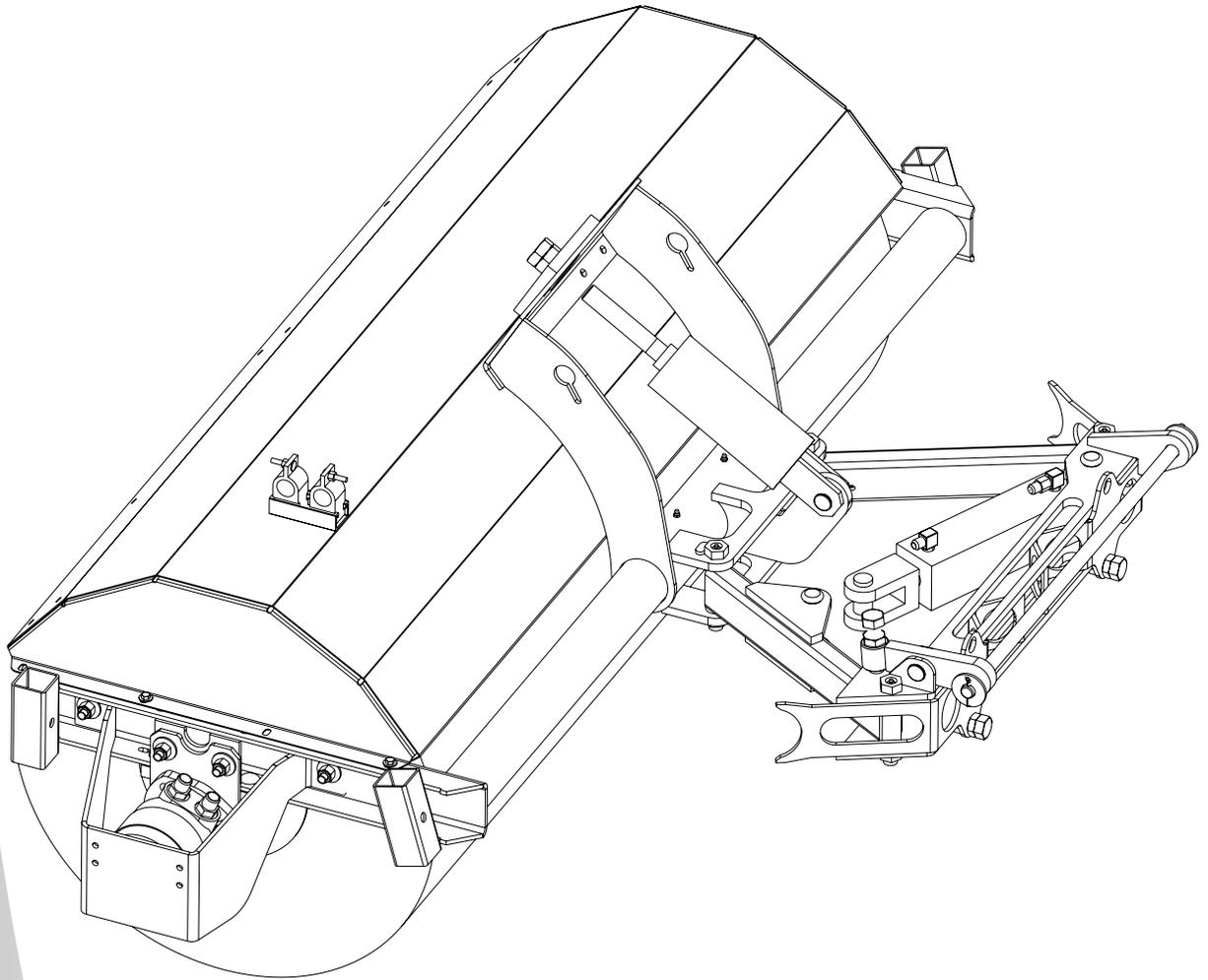


# OPERATOR'S MANUAL

## Model SHL/SHT

### Hydraulic Power Broom



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# INTRODUCTION

## GENERAL

The SHL/SHT Model brooms are hydraulically-driven. The SHT model for tractors uses a hydraulic cylinder for lift in place of the anchor used on the SHL model for loaders/skid steers.

## OPERATOR'S MANUAL

You must read, understand and comply with all the safety and operating instructions in this manual before attempting to set-up and operate your power broom.

Failure to comply with the safety and operating instructions can result in loss of machine control, serious personal injury to you and/or bystanders, and risk of equipment and property damage.

## IDENTIFICATION NUMBERS

When contacting your authorized dealer for information, replacement parts or service, you **MUST** have the model and serial number of your unit.

Record the serial number in the space provided. The serial number plate/decals can be found in the location shown in Figure 1.

Model Name/Number:	
Date Purchased:	Serial #:



Figure 1.

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# SAFETY

## SAFETY ALERTS

Signal words and alert symbols notify of important safety precautions.

### DANGER!



Indicates a hazardous situation which, if not avoided, will result in serious injury or death.

### WARNING!



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

### CAUTION!



Indicates a hazardous situation or unsafe practice which, if not avoided, could result in minor or moderate injury or property damage.

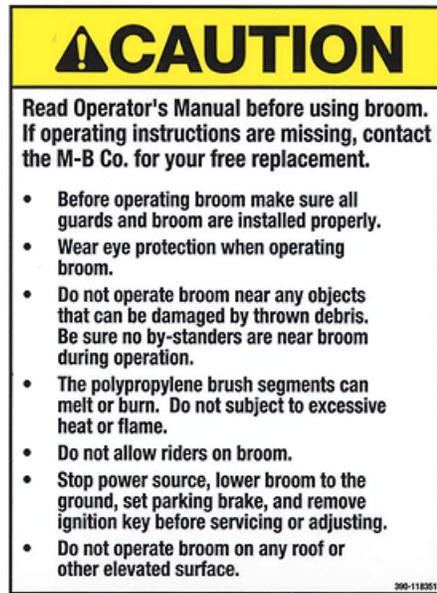
## SAFETY DECALS

Although reading this manual and the safety instructions it contains will provide you with the necessary basic knowledge to operate this equipment safely and effectively, we have placed several safety labels on the unit to remind you of this important information while you are operating your unit.

All DANGER, WARNING, CAUTION, and instructional messages on your unit should be carefully read and obeyed. Bodily injury can result when these instructions are not followed. The information is for your safety and it is important.

These labels will act as a constant visual reminder to you, and others who may use the equipment, to follow the safety instructions necessary for safe, effective operation.

If any of these labels are lost or damaged, replace them at once. See your local dealer for replacements.



## PRE-START GUIDELINES

- Install any covers or guards which may have been removed for shipping purposes.
- Before starting equipment, walk around equipment, making a visual inspection that all safety devices are properly installed and secured.
- Check that all hardware, fasteners, hydraulic fittings, etc. are in good condition and properly fastened. Replace any fatigued or damaged items with proper replacements.
- Personnel who are not required to be in the work area should be kept away. Never start the equipment unless you are absolutely certain that everyone in the area is clear of the machine and aware it is being started.
- Follow the manufacturer's recommended start-up procedure.

## OPERATION GUIDELINES

Read, understand and follow all instructions in the manual and on the unit before starting.

- To avoid serious injury or death, do not modify equipment. Any modifications made to equipment can be dangerous and can void equipment warranty.
- Never defeat a safety device to make a task easier.
- Always wear proper apparel when operating equipment; safety glasses, face shield or goggles, ear protection, and dust mask. Tie hair back. Never wear loose clothing or jewelry that could get caught in moving parts.
- Never operate equipment with covers or guards removed. Rotating parts can cause severe injury. Keep hands, feet, hair, jewelry and clothing away from all moving parts.
- Only allow responsible adults who are familiar with the instructions, to operate the unit (local regulations can restrict operator age).
- Clear the area of objects such as rocks, toys, wire, etc., which could be picked up and thrown.
- Be aware of surroundings. Be sure the area is clear of other people, bystanders or pets. Stop unit if anyone enters the area.
- Always look down and behind before and while traveling in reverse.

