



## OPERATOR'S HANDBOOK

### COLLECTOR SWEEPER SB & VRS Series



SERIAL NUMBER: \_\_\_\_\_

MODEL NUMBER: \_\_\_\_\_

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## Notes

# TABLE OF CONTENTS

PREFACE.....	4
SAFETY STATEMENTS .....	5
GENERAL SAFETY PRECAUTIONS.....	5-8
SAFETY SIGNS & LABELS .....	9-11
INSTALLATION & SET-UP .....	12-13
OPERATION.....	14-19
STORAGE .....	17
LIFT & TIE DOWN .....	18-19
MAINTENANCE .....	20-25
BRUSH PATTERN .....	22-23
TROUBLESHOOTING .....	26-27
SPECIFICATIONS .....	28-30
DECLARATION OF CONFORMITY .....	31-32

# PREFACE

## GENERAL INFORMATION

This product was carefully designed and manufactured to give you many years of dependable service. Only minor maintenance (such as cleaning and lubricating) is required to keep it in top working condition. Be sure to observe all maintenance procedures and safety precautions in this manual and on any safety decals located on the product and on any equipment on which the attachment is mounted.

**WARNING!** Never let anyone operate this unit without reading the "Safety Precautions" and "Operating Instructions" sections of this manual.



Always choose hard, level ground to park the vehicle on and set the brake so the unit cannot roll.

Unless noted otherwise, right and left sides are determined from the operator's control position when facing the attachment.

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

## BEFORE OPERATION

The primary responsibility for safety with 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 operator's

## SAFETY ALERT SYMBOL



This is the "Safety Alert Symbol" used by this industry. This symbol is used to warn of possible injury. Be sure to read all warnings carefully. They are included for your safety and 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 move, 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 IS USED WHERE SERIOUS INJURY OR DEATH WILL RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.



### **WARNING**

THIS SIGNAL WORD IS USED WHERE SERIOUS INJURY OR DEATH COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.



### **CAUTION**

THIS SIGNAL WORD IS USED WHERE MINOR INJURY COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.

### **NOTICE**

NOTICE INDICATES A PROPERTY DAMAGE MESSAGE.

## 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.

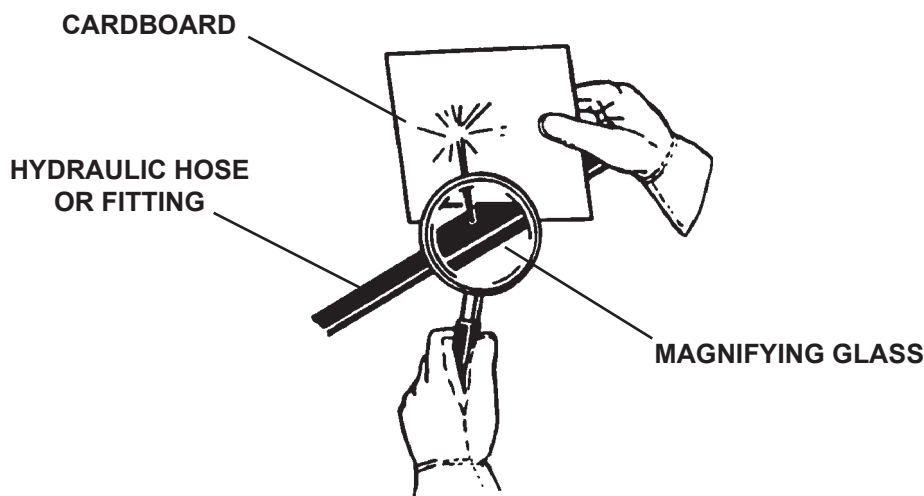
### WARNING!



### 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 Protection 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.



# **SAFETY SIGNS & LABELS**

There are several specific signs on this sweeper. The exact location of hazards and description of hazards are reviewed.

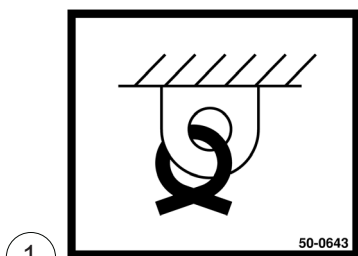
## **Placement or replacement of Safety Signs**

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

## **Instructions**

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

## SAFETY SIGNS & LABELS



1

50-0643

**TIE DOWN POINT**

Secure at this location.

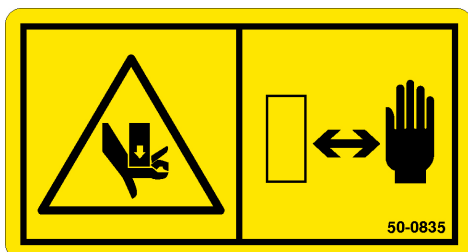


3

50-0832

**HAZARD: WARNING! HIGH PRESSURE FLUID HAZARD.** ESCAPING HYDRAULIC FLUID CAN HAVE ENOUGH PRESSURE TO PENETRATE SKIN. Consult physician immediately if skin penetration occurs.

**AVOIDANCE: KEEP SAFE DISTANCE AWAY FROM HAZARD. RELIEVE PRESSURE BEFORE DISCONNECTING LINES. DO NOT** use hands to check for leaks. *Failure to heed this warning could result in serious injury or death.*



5

50-0835

**HAZARD: WARNING! PINCH POINT HAZARD.**

**AVOIDANCE: KEEP HAND SAFE DISTANCE AWAY FROM HAZARD.** *Failure to heed this warning could result in serious injury or death.*

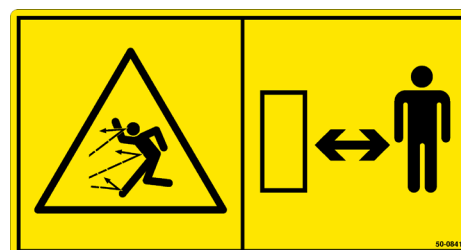


2

50-0831

**HAZARD: GENERAL WARNING.**

**AVOIDANCE: READ HANDBOOK - DO NOT OPERATE OR SERVICE UNLESS YOU HAVE READ AND UNDERSTAND THE INSTRUCTIONS AND SAFETY INFORMATION IN THE OPERATOR'S HANDBOOK AND ALL PRIME MOVER MANUALS.** *Failure to follow the instructions or heed the warnings could result in serious injury or death.*

