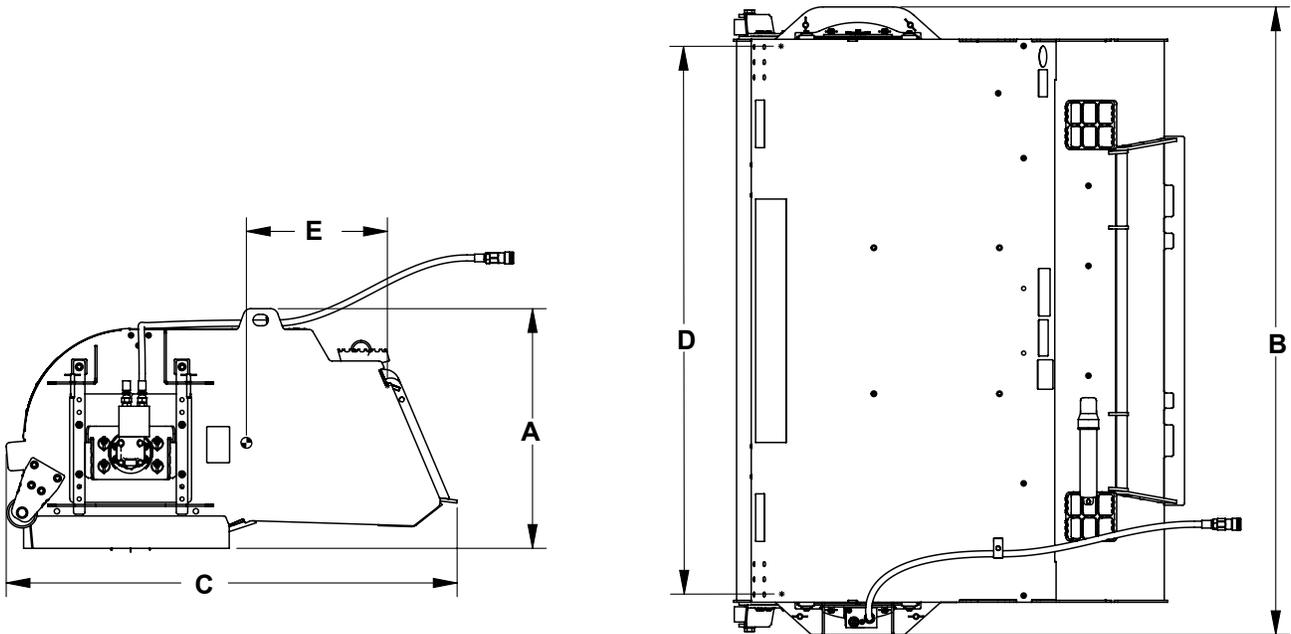
PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
BRUSH WEARS QUICKLY	Slider plates are jammed.	Check for material buildup and clean as required.
	Brush pattern set too wide.	Check and set brush height/pattern.
	Sweeper in "float" position.	Install "T" handle quick pins.
EXCESSIVE HYDRAULIC OIL TEMPERATURE	Low hydraulic oil level on the Prime Mover.	Refer to Prime Mover operator's manual.
	Obstruction in hydraulic line.	Check hose routing. Remove obstruction and replace if necessary.
	Dirty hydraulic oil.	Refer to Prime Mover operator's manual.
	Quick couplers not engaged or loose.	Tighten or engage quick couplers. Replace if necessary.
HYDRAULIC QUICK COUPLERS LEAKING	Quick coupler poppet is unseated	Tighten or replace quick couplers.
CYLINDER SPEED TOO SLOW	Manifold failure.	Replace. (Call Service Department)
	Hoses pinched or obstructed.	Check hose routing, remove obstruction and replace if necessary.
BRUSH NOT TOUCHING GROUND BEFORE CUTTING EDGE	Brush "T" handle quick pins set too high.	Check brush pattern and install "T" handle quick pins.
	Slider plates are jammed.	Check for material buildup and clean as required.
CYLINDERS UNABLE TO CLOSE HIGH DUMP FLOOR	Relief valve failure.	Replace. (Call Service Department)
	Hoses pinched or obstructed.	Check hose routing. Remove obstruction and replace if necessary.
	Insufficient oil flow from Prime Mover.	Check compatibility between sweeper hydraulic flow requirements and Prime Mover.
FAN DOES NOT TURN	Debris buildup.	Remove fan and clean fan housing.
DUST ESCAPING FROM SWEEPER	Skirting flaps or seals damaged	Replace as necessary.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
DUST ESCAPING FROM FAN EXHAUST	Filter seal damaged or hole in filter.	Inspect filter and seals for damage. Replace if necessary.
FILTER SHAKING FREQUENCY INCREASING	Dirty Filter. Material embedded in filter	Remove filter and clean with water. (See Operation Section)
FILTER DOES NOT SHAKE	12V DC power source not functioning. Debris build up between filter tray and body, eliminating shaking.	Prime mover not providing power or electrical cord damaged. Remove debris. (See Operation Section)