# SAFETY

- Be aware of discharge direction and do not point discharge at anyone. Do not point the discharge at glass enclosures, automobiles, or windows.
- Always stand clear of the discharge area when operating this unit.
- Disengage all clutches and PTO's before starting engine.
- Never leave a running machine unattended. Always disengage the attachment and traction controls, lower the attachment, set the park brake, stop the engine and remove the ignition key before leaving the machine.
- Operate only in daylight or good artificial light.
- Never carry passengers.
- Do not operate the unit while under the influence of drugs, alcohol or other medication.
- Watch for traffic when operating near or crossing roadways.
- Use extra care when loading or unloading the unit into a trailer or truck.
- Keep in mind the operator is responsible for accidents occurring to other people or property.
- Data indicates that operators, age 60 years and above, are involved in a large percentage of power equipment-related injuries. These operators should evaluate their ability to operate the unit safely enough to protect themselves and others from injury.
- All operators should seek and obtain professional and practical instruction.
- Protect eyes, face and head from objects that may be thrown from unit. Wear appropriate hearing protection.
- Always wear substantial footwear and appropriate clothing. Wear footwear that improves traction on slippery slopes. DO NOT wear long scarves or loose clothing that could become entangled in moving parts.
- Abnormal Vibrations are a warning of trouble. Striking a foreign object can damage unit. Stop unit and engine. Wait for all moving parts to stop. Inspect unit and make any necessary repairs before restart.
- Never place your hands or any part of your body or clothing inside or near any moving part while unit is running.
- Stop engine before: refueling, cleaning, making adjustments or removing the attachment assembly.
- Follow the drive unit manufacturer's recommendations for wheel weights or counter weights.
- Make any adjustments before operating unit.
- Do not touch parts which may be hot from operation. Allow such parts to cool before attempting to service the unit.
- Before using, always visually check that hardware is present, intact and secure. Replace worn or damaged parts.
- Never operate the machine with damaged guards, or without safety protective devices in place.
- Follow the manufacturer's recommendations for towing weight restrictions and procedures.
- Original purchaser of this unit was instructed by the seller on safe and proper operation. If unit is to be used by someone other than original purchaser; loaned, rented or sold, ALWAYS provide this manual and any needed safety training before operation.
- The Operator must understand the functions and parameters of all controls and how to operate, as well as how to STOP in an Emergency.

NOTE: All reference to left, right, front, or rear are given from the operator position and facing forward.

## MAINTENANCE GUIDELINES

- Maintain or replace safety and instruction decals/labels as necessary.
- Never run a unit in an enclosed area.
- Keep nuts and bolts tight and keep equipment in good condition
- Never tamper with safety devices. Check their proper operation regularly and make necessary repairs if they are not functioning properly.
- Keep unit free of debris and build-up. Clean up any oil spillage.
- Never make adjustments or repairs with the engine running unless specified otherwise in the engine manufacturer's manual.
- Components are subject to wear, damage, and deterioration. Frequently check components and replace with the manufacturer's recommended parts, when necessary.
- Check control operation frequently. Adjust and service as necessary.
- Use only factory authorized parts when making repairs.
- Always comply with factory specifications on all settings and adjustments.
- Only authorized service locations should be utilized for major service and repair requirements.
- Never attempt to make your own repairs on this unit unless you have been properly trained. Improper service procedures can result in hazardous operation, equipment damage and voiding the manufacturer's warranty.
- Stop engine on tractor and set parking brake before performing any adjustments on the machinery.
- Do not disassemble a pressurized system unless properly trained and equipped with adequate tooling.
- Escaping hydraulic fluid under pressure can have sufficient force to penetrate the skin, causing serious injury. Before operation, be sure that all hydraulic connections are tight and hoses are not damaged. Relieve pressure in system before making adjustments.
- Oils and fluids can be very hot under pressure. Use caution and allow the system to cool before beginning maintenance work.
- Never operate or pressurize one of these systems with worn or damaged components. Replace hoses, fittings, valves or other components which appear defective.
- Never adjust pressurized systems beyond recommended levels to achieve higher operating pressures.
- NEVER search for hydraulic leaks with only your hands. Use cardboard or a piece of wood.
- For engine equipped models, follow specific engine manufacturer's recommended service intervals for dirty/dusty environments.

# CONTROLS AND FEATURES

## CONTROLS

Operation of the SHL/SHT Power Broom is accomplished with the prime mover's controls. Refer to the prime mover's Operation/Owner's Manual.

## FEATURES

Refer to the Setup and Adjustments instruction, Specifications and Parts Lists within this manual for information on the SHL/SHT Power Broom components and functions.

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# SETUP AND ADJUSTMENTS

## SETUP

Proper setup and leveling of your power broom will increase the life of the brush and produces more efficient movement of material. Visually inspect the adjustments on the broom before each operating session and measure the adjustments once every 10 hours.

The following procedures must be followed in the prescribed sequence in order to be effective.

## LEVELING

See Figure 1.

1. After the broom is mounted to the prime mover (tractor, skid-steer, loader), park the unit on a flat level surface; preferably concrete or asphalt.
2. If mounted to a tractor (SHT), the frame is fixed and no movement is possible. See Figure 1.
3. If mounting to a skid-steer (SHL), lower the arms all the way down and tilt (rotate) the top of quick-attach all the way back until bolt contact plate is vertical (at 90° to ground). See Figure 2.

**NOTE:** Some brand skid steers may not allow top of Quik-Attach to be rotated back far enough to correctly position contact plate. This may not allow the swing arms to be properly leveled because the supplied front-to-rear leveling bolts will not be long enough. In this case, longer bolts (4") must be sourced from a local supplier.

4. If mounting to a loader (SHL), tilt the bucket cylinders all the way back until bolt contact plate is vertical. Lower the arms until the horizontal mounting shaft is 14.5" from the ground. If there is a way to set this location on the loader hydraulics, do so at this time. See Figure 2.

**NOTE:** Occasionally the horizontal mounting shaft is replaced by pins or bolts, based on mounting.

5. Swing the broom so that it is horizontal and tighten the pattern adjustment nuts all the way down. See Figures 1 and 2.