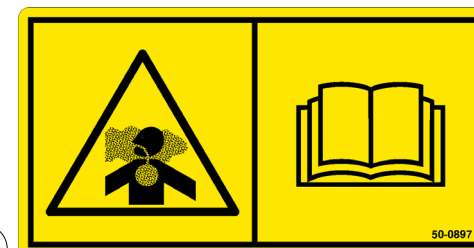


4

50-0841

**HAZARD: WARNING! FLYING OBJECTS HAZARD.**

**AVOIDANCE: KEEP SAFE DISTANCE AWAY FROM HAZARD. REMOVE ALL PEOPLE, ANIMALS AND PROPERTY THAT COULD BE INJURED OR DAMAGED BY FLYING DEBRIS FROM THE AREA.** *Failure to heed this warning could result in serious injury or death.*



6

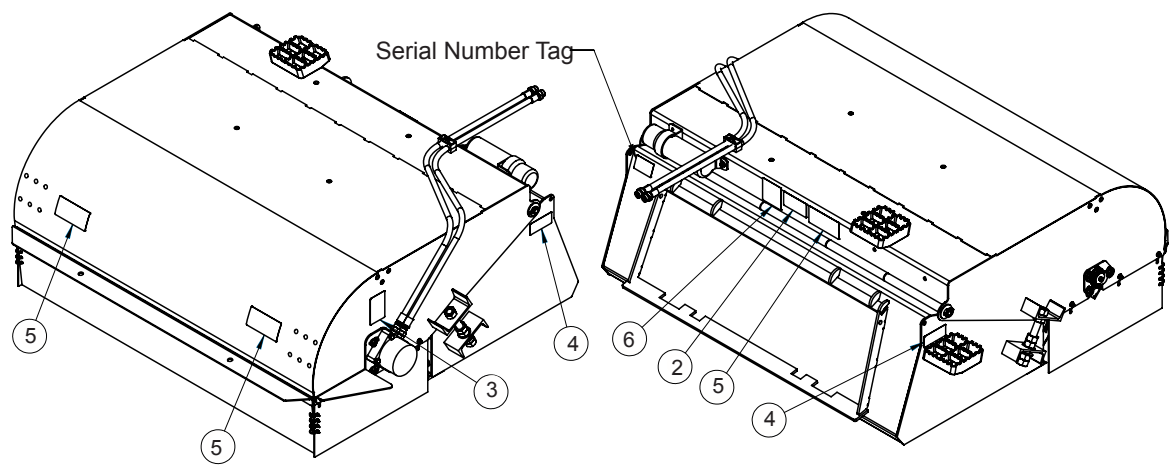
50-0897

**HAZARD: WARNING! DUST INHALATION.**

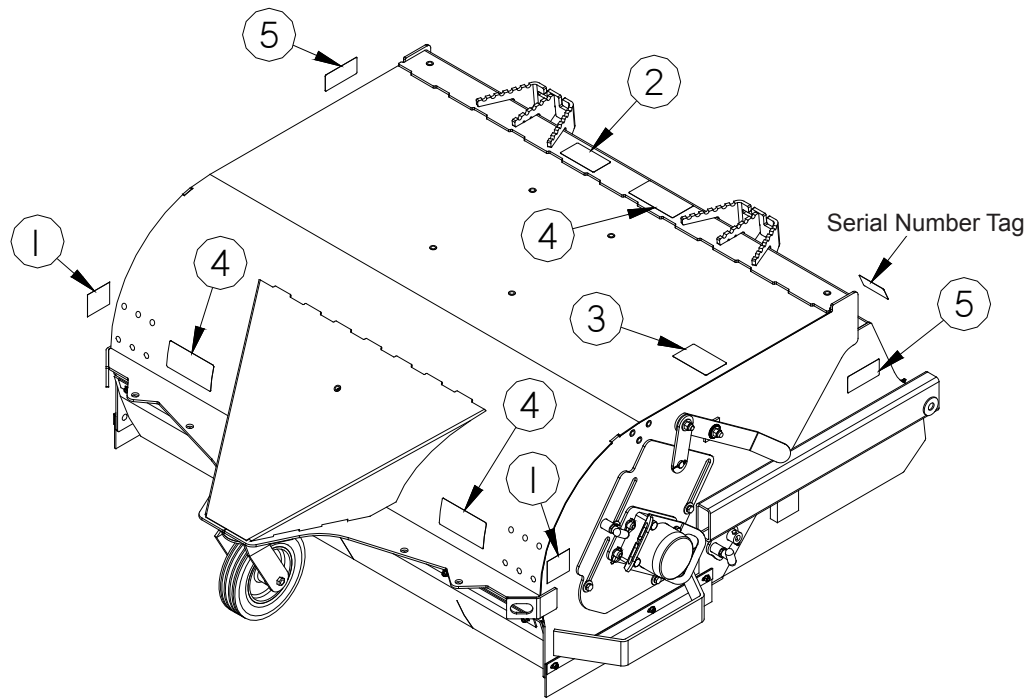
**AVOIDANCE: READ HANDBOOK - DO NOT OPERATE UNTIL THE RECOMMENDED DUST SUPPRESSION, DUST COLLECTION OR PERSONAL PROTECTION EQUIPMENT PRECAUTIONS HAVE BEEN REVIEWED AND IMPLEMENTED.** *Failure to follow the instructions or heed the warnings could result in serious injury or death.*

# SAFETY SIGNS & LABELS

## SB LABEL POSITION



## VRS LABEL POSITION



# INSTALLATION & SET-UP

## Sweeper Installation

### WARNING!



**Improper attachment of sweeper could result in injury or death.** Do not operate this machine until you have positive indication that the attachment is securely mounted.

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

# INSTALLATION & SET-UP

## VRS Installation

### ATTACHING CHAINS ON VRS

1. Install sweeper to prime movers quick attach mounting.
2. Attach chains to SSL grab bars using one 5/16 quick link.
3. Attach chains to sweeper using one 5/16 wide jaw quick clip per side. (figure 3) Leave chains loose with equal slack in both sides. **Do not entangle hydraulic hoses.**
4. Connect hydraulic hoses to prime mover remote hydraulics.

#### CAUTION!



**AVOID EQUIPMENT DAMAGE AND PERSONAL INJURY.** Chains must be of equal length and long enough to keep sweeper level during dumping. Short chains may cause sweeper body to tip back and damage sweeper body.

