

HR Series

Hydraulic Windrow Sweepers



PALADIN
LIGHT CONSTRUCTION GROUP



The Power of Combined Excellence



Serial Number _____

Manual Number: 51-3951
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Serial Number 0815001 and UP

Notes

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Notes

Introduction

Importance of this Manual



Read this manual before attempting to operate the equipment.

This operator's manual should be regarded as part of the sweeper. Suppliers of both new and secondhand sweepers are advised to keep documentation indicating that this manual was provided with the sweeper.

This manual contains information regarding installation, operation and maintenance required for this sweeper and optional equipment. It also includes detailed parts lists.

Purpose of Sweeper

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

This sweeper should be operated, serviced and repaired only by persons who are familiar with its characteristics and acquainted with relevant safety procedures.

Accident prevention regulations, all other generally recognized safety regulations and all road traffic regulations must be observed at all times.

Any modifications made to this sweeper may relieve the manufacturer of liability for any resulting damage or injury.

Safety Alert Symbol



This safety alert symbol indicates important safety messages in this manual. When you see this symbol, be alert to the possibility of injury. Carefully read the message that follows and inform other operators

Contacting SWEEPSTER

If you have any questions about information in this manual or need to order parts, please call, write, fax or e-mail SWEEPSTER.

SWEEPSTER
2800 North Zeeb Road
Dexter, Michigan 48130
Phone: (734) 996-9116 - (800) 456-7100
FAX: (734) 996-9014
e-mail: sweepster@paladinbrands.com

For help with installation, operation or maintenance procedures, contact our Technical Service Department. Direct product questions and parts orders to our Sales Department.

When ordering parts or accessories, be prepared to give the following information:

- Sweeper model, serial number and date of purchase
- Prime mover, make and model
- Part number, description and quantity

Right-hand, left-hand, front and rear are determined from the operator's perspective (either the operator's seat or standing behind a walk-behind unit), facing forward in the normal operating position.

Prime mover refers to the tractor, truck, loader or tow vehicle that the sweeper is mounted on or towed by.

Optional Equipment Terms Used in Manual

Installation instructions for optional equipment, if applicable, are included in the optional equipment package.

Specifications & Features

Due to continuous product improvement, specifications and features may change without notice.

Warranty

To validate the warranty for this unit, fill out the warranty card or warranty pages located at the back of this manual. Then, send this information to SWEEPSTER.

Safety Information

Read this manual

Read all safety information in this manual. All operators must read and understand the entire contents of this manual before sweeping. General safety practices are listed on Safety Information pages and specific safety information is located throughout this manual.

Hazard Definitions

Four hazard classifications are used in this manual. They are:



DANGER! Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING! Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION! Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION - Used for instructions when machine damage may be involved.

Operation



CAUTION! A sweeper is a demanding machine. Only fully trained operators or trainee operators under supervision of a fully trained person should use this machine.

Before operating sweeper:

- Learn sweeper and prime mover controls in an off-road location.
- Be sure that you are in a safe area, away from traffic or other hazards.
- Check all hardware holding the sweeper to the prime mover, making sure it is tight.

- Replace any damaged or fatigued hardware with properly rated fasteners. See Maintenance Section.
- Make sure all hydraulic hardware and hydraulic fittings are tight.
- Replace any damaged or fatigued fittings or hoses.
- Check prime mover tire pressure before sweeping.
- Check tire ratings to be sure they match the prime mover load. Weigh the sweeper end of the prime mover, if necessary, to insure proper tire rating.
- Remove from the sweeping area all property that could be damaged by flying debris.
- Be sure all persons not operating the sweeper are clear of the sweeper discharge area.
- Always wear proper apparel such as a long-sleeved shirt buttoned at the cuffs; safety glasses, goggles or a face shield; ear protection; and a dust mask.

While operating sweeper:

- When operating sweeper, adhere to all government rules, local laws and other professional guidelines for your sweeping application.



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

- Before leaving the operator's area for any reason, lower the sweeper to the ground. Stop the prime mover engine, set the parking brake and remove the key from the ignition.
- Minimize flying debris - use the slowest rotating speed that will do the job. See Operation Section: Operating Tips.
- Keep hands, feet, hair and loose clothing away from all moving parts.

- Leave the brush hood (shield) and all other shields and safety equipment in place when operating the sweeper and prime mover.
- Be aware of the extra weight and width a sweeper adds. Reduce travel speed accordingly. See Product Information Section.
- 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 the sweeper while you are in the operating position. The safety restraint must be fastened while you operate the prime mover. Only operate the controls while the engine is running. Protective glasses must be worn while you operate the prime mover and while you operate the sweeper.
- While you operate the sweeper slowly in an open area, check for proper operation of all controls and all protective devices. Note any repairs needed during operation of the sweeper. Report any needed repairs.

Service & Repair - General



CAUTION! Do not modify the sweeper in any way. Personal injury could result. If you have questions, contact your dealer or SWEEPSTER.

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

Before adjusting or servicing - lower the sweeper to the ground, set parking brake, shut down the prime mover and remove the key from the ignition.

When working on or around the sweeper, safely secure it from falling or shifting.

Service & Repair - Hydraulic Safety

Stop the prime mover engine and release hydraulic pressure before servicing or adjusting sweeper



WARNING! Escaping hydraulic fluid can have enough pressure to penetrate the skin, causing serious personal injury.

Check lines, tubes and hoses carefully. Do not use your hand to check for leaks. Use a board or cardboard to check for leaks. Tighten all connections to the recommended torque. See Appendix.

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, damaged tubes, or damaged hoses.

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

Replace the parts if any of the following conditions are present:

- The end fittings are damaged or leaking.
- The outer covering is chafed or cut.
- The reinforcing wire layer is exposed.
- The outer covering is ballooning locally.
- The hose is kinked or crushed.
- The hoses have been pulled or stretched.

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

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.

Safety Signs and Labels

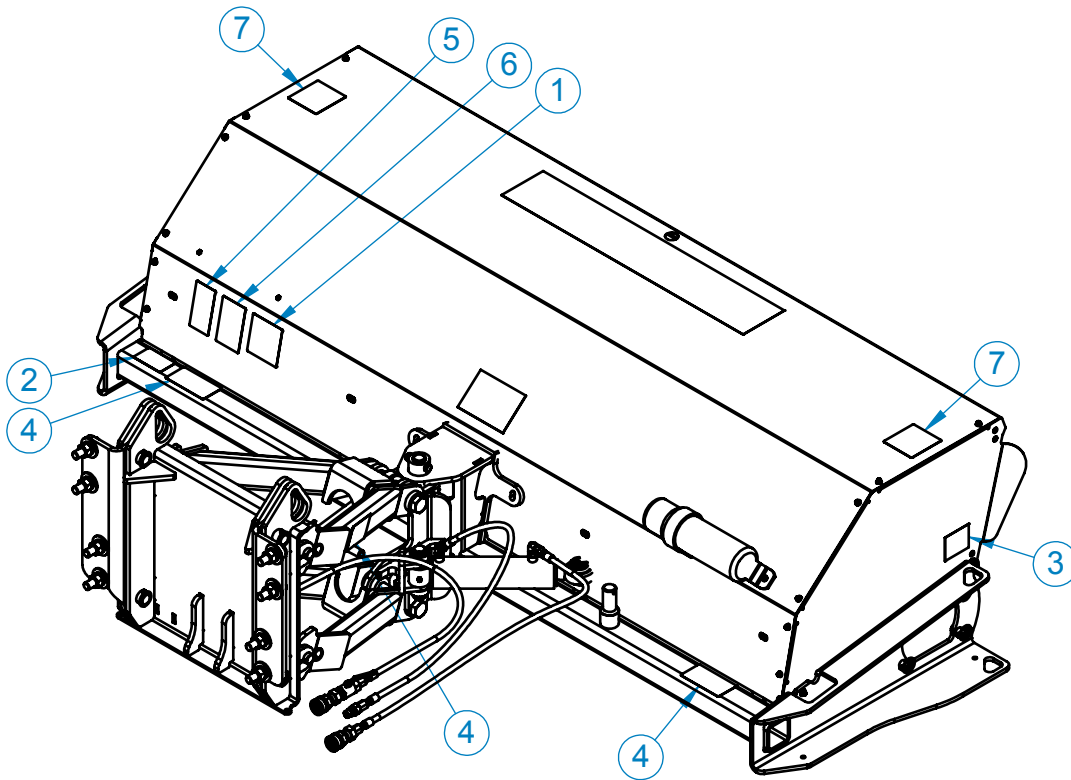
There are several specific safety signs on this sweeper. The exact location of the hazards and the description of the hazards are reviewed in this section.

Placement or Replacement of Safety Signs

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

Instructions

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

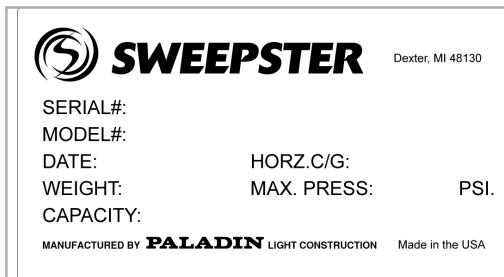


Item	Part	Qty	Description
1.	41043	1	Decal, Warning, Hazardous Dust
2.	50-0634	1	Label, Serial Number
3.	50-0643	2	Label, Tie Down Point
4.	50-0721	4	Label, Warning, Crush Hazard
5.	50-0722	1	Label, Warning, Misuse Hazard
6.	50-0724	1	Label, Warning, High Pressure Fluid Hazard
7.	50-0726	2	Label, Warning, Flying Objects & Entanglement

Safety Signs and Labels



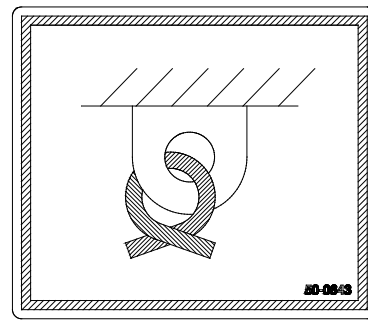
1. 41043



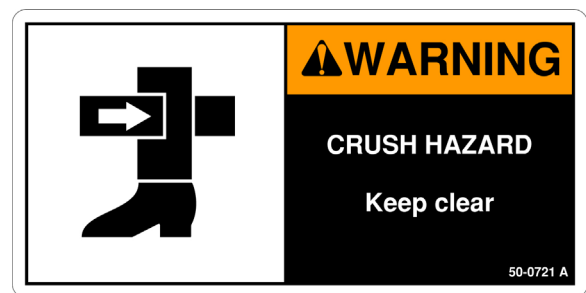
2. 50-0634



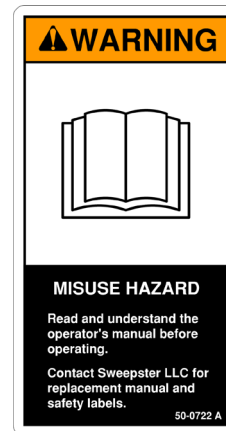
6. 50-0724



3. 50-0643



4. 50-0721



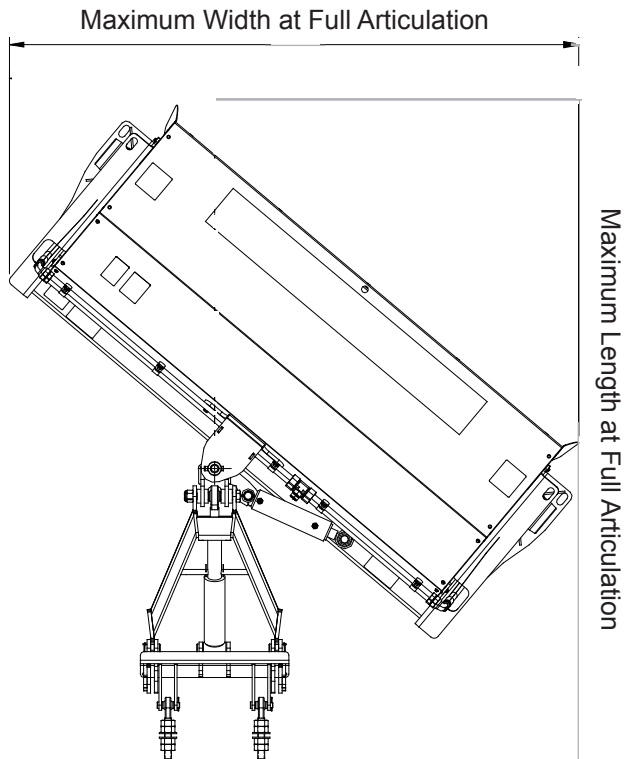
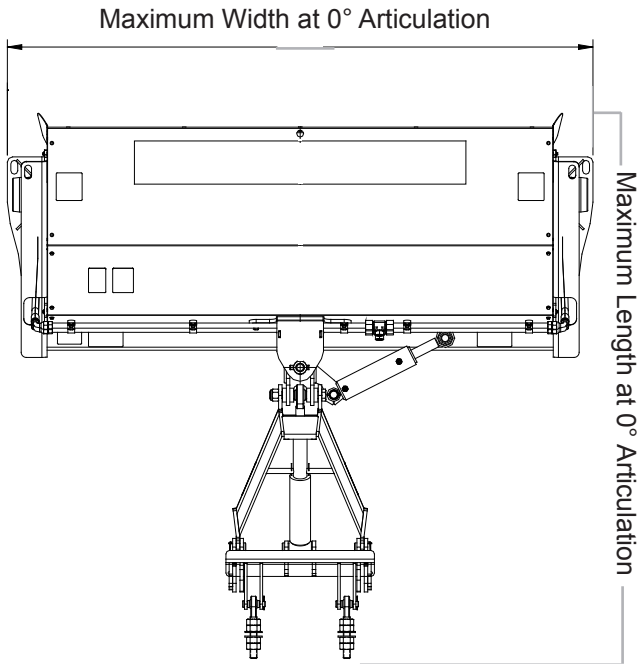
5. 50-0722



7. 50-0726

**Product Information
Section**

**Specifications and Model
Views**



HR Brush Head			
Approximate Weight	Single Motor	Dual Motor	
	677 lbs	720 lbs	6 Ft
	708 lbs	752 lbs	7 Ft
	739 lbs	783 lbs	8 Ft
Maximum Length at 0° Articulation	74 inches		
Maximum Width at 0° Articulation	84.8 inches	6 Ft	
	96.8 inches	7 Ft	
	108.8 inches	8 Ft	
Maximum Length at Full Articulation	86.7 inches	6 Ft	
	90.6 inches	7 Ft	
	94.5 inches	8 Ft	
Maximum Width at Full Articulation	84.5 inches	6 Ft	
	93.7 inches	7 Ft	
	103 inches	8 Ft	
Sweeping Width at 0° Articulation	72 inches	6 Ft	
	84 inches	7 Ft	
	96 inches	8 Ft	
Sweeping Width at Full Articulation	54.3 inches	6 Ft	
	63.5 inches	7 Ft	
	73 inches	8 Ft	
Range of Hydraulic Oil Flow	14-25 gpm Single Motor		
	22-36 gpm Dual Motor		
Maximum Hydraulic Oil Pressure	3000 psi	3500 psi	

Storage

CAUTION! 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.