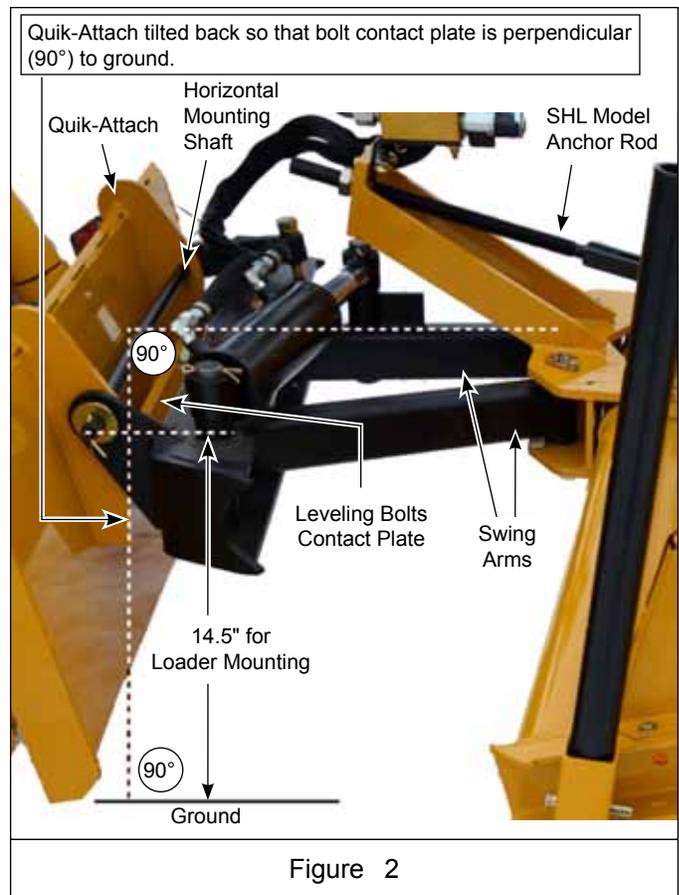


Figure 2

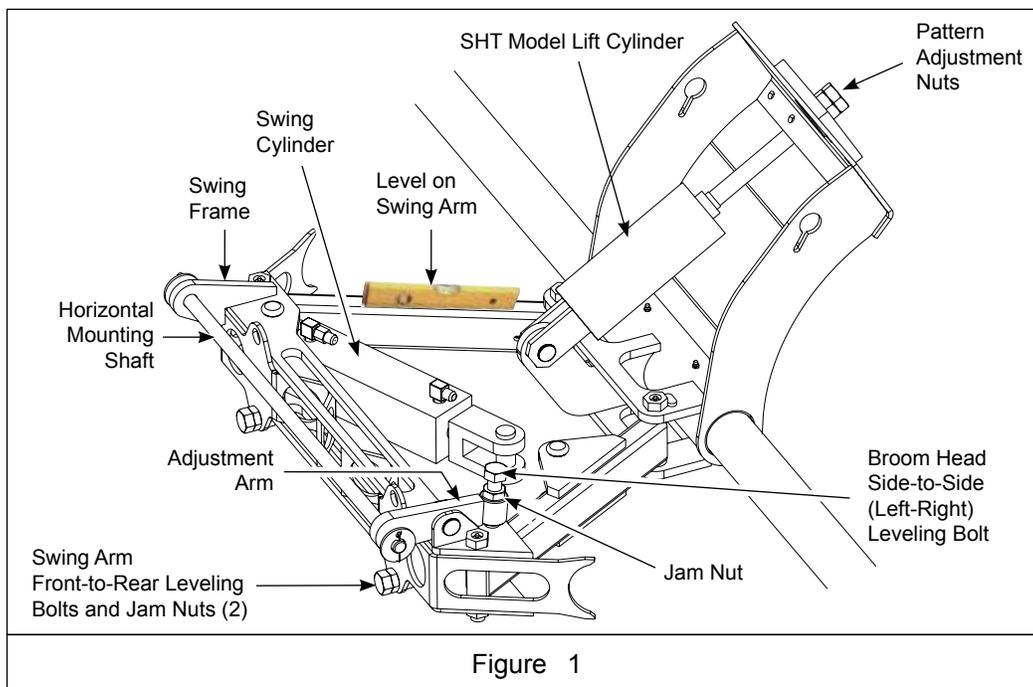


Figure 1

# SETUP AND ADJUSTMENTS

- Adjust the swing arms so they are level front-to-rear by adjusting the bolts in or out on the back of the swing mounting frame. Adjust both bolts evenly to maintain an even load on the mounting frame and the arms. Check to see that the arms are level by placing a level along one of the arms. Once the arms are level, tighten the jam nuts against the swing frame to lock the bolts in place. See Figures 1 and 2.
- Adjust the broom head so it is level side-to-side by adjusting the bolt in the adjustment arm on the top of the swing mounting frame. Adjust the bolt in (down) to lower the left side, and adjust it out (up) to raise the left side. Check for level on the broom head by placing a level along the length of the hood. Once the broom head is level, tighten the jam nut against the adjustment arm to lock the bolt in place. See Figure 1.
- Recheck the level on the swing arms. If the arms are still level, continue to Pattern Adjustment. If not, perform the leveling process again.

## PATTERN ADJUSTMENT

- After the broom has been leveled, the last adjustment is to set the brush pattern (swept area).
- With the unit on a flat level surface, adjust the nuts on the end of the hydraulic lift cylinder (SHT) or actuator rod (SHL) so that the broom contact patch is approximately 3" wide from front to rear. Loosening the nuts will lower the broom, creating more contact. See Figures 1 and 2.
- Once this adjustment is set, it can be confirmed by running the unit for about 30 seconds in the down position while stationary. Stop the broom and back the unit away. The 'cleaned' (contact patch) should be 2"-4" wide for the entire length of the broom. See Figure 3.

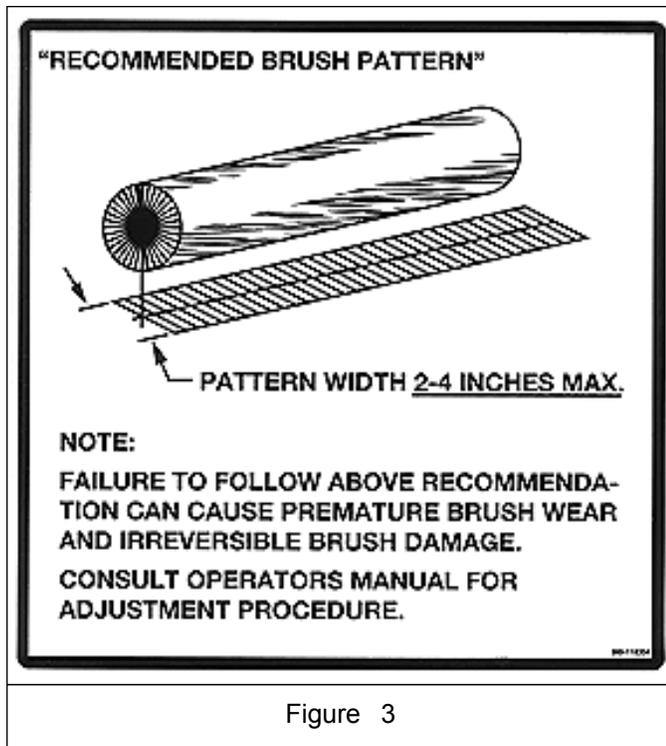
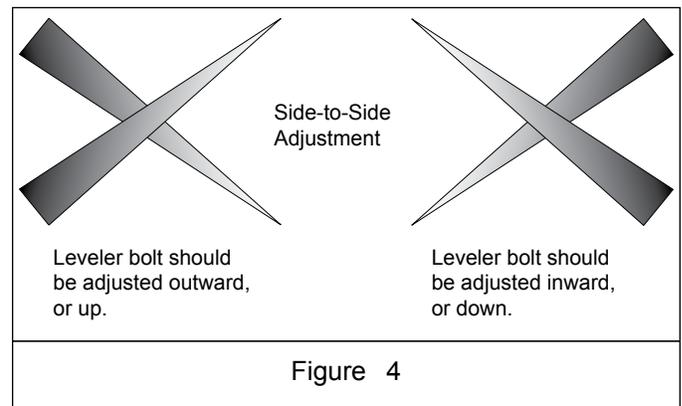
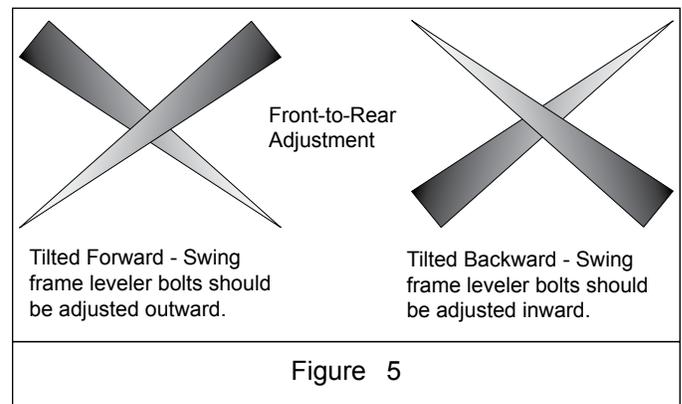


Figure 3

The level of the broom may create too heavy a brush pattern on either the left or right side. In order to balance the pattern, the Side-to-Side (Left-Right) Leveling Bolt in the Adjustment Arm (Figure 1) must be adjusted to compensate for the lean. See Figure 4.



Broom head may be either pitched down too far forward or up too far backward on either side swing arm, giving us the impression of a bowtie. The swing frame bolts must be adjusted either out or in, either separately or together, to achieve a balanced pattern. See Figure 5.



Once the broom has been properly adjusted, a short operation period is recommended for break-in; approximately 15 minutes. After this break-in period, repeat the leveling procedure to ensure that it is correct.

# OPERATION

## PRE-STARTUP CHECKS

**IMPORTANT!** You must read, understand and comply with all the safety and operating instructions in this manual before attempting to set-up and operate your power broom.

Failure to comply with the safety and operating instructions can result in loss of machine control, serious personal injury to you and/or bystanders, and risk of equipment and property damage.

1. Visually inspect equipment and hardware to ensure that all parts are secure and all hardware is tightened and secure.
2. Check for oil leaks and loose hose connections.
3. Inspect the broom adjustments to ensure that the broom is level and that there is proper brush pattern. Refer to the **SETUP AND ADJUSTMENT** section.
4. Inspect the bristle length to determine if replacement segments are needed.

## TRAVEL PROCEDURE

Follow these instructions for extended travel (i.e. to and from the sweeping site):

- Move the broom switch to the on/off position.
- Move the lift toggle to the up position until the brush is in the fully raised position.
- Raise the support stands to the highest position and secure in place.
- If equipped with the engine pallet system, be certain the engine for the independent hydraulic system is set to the "STOP" position.

## OPERATION

**IMPORTANT!** The support stands should never be used for anything other than as stationary storage stands to hold the broom up while it is being stored.

- Ensure the support stands are raised to the highest position and secured in place.
- Sweep at a speed that is appropriate for the conditions and location.
- For heavy material such as gravel or stones, drive more slowly with a higher broom speed. For lighter material, drive faster with a lower broom speed.
- It may be necessary to increase broom contact pattern under some conditions. If the surface being swept is uneven and causes the broom to leave upswept patches, increase the pattern size to compensate.
- If the material being swept is dried-on or difficult to remove, such as mud or ice, it may be necessary to drive extremely slow to allow the broom to "scrub" the surface.

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# MAINTENANCE

## MAINTENANCE SCHEDULE

- Check adjustments – every 10 hours
- Grease bearings – after initial 10 hours, then every 200 - 300 hours thereafter.
- Grease pivot points – every 50 hours

NOTE: Grease points are noted with an applicable decal.