### ADJUSTING CHAINS

1. Make sure chains are quite loose
2. Raise sweeper and then dump the bucket slowly. Sweeper will dump correctly if chains have proper tension. If the sweeper tips down when test dumping, go to step 3.
3. Tighten both chains by the same amount but no more than two links each.
4. Repeat steps 2 and 3 until sweeper dumps correctly.

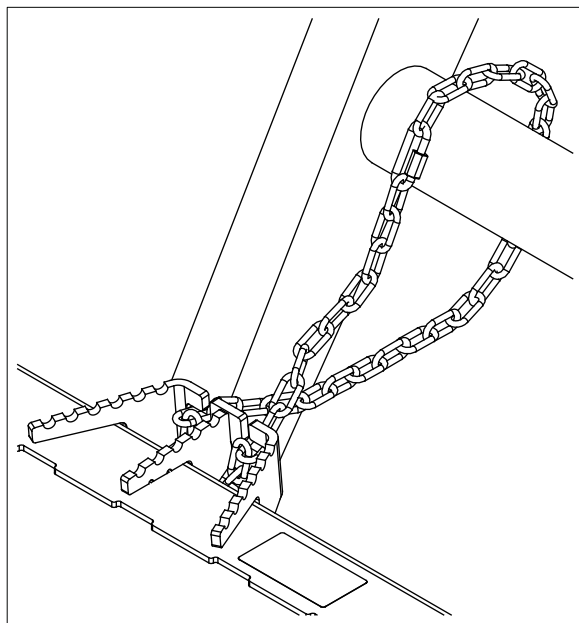


figure 3

# 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.

### CAUTION!



**A SWEEPER IS A DEMANDING MACHINE.** Only fully trained operators or trainee operators under supervision of a fully trained person should use machine.

Before operating sweeper:

- Learn sweeper and prime mover controls in off-road location.
- Be sure you are in a safe area, away from traffic or other hazards.
- Check hardware holding sweeper to host machine, making sure it is tight.
- Replace damaged or fatigued hardware.
- Make sure hydraulic hardware and fittings are tight.
- Replace damaged or fatigued fittings or hoses.
- Check tire pressures.
- Check tire ratings to be sure they match the prime mover load. Weigh sweeper end of prime mover to insure proper tire rating.
- 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, long sleeved shirt buttoned at cuffs; safety glasses, goggles or face shield; ear protection; and dust mask.

While operating sweeper:

- When operating sweeper, adhere to all government rules, local laws and other professional guidelines for your sweeping application.
- Before leaving operators area for any reason, lower sweeper to ground. Stop prime mover engine, set brakes, remove key from ignition.
- Minimize flying debris - use slowest rotating speed that will do the job.

# OPERATION

- Keep hands, feet, hair and other loose clothing away from all moving parts.
- Leave brush hood (shield) and all other shields and safety equipment in place when operating sweeper and primer mover.
- Be aware of extra weight and width a sweeper adds. Reduce travel speed accordingly.
- When sweeping 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 while you are in the seat of the prime mover. Seat belt must be fastened while you operate prime mover. Only operate controls while the engine is running. Protective glasses must be worn while you operate prime mover and while you operate sweeper.
- Operate sweeper slowly in open area, check for proper operation of all controls and all protective devices. Note any repairs needed. Report any needed repairs.

## **Before Each Use**

Perform daily maintenance as indicated in Maintenance Schedule.

Run prime mover and sweeper at low idle. Check for hydraulic leaks or other problems, make corrections, if necessary, before using sweeper.

### **WARNING!**



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

## **During Use**

Carry sweeper low to ground so operator has good visibility and stability. Avoid sudden movements from one side to the other side when you carry a sweeper.

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.

## **Directing Debris**

Sweeping with wind to operator's back makes sweeping more effective and keeps debris off operator.

### **NOTICE!**

**AVOID SWEEPER DAMAGE.** Reduce travel speed to avoid hitting immovable objects.

# OPERATION

## **Brush, Engine & Travel Speeds**

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

## **Large Areas**

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

## **Snow**

Fast brush speeds and slow travel speeds are needed to sweep effectively. Start at 3/4 throttle and lowest gear of prime mover. For wet and/or deep snow, increase to almost full throttle. This keeps snow from packing up inside brush hood.

In deep snow you may need to make multiple passes to get a clean surface.

To keep snow from blowing back on swept area, always keep wind at your back.

## **Dirt & Gravel**

To keep dust at a minimum, plan sweeping for overcast and humid days or after rain. Sweep with wind at your back.

Low brush speeds, moderate travel speeds work best for cleaning debris from hard surfaces.

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

## **Heavy Debris**

Travel slowly - 1-2 mph (2-3 kph).

Sweep a path less than the full width of sweeper.

Increase engine speed if debris becomes very heavy.



# 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.*

## General Storage:

### Storage:

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

### Additional Precautions for Long Term Storage:

- Touch up all unpainted surfaces with paint to avoid rust.
- Inflate tires to recommended tire pressure.
- Fill fuel tank and hydraulic oil tank to maximum.
- Check antifreeze properties and drain fluids as appropriate.

### Removal from Storage:

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

# OPERATION

## SB LIFT POINTS

Lifting points are identified by lifting decals where required. Lifting at other points is unsafe and can damage attachment. Do not attach lifting accessories around cylinders or in any way that may damage hoses or hydraulic components. See diagram:

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

### WARNING!



**USE LIFTING ACCESSORIES (CHAINS, SLINGS, ROPES, SHACKLES AND ETC.) THAT ARE CAPABLE OF SUPPORTING THE SIZE AND WEIGHT OF YOUR ATTACHMENT. Secure all lifting accessories in such a way to prevent unintended disengagement. Failure to do so could result in the attachment falling and causing serious personal injury or death.**