Before Each Use

Perform daily maintenance as indicated in Maintenance Schedule.

Run the prime mover and sweeper at a slow idle. Check for hydraulic leaks or other problems and make corrections, if necessary, before using the sweeper. See “Hydraulic Inspection Guideline”.



WARNING! **Avoid serious injury.** Check for large objects that could harm the operator or others if thrown by the sweeper. Remove these items before operating.

During Use

Directing Debris

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

Avoid excessive downward pressure on the brush sections to prevent excessive wear. A two to four inch wide pattern is sufficient for most applications. Ensure that the adjustment bolts are equally adjusted in order to prevent an uneven wear pattern. To adjust brush pattern see “Adjusting Brush Pattern”.

Direct debris by angling the brush head in that direction.

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

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

Hydraulic Angle

1. Start the prime mover.
2. Position the brush head at the desired angle by using the valve control for the swing function.

Sweeping

To sweep:

1. Swing the brush head assembly the direction that you want to direct debris.
2. Engage the brush and then lower it to the ground.
3. Increase prime mover engine rpm to sweeping speed.
4. Travel forward at 2-3 mph (3-5 kph) or less.

CAUTION - Avoid sweeper damage. Reduce travel speed to avoid hitting immovable objects.

Operating Tips

CAUTION - **Avoid sweeper damage.** Do not ram into piles. Use an appropriate attachment for this type of job.

Brush, Engine & Travel Speeds

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

Large Areas

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

Snow

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

In deep snow you may need to make multiple passes 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.

Dirt & Gravel

To keep dust at a minimum, use the optional dust suppression kit or plan sweeping for days when it is overcast and humid or after it has rained. Also, sweep so the wind blows at your back.

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

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

Heavy Debris

Travel slowly - 1-2 mph.

Sweep a path less than the full width of the sweeper.

Leveling

Level the sweeper for even brush wear and effective use.



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

1. Move the tractor to a flat, paved surface.
2. Verify that the pressure is correct in tractor tires. Refer to the tractor operator’s manual.
3. Make sure that the tractor parking brake is on; start the tractor and sweeper. Lower the brush head so the brush is 2 inches (51mm) above the ground. Adjust sweeper to be level left and right. To check swing level use a bubble level and refer to figure 2.
4. Check to see if broom is level when angled. Swing the sweeper to the right; stop the tractor. Then, on both sides of the sweeper measure from the ground to the bottom of the brush frame (figure 1).
5. Start the tractor. Swing the sweeper to the left; stop the tractor. then, on both sides of the sweeper measure from the ground to the bottom of the brush frame.
6. If measurements in step 4 and 5 are all equal, the sweeper is level.

If not, make adjustments as shown in figures 3-5.

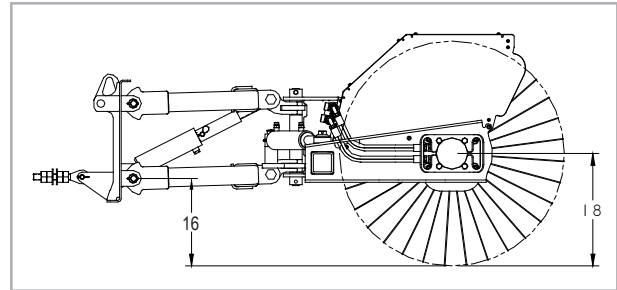


figure 1.

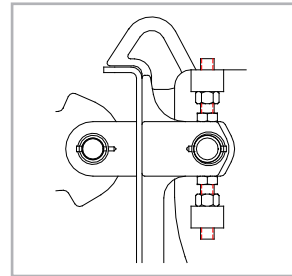


figure 2.

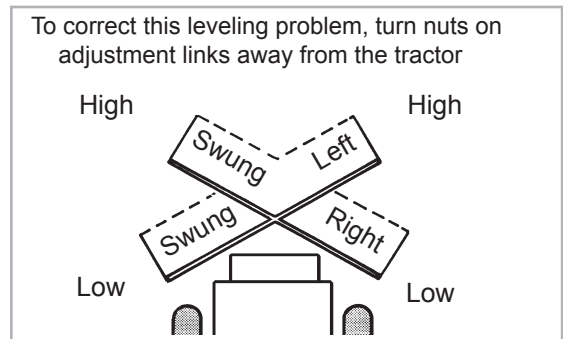


figure 3.

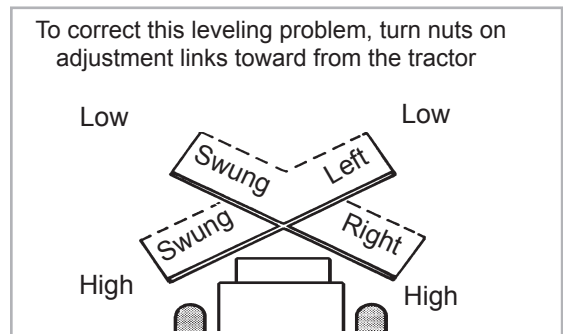


figure 4.

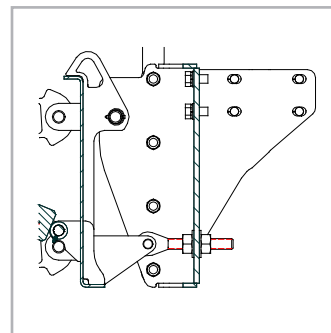


figure 5.

Setting Brush Pattern

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

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

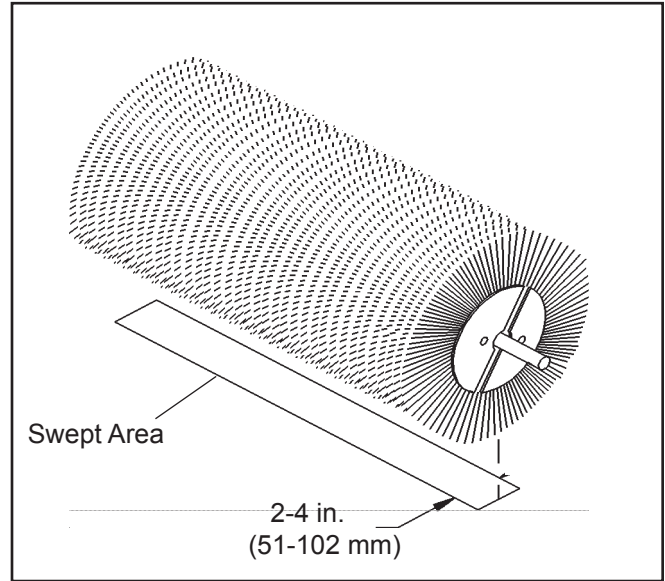


Figure 1

Adjusting the Brush Pattern

1. Lower the sweeper.
2. To adjust brush pattern rotate the cylinder rod on the lift rod assembly (figure 2). Turning the rod counter clockwise will lessen brush pressure and decrease the width of the brush pattern. Turning the rod clockwise will increase pressure on the brush and widen brush pattern. To relieve pressure from the rod assembly when adjusting lower the brush head completely.

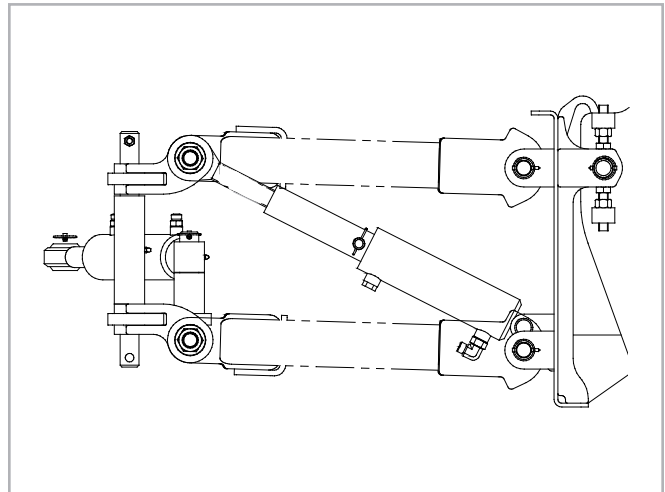


Figure 2

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

Maintenance Schedule

Procedure	Before Each Use	After Each Use	100 Hours	500 Hours	See Prime Mover Manual
Brush head assembly - Level	✓				
Brush pattern - Check (See Pattern Adj. Section)	✓				
Cylinders - Retract rods		✓			
Filter, air, prime mover - Clean		✓			
Fittings/hoses, hydraulic - Check for leaks/tighten Check for damage	✓				✓
Fittings, zerk - Grease (See lubrication points)	✓				
Oil, hydraulic - Check level	✓				
Hardware - Check for tightness	✓				
Remove hydraulic oil filter - Replace			✓		
Wash Unit - Remove grease and debris from all components, especially hoses, tank, motor, pump		✓			

Replacing Brush Sections

1. Remove motor mount retainer pins. Retain hardware for reinstallation. Remove motor mount(s).
2. Remove idler bearing shaft mounting plate retainer pins from side . Retain hardware for reinstallation. (Single motor only)
3. Remove core from brush head assembly.
4. Remove retaining plate from core assembly.
5. Remove old sections.
6. Install new sections by doing the following:
 - a. Slide the first section onto the core with the drive pins on either side of a tube. Make sure that the drive pins angle up. (figure 1)
 - b. Install a second section with drive pins rotated 180° from those on the first section. (figure 2)
 - c. Continue installing sections, rotating each section 180° until the core is full.
7. Re-attach the section retainer.
8. Lay core on ground. Lower frame over core.
9. Re-attach idler bearing shaft mounting plate with previously removed hardware.
10. Re-attach motor mount with hardware removed in first step.

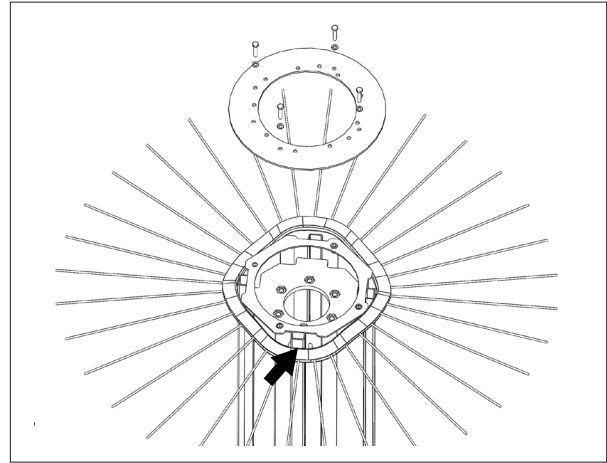


figure 1

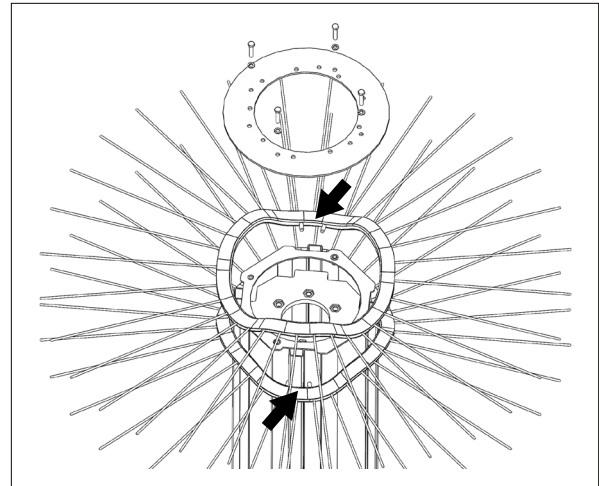
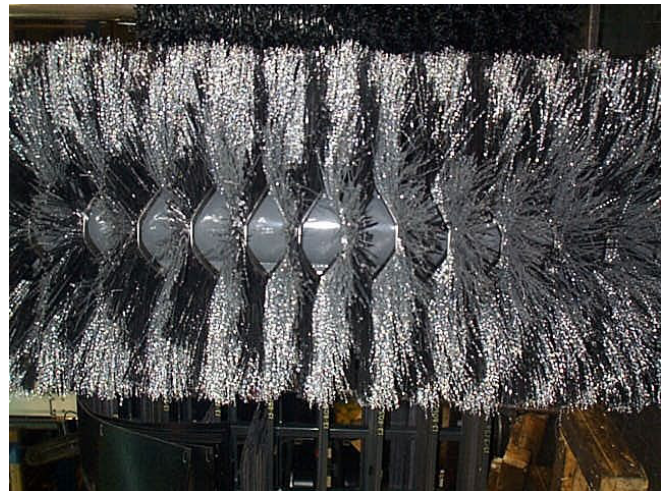