NOTE: Maintenance pertaining to oil and oil filter only refers to the independent hydraulic systems provided by M-B Co.

- Check and refill oil level – every 50 hours
- Replace oil filter – every 250 hours
- Replace hydraulic oil – annually
- Replace brush filler – as needed

## LUBRICATION

- Grease bearings and pivot points per the MAINTENANCE SCHEDULE using Chevron Ultra Duty II, Grade 2; or equivalent high-temp grease.
- There are minimum of (8) grease points on the unit; (4) at the horizontal swing arms, (2) at the vertical lift pivot points and (2) on the brush end bearings.
- Use Chevron Rykon MV, Dexron-III/Mercon ATF or equivalent for M-B supplied independent hydraulic systems. If the oil is supplied by the prime mover, use the prime mover manufacturer's recommended fluid.

## FILLER REPLACEMENT

### Core Removal

1. Lower broom until brush contacts the ground via hydraulic lift cylinder (HT) or mechanical head anchor (HL).

NOTE: Steps 2 and 3 apply to each brush drive motor, whether broom is single or dual motor drive.

2. Remove (2) 1/2-13 x 1-1/2" capscrews, flat washers, lock nuts and motor guard from brush frame. Retain guard and mounting hardware. See Figure 1.
3. Remove (2) 1/2-13 x 1" capscrews, flat washers, lock nuts and motor mount plate from brush frame. Slide motor out of mating splined hub. Let motor hang on hoses. Retain mounting hardware. See Figure 1.
4. Remove (2) 1/2-13 x 2" bolts, flat washers and lock nuts attaching core support bearing to bottom of brush frame at each end of broom. See Figure 2.
5. Slide core out the front of broom.

### Brush Removal

1. Remove end bearing from hub on one end of core.
2. Remove (3) 1/2-13 x 1" capscrews, lock washers and splined hub from one end of core. Retain hub and mounting hardware. See Figures 2 and 3.

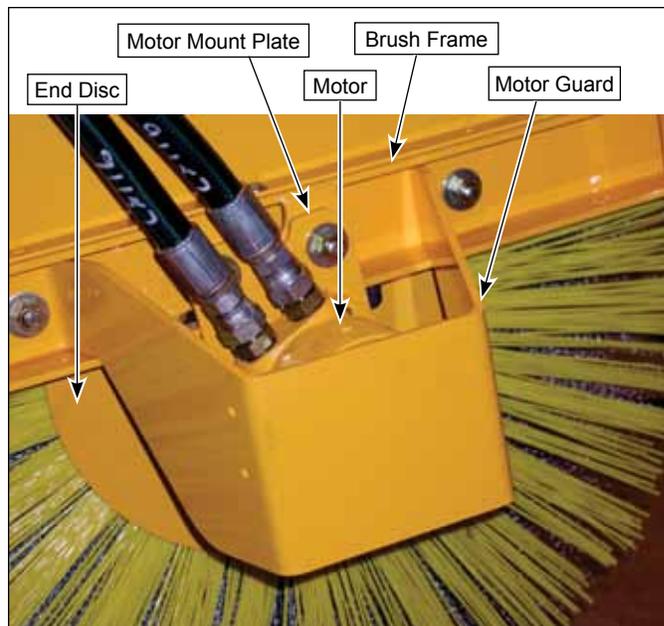


Figure 1

3. Remove (3) or (4) 5/16-18 x 3/4" capscrews, lock washers and end disc (wafer retainer plate) from one end of core. Retain end disc and mounting hardware. See Figures 2 and 3.
4. Slide spent brush wafers and spacers off core and discard.

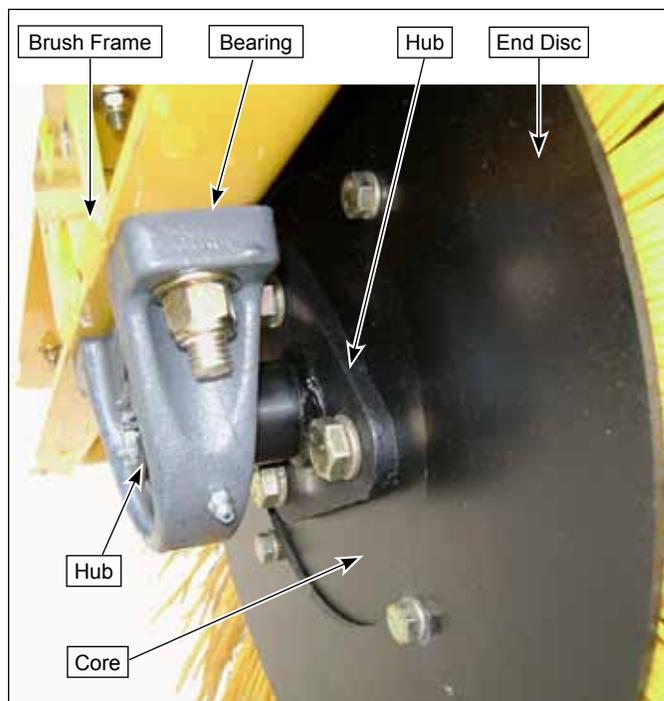


Figure 2

# MAINTENANCE

## Brush Installation

1. Stand core in upright position and begin filling by sliding a poly brush wafer and then a spacer down the full length of the core.
  - a. Note the location of the drive pin on the inside ring of each brush wafer. Position each wafer so its drive pin is positioned between the stop flanges. Rotate each subsequent wafer before installing so the position of its pin is staggered on the core by one stop flange. See Figure 3.

**IMPORTANT!** Proper wafer and spacer position must be followed to ensure proper balance on the core.

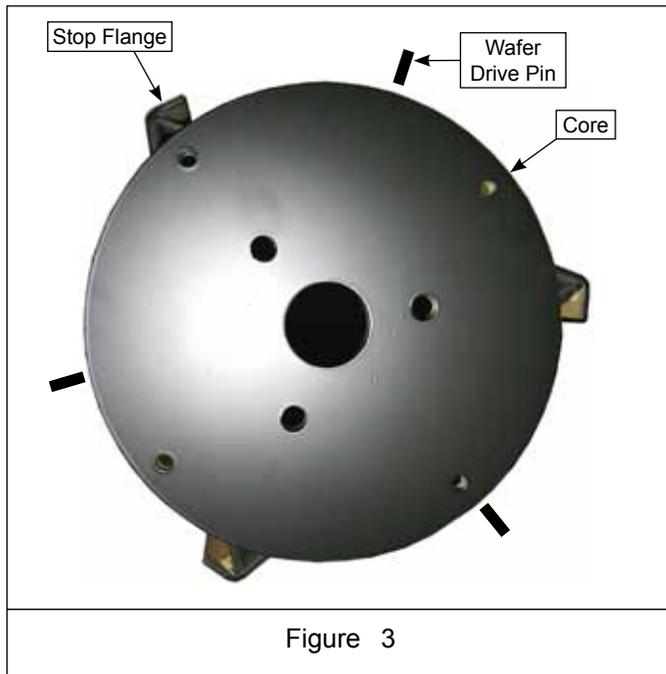


Figure 3

**NOTE:** Brush surface contact during initial operation will set all wafer drive pins up against the core stop flanges. See Figure 4.

- b. The circular spacers have unconnected, overlapped ends. Position the overlap of the first spacer between the stop flanges, rotated one flange ahead of the drive pin location of the immediately preceding brush wafer. All subsequent spacers must follow the same staggered placement pattern.

3. Continue stacking the core in a wafer-spacer, wafer-spacer configuration until it is full, ending with a poly brush wafer.

**NOTE:** Always start and finish with a poly wafer. The last wafer should actually extend beyond the end of the core (Minimum 1/2") so the end disc compresses the spacers onto the core when tightened.

4. Install end disc on core with original hardware. See Figure 2.
5. Install splined hub on core with original hardware. See Figure 2.
6. Install end bearing on hub. See Figure 2.