## SB TIE DOWN POINTS

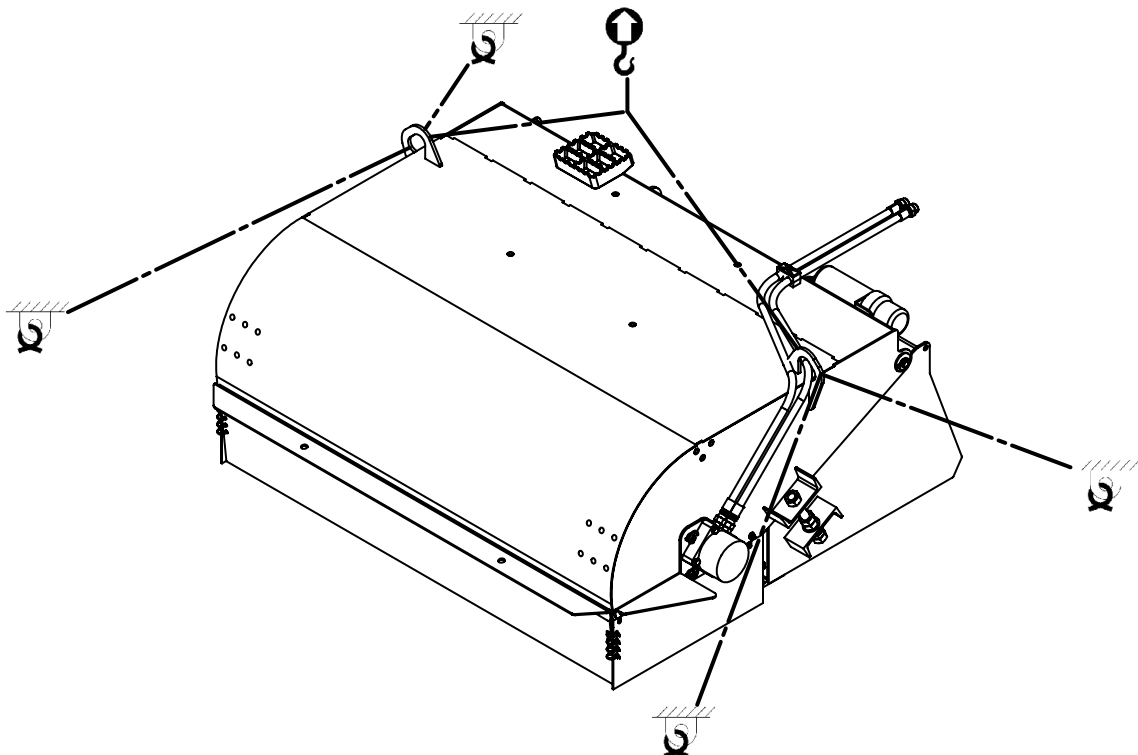
Tie down points are identified by tie down decals where required. Securing to trailer at other points is unsafe and can damage attachment. Do not attach tie down accessories around cylinders or in any way that may damage hoses or hydraulic components. See diagram:

- Attach tie down accessories to unit as recommended.
- Check unit stability before transporting.

### WARNING!



**VERIFY THAT ALL TIE DOWN ACCESSORIES (CHAINS, SLINGS, ROPES, SHACKLES AND ETC.) ARE CAPABLE OF MAINTAINING ATTACHMENT STABILITY DURING TRANSPORTING and are attached in such a way to prevent unintended disengagement or shifting of the unit. Failure to do so could result in serious personal injury or death.**



# OPERATION

## VRS LIFT POINTS

Lifting points are identified by lifting decals where required. Lifting at other points is unsafe and can damage attachment. Do not attach lifting accessories around cylinders or in any way that may damage hoses or hydraulic components. See diagram:

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

### WARNING!



**USE LIFTING ACCESSORIES (CHAINS, SLINGS, ROPES, SHACKLES AND ETC.) THAT ARE CAPABLE OF SUPPORTING THE SIZE AND WEIGHT OF YOUR ATTACHMENT. Secure all lifting accessories in such a way to prevent unintended disengagement. Failure to do so could result in the attachment falling and causing serious personal injury or death.**

## VRS TIE DOWN POINTS

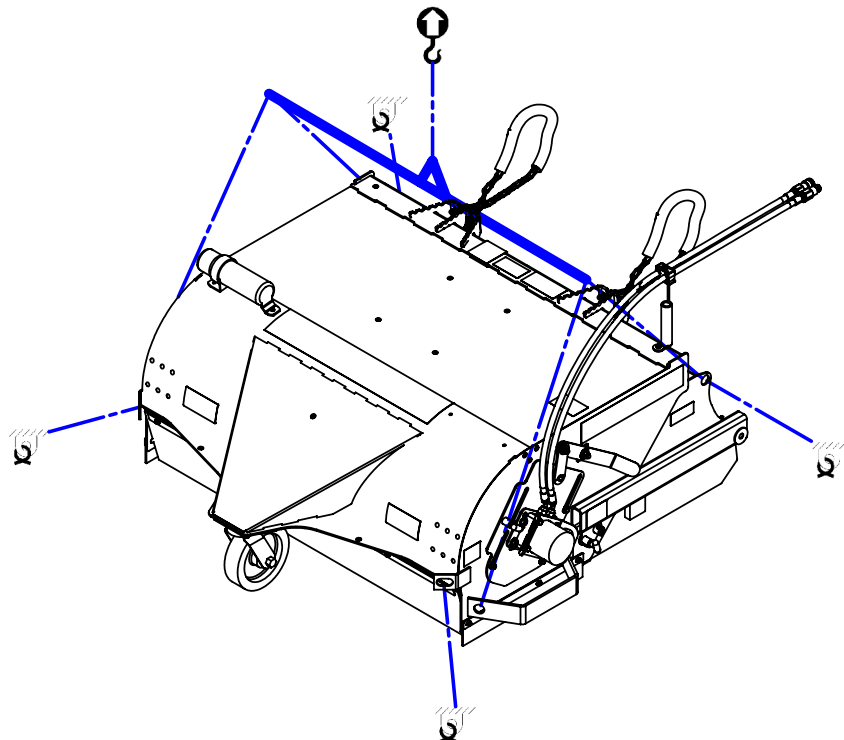
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- Attach tie down accessories to unit as recommended.
- Check unit stability before transporting.

### WARNING!



**VERIFY THAT ALL TIE DOWN ACCESSORIES (CHAINS, SLINGS, ROPES, SHACKLES AND ETC.) ARE CAPABLE OF MAINTAINING ATTACHMENT STABILITY DURING TRANSPORTING and are attached in such a way to prevent unintended disengagement or shifting of the unit. Failure to do so could result in serious personal injury or death.**



## MAINTENANCE

### CAUTION!



**DO NOT MODIFY THE SWEEPER IN ANY WAY.** Personal injury could result. If you have questions, contact your dealer or Paladin.

Repair or adjust sweeper in safe area, away from traffic and hazards.

Before adjusting or servicing sweeper, lower sweeper to ground, stop prime mover engine, set brakes and remove key from ignition.

When working on or around sweeper, lower it to ground or secure with transport chains or cylinder-stop locks.

Stop prime mover engine and cycle control levers to release hydraulic pressure before servicing or adjusting sweeper hydraulic systems.