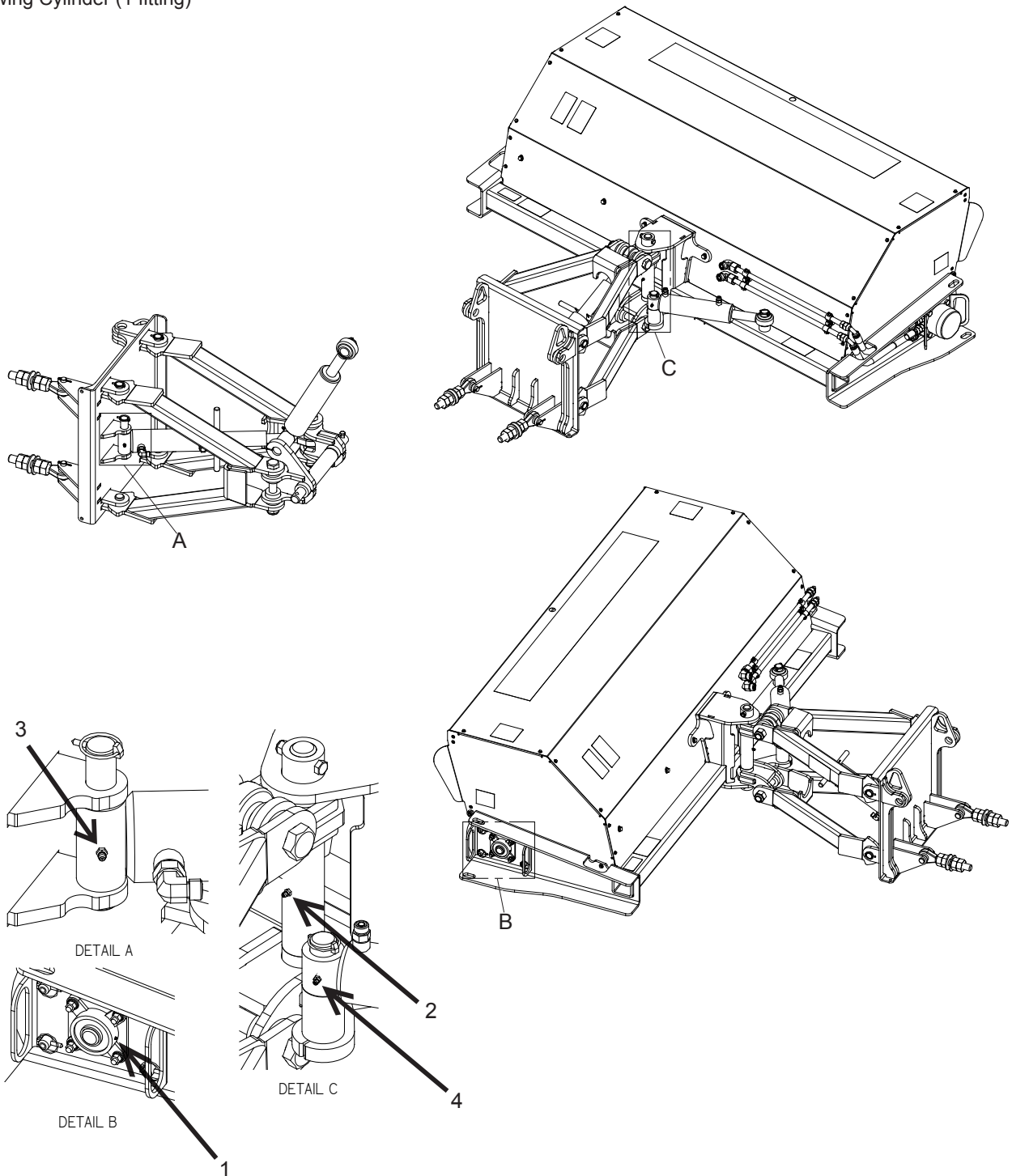
figure 2



Lubrication Points

The following grease fittings should be greased before each use. See figure for locations.

1. Core bearing (1 fitting) - Single motor only
2. Brush Head Pivot (1 fitting)
3. Lift Cylinder (1 fitting)
4. Swing Cylinder (1 fitting)



Brush Head Troubleshooting

Problem	Possible Cause	Possible Solution
Brush rotates wrong direction	Hoses installed incorrectly	Switch hoses at brush head tubes
Brush slows or stops when sweeping	Brush pattern too wide	Adjust pattern to 2-4 inches (51-101mm) wide: see Maintenance: Adjusting Brush Pattern
	Travel speed too fast	Travel no more than 5mph (8 kph) while sweeping (2-3mph recommended)
	Trying to sweep too much material at once	Make several passes with sweeper
	Relief pressure set too low	Set relief pressure to 2000psi (138.0 bars)
	Filter plugging	Change or clean hydraulic oil filter
Brush head assembly “bounces” during sweeping	Travel speed too fast and/or brush speed too slow	Find correct combination of ground and brush speeds: do not travel at more than 5 mph (8 kph)
Brush wears into cone shape	Sweeper is not level	Level sweeper before each use: see Maintenance: Leveling
	Tires on prime mover at different pressures or are different sizes	Check tire sizes and rating: make corrections as necessary
Brush wears very quickly	Brush pattern too wide	Adjust brush pattern to 2-4 inches (51-101mm) wide: see Maintenance: Setting Brush Pattern

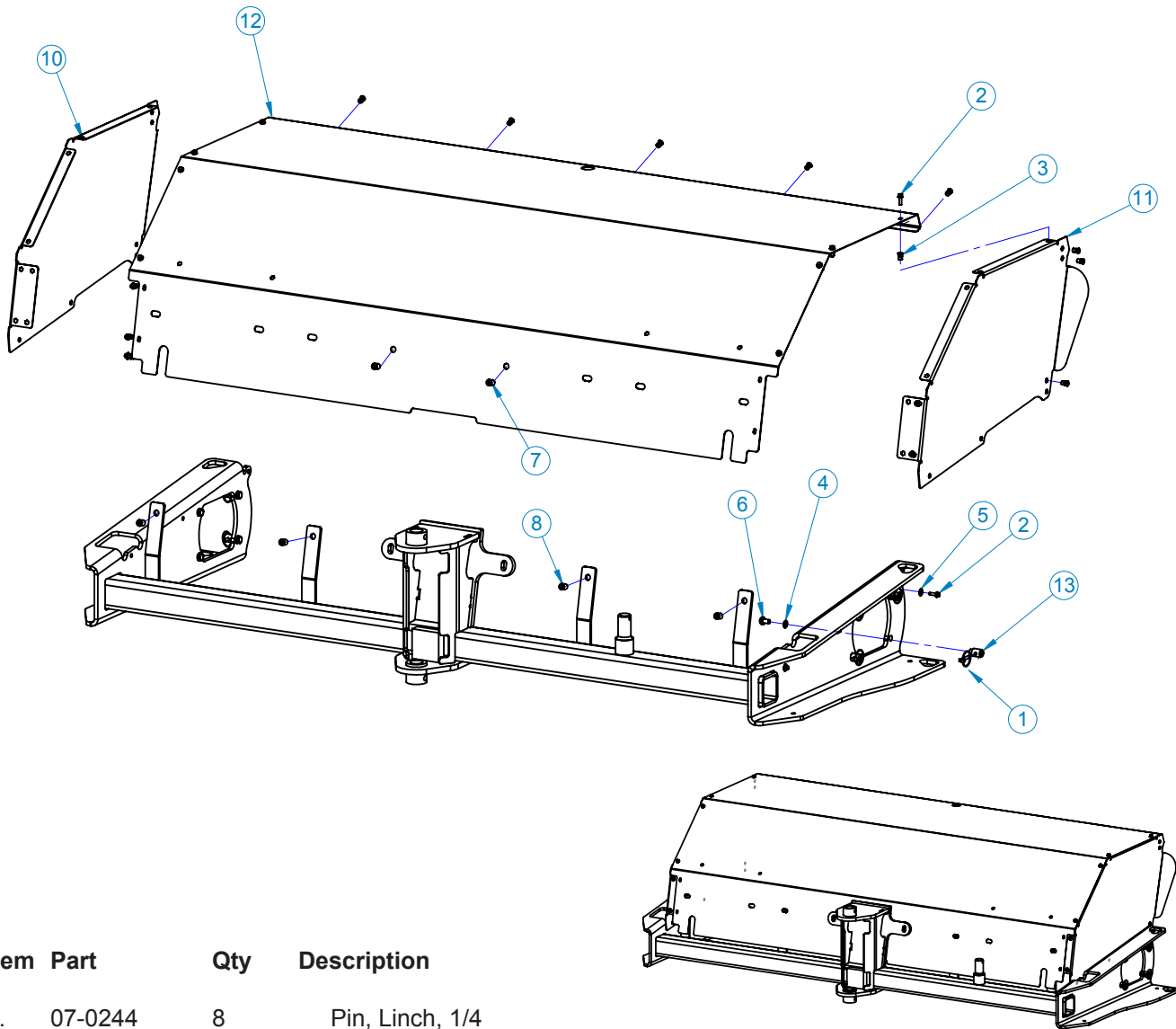
Hydraulic Cylinders - Lift & Swing Troubleshooting

Problem	Possible Cause	Possible Solution
Hydraulic cylinder neither extends nor retracts	Control rods not connected or are binding	Check control rod linkage; make sure all parts are connected and are not binding; fix if necessary
	Hydraulic oil level too low	Fill tank to 2-3 inches (51-76mm) from top of tank with ISO VG-46 oil
	Hoses or fittings loose or disconnected	Tighten hoses and fittings
	Restriction in hoses	Remove bends in hoses, remove obstructions inside hoses
Hydraulic cylinder only extends or only retracts	Dirt or debris in spools	Contact Sweepster Technical Service
Hydraulic cylinder extends or retracts too quickly	Flow too high because restrictor fitting missing from cylinder	Reinstall restrictor fitting on barrel end of cylinder
	Flow too high even though restrictor fitting is installed	Contact Sweepster for smaller orifice fitting

Hydraulic System Troubleshooting

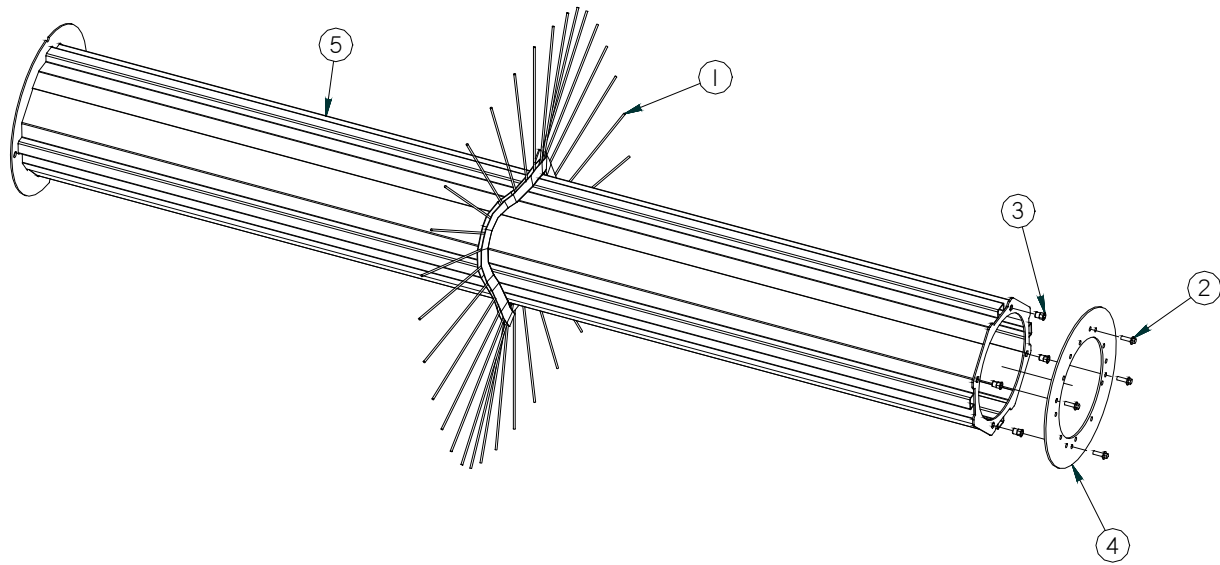
Problem	Possible Cause	Possible Solution
Hydraulic system overheats	Hydraulic oil level too low	Add hydraulic oil to tank until it comes to 2 inches (51mm) from top
	Restriction in hoses	Remove bends in hoses; remove obstructions inside hoses
	Host pump flow rate exceeds maximum rate of broom	Contact host manufacturer for proper flow control method
Hydraulic motor seals leak	Back pressure exceeds 1000psi	Contact Sweepster
	Motor is failing	High number of hours on motor; Contact dealer to rebuild or replace