SPECIFICATIONS

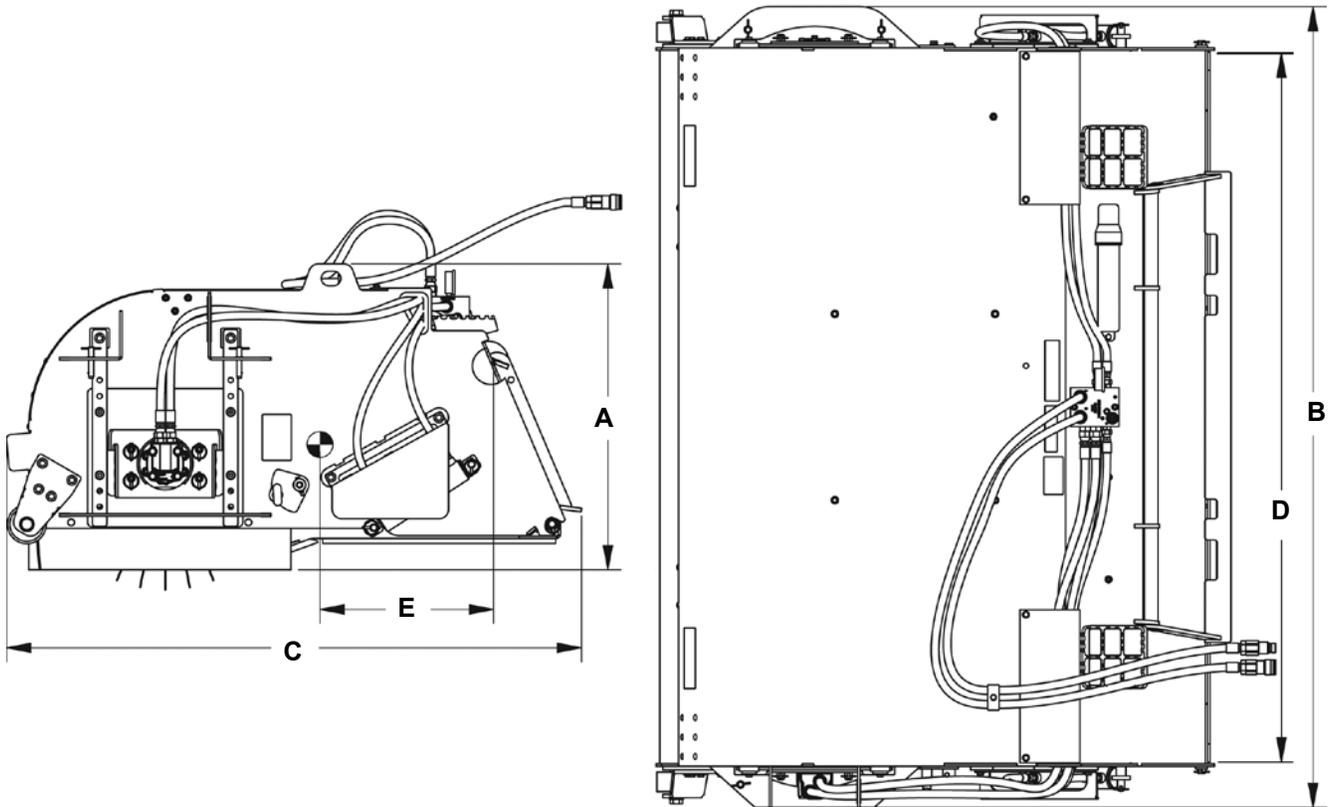
240 SERIES PICK-UP SWEEPERS



SPECIFICATIONS			
240 SERIES			
DESCRIPTION	60"	72"	84"
A. Overall Height	30" (76.2cm)	30" (76.2cm)	30" (76.2cm)
B. Overall Width	70.50" (179.1cm)	82.50" (209.6cm)	94.50" (240.0cm)
C. Overall Length	59.25" (150.5cm)	59.25" (150.5cm)	59.25" (150.5cm)
D. Sweeping Width	60" (152.4cm)	72" (152.4cm)	84" (152.4cm)
E. Center of Gravity	21.30" (54.1cm)	21.30" (54.1cm)	21.30" (54.1cm)
Weight	920 lbs (417.3kg)	1035 lbs (469.5kg)	1145 lbs (519.4kg)
Flow Range	15-25 GPM (57-95 lpm)		
Maximum Pressure	3500 PSI (241 bar)		
Brush Diameter	26" (66cm)		
SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE. WHENEVER APPLICABLE, SPECIFICATIONS ARE IN ACCORDANCE WITH SAE STANDARDS.			