### WARNING!



**ESCAPING HYDRAULIC FLUID** can have enough pressure to penetrate skin, causing serious personal injury.

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

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

Replace parts if following conditions are present:

- End fittings are damaged or leaking.
- Outer covering is chafed or cut.
- Reinforcing wire layer is exposed.
- Outer covering is ballooning locally.
- Hose is kinked or crushed.
- Hose has been pulled or stretched.

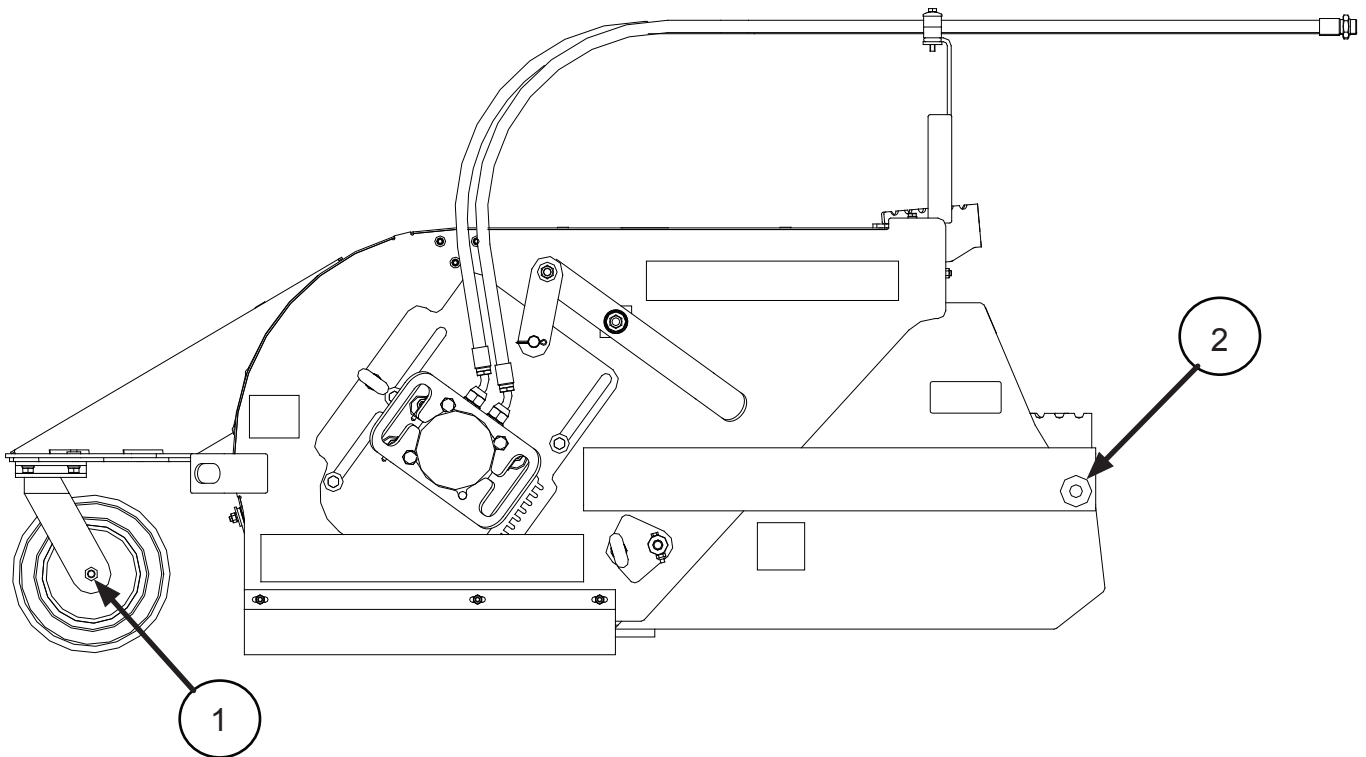
Make sure all clamps, guards, and shields are installed correctly.

# MAINTENANCE

## VRS LUBRICATION POINTS

Grease fittings should be greased before each use. See figure for locations.

1. Caster ( 2 fittings)
2. Bucket Pivot ( 1 Fitting each )



# MAINTENANCE

## SB Brush Pattern

Properly adjusted brush offers best sweeper performance. Check brush pattern:

1. Move sweeper to a dusty, flat surface.
2. Set prime movers parking brake, leave engine running.
3. Start sweeper at a slow speed; lower it till boom arms bottom out. Run sweeper in stationary position for 10 seconds.
4. Raise sweeper and back away; switch off engine and remove key from prime mover. Brush pattern left in dust should be 2-4 inches (5-10 cm) wide, running the length of the brush. (figure 1)
5. Adjust brush pattern as necessary according to the following instructions.
  - a. Loosen the bottom 1 inch nut.
  - b. Adjust the top 1 inch nut to set the pattern. Tighten (clockwise) to increase pattern. Loosen (Counterclockwise) to decrease pattern. (figure 3)
  - c. When the pattern is set, tighten the bottom 1 inch nut. (figure 3)
  - d. Adjust the flaps so they just touch the ground.