Brush Head Frames



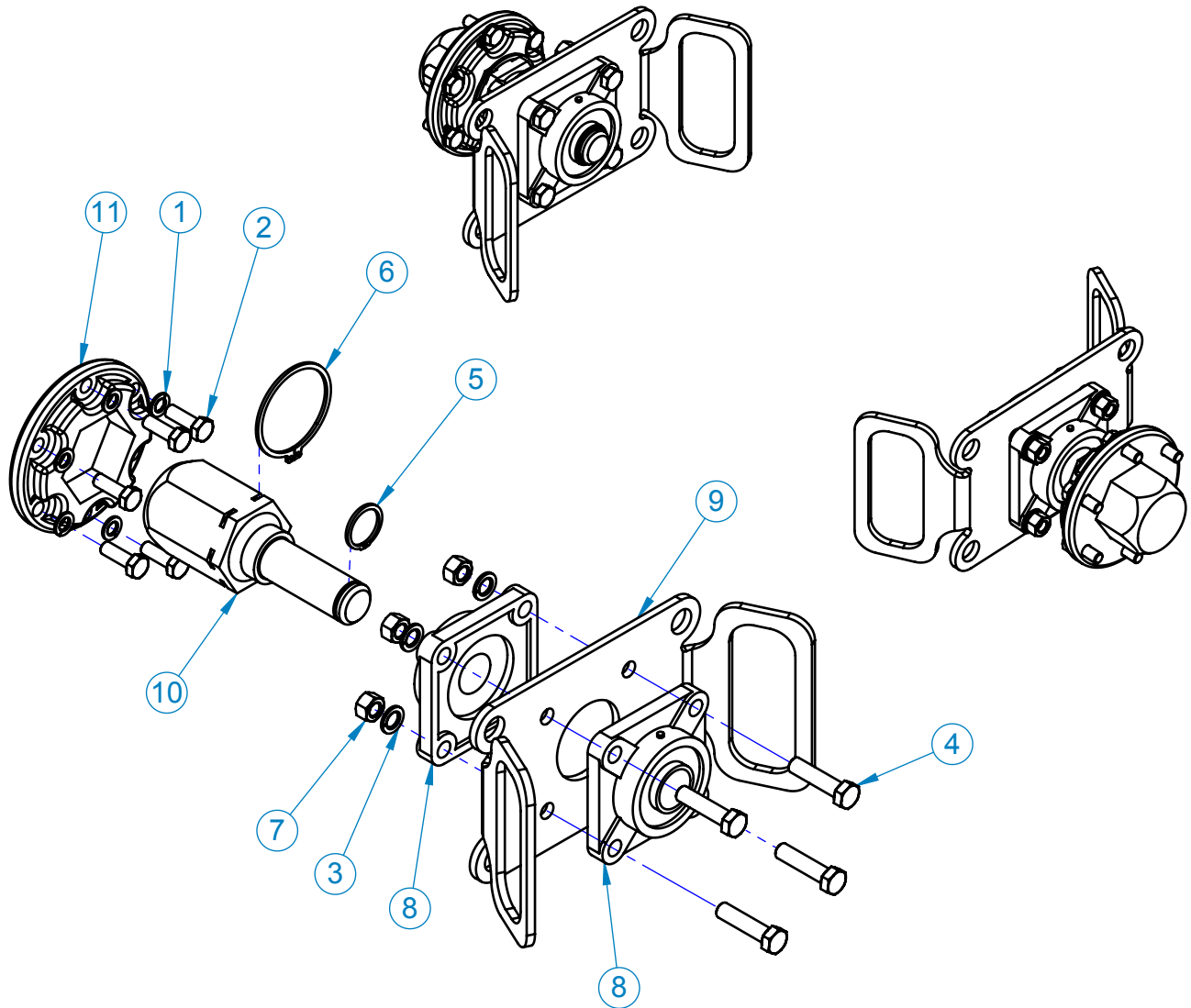
Item	Part	Qty	Description
1.	07-0244	8	Pin, Linch, 1/4
2.	07-2952	18	Screw, HFH, CL10.9, M6-1 x 20
3.	07-3617	29	Nut, Insert, M6 x 1, 6 ft
	07-3617	30	Nut, Insert, M6 x 1, 7,8 ft
4.	07-3747	8	Washer, Lock, Split, Medium, M10
5.	07-4927	6	Washer, Fender, CL8.8, M6
6.	07-6769	8	Screw, HHC, CL10.9, M10-1.5 x 16mm
7.	07-7115	2	Nut, Insert, M8-1.25, 22-10ga
8.	07-7116	4	Nut, Insert, M8-1.25, 3/16-5/16
9.	13-14059-6	1	Weld, Brush Frame, 6 ft
	13-14059-7	1	Weld, Brush Frame, 7 ft
	13-14059-8	1	Weld, Brush Frame, 8 ft
10.	13-14077	1	Sheet, Hood, Side, Left
11.	13-14078	1	Sheet, Hood, Side, Right
12.	13-14079	1	Sheet, Hood, 6 ft
	13-14080	1	Sheet, Hood, 7 ft
	13-14081	1	Sheet, Hood, 8 ft
13.	13-14083	8	Stud, Mounting, Motor

Core Assemblies



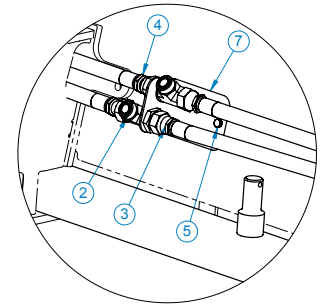
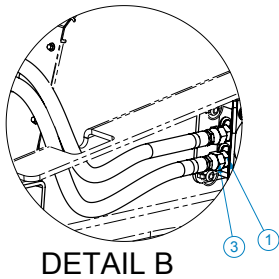
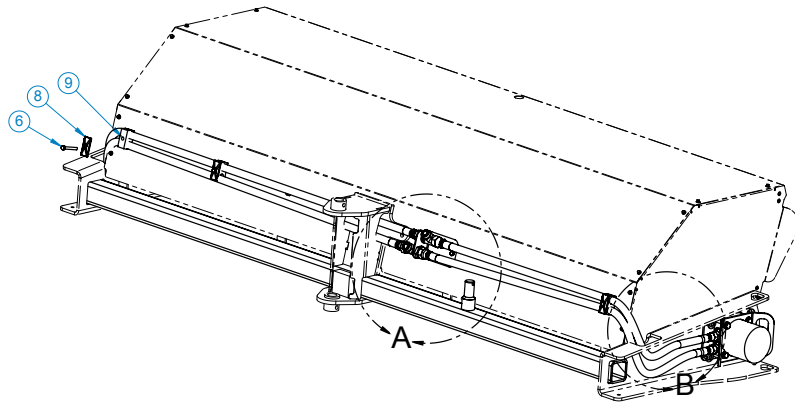
Item	Part	Qty	Description
1.	01-1211-6	1	Section, Set, 36, 10, Mixed, Convoluted, 6 ft
	01-1211-7	1	Section, Set, 36, 10, Mixed, Convoluted, 7 ft
	01-1211-8	1	Section, Set, 36, 10, Mixed, Convoluted, 8 ft
	01-1212-6	1	Section, Set, 36, Poly, Convoluted, 6 ft
	01-1212-7	1	Section, Set, 36, Poly, Convoluted, 7 ft
	01-1212-8	1	Section, Set, 36, Poly, Convoluted, 8 ft
2.	07-3731	4	Screw, HHC, CL10.9, M6-1 x 30mm
3.	07-3617	4	Nut, Insert, M6 x 1
4.	13-13166	1	Plate. Ring, Core, End
5.	13-15866-6	1	Weld, Core, 6 ft
	13-15866-7	1	Weld, Core, 7 ft
	13-15866-8	1	Weld, Core, 8 ft

Shaft Assembly



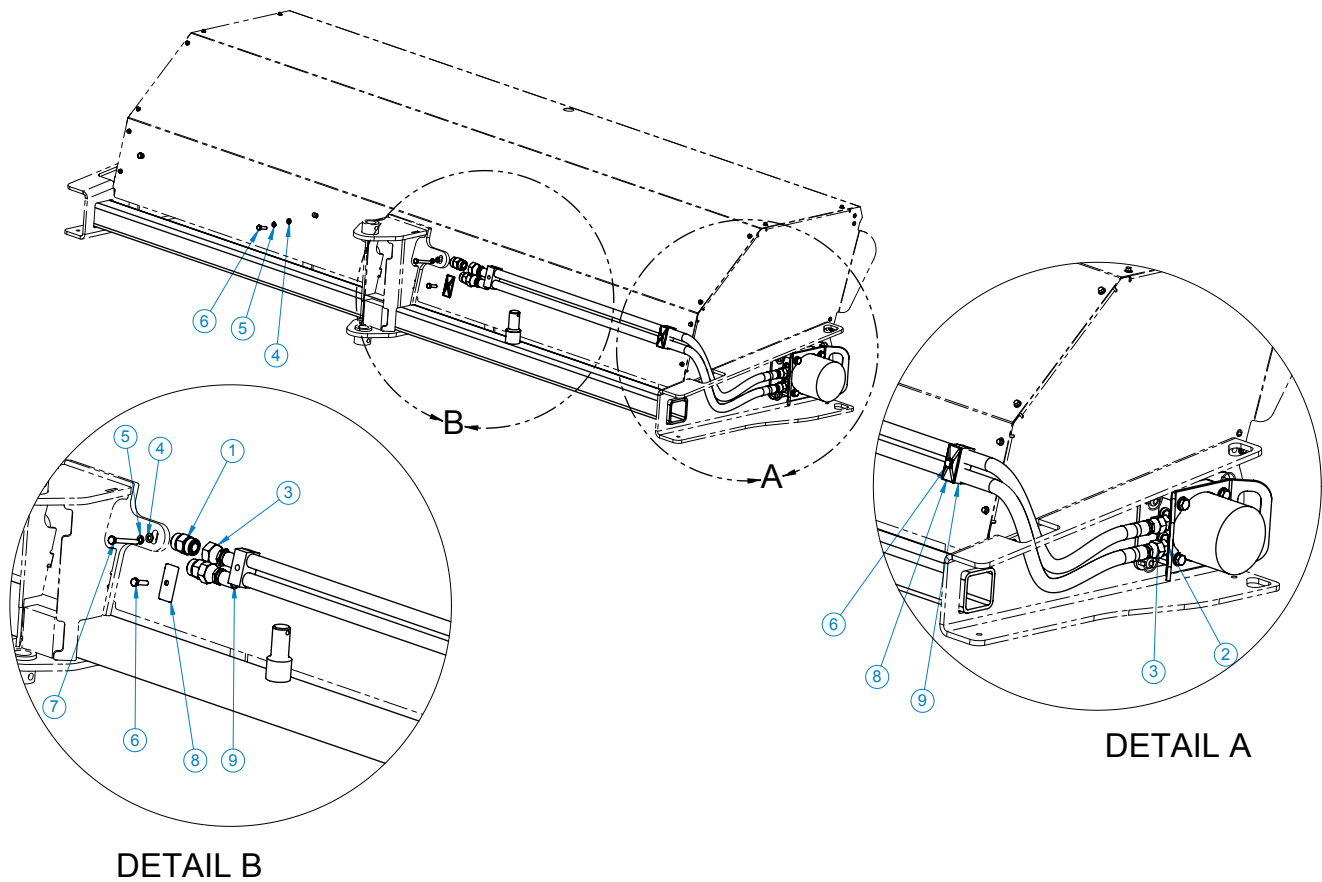
Item	Part	Qty	Description
1.	07-3747	6	Washer, Lock, Split, Medium, M10
2.	07-3749	6	Screw, HHC, CL10.9, M10-1.5 x 30mm
3.	07-3756	4	Washer, Lock, Split, Medium, M12
4.	07-3762	4	Screw, HHC, CL10.9, M12-1.75 x 50mm
5.	07-3842	1	Ring, Snap
6.	07-6196	1	Ring, Retaining, 2.75
7.	07-6766	4	Nut, Hex, CL10.9, M12-1.75
8.	08-0067	2	Bearing, 1 1/4, 4 Bolt
9.	13-14133	1	Plate, Mounting, Bearing
10.	13-14135	1	Hub, Hex, 2 1/2, Single Motor
11.	13-12750	1	Weld, Hex, Plate , with Doubler