SPECIFICATIONS

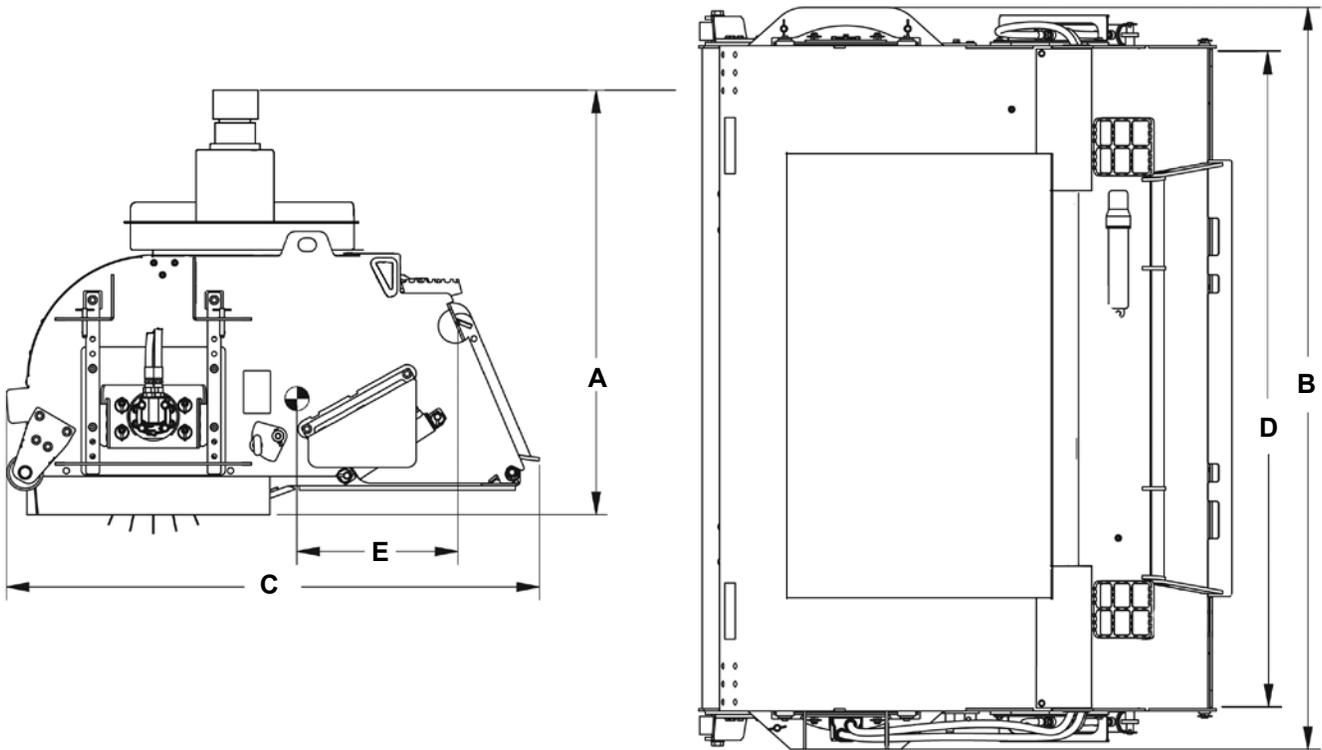
241 SERIES PICK-UP PRO SWEEPERS



SPECIFICATIONS			
241 SERIES			
DESCRIPTION	60"	72"	84"
A. Overall Height	30" (76.2cm)	30" (76.2cm)	30" (76.2cm)
B. Overall Width	70.50" (179.1cm)	82.50" (209.6cm)	94.50" (240.0cm)
C. Overall Length	59.25" (150.5cm)	59.25" (150.5cm)	59.25" (150.5cm)
D. Sweeping Width	60" (152.4cm)	72" (152.4cm)	84" (152.4cm)
E. Center of Gravity	18.40" (46.7cm)	18.40" (46.7cm)	18.40" (46.7cm)
Weight	1195 lbs (542.0kg)	1310 lbs (594.2kg)	1430 lbs (648.6kg)
Flow Range	15-25 GPM (57-95 lpm)		
Maximum Pressure	3500 PSI (241 bar)		
Brush Diameter	26" (66cm)		
SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE. WHENEVER APPLICABLE, SPECIFICATIONS ARE IN ACCORDANCE WITH SAE STANDARDS.			