**NOTE:** To extend brush life make sure bolts on both sides are adjusted evenly.

6. Repeat steps # 1 through #5 until brush pattern is 2-4 inches (5-10 cm) wide.

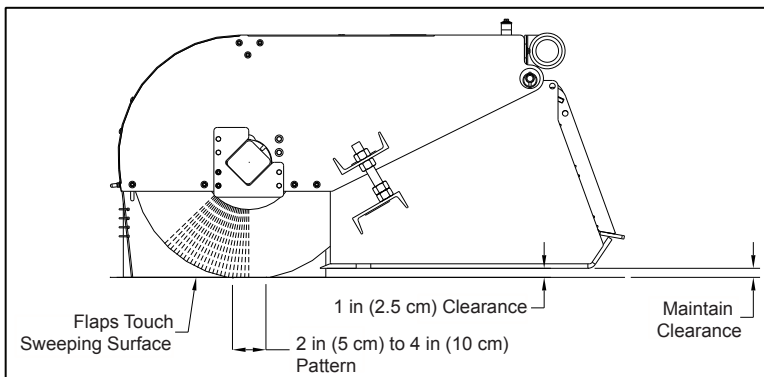


figure 3

Worn Section Standard				Reference Information	
Section OD, New	Ring ID	Section OD, Worn	Exposed Bristle, Worn	Bristle Length	Exposed Bristle, New
24 inches (61cm)	6.38 inches (16.2cm)	17 inches (43cm)	3.8 inches (9.7cm)	6.5 inches (16.5cm)	7.5 inches (19cm)
26 inches (66cm)	8.00 inches (20.3cm)	18 inches (46cm)	4.0 inches (10cm)	9.0 inches (22.9cm)	8.0 inches (20.3cm)
32 inches (81cm)	10.0 inches (25.4cm)	22 inches (56cm)	5.0 inches (12.7cm)	11.0 inches (27.9cm)	10.0 inches (25.4cm)
36 inches (91cm)	10.0 inches (25.4cm)	24 inches (61cm)	6.0 inches (15.2cm)	13.0 inches (33cm)	12.0 inches (30.5cm)
36 inches (91cm)	10.63 inches (27cm)	25 inches (64cm)	6.0 inches (15.2cm)	12.69 inches (32.2cm)	11.4 inches (29cm)
46 inches (117cm)	19.38 inches (49.2cm)	34 inches (86cm)	6.0 inches (15.2cm)	13.31 inches (33.8cm)	12.1 inches (30.7cm)

# MAINTENANCE

## VRS Brush Pattern

Properly adjusted brush offers best sweeper performance. Check brush pattern:

1. Move sweeper to a dusty, flat surface.
2. Set prime movers parking brake, leave engine running.
3. Start sweeper at a slow speed; lower it till boom arms bottom out. Run sweeper in stationary position for 10 seconds.
4. Raise sweeper and back away; switch off engine and remove key from prime mover. Brush pattern left in dust should be 2-4 inches (5-10 cm) wide, running the length of the brush. (figure 1)
5. Adjust brush pattern as necessary according to the following instructions.
  - a. If brush pattern is too wide, pull "T" handle quick pin, move it up one notch. Repeat on opposite side. (figure 2)
  - b. If brush pattern is too narrow, pull "T" handle quick pin, move it down one notch. Repeat on opposite side. (figure 2)
  - c. Use sight indicator to be sure sweeper brush is level. (figure 2)
6. Repeat steps # 1 through #5 until brush pattern is 2-4 inches (5-10 cm) wide.

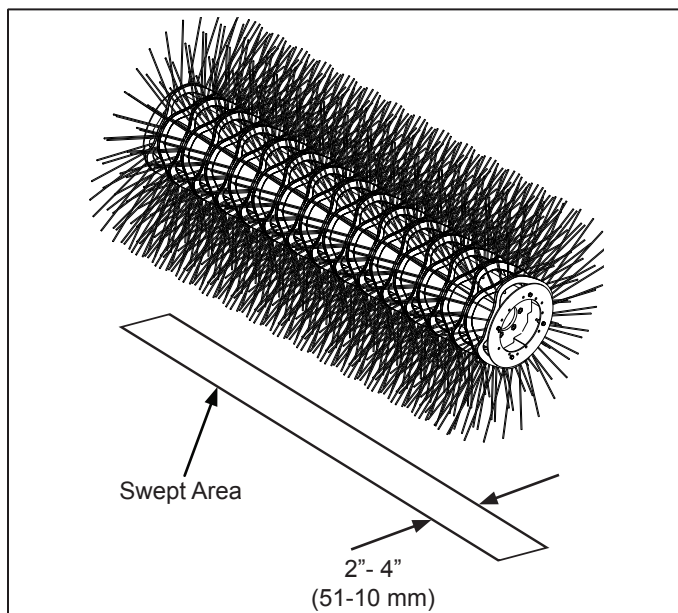


figure 1

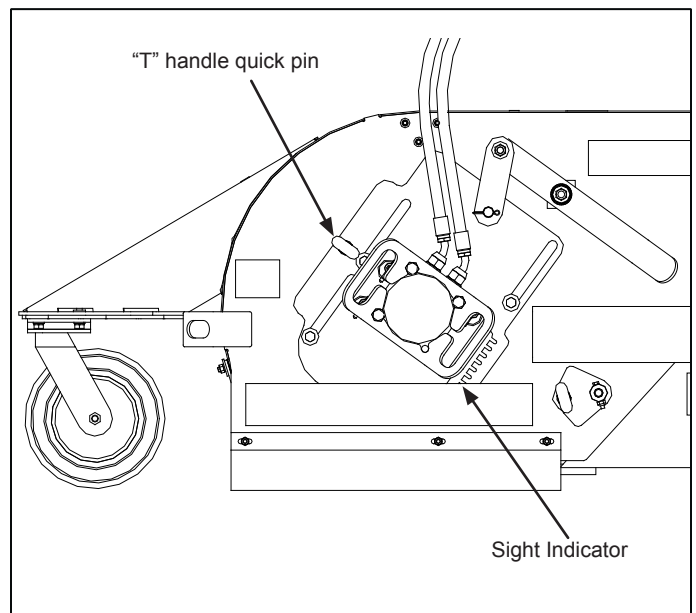


figure 2

# MAINTENANCE

## REPLACING BRUSH SECTIONS

1. Remove four motor mount screws. Retain hardware for reinstallation. Remove motor mount.
2. Detach four bearing mount screws from side plate. Retain hardware for reinstallation.
3. Lift sweeper body leaving core on ground.
4. Remove core plate. Retain hardware for reinstallation.
5. Remove old sections.
6. Install new sections by doing the following:
  - a. Number tubes on core as 1,2 and 3 (figure 1).
  - b. Slide first section onto core with drive pins on either side of tube 1. Make sure that drive pins angle up (figure 1).
  - c. Place second section on core with drive pins on either side of tube 2. Be sure drive pins angle down (figure 2).
  - d. Put third section on with drive pins around tube 3. Be sure drive pins angle up.
  - e. Slide sections on until core is full, alternate tubes used and direction of drive pins.
7. Re-attach core plate.
8. Lay core on ground. Lower body over core.
9. Re-attach bearing plate with previously removed hardware.
10. Attach motor mount with hardware removed in step one.