Hydraulic Assemblies - Dual Motor



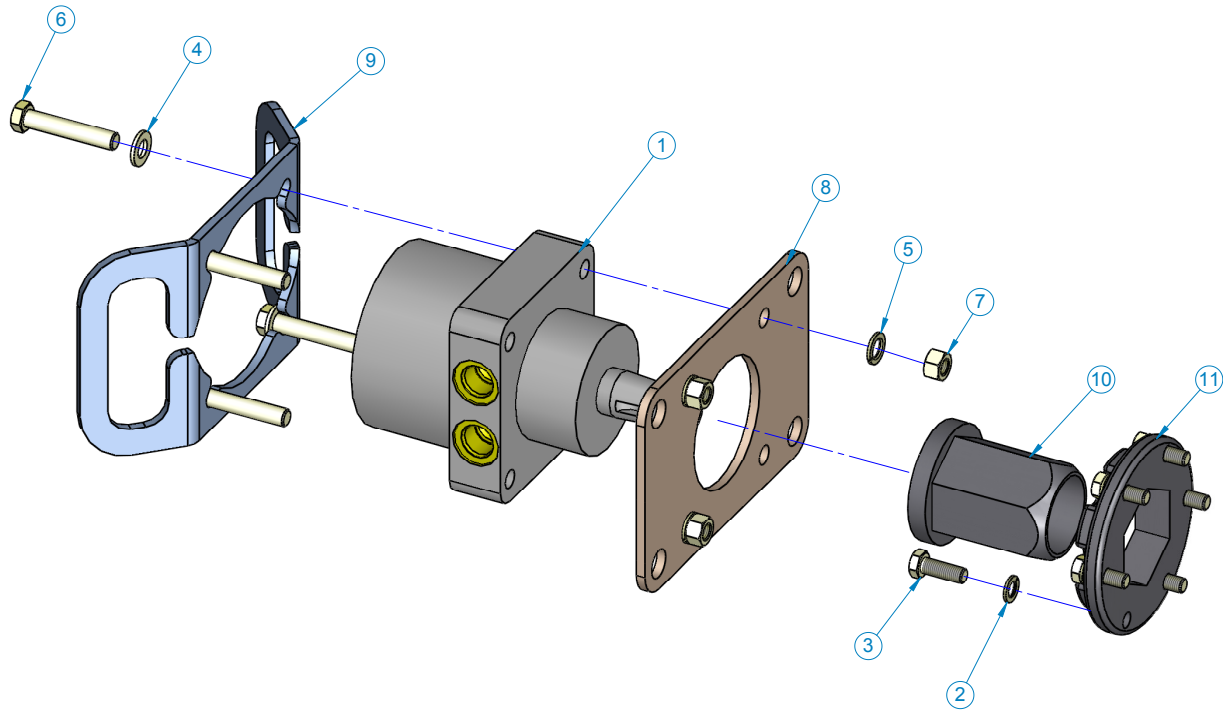
Item	Part	Qty	Description
1.	03-1939	4	Fitting, 10MB-10MF
2.	03-5160	2	Fitting, Tee, Bulkhead, RH, 12FSA All Sides
3.	03-5179	2	Hose, .50 x 56, 10FF-12FF, 3.5K (8 Ft)
	03-5168	2	Hose, .50 x 50, 10FF-12FF, 3.5K (7 Ft)
	03-5167	2	Hose, .50 x 44, 10FF-12FF, 3.5K (6 Ft)
4.	03-5584	2	Hose, .50 x 79, 10FF-12FF, 3.5K (8 Ft)
	03-5583	2	Hose, .50 x 73, 10FF-12FF, 3.5K (7 Ft)
	03-5582	2	Hose, .50 x 67, 10FF-12FF, 3.5K (6 Ft)
5.	07-3740	1	Screw, HHC, CL10.9, M8-1.25 x 30mm
6.	07-5287	3	Screw, HHC, CL10.9, M8-1.25 x 65mm
7.	13-15094	1	Bracket, Mounting, Bulkhead, Tees
8.	RHW8614	3	Cover, Plate
9.	RHW8616	3	Hose, Cradle

Hydraulic Assemblies - Single Motor



Item	Part	Qty	Description
1.	03-1920	2	Fitting, Union, 12MF-12MF
2.	03-1939	2	Fitting, 10MB-10MF
3.	03-5179	2	Hose, .50 x 56, 10FF-12FF, 3.5K (8 Ft)
	03-5168	2	Hose, .50 x 50, 10FF-12FF, 3.5K (7 Ft)
	03-5167	2	Hose, .50 x 44, 10FF-12FF, 3.5K (6Ft)
4.	07-3736	4	Washer, Flat, CL8.8, M8
5.	07-3738	4	Washer, Lock, Split, Medium, M8
6.	07-3740	5	Screw, HHC, CL10.9, M8-1.25 x 30mm
7.	07-5287	2	Screw, HHC, CL10.9, M8-1.25 x 65mm
8.	RHW8614	2	Cover, Plate

Motor Mount Assemblies



Item	Part	Qty	Description
1.	03-5612	1	Motor, 18.3 CID, 1.25 TPR, White
	03-5613	1	Motor, 28.3 CID, 1.25TPR, White
2.	07-3747	6	Washer, Lock, Split, Medium, M10
3.	07-3749	6	Screw, HHC, CL10.9, M10-1.5 x 30mm
4.	07-3754	4	Washer, Flat, CL8.8, M12
5.	07-3756	4	Washer, Lock, Split, Medium, M12
6.	07-6683	4	Screw, HHC, CL10.9, M12-1.75 x 65mm
7.	07-6766	4	Nut, Hex, CL10.9, M12-1.75
8.	13-14085	1	Plate, Mounting, Motor
9.	13-14086	1	Plate, Handle, Motor
10.	13-15206	1	Hub, Hex, 2 1/2 x 1 1/4, Tapered Bore x 3.75
11.	13-12750	1	Weld, Hex, Plate, with Doubler

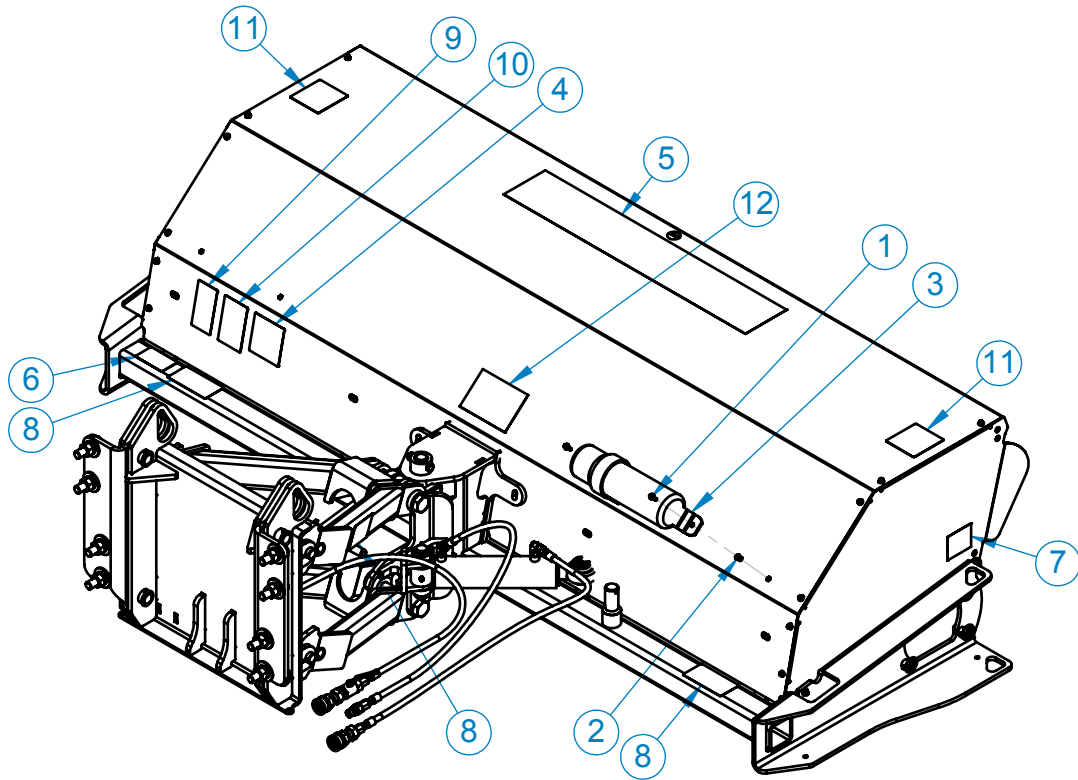
Replacement Part for 03-5612:

03-5503 Seal Kit
07-7286 Replacement Key

Replacement Part for 03-5613:

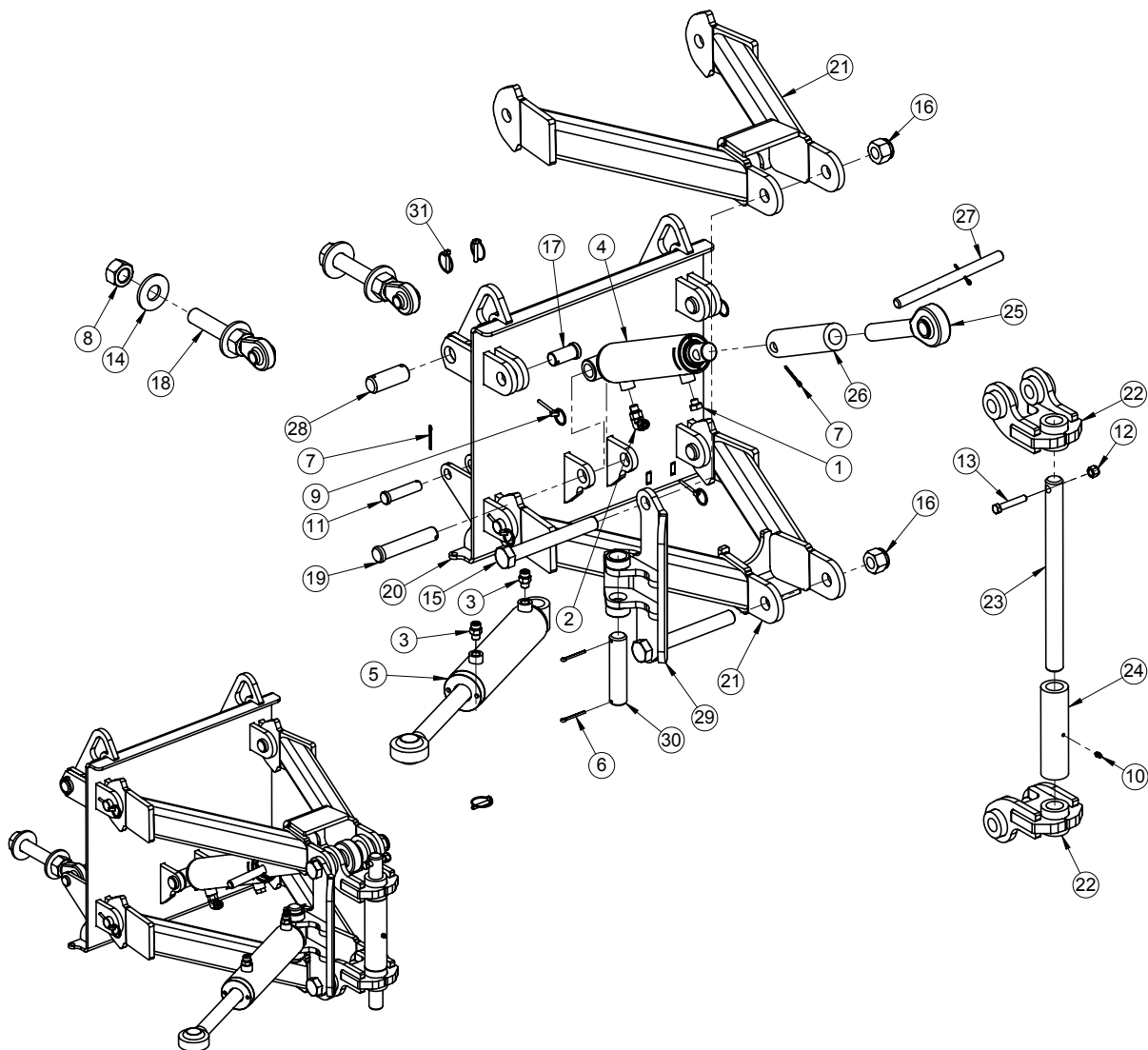
03-5644 Seal Kit
07-7286 Replacement Key

Brush Head Labels



Item	Part	Qty	Description
1.	07-3522	2	Screw, CL10.9, M6 x 1 x 20
2.	07-3617	2	Nut, Insert, M6 x 1
3.	07-6869	1	Manual Holder
4.	41043	1	Decal, Warning, Hazardous Dust
5.	50-0252	1	Label, Logo, Large, White
6.	50-0634	1	Label, Serial Number
7.	50-0643	2	Label, Tie Down Point
8.	50-0721	4	Label, Warning, Crush Hazard
9.	50-0722	1	Label, Warning, Misuse Hazard
10.	50-0724	1	Label, Warning, High Pressure Fluid Hazard
11.	50-0726	2	Label, Warning, Flying Objects & Entanglement
12.	50-0752	1	Label, Brush Pattern Adjustment