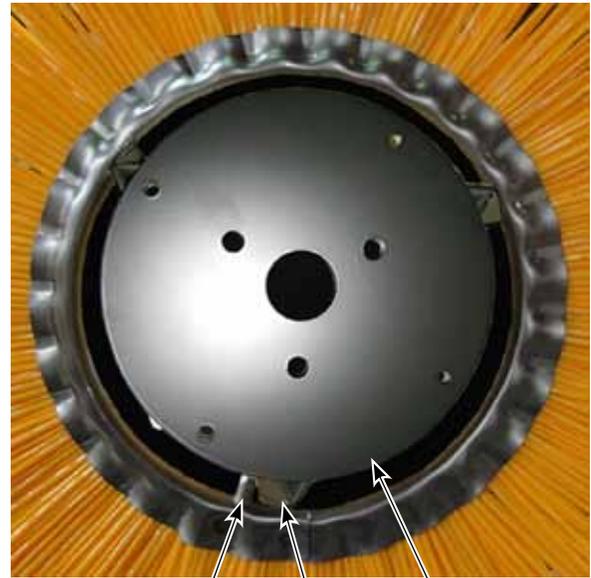


Figure 4

## Core Installation

1. Position refilled core in front of the broom head. Lift the broom high enough so that core clears the hood and the brush can be rolled/pushed back into its original position. Once in place, lower broom head down onto support bearing at each end of core.
2. Attach pillow block bearings to bottom of brush frame at each end of broom with original hardware. See Figure 2.

**NOTE:** Steps 3 through 5 apply to each brush drive motor, whether broom is single or dual motor drive.

Apply grease to hub splines before installing hydraulic motor(s).

3. Slide motor shaft into mating splined hub.
4. Install motor mount plate on brush frame using original hardware. See Figure 1.
5. Install motor guard on brush frame with original hardware. See Figure 1.
6. Before placing machine back into service, adjust and test for proper amount of brush pattern. Excessive and/or misaligned pattern can cause brush failure or premature wear. Refer to the **Setup and Adjustments** section of the manual for pattern adjustment.

# STORAGE

## STORAGE

- Always store the broom in a supported position, on its included stands, with the brush off the ground. If the bristles are stored in a deformed position for extended periods of time the broom will become severely out of balance.
- Store the broom in a location out of the sun and weather to prevent premature failure of plastic bristles. Bristles can become brittle when subjected to sunlight or repeated temperature changes.
- Disconnect all electrical connections between the broom and prime mover (loader/tractor) for extended storage to prevent battery drain.
- Properly clean the unit before storage and remove dirt, debris, salt, etc. to extend paint life.
- If the unit is power-washed, all lubrication points should be greased before storage.

# TROUBLESHOOTING

Trouble	Possible Cause	Remedy
Broom does not rotate.	<ol style="list-style-type: none"> <li>1. No hydraulic pressure/flow.</li> <li>2. Hoses disconnected.</li> <li>3. Hoses bent or kinked.</li> <li>4. Pressure relieving too low.</li> <li>5. Electric valve not functioning.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check tractor operation.</li> <li>2. Connect hoses and fittings.</li> <li>3. Remove sharp bends and kinks.</li> <li>4. Adjust relief valve.</li> <li>5. Check electrical connections.</li> </ol>
Broom rotates in wrong direction.	<ol style="list-style-type: none"> <li>1. Hoses installed incorrectly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Switch hydraulic hose connections</li> </ol>
Bristles wearing unevenly.	<ol style="list-style-type: none"> <li>1. Swing arms not level.</li> <li>2. Broom head not level.</li> <li>3. Pattern adjustment not set.</li> <li>4. Tires on prime mover at different pressures or of different sizes.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust using bolts on rear of frame.</li> <li>2. Adjust using leveling bolt on top of frame.</li> <li>3. Adjust on head anchor/lift cylinder.</li> <li>4. Check tire pressure, sizes and rating. Adjust and/or correct as necessary.</li> </ol>
Brushes wear very quickly.	<ol style="list-style-type: none"> <li>1. Brush pattern too wide.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust brush pattern to be 2-4" wide. Refer to the <b>Setup and Adjustments</b> section of this manual.</li> </ol>
Broom bounces during sweeping.	<ol style="list-style-type: none"> <li>1. Travel speed too fast and/or brush speed too slow.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust to find correct ground and brush speed for surface.</li> </ol>
Broom sweeping poorly.	<ol style="list-style-type: none"> <li>1. Material is 'caked-on' or frozen.</li> <li>2. Uneven sweeping surface.</li> <li>3. Material is too heavy.</li> <li>4. Broom rotating too slowly.</li> <li>5. Prime mover moving too fast.</li> <li>6. Pattern adjustment incorrectly set.</li> </ol>	<ol style="list-style-type: none"> <li>1. Slow down and 'scrub' surface.</li> <li>2. Increase pattern to compensate.</li> <li>3. Slow down prime mover speed.</li> <li>4. Increase engine speed.</li> <li>5. Slow down prime mover speed.</li> <li>6. Adjust at head anchor.</li> </ol>
Broom does not lift or angle.	<ol style="list-style-type: none"> <li>1. No/Low hydraulic pressure/flow.</li> <li>2. Electric valve not functioning.</li> <li>3. System backpressure</li> </ol>	<ol style="list-style-type: none"> <li>1. Check prime mover operation. Check hydraulic oil level. Refer to Maintenance section of this manual for hydraulic system requirements.</li> <li>2. Check electrical connections.</li> <li>3. Check prime mover instructional manual.</li> </ol>
Hydraulic pump making noise.	<ol style="list-style-type: none"> <li>1. Pump intake blocked.</li> <li>2. Shaft seal leaking.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check inlet lines for obstructions.</li> <li>2. Check and repair as necessary.</li> </ol>

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# SPECIFICATIONS

Model:	SHL (Loader)	SHT (Tractor)
Brush Diameter	25"	
Brush Length:	4' (48"), 5' (60"), 6' (72"), 7' (84")	5' (60"), 6' (72"), 7' (84")
Brush Drive Motor:	<p style="text-align: center;">Single hydraulic motor (standard) for prime mover with 12 to 20 GPM.                      Optional low flow hydraulic motor for prime mover with 8 to 11 GPM.</p> <p>(Note: Hoses are provided from broom motor to bulkhead fittings. Customer to provide hoses and couplers to connect loader/tractor hydraulics to bulkhead and lift cylinder. Optional hose kit available. Does not include hydraulic valve(s) on prime mover. Brush on/off with tractor/loader valve.)</p>	
Brush Speed	200 RPM Maximum	
Brush Angle:	Maximum 30° left/right	
Shipping Weight:		
4' (48")	800	NA
5' (60")	850	850
6' (72")	900	886
7' (84")	1000	950
Brush Filament:	Poly (polypropylene), Wire (steel) or Combo (Poly/Wire)	
Swing Method	Manual	
	Hydraulic	
	(Hydraulic cylinder only. Customer must provide hydraulic hoses, coupler and valve to swing cylinder.)	
	Electric/Hydraulic Swing Needed to complete hydraulic swing for skid steer. (Valve and control box actuate the swing cylinder.)	Electric/Hydraulic Swing and Lift Required if remotes are not available for lift and swing functions. (Valve and control box actuate the swing cylinder.)
Electric/Hydraulic Swing with Reverse	Electric/Hydraulic Swing and Lift with Reverse Reverse valve electronically changes direction of broom rotation.	
Mounting:	No Mounting by MB (Provided by customer.)	
	Pin and/or quick-attach mountings for most popular applications. Some loaders with quick-attach buckets will require customer to provide female quick-attach. Consult M-B.	Agricultural tractor front mount frame with tank mounting capabilities.
	Standard Skid Steer Quick Coupler SAE J2513.	
	Quick Coupler Mounting for loaders. (Hook and Pin)	
	Mounting Frame with Pin-on ears. Customer may be required to provide dimensions (Pin only).	
Custom Mount Design (Applies to mounts not previously designed by MB.)		
Options:	Independent Hydraulic system (IHS) Required if tractor/loader auxiliary hydraulic system cannot supply 8 GPM @ 2,000 psi. Includes hydraulic pump, relief valve, hydraulic reservoir and hoses to broom. (Minimum of 25Hp on tractor required.)	
	Hose Kit and Couplers	
	Broom Hood	
	Dirt Deflector (Hood)	
	45 Gallon Sprinkler System (Application specific, requires evaluation.)	
	Sight/Guide Indicators	