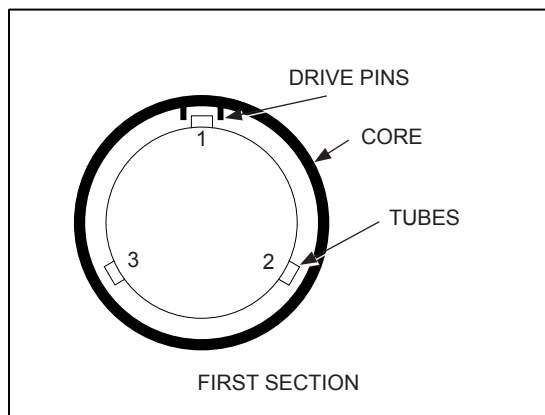
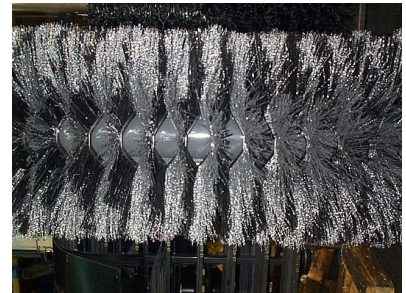


figure 1

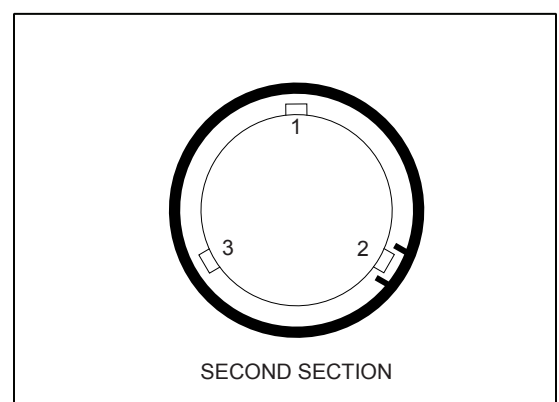


figure 2



## MAINTENANCE SCHEDULE

Procedure	Before Each Use	After Each Use	100 Hours	500 Hours	See Prime Mover Manual
<b>Brush pattern</b> - Check (See Brush Pattern)	✓				
<b>Fittings/hoses, hydraulic</b> - Tighten - Check for damage	✓				
<b>Fittings, zerk</b> - Grease (See Lubrication Points)	✓				
<b>Oil, hydraulic (Prime Mover)</b> - Check Level - Check Cleanliness	✓				✓
<b>Hardware</b> -Tighten	✓				

### Oil Cleanliness Requirements

**NOTICE!**

*All hydraulic fluid shall be filtered before use in this product to obtain the cleanliness standard of ISO 4406:20/18/13, unless explicitly specified otherwise.*

# TROUBLESHOOTING

## Brush Head Assembly

Problem	Possible Cause
Motor for broom will not operate	Auxiliary hydraulics control on prime mover activated in wrong position
	Hoses improperly connected to prime mover
	Hoses on prime mover obstructed
	Hoses on broom obstructed
	Motor failed
Sluggish broom operation	Insufficient oil flow from prime mover
	One or more seals have failed in motor
	Hydraulic filter on prime mover dirty
Motor runs but broom does not run	Motor shaft has sheared key
Oil leaks from motor	One or more seals have failed in motor
	Seals on fittings are damaged
	Fittings are loose or damaged
	Hydraulic hoses are loose or damaged
Brush rotates in wrong direction	Hoses installed incorrectly
Brush slows or stops when sweeping	Brush pattern too wide
	Travel speed too fast
	Trying to sweep too much material.
	Hydraulic motor failing
Brush wears quickly	Brush pattern too wide

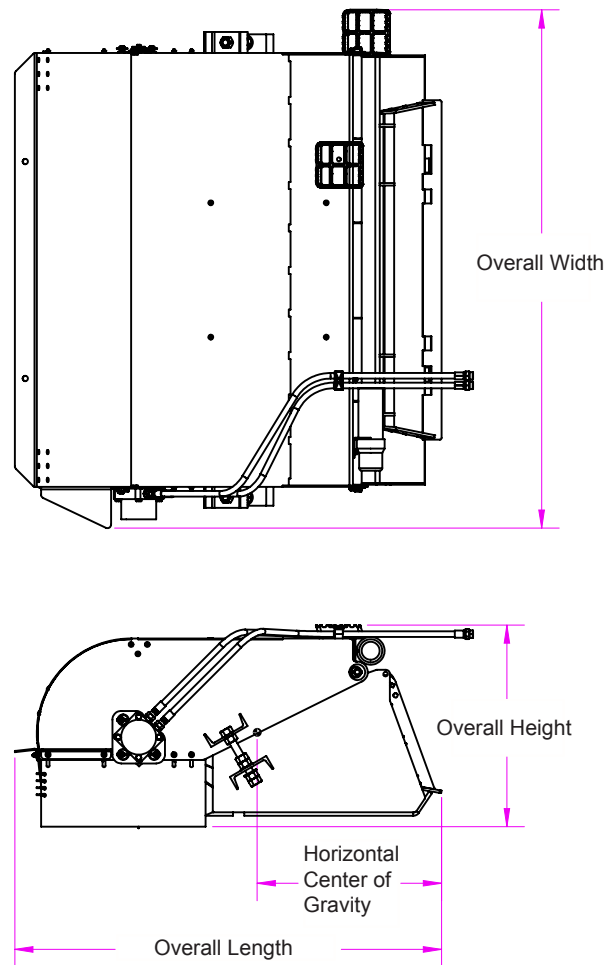
# TROUBLESHOOTING

## Hydraulic Assembly

Problem	Possible Cause
Excessive hydraulic oil temperature	Low hydraulic oil level on prime mover
	Hydraulic hoses are obstructed
	Hydraulic oil dirty
	Quick couplers loose
Hydraulic quick coupler leaks	Quick coupler poppet unseated