SPECIFICATIONS

242 SERIES PICK-UP PRO SWEEPERS



SPECIFICATIONS			
242 SERIES			
DESCRIPTION	60"	72"	84"
A. Overall Height	47.25" (120.0cm)	47.25" (120.0cm)	47.25" (120.0cm)
B. Overall Width	70.50" (179.1cm)	82.50" (209.6cm)	94.50" (240.0cm)
C. Overall Length	59.25" (150.5cm)	59.25" (150.5cm)	59.25" (150.5cm)
D. Sweeping Width	60" (152.4cm)	72" (152.4cm)	84" (152.4cm)
E. Center of Gravity	19.10" (48.5cm)	19.10" (48.5cm)	19.10" (48.5cm)
Weight	1375 lbs (623.7kg)	1490 lbs (675.9kg)	1610 lbs (730.3kg)
Flow Range	15-25 GPM (57-95 lpm)		
Maximum Pressure	3500 PSI (241 bar)		
Brush Diameter	26" (66cm)		
SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE. WHENEVER APPLICABLE, SPECIFICATIONS ARE IN ACCORDANCE WITH SAE STANDARDS.			

BOLT TORQUE SPECIFICATIONS

GENERAL TORQUE SPECIFICATION TABLES

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

SAE BOLT TORQUE SPECIFICATIONS

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

Bolt Size		SAE GRADE 5 TORQUE				SAE GRADE 8 TORQUE				Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary
		Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters		
Inches	Millimeters	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	
1/4	6.35	8	9	11	12	10	13	14	18	<p>GRADE 2</p>  <p>GRADE 5</p>  <p>GRADE 8</p> 
5/16	7.94	14	17	19	23	20	25	27	34	
3/8	9.53	30	36	41	49	38	46	52	62	
7/16	11.11	46	54	62	73	60	71	81	96	
1/2	12.70	68	82	92	111	94	112	127	152	
9/16	14.29	94	112	127	152	136	163	184	221	
5/8	15.88	128	153	174	207	187	224	254	304	
3/4	19.05	230	275	312	373	323	395	438	536	
7/8	22.23	340	408	461	553	510	612	691	830	
1	25.40	493	592	668	803	765	918	1037	1245	
1-1/8	25.58	680	748	922	1014	1088	1224	1475	1660	
1-1/4	31.75	952	1054	1291	1429	1547	1700	2097	2305	
1-3/8	34.93	1241	1428	1683	1936	2023	2312	2743	3135	
1-1/2	38.10	1649	1870	2236	2535	2686	3026	3642	4103	

METRIC BOLT TORQUE SPECIFICATIONS

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

Bolt head identification marks as per grade.		
		

Size of Bolt	Grade No.	Pitch (mm)	Pounds Feet	Newton-Meters	Pitch (mm)	Pounds Feet	Newton-Meters
M6	5.6	1.0	3.6-5.8	4.9-7.9	-	-	-
	8.8		5.8-4	7.9-12.7		-	-
	10.9		7.2-10	9.8-13.6		-	-
M8	5.6	1.25	7.2-14	9.8-19	1.0	12-17	16.3-23
	8.8		17-22	23-29.8		19-27	25.7-36.6
	10.9		20-26	27.1-35.2		22-31	29.8-42
M10	5.6	1.5	20-25	27.1-33.9	1.25	20-29	27.1-39.3
	8.8		34-40	46.1-54.2		35-47	47.4-63.7
	10.9		38-46	51.5-62.3		40-52	54.2-70.5
M12	5.6	1.75	28-34	37.9-46.1	1.25	31-41	42-55.6
	8.8		51-59	69.1-79.9		56-68	75.9-92.1
	10.9		57-66	77.2-89.4		62-75	84-101.6
M14	5.6	2.0	49-56	66.4-75.9	1.5	52-64	70.5-86.7
	8.8		81-93	109.8-126		90-106	122-143.6
	10.9		96-109	130.1-147.7		107-124	145-168
M16	5.6	2.0	67-77	90.8-104.3	1.5	69-83	93.5-112.5
	8.8		116-130	157.2-176.2		120-138	162.6-187
	10.9		129-145	174.8-196.5		140-158	189.7-214.1
M18	5.6	2.0	88-100	119.2-136	1.5	100-117	136-158.5
	8.8		150-168	203.3-227.6		177-199	239.8-269.6
	10.9		175-194	237.1-262.9		202-231	273.7-313
M20	5.6	2.5	108-130	146.3-176.2	1.5	132-150	178.9-203.3
	8.8		186-205	252-277.8		206-242	279.1-327.9
	10.9		213-249	288.6-337.4		246-289	333.3-391.6

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 model and serial number of your product ready to ensure that you receive the correct parts for your specific attachment.

The product control number (PCN), 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.