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# SERVICE PARTS

Part Number	Description
907-63444	Refill Kit, 25" x 4', Wafer, Poly
907-92090	Refill Kit, 25" x 4', Wafer, Alternating Poly/Wire
907-92091	Refill Kit, 25" x 4', Wafer, Wire
907-90817	Refill Kit, 25" x 4', Wafer, Poly/Wire Combo
907-46674	Refill Kit, 25" x 5', Wafer, Poly
907-92092	Refill Kit, 25" x 5', Wafer, Alternating Poly/Wire
907-46676	Refill Kit, 25" x 5', Wafer, Wire
907-46675	Refill Kit, 25" x 5', Wafer, Poly/Wire Combo
907-46671	Refill Kit, 25" x 6', Wafer, Poly
907-92093	Refill Kit, 25" x 6', Wafer, Alternating Poly/Wire
907-90592	Refill Kit, 25" x 6', Wafer, Wire
907-64664	Refill Kit, 25" x 6', Wafer, Poly/Wire Combo
907-63472	Refill Kit, 25" x 7', Wafer, Poly
907-92094	Refill Kit, 25" x 7', Wafer, Alternating Poly/Wire
907-63473	Refill Kit, 25" x 7', Wafer, Wire
907-63474	Refill Kit, 25" x 7', Wafer, Poly/Wire Combo
401-132066	Guard, Motor
201-75209	Hydraulic Motor, Standard Flow
201-75649	Hydraulic Motor, Low Flow
201-92028	Shaft, Hydraulic Motor (201-75209 and 201-75649)
201-92039	Seal Kit, Hydraulic Motor (201-75209 and 201-75649)
600-68509	Bearing, Core Hub Support
410-93199	Hub, Splined, Core Support
402-93754	End Disc, Core
203-92074	Cylinder, Swing
203-50013	Seal Kit, Swing Cylinder
100-132340	Pin, Swing
203-72275	Cylinder, Lift
203-92006	Seal Kit, Lift Cylinder
200-92309	Seal Kit, Hydraulic PTO Pump (200-92110 and 200-92218)
200-50033	Seal Kit, Hydraulic PTO Pump (200-138105)

Part Number	Description
410-94050	Storage Stand
380-76379	Clevis Pin, Storage Stand
380-84739	Hair Clip, Clevis Pin
390-160105	Guide Stick, 1/2" x 26"
401-160790	Bracket, Guide Stick
109-131128	Paint, Spray, MB Yellow
249-92003	Paint, Spray, Black
249-92005	Primer, Spray

Please have your serial number (S/N) ready when contacting M-B Co. or an Authorized Dealer for replacement parts or service information.

M-B Co.  
1615 Wisconsin Ave.  
P.O. Box 200  
New Holstein, WI 53061-0200

website: [www.m-bco.com](http://www.m-bco.com)  
email: [sales@m-bco.com](mailto:sales@m-bco.com)  
Phone: 800-558-5800 or 920-898-4203  
FAX:

Main 920-898-4588  
Attachments 920-898-1085  
Brush Dept. 920-898-1082



**4**

**⚠ DANGER**

To prevent serious injury or death:

- Do not allow any riders

**1**

**⚠ WARNING**

**FLYING OBJECTS HAZARD**  
Keep Clear

**ENTANGLEMENT HAZARD**  
Keep Clear

390-169292

**⚠ CAUTION**

Read Operator's Manual before using broom. If operating instructions are missing, contact the M-B Co. for your free replacement.

- Before operating broom make sure all guards and broom are installed properly.
- Wear eye protection when operating broom.
- Do not operate broom near any objects that can be damaged by thrown debris. Be sure no by-standers are near broom during operation.
- The polypropylene brush segments can melt or burn. Do not subject to excessive heat or flame.
- Do not allow riders on broom.
- Stop power source, lower broom to the ground, set parking brake, and remove ignition key before servicing or adjusting.
- Do not operate broom on any roof or other elevated surface.

390-118351

11 or 12

**7**

**⚠ WARNING**



**HIGH PRESSURE FLUID HAZARD**

Use cardboard or wood (not your hand) to search for leaks.  
Keep away from hydraulic system until pressure is relieved.  
If high pressure fluid penetrates the skin, see a doctor immediately.

390-169271

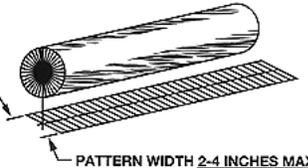
**3**

FOR BEST PERFORMANCE OF THIS POWER BROOM, USE

**M-B TOUGH BRUSH REFILLS ONLY.**

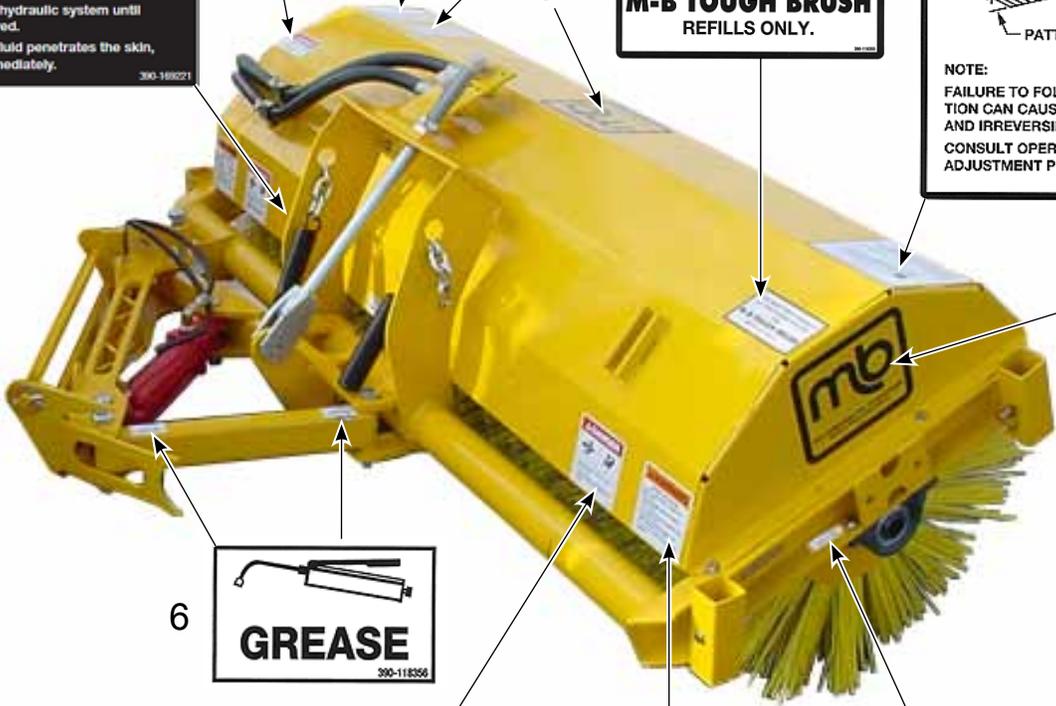
**2**

"RECOMMENDED BRUSH PATTERN"



PATTERN WIDTH 2-4 INCHES MAX.

NOTE:  
FAILURE TO FOLLOW ABOVE RECOMMENDATION CAN CAUSE PREMATURE BRUSH WEAR AND IRREVERSIBLE BRUSH DAMAGE.  
CONSULT OPERATORS MANUAL FOR ADJUSTMENT PROCEDURE.



**6**



**GREASE**

390-118356

**6**



**GREASE**

390-118356

**8**

**⚠ DANGER**



To prevent serious injury or death from pinching:

- Keep all persons and objects clear while any part of this machine is in motion.

390-118353

**9**

**⚠ WARNING**

**MOVING PART HAZARD**

To prevent serious injury or death from moving parts:

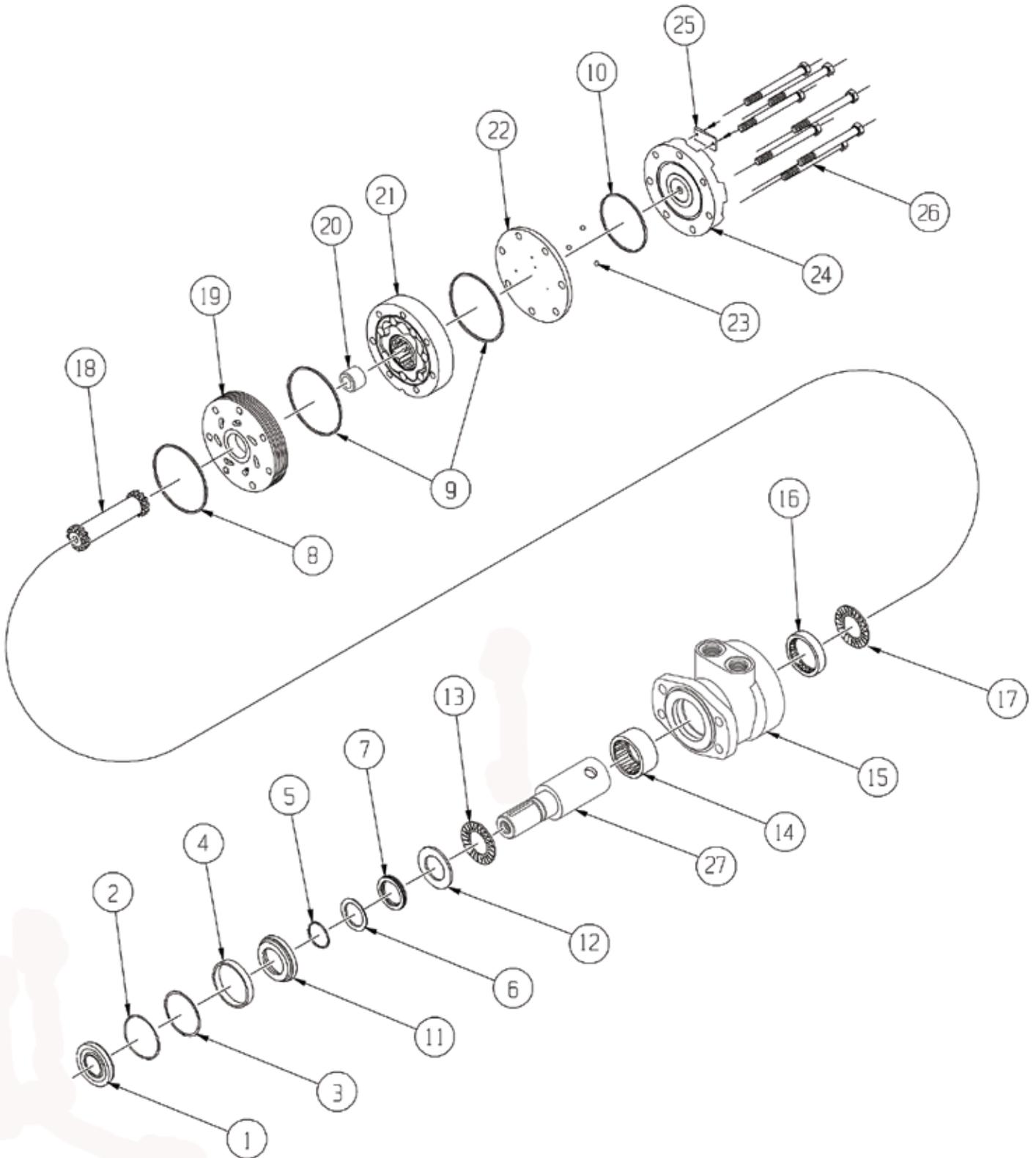
- Close and secure guards and shields before starting.
- Keep hands, feet, hair and clothing away from moving parts.
- Disconnect and lockout power source before adjusting or servicing.
- Do not stand or climb on machine when operating.

390-118354

## SHL/SHT Decals

Item	Description	Part Number	
	Decal Sheet	390-117958	(Includes items 1 - 11)
1	• Decal, WARNING, Flying Debris	390-169222	
2	• Decal, Brush Pattern	390-118354	
3	• Decal, M-B Brush Refills	390-118355	
4	• Decal, DANGER, No Riders	390-118349	
5	• Decal, MB Logo, Black, Large	390-117898	
6	• Decal, Grease	390-118356	
7	• Decal, WARNING, High Pressure Fluid	390-169221	
8	• Decal, DANGER, Pinch Point	390-118353	
9	• Decal, WARNING, Moving Part/Guards	390-118352	
10	• Decal, MB Logo, Black, Medium	390-117897	
11	• Decal, CAUTION, Read Operator's Manual	390-118351	(M-B Co.)
12	Decal, CAUTION, Read Operator's Manual	390-151987	(Non-M-B Co.)

**HYDRAULIC MOTOR**  
**Standard Displacement (201-75209)**  
**Low Displacement (201-75649)**



**HYDRAULIC MOTOR**  
**Standard Displacement (201-75209)**  
**Low Displacement (201-75649)**

Item	Description	Part Number	Qty	
	Kit, Seal	201-92039	1	(Includes items 1 - 12)
1	• Seal, Dust			
2	• Seal, Housing			
3	• Shim, Metal Backup			
4	• Seal, High Pressure			
5	• Shim, Metal Backup			
6	• Seal, Polyamide			
7	• Seal, Shaft			
8	• Seal, Rear Housing			
9	• Seals, Body (2)			
10	• Seal, End Cover			
11	• Seal Carrier			
12	• Washer, Thrust			
13	Bearing, Front Thrust	201-169461	1	
14	Bearing, Housing Front			(Available in Item 15, Housing Kit, P/N 201-92022)
15	Kit, Housing	201-92022	1	(Includes Items 14 & 16)
16	Bearing, Housing Rear			(Available in Item 15, Housing Kit, P/N 201-92022)
17	Bearing, Rear Thrust	201-92027	1	
18	Kit, Drive Link (Includes Item 20)	201-92029	1	(Standard Displacement Motor P/N 201-75209)
		201-169461	1	(Low Displacement Motor P/N 201-75649)
19	Plate, Manifold	201-92031	1	
20	Spacer, Drive Link			(Available in Item 18, Drive Link Kit, P/N 201-92029)
21	Rotor, Roller Stator	201-92032	1	(Standard Displacement Motor P/N 201-75209)
		201-169459	1	(Low Displacement Motor P/N 201-75649)
22	Plate, Balance (Includes Item 23)	201-92034	1	
23	Balls, 3/16" Steel	201-92033	3	
24	End Cover	201-92035	1	
26	Kit, Bolt	201-92036	1	(Standard Displacement Motor P/N 201-75209)
		201-169460	1	(Low Displacement Motor P/N 201-75649)
27	Shaft, Splined	201-92028	1	

**SERVICE INSTRUCTIONS FOR THE RE [500 & 501] SERIES MOTORS**

For Use With Seal Kits: 500444001 &amp; 500444002

dimensions: mm [in]

**NOTE: IN DECEMBER 2006, THE 500 SERIES INCORPORATED A DESIGN CHANGE. THIS SET OF INSTRUCTIONS WILL AID IN THE DISASSEMBLY AND ASSEMBLY FOR BOTH DESIGNS. MID 2010 A DESIGN CHANGE WAS IMPLEMENTED ON WHEEL MOUNTS TO REMOVE THE EXTERNAL DUST SEAL AND REPLACE IT WITH AN INTERNAL EXCLUDER SEAL. PLEASE REFER TO THE EXPLODED VIEW DRAWING ON PAGE 3 TO DETERMINE WHICH DESIGN IS BEING REPAIRED AND THEN FOLLOW THE APPROPRIATE INSTRUCTIONS FOR THAT DESIGN.**

**Motor Section Disassembly (Same Instructions For Both Designs)**

- A)** Remove all shaft related components from shaft (27) (i.e. keys, wire rings, nuts). To aid in reassembly of the motor, make a "V" shaped set of lines from the endcover (24) to the housing using either paint or a marker. With shaft facing down, secure motor in vise by clamping on to housing (15).
- B)** Loosen and remove seven bolts (26) holding motor assembly together. Remove endcover (24) and endcover seal (10). Discard seal. Remove balance plate (22) taking care not to drop the three steel balls (23) located in the three holes in the balance plate (22). Remove rotor assembly (21), manifold (19), drive link spacer (20) (NOTE: Some motors do not use spacer), drive link (18) and thrust bearing (17). Remove body seals (9) from rotor assembly (21) and housing seal (8) from housing (15) and discard seals. (NOTE: Compare old housing seal (8) to the two housing seals included in kit to determine which one to use.) Gently tap shaft (27) upward from housing (15) and remove through rear of housing and lay aside.

**Housing/Shaft Disassembly And Assembly (Design That Utilizes A Seal Carrier (11))**

- C)** Remove housing (15) from vise and turn over. Pry dust seal (1) from housing. Push the seal carrier (11), thrust washer (12) and thrust bearing (13) down until they make contact with the roller bearing (14) located in the housing bore.
- D)** Remove wire ring (2), steel backup shim (3) and high pressure seal (4) from inner bore groove with a small screwdriver. Lift seal carrier (11), thrust washer (12) and thrust bearing (13) from the housing bore. Using a small screwdriver, carefully pry shaft seal (7), backup seal (6), and metal backup shim (5) from seal carrier (11) and discard. Lay seal carrier (11), thrust washer (12) and thrust bearing (13) aside. (NOTE: If a new thrust washer (12) and seal carrier (11) is included in kit, old items may be discarded).

At this point, all parts should be cleaned in an oil-base solvent and dried using compressed air (For safety, observe all OSHA safety guidelines). All new seals should be lightly coated in clean oil prior to installation.