# PRODUCT INFORMATION

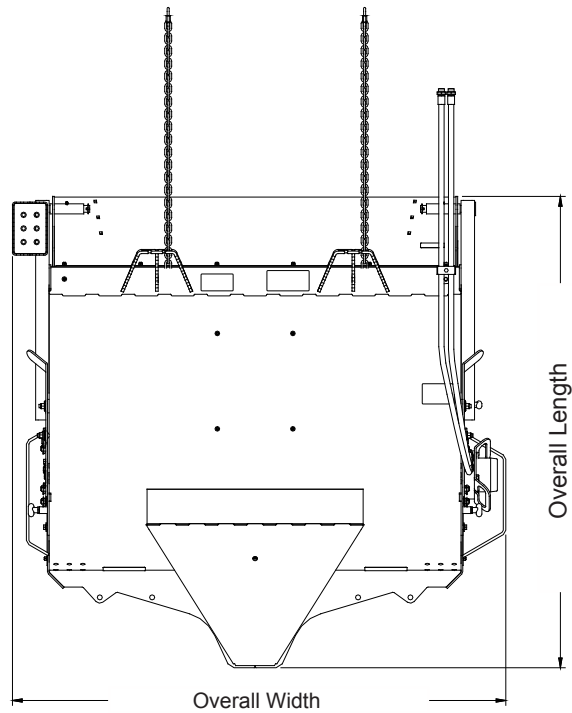
## SB Specifications and Model Views



	SB 205	SB 215
Approximate Weight with Bucket	877 lbs (398 kg) (SB 20560) 970 lbs (440 kg) (SB 20572) 1090 lbs (494 kg) (SB 20584)	943 lbs (428 kg) (SB 21560) 1068 lbs (484 kg) (SB 21572) 1190 lbs (540 kg) (SB 21584)
Actual Sweeping Width	60 inches (152 cm) (SB60) 72 inches (183 cm) (SB72) 84 inches (213 cm) (SB84)	
Overall Length	61 Inches (155 cm) (all models)	
Overall Width	77 inches (196 cm) (SB 20560) 89 inches (226 cm) (SB 20572) 101 inches (257 cm) (SB 20584)	72.3 inches (184 cm) (SB 21560) 84.3 inches (214 cm) (SB 21572) 96.3 inches (245 cm) (SB 21584)
Flow Requirements	17.1 CI Motor 10-18 gpm (38-68 lpm) 24.7 CI Motor 15-25 gpm (57-95 lpm)	18.7 CI Motor 10-18 gpm (38-68 lpm) 24.1 CI Motor 15-25 gpm (57-95 lpm)
Maximum Hydraulic Oil Pressure	3500 psi (241 bar)	

# PRODUCT INFORMATION

## VRS Specifications and Model Views



Approximate Weight with Bucket	1201 lbs (545 kg) (VRS 60) 1294 lbs (587 kg) (VRS 72) 1385 lbs (628 kg) (VRS 84)
Actual Sweeping Width	60 inches (152 cm) (VRS 60) 72 inches (183 cm) (VRS 72) 84 inches (213 cm) (VRS 84)
Overall Length	69 inches (175 cm) (all models)
Overall Width	72 inches (183 cm) (VRS 60) 85 inches (216 cm) (VRS 72) 97 inches (246 cm) (VRS 84)
Flow Requirements	15-25 gpm (57-95 lpm)
Maximum Hydraulic Oil Pressure	3000 psi (206 bar)

# 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.

		SAE GRADE 5 TORQUE				SAE GRADE 8 TORQUE				Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary
Bolt Size		Ft-lbs		Newton-Meter		Ft-lbs		Newton-Meter		
Inches	mm	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	
1/4	6,35	8	9	11	12	10	13	14	18	
5/16	7,94	14	17	19	23	20	25	27	34	
3/8	9,53	30	36	41	49	38	46	52	62	
7/16	11,11	46	54	62	73	60	71	81	96	
1/2	12,70	68	82	92	111	94	112	127	152	
9/16	14,29	94	112	127	152	136	163	184	221	
5/8	15,88	128	153	174	207	187	224	254	304	
3/4	19,05	230	275	312	373	323	395	438	536	
7/8	22,23	340	408	461	553	510	612	691	830	
1	25,40	493	592	668	803	765	918	1037	1245	
1-1/8	25,58	680	748	922	1014	1088	1224	1475	1660	
1-1/4	31,75	952	1054	1291	1429	1547	1700	2097	2305	
1-3/8	34,93	1241	1428	1683	1936	2023	2312	2743	3135	
1-1/2	38,10	1649	1870	2236	2535	2686	3026	3642	4103	




Grade 2



Grade 5






Grade 8



### METRIC BOLT TORQUE SPECIFICATIONS

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

Bolt head identification marks as per grade.		
		

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



**PALADIN**<sup>TM</sup>  
CONSTRUCTION GROUP



## EU DECLARATION OF CONFORMITY

*I, the undersigned, on behalf of:*

Manufacturer/Technical Document Holder

Paladin Construction Group  
2800 N. Zeeb Road  
Dexter, MI 48130 USA  
Phone: 734-996-9116  
Fax: 734-996-9014

*hereby declare that the following product:*

Description of Equipment:

**Hydraulically driven Pick-Up Broom for loader applications. Used for construction cleanup, road maintenance and similar operations.**

Attachment Model:

**SB**

Serial Number:

Conforms to:

**2006/42/EC Machinery Directive  
EN982:2008; EN ISO 474-1:2009;  
EN ISO 12100-1:2009; EN ISO  
12100-2:2003; EN ISO 2860:1992;  
EN ISO 2867:2006**

Certification method:

**Self-certified, per Annex  
V of the Directive**

Name and address of the person in the Community authorized to compile the technical construction file:

GENESIS GmbH  
Alpenstrasse 71  
Memmingen, GERMANY D – 87700

At Dexter, Signature, Title, Date

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_







# PALADIN®

## UKCA DECLARATION OF CONFORMITY

The undersigned, representing the following manufacturer:

**Manufacturer:** Paladin Attachments  
2800 N Zeeb Rd.  
Dexter, MI 48130  
United States

Declares that the product(s)

**Product identification:**

Description:	HYDRAULIC CABLES CUTTING TOOLS WITH 18V RECHARGEABLE BATTERY
Model:	<b>BCP040GC - BCP045GC - BCP055GC - BCP065CC - BCP085G+</b>
Serial number:	L-00001 à L-99999

Conforms to the UK Regulations:

The supply of Machinery (Safety) Regulations 2008, S.I. 2008/1597 (as amended)

Electromagnetic Compatibility Regulations, 2016, S.I. 2016/1091 (as amended)

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, S.I. 2012/3032 (as amended)

Designated Standards:

SI 2008/1597 NF EN ISO 15744 (December 2008)  
NF EN ISO 3744 (February 2012)  
NF EN ISO 20643 (September 2008)  
NF EN ISO 11201 (December 2010)  
NF EN 12096 (September 1997)

SI 2016/1091 EN 62233 (September 2013)  
EN 55014-1 (June 2017)  
EN 55014-2 (July 2015)  
EN 62311 (October 2008)

S.I. 2012/3032 NF EN IEC 63000 (December 2018)

The undersigned is responsible for compilation of the technical file and makes this declaration on behalf of DUBUIS.

Signature

Blois, July 28, 2021

Patrick VERVIER,

Engineering Manager