Lift Linkage



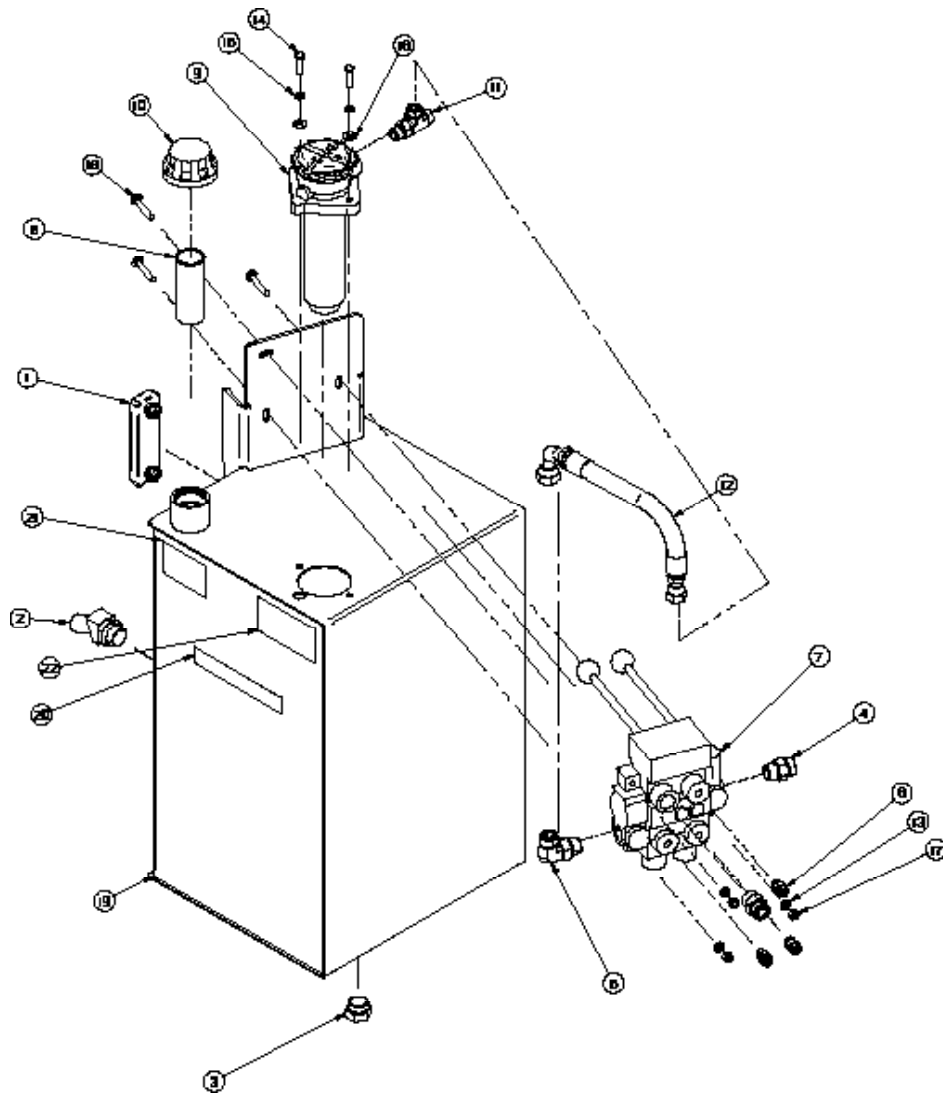
Item	Part	Qty	Description
1.	03-1957	1	Fitting, Vent, 9/16-18MOR, Hex, with Screen
2.	03-2092	1	Fitting, Elbow, HP, 90°, 9/16MOR 3/8MFS
3.	03-2291	2	Fitting, Adapter, HP, 3/8MFS, 9/16MOR
4.	03-5890	1	Cylinder, 2.5 x 1.5 x 6.75
5.	03-6062	1	Cylinder, 2.5 x 1.25 x 7.5 x 15
6.	07-0206	2	Pin, Cotter, Gr2, 3/16 x 2
7.	07-1044	4	Pin, Cotter, Gr2, 5/32 x 1 1/2
8.	07-1284	4	Nut, Hex, Gr8, 1 1/8-7
9.	07-2843	5	Pin, Klick, 3/16 x 1 5/8
10.	07-3112	1	Fitting, Zerk, 1/4-28, Self Tap
11.	07-3473	2	Pin, Clevis, Gr2, 3/4 x 3
12.	07-3664	1	Nut, Hex, Nylock, Gr8, 7/16-14
13.	07-3669	1	Screw, HHC, Gr8, 7/16-14 x 2 1/2
14.	07-4041	4	Washer, Flat, Gr8, 1 1/8
15.	07-5277	2	Screw, HHC, Gr8, 1-8 x 8

Item	Part	Qty	Description
16.	07-5938	2	Nut, Hex, Nylock, Gr8, 1-8
17.	07-6691	4	Pin, Clevis, 1 x 2
18.	07-6692	2	Toplink, 3/4, 1-8
19.	07-6889	1	Pin, Clevis, 1 x 5
20.	13-14018	1	Weld, Mounting
21.	13-14024	2	Weld, Arm
22.	13-14028	2	Weld, Pivot, Upper
23.	13-14043	1	Pin, 1.25 x 15.53, with Holes
24.	13-14048	1	Bushing, 2 x 1.26 x 7.125
25.	13-14250	1	Toplink, 5.81
26.	13-14252	1	Tube, Adjustment
27.	13-14254	1	Rod, Adjustment
28.	13-14787	2	Pin, 1 1/4 x 4, with Holes
29.	13-17153	1	Weld, Bracket, Mounting
30.	13-17157	1	Pin, 1.25 x 5.5
31.	RHW8068	5	Pin, Linch, 1/4

Replacement Parts:

- 03-5061 Seal Kit for 03-4888
- 03-5037 Seal Kit for 03-5665

Hydraulic Tank



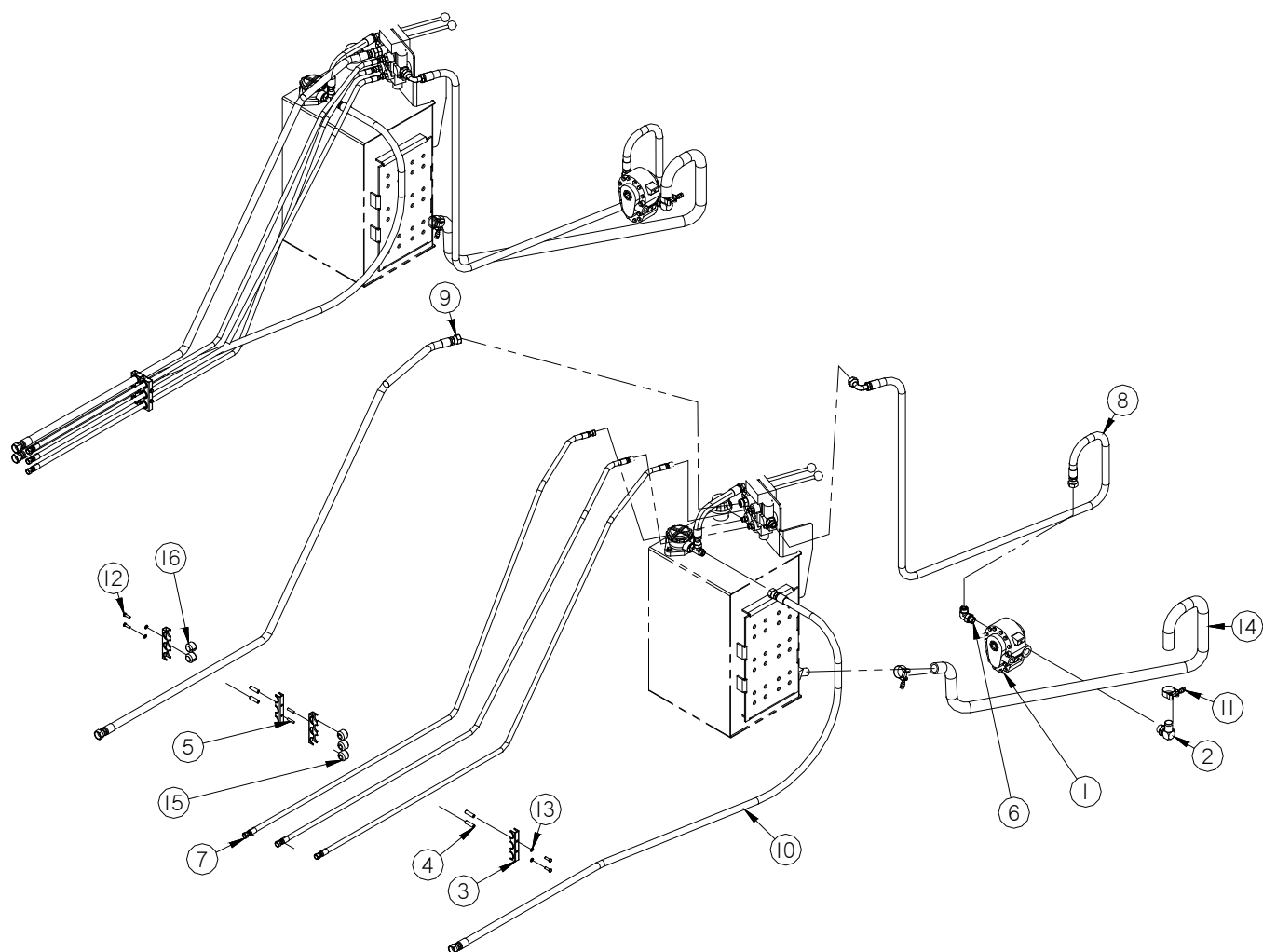
Item	Part	Qty	Description
1.	03-1074	1	Gauge, Sight, Hydraulic
2.	03-1457	1	Fitting, HP, 45°, 1 1/4, 1 5/8MOR
3.	03-1520	1	Fitting, Plug, HP, Hex, 1 5/16
4.	03-1945	2	Fitting, Adapter, HP, 1 1/16MOR, 3/4MFS
5.	03-2177	1	Fitting, Elbow, HP, 90°, 3/4FFS, 1 1/16MOR
6.	03-2291	3	Fitting, Adapter, HP, 3/8MFS, 9/16MOR
7.	03-3138	1	Valve, Prince, 2 Spool
8.	03-4642	1	Strainer, Filler Spout
9.	03-5054	1	Filter, Hydraulic, Return Line
10.	03-5055	1	Cap, Breather
11.	03-5170	1	Fitting, Tee Run, 16MOR, 12MFS
12.	03-5171	1	Hose, 3/4 x 17, TC, 12FFS90, 12FFS
13.	07-1718	3	Washer, Lock, Split, Medium, 3/8

Item	Part	Qty	Description
14.	07-1973	2	Screw, HHC, Gr8, 5/16-18 x 1 1/4
15.	07-3273	2	Washer, Lock, Split, Medium, 5/16
16.	07-3275	2	Washer, Flat, Gr8, 5/16
17.	07-3654	3	Nut, Hex, Gr8, 3/8-16
18.	07-3703	3	Bolt, Carriage, Gr5, 3/8-16 x 2 1/4
19.	13-13975	1	Weld, Tank
20.	50-0184	1	Label, Logo, Sweepster
21.	50-0272	1	Label, oil, ISO VG 46
22.	50-0725	1	Label, Warning, High Pressure Fluid Hazard

Replacement Parts for 03-3138 :

03-3178	Seal Kit for Swing Spool
03-2179	Seal Kit for Run/Lift

Hydraulic Pump/Hose Assembly



Item	Part	Qty	Description
1.	03-0597	1	Pump, PTO, 20gpm
2.	03-0710	1	Fitting, Barb, HP, 90°, 1 1/4, 1 5/16MOR
3.	03-0785	4	Clamp, Hydraulic, Metal, 3 Position
4.	03-0788	4	Nut, Stack, Socket Head
5.	03-1184	2	Stud, Self Tapping, 5/16, 5/16
6.	03-2177	1	Fitting, Elbow, HP, 90°, 3/4MFS, 1 1/16MOR
7.	03-3345	3	Hose, 3/8 x 120, TC, 3/8FFS, 3/8FFS
8.	03-3987	1	Hose, 3/4 x 126, TC, 3/4FFS90, 3/4FFS
9.	03-4101	1	Hose, 3/4 x 142, TC, 3/4FFS, 3/4FFS
10.	03-4101	1	Hose, 3/4 x 142, TC, 3/4FFS, 3/4FFS
11.	07-1192	2	Clamp, T-Bolt, 1 1/4
12.	07-1714	4	Screw, HHC, Gr8, 5/16-18 x 1
13.	07-3273	4	Washer, Lock, Split, Medium, 5/16
14.	09-0020	8ft	Hose, Suction, 1 1/4
15.	09-0223	3	Bushing, Rubber, Split, 3/8
16.	09-0224	2	Bushing, Rubber, Split, 3/4

Replacement Part for 03-0597 :
03-0597A Seal Kit

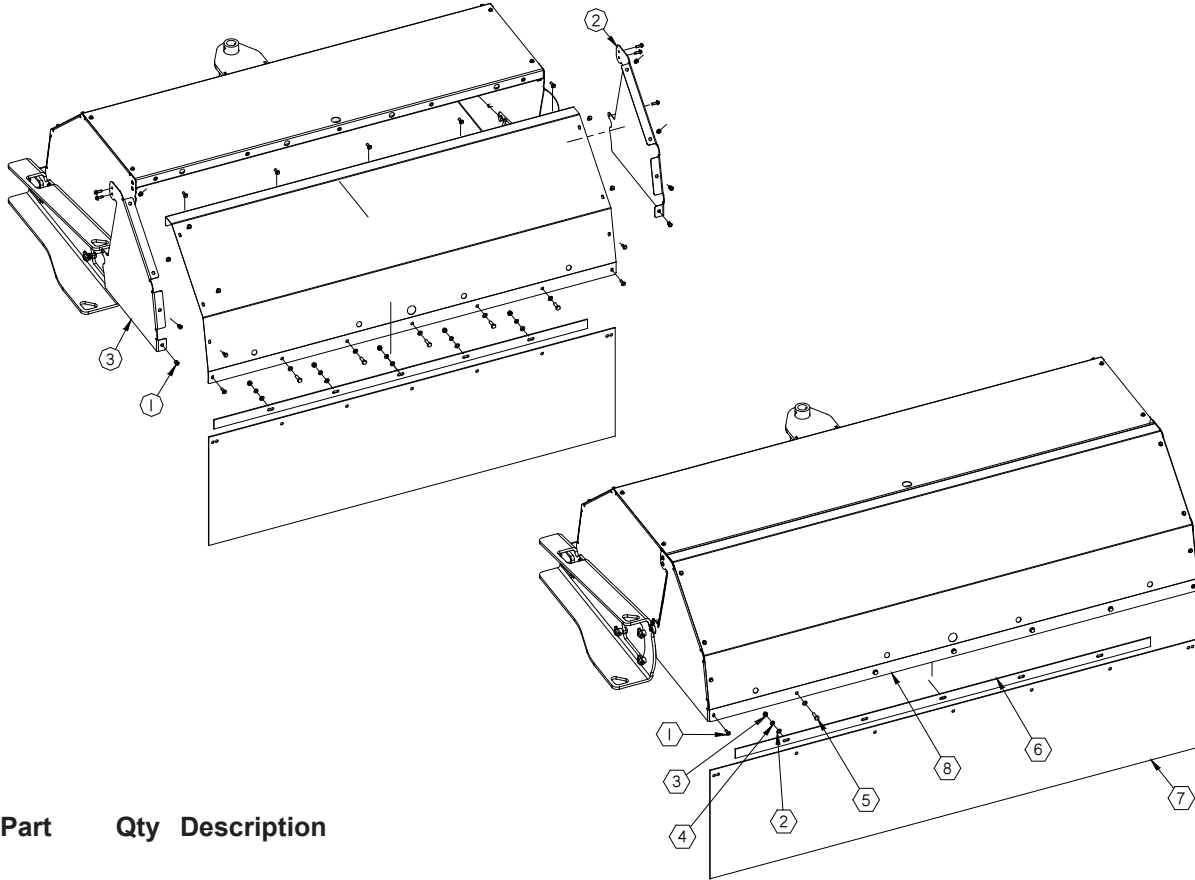
180° Hood with Drape

Assemblies

28-9918-6

28-9918-7

28-9918-8



Item	Part	Qty	Description
1.	07-2952	19	Screw, HFH, CL10.9, M6-1 x 20, 6 ft
	07-2952	20	Screw, HFH, CL10.9, M6-1 x 20, 7,8 ft
2.	07-3736	10	Washer, Flat, CL8.8, M8, 6,7 ft
	07-3736	14	Washer, Flat, CL8.8, M8, 8 ft
3.	07-3737	5	Nut, Hex, CL10, M8-1.25, 6,7 ft
	07-3737	7	Nut, Hex, CL10, M8-1.25, 8 ft
4.	07-3738	5	Washer, Lock, Split, Medium, M8, 6,7 ft
	07-3738	7	Washer, Lock, Split, Medium, M8, 8 ft
5.	07-3739	5	Screw, HHC, CL10.9, M8-1.25 x 25mm, 6,7 ft
	07-3739	7	Screw, HHC, CL10.9, M8-1.25 x 25mm, 8 ft
6.	13-12298	1	Plate, Retainer, 6 ft
	13-12806	1	Plate, Retainer, 7 ft
	13-12509	1	Plate, Retainer, 8 ft
7.	13-13302	1	Flap, Neoprene, 6 ft
	13-13272	1	Flap, Neoprene, 7 ft
	13-13301	1	Flap, Neoprene, 8 ft
8.	13-14536	1	Sheet, Hood, 6 ft
	13-14537	1	Sheet, Hood, 7 ft
	13-14538	1	Sheet, Hood, 8 ft
9.	07-3617	8	Nut, Hex, Insert, M6 x 1
10.	13-14545	1	Sheet, Side, Left
11.	13-14546	1	Sheet, Side, Right

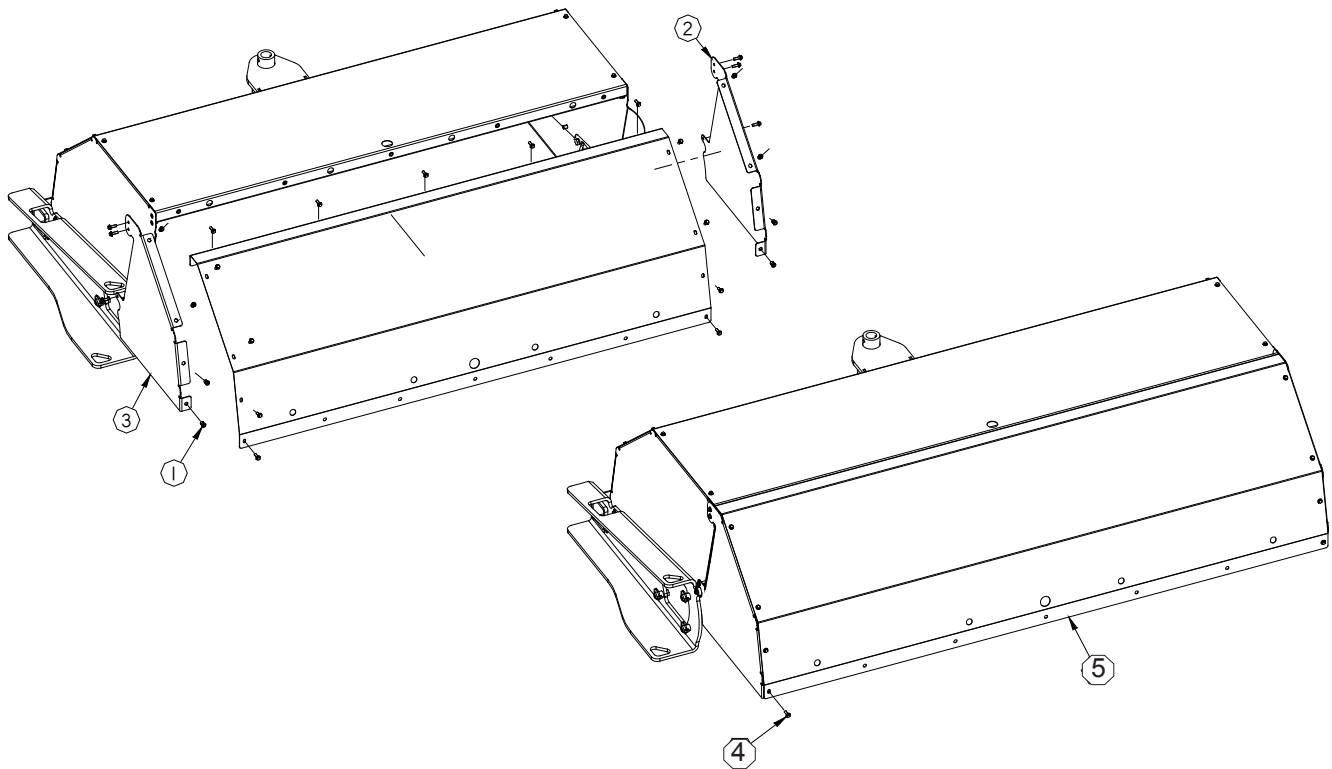
180° Hood Kits

Assemblies

28-9930-6

28-9930-7

28-9930-8



Item	Part	Qty	Description
1.	07-3617	8	Nut, Insert, Hex, M6 x 1
2.	13-14545	1	Sheet, Side, Left
3.	13-14546	1	Sheet, Side, Right
4.	07-2952	19	Screw, HFH, CL10.9, M6-1 x 20, 6 Ft
	07-2952	20	Screw, HFH, CL10.9, M6-1 x 20, 7/8 Ft
5.	13-14536	1	Sheet, Hood, 6 ft
	13-14537	1	Sheet, Hood, 7 ft
	13-14538	1	Sheet, Hood, 8 ft

Dust Suppression System

Item	Part	Qty	Description
1.	03-0457	1	Fitting, Barb, Nylon, 3/8-3/8MP
2.	03-1226	1	Fitting, Barb, HP, 5/8, 1/2MP
3.	03-1326	1	Pump, Flojet, Water, 2.9 gpm, 12 volt
4.	03-3537	2	O-Ring, #8 Face Seal
5.	07-0140	4	Washer, Lock, Gr2, #10
6.	07-0141	4	Nut, Hex, Gr2, 10-24
7.	07-0413	2	Nozzle, Cap, Nylon
8.	07-0414	2	Nozzle, Tip, Brass
9.	07-0532	1	Strainer, Hypro, Water
10.	07-0547	1	Clamp, Spring, 7/8 Hose
11.	07-0549	6	Clamp, Spring, 5/8 Hose
12.	07-1430	8	Washer, Flat, #10
13.	07-3869	1	Fitting, Barb, Tee, Nylon, 3/8
14.	07-4804	1	Grommet, Rubber
15.	07-4831	4	Screw, BHC, 10-24UNC, 2B x 3/4
16.	07-4862	2	Nozzle, Elbow, without Clamp
17.	07-5127	22ft	Hose, Clear, Vinyl, 3/8, 6 ft
	07-5127	21.5ft	Hose, Clear, Vinyl, 3/8, 7 ft
	07-5127	21ft	Hose, Clear, Vinyl, 3/8, 8 ft
18.	07-6862	1	Valve, Shut-off, 1/2, Nylon
19.	07-6863	1	Fitting, Nipple, 1/2, Nylon
20.	07-6864	1	Fitting, Nipple, 1/2 x 3/8, Nylon
21.	LAF8316	1	Wire, Harness, with Box, for Water Pump
22.	LAF8320	1	Wire, Assembly x 11 inches
23.	07-5127	1.5ft	Hose, Clear, Vinyl, 3/8, 6 ft
	07-5127	1.75ft	Hose, Clear, Vinyl, 3/8, 7 ft
	07-5127	2ft	Hose, Clear, Vinyl, 3/8, 8 ft
24.	07-5127	1.5ft	Hose, Clear, Vinyl, 3/8, 6 ft
	07-5127	1.75ft	Hose, Clear, Vinyl, 3/8, 7 ft
	07-5127	2ft	Hose, Clear, Vinyl, 3/8, 8 ft

Replacement Parts for 03-1326 :

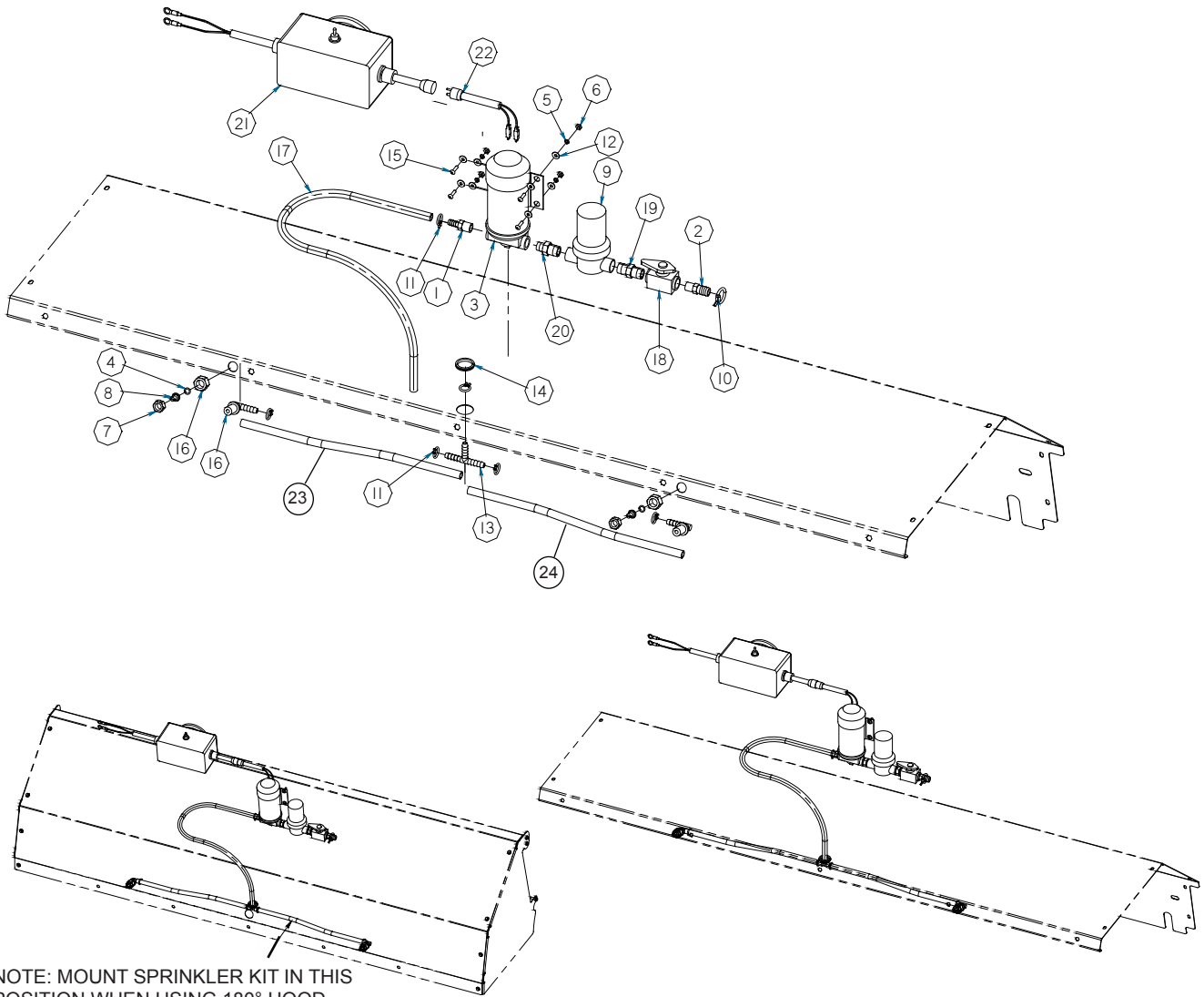
07-6565 Fan Shroud
 07-6566 Grommet Set (Qty 4)
 07-6567 Motor Base Plate

Replacement Parts for LAF8316 :

07-7492 Switch
 07-3152 Circuit Breaker
 07-1824 Rubber Boot

Dust Suppression System

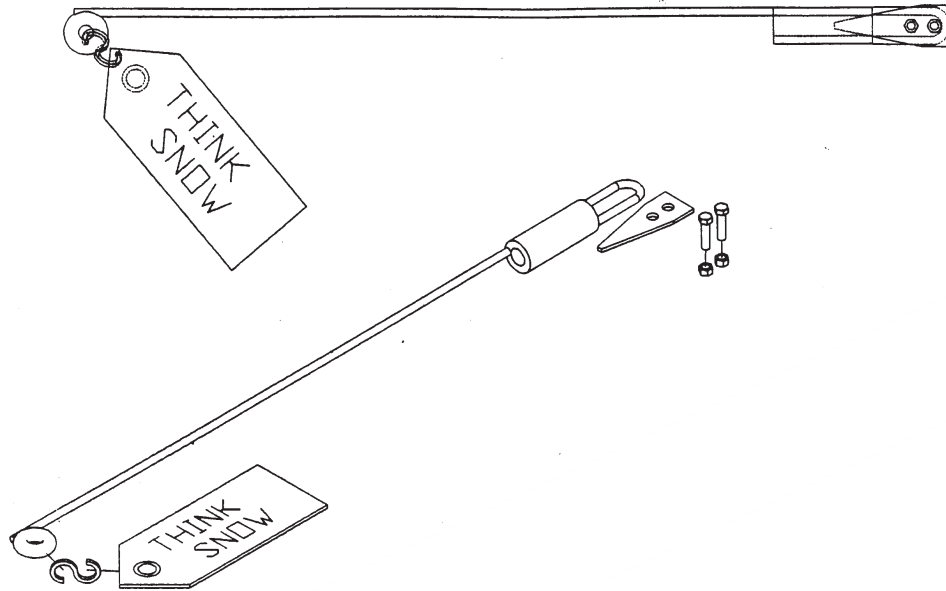
Assembly 28-9919



NOTE: MOUNT SPRINKLER KIT IN THIS POSITION WHEN USING 180° HOOD OR DIRT DEFLECTOR OPTION.

Sight Indicator Kits

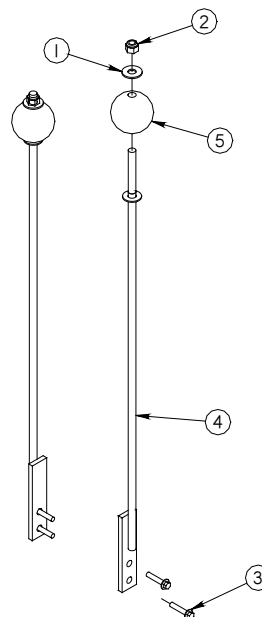
Kit Number: 11-5897



Kit Number: 28-9965

Item Part Qty Description

- 1. 07-3279 2 Washer, Flat, Gr8, 3/8
- 2. 07-4036 2 Nut, Hex, Nylock, 3/8-16
- 3. 07-6597 4 Screw, HFH, CL10.9, M6-1 x 30
- 4. 13-14857 2 Weld, Sight Indicator
- 5. 13-9567 2 Ball, 2 1/8, Red, with Hole






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.

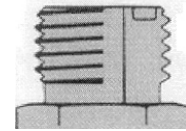
Bolt head identification marks as per grade.		
		

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

Hydraulic Torque Specifications

Face Seal: Assembly, Tube to Fitting

Note - Face seal fittings have the most reliable sealing method and therefore, should be used whenever possible



Installation

1. Make sure threads and sealing surfaces are free of burrs, nicks, scratches, or any foreign materials.
2. Install proper SAE o-ring to end of fitting if not already installed. Ensure o-ring is fully seated and retained properly.
3. Lubricate o-ring with a light coating of clean hydraulic oil.
4. Position tube and nut squarely on face seal of fitting and tighten nut finger tight.
5. Using appropriate torquing device, tighten to given torque rating from the table below.

Torque Values

SAE Dash Size	Tube Side Thread Size	In-lbs	Ft-lbs
-4	9/16 - 18	220 ± 10	18 ± 1
-6	11/16 - 16	320 ± 25	27 ± 2
-8	13/16 - 16	480 ± 25	40 ± 2
-10	1 - 14	750 ± 35	63 ± 3
-12	1 3/16 - 12	1080 ± 45	90 ± 4
-16	1 7/16 - 12	1440 ± 90	120 ± 8
-20	1 11/16 - 12	1680 ± 90	140 ± 8
-24	2 - 12	1980 ± 100	165 ± 8

NOTE - ft-lb may be converted to Newton Meters by multiplying by 1.35582.

NOTE - in-lbs may be converted to Newton Meters by multiplying by 0.11298.

Hydraulic Torque Specifications

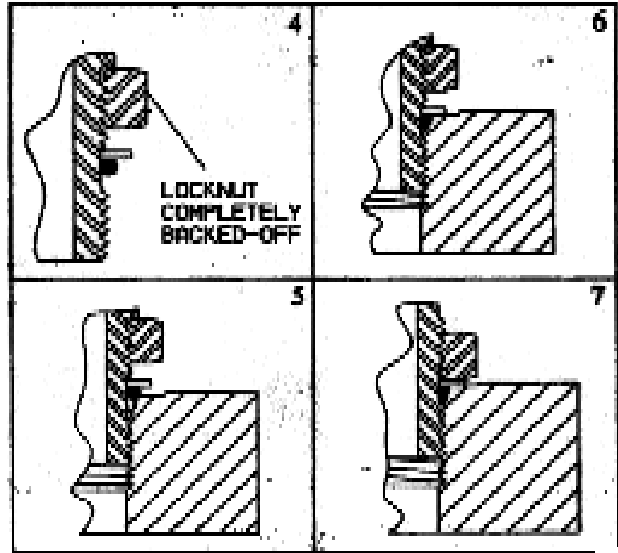
Straight Thread O-ring Fitting: Assembly, Fitting to Port

NOTE - Straight thread o-ring fittings are utilized to adapt hydraulic systems to motors, pumps, cylinders, and valves.



Installation (Adjustable Fitting)

1. Make sure threads and sealing surfaces are free of burrs, nicks, scratches, or any foreign materials.
2. Install proper SAE o-ring on port end of fitting if not already installed. Ensure o-ring is fully seated and retained properly.
3. Lubricate o-ring with a light coating of clean hydraulic oil.
4. Back off nut as far as possible and push washer up as far as possible. (Figure 4 & 5)
5. Screw fitting into port. Hand tighten fitting until backup washer contacts face of port. (Figure 6)
6. To position the fitting, unscrew to desired position, but not more than one full turn.
7. Hold fitting in position with wrench. Using appropriate torquing device, tighten nut to given torque rating from the table in section. (Figure 7)



Figures 4, 5, 6 and 7

Torque Values

Fitting Size	SAE Port Thread Size	In-lbs	Ft-lbs
-4	7/16 - 20	190 ± 10	16 ± 1
-6	9/16 - 18	420 ± 15	35 ± 1
-8	3/4 - 14	720 ± 25	60 ± 2
-10	7/8 - 14	1260 ± 50	105 ± 5
-12	1 1/16 - 12	1680 ± 75	140 ± 6
-16	1 5/16 - 12	2520 ± 100	210 ± 8
-20	1 5/8 - 12	3100 ± 150	260 ± 12
-24	1 7/8 - 12	3800 ± 150	315 ± 12

NOTE - ft-lb may be converted to NewMeters by multiplying by 1.35582.
NOTE - in-lbs may be converted to Newton Meters by multiplying by 0.11298.

Glossary

angle or angle assembly - portion of the sweeper that allows the brush head assembly to angle.

BP - black pipe.

brush head assembly - assembly that includes the core, hood, and brush frame.

brush pattern - area of dirt removed from sweeping surface; with a properly adjusted sweeper; the pattern is the same width for the entire length.

castellated - having battlements like a castle.

caution - indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

core - weldment that holds brush sections.

danger - indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

F - female.

FS - face seal.

front - side that is in front when facing the normal forward direction of travel of the machine.

gpm - gallons per minute.

HP - high pressure.

hood - brush shield.

hydraulic angle kit - means of swinging an assembly hydraulically.

important - used for instructions when machine damage may be involved.

in. - inches.

kph - kilometers per hour.

lb - pounds.

left-hand - side that is on the left when facing the normal forward direction of travel of the machine.

lift cylinder - means of raising the brush head assembly hydraulically.

lps - liters per second.

M - male.

mm - millimeters.

mph - miles per hour.

manual angle kit - means of swinging the brush head assembly mechanically.

mid pump unit - sweeper in which the pump is mounted on the mid PTO.

mounting assembly - portion of the sweeper that attaches to the prime mover; designed specifically for each prime mover.

NPT - national pipe thread.

note - indicates supplementary information.

OR - o-ring.

psi - pounds per square inch.

PTO - power take off; shaft on the prime mover used to drive attachments.

plate swing - swing assembly that includes a half-moon plate.

power pack - auxiliary hydraulic package used when prime mover hydraulics do not have enough flow available.

prime mover - refers to the tractor, truck, loader or other vehicle to which a sweeper is attached.

qty - quantity.

quick change core - core designed in a way that allows brush sections to be changed without removing hoses from motors.

rpm - revolutions per minute.

rear - side that is in rear when facing the normal forward direction of travel of the machine.

rear pump unit - sweeper in which the pump is mounted on a rear PTO.

retainer - removable plate or set of plates that keeps sections on the core.

Glossary

right-handed - side that is on the right when facing the normal forward direction of travel of the machine.

section - single brush wafer.

section set - replacement brush wafers.

sprinkler system - system that sprays water ahead of the sweeper used to reduce dust.

sprinkler tank - assembly that includes the water reservoir and mounting used in a sprinkler system.

stands - devices designed to keep the components off the ground when the sweeper is dismounted.

swing or swing assembly - portion of the sweeper that allows the brush head assembly to angle.

swing cylinder - means of angling the brush head assembly hydraulically.

tank assembly, hydraulic - assembly that includes the hydraulic reservoir, filter and fittings; may also incorporate valves.

warning - indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

weld - weldment.

windrow - pile of debris.

zerk - grease fitting.

Limited Warranty

Except for the Excluded Products as described below, all new products are warranted to be free from defects in material and/or workmanship during the Warranty Period, in accordance with and subject to the terms and conditions of this Limited Warranty.

1. Excluded Products. The following products are excluded from this Limited Warranty:

(a) Any cable, part that engages with the ground (i.e. sprockets), digging chain, bearing, teeth, tamping and/or demolition head, blade cutting edge, pilot bit, auger teeth and broom brush that either constitutes or is part of a product.

(b) Any product, merchandise or component that, in the opinion of Paladin Light Construction¹, has been (i) misused; (ii) modified in any unauthorized manner; (iii) altered; (iv) damaged; (v) involved in an accident; or (vi) repaired using parts not obtained through Paladin Light Construction.

2. Warranty Period. The Limited Warranty is provided only to those defects that occur during the Warranty Period, which is the period that begins on the first to occur of: (i) the date of initial purchase by an end-user, (ii) the date the product is first leased or rented, or (iii) the date that is six (6) months after the date of shipment by Paladin Light Construction as evidenced by the invoiced shipment date (the "Commencement Date") and ends on the date that is twelve (12) months after the Commencement Date.

3. Terms and Conditions of Limited Warranty. The following terms and conditions apply to the Limited Warranty hereby provided:

(a) Option to Repair or Replace. Paladin Light Construction shall have the option to repair or replace the product.

(b) Timely Repair and Notice. In order to obtain the Limited Warranty, (i) the product must be repaired within thirty (30) days from the date of failure, and (ii) a claim under the warranty must be submitted to Paladin Light Construction in writing within thirty (30) days from the date of repair.

(c) Return of Defective Part or Product. If requested by Paladin Light Construction, the alleged defective part or product shall be shipped to Paladin Light Construction at its manufacturing facility or other location specified by Paladin Light Construction, with freight PRE-PAID by the claimant, to allow Paladin Light Construction to inspect the part or product.

Claims that fail to comply with any of the above terms and conditions shall be denied.

LIMITATIONS AND EXCLUSIONS.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY BASED ON A COURSE OF DEALING OR USAGE OF TRADE.

IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES.

IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR ANY LOSS OR CLAIM IN AN AMOUNT IN EXCESS OF THE PURCHASE PRICE, OR, AT THE OPTION OF PALADIN LIGHT CONSTRUCTION, THE REPAIR OR REPLACEMENT, OF THE PARTICULAR PRODUCT ON WHICH ANY CLAIM OF LOSS OR DAMAGE IS BASED. THIS LIMITATION OF LIABILITY APPLIES IRRESPECTIVE OF WHETHER THE CLAIM IS BASED ON BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE OR OTHER CAUSE AND WHETHER THE ALLEGED DEFECT IS DISCOVERABLE OR LATENT.

¹Attachment Technologies Inc., a subsidiary of Paladin Brands Holding, Inc. (PBHI) is referred to herein as Paladin Light Construction.

February 10, 2010