- E)** Place shaft (27) on a clean flat surface with output end facing up. Place thrust bearing (13) (NOTE: If thrust bearing has integral washer, make sure washer surface faces down.) Then thrust washer (12) on shaft (See Technical Bulletin PI444004 to determine correct thrust washer to use). Lightly coat seal area of shaft with clean oil and place plastic installation sleeve with shaft seal (7) down onto shaft covering all splines, keyways and wire ring grooves. Slide shaft seal (7) down onto shaft (27) making sure that lip on seal faces down (See Figure 1 for correct seal orientation) until it contacts thrust washer (12). Remove plastic installation sleeve. Carefully install the backup seal (6) onto the shaft (27) with the flat side up and the seal lip facing the shaft seal (7). Place the metal backup shim (5) onto the shaft and against the backup seal (6). Place the seal carrier (11) onto the shaft (large end down) and carefully press the seal carrier (11) down onto the seal assembly using an arbor press and sleeve to compress the seal into the carrier.
- F)** With pilot side facing up, place housing (15) on spacers to raise housing approximately 6 [.25] above work surface (NOTE: Spacers should allow shaft to contact work surface). Place shaft/seal carrier assembly into housing (15). Install high pressure seal (4) into groove in housing. Install metal backup shim (3) against high pressure seal (4) in groove in housing bore by squeezing the shim (3) between thumb and forefinger to bow shim. While maintaining bow in shim, start the shim into the groove and use a small screwdriver to push the shim into groove. Install wire ring (2) into the groove making sure that the ends are butted.
- G)** While holding shaft into housing, place housing/shaft assembly in vise with shaft end down. Making sure that end of drive link (18) with crowned splines goes into shaft end, install drive link (18) into shaft and tap lightly to seat the seal carrier against the wire ring (2). Place thrust bearing (17) over drive link (18). If seal carrier (11) is properly seated against wire ring (2), thrust bearing (17) will be flush with rear surface of housing.

**Housing/Shaft Disassembly And Assembly (Design That Does NOT Utilize A Seal Carrier (11))**

- H)** Position the housing (15) in vise and use a slide and hammer type bearing puller to remove the rear housing bearing (16), the bearing spacer (32), and the front housing bearing (14). Remove the thrust washer (12) and thrust bearing (13) and set aside. Using a small screwdriver carefully pry the shaft seal (7), backup seal (6), and metal shim (5) from housing bore and discard. Also remove excluder seal (33) if the motor design uses this seal and discard. (See Figure 4 for additional information.)
- I)** Remove the housing from vise and turn over and pry the dust seal (1) from housing and discard (external dust seal is not used on models that use an internal excluder seal).

At this point, all parts should be cleaned in an oil-base solvent and dried using compressed air (For safety, observe all OSHA safety guidelines). All new seals should be lightly coated in clean oil prior to installation.

J) Place housing (15) in vice with the seven bolt assembly holes facing up. If model uses an excluder seal (33), place in the recess of housing. Place metal shim (5) in the smallest diameter recess in the housing (15) on top of excluder seal if used. Install the backup seal (6) into the housing (15) with the flat side down and the seal lip facing up. Insert shaft seal (7) down into housing (15) making sure that lip on seal faces up (See Figure 2 for correct seal orientation). Install thrust washer (12) into housing and using an arbor press, seat the shaft seal (7) into housing (15), then place the thrust bearing (13) into housing.

K) Place front housing bearing (14) onto housing and press bearing into housing to a depth of 60,1 [2.37] from the rear surface of the housing (15) to the top of the bearing. Insert the bearing spacer (32) into the housing. Place the rear housing bearing (16) onto the rear housing bore and press to a depth of 3,6 [14] from the rear surface of the housing (15) to the top of the bearing (16). Place the shaft (27) down into housing (15) and place thrust bearing (17) on top of shaft (27). If shaft seals are properly seated against the housing (15), thrust bearing (17) will be flush with rear surface of housing.

**Motor Section Assembly (Same Instructions For Both Designs)**

L) Install housing seal (8) into groove in housing (15). Place manifold (19) onto housing, (15) side with only seven holes facing housing (15). Place body seals (9) in grooves in both sides of rotor (21). Place rotor (21) onto manifold (19) with side of rotor with chamfer in splines facing manifold (19).

M) Install balance plate (22) onto rotor (21) making sure holes for steel balls (23) faces up. Install three steel balls (23) in holes in balance plate (22). Install endcover seal (10) into groove in endcover (24) and place endcover onto balance plate (22). Install seven assembly bolts (26) and pre-torque to 13,6 Nm [10 ft. lbs.] Using the bolt torque sequence shown in Figure 3, final torque all bolts to 67,8 Nm [50 ft. lbs.]

N) Remove motor from vise and place on work surface with shaft (27) facing up. Making sure that lip on seal (1) faces up, place dust seal (1) over shaft (27). Using a sleeve and a hammer, carefully drive dust seal (1) into place.

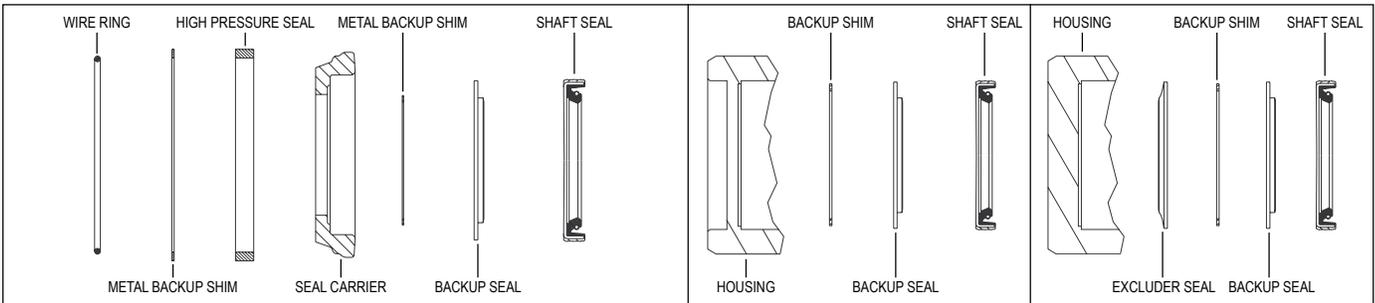


FIGURE 1

FIGURE 2

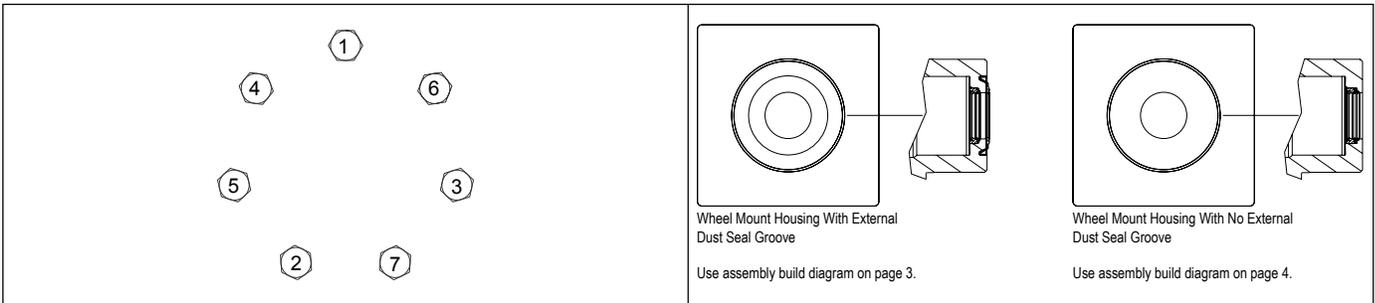


FIGURE 3

FIGURE 4

**EXPLODED VIEW PARTS DESCRIPTION**

- |                          |                           |                             |
|--------------------------|---------------------------|-----------------------------|
| 1. *† Dust Seal          | 13. Front Thrust Bearing  | 25. I.D. Tag Assembly       |
| 2. *† Split Wire Ring    | 14. Front Housing Bearing | 26. Assembly Bolts (7)      |
| 3. *† Metal Backup Shim  | 15. Housing               | 27. Shaft                   |
| 4. *† High Pressure Seal | 16. Rear Housing Bearing  | 28. Shaft Key               |
| 5. *† Metal Backup Shim  | 17. Rear Thrust Bearing   | 29. Shaft Bolt              |
| 6. *† Backup Seal (2)    | 18. Drive Link            | 30. Lock Washer             |
| 7. *† Shaft Seal (2)     | 19. Manifold              | 31. Wire Ring               |
| 8. *† Housing Seal       | 20. Drive Link Spacer     | 32. Bearing Spacer          |
| 9. *† Body Seals (2)     | 21. Rotor Assembly        | 33. * † Excluder Shaft Seal |
| 10. *† Endcover Seal     | 22. Balance Plate         |                             |
| 11. * Seal Carrier       | 23. Steel Balls (3)       |                             |
| 12. * Thrust Washer      | 24. Endcover              |                             |
- \* Contained in Seal Kit 500444001  
† Contained in Seal Kit 500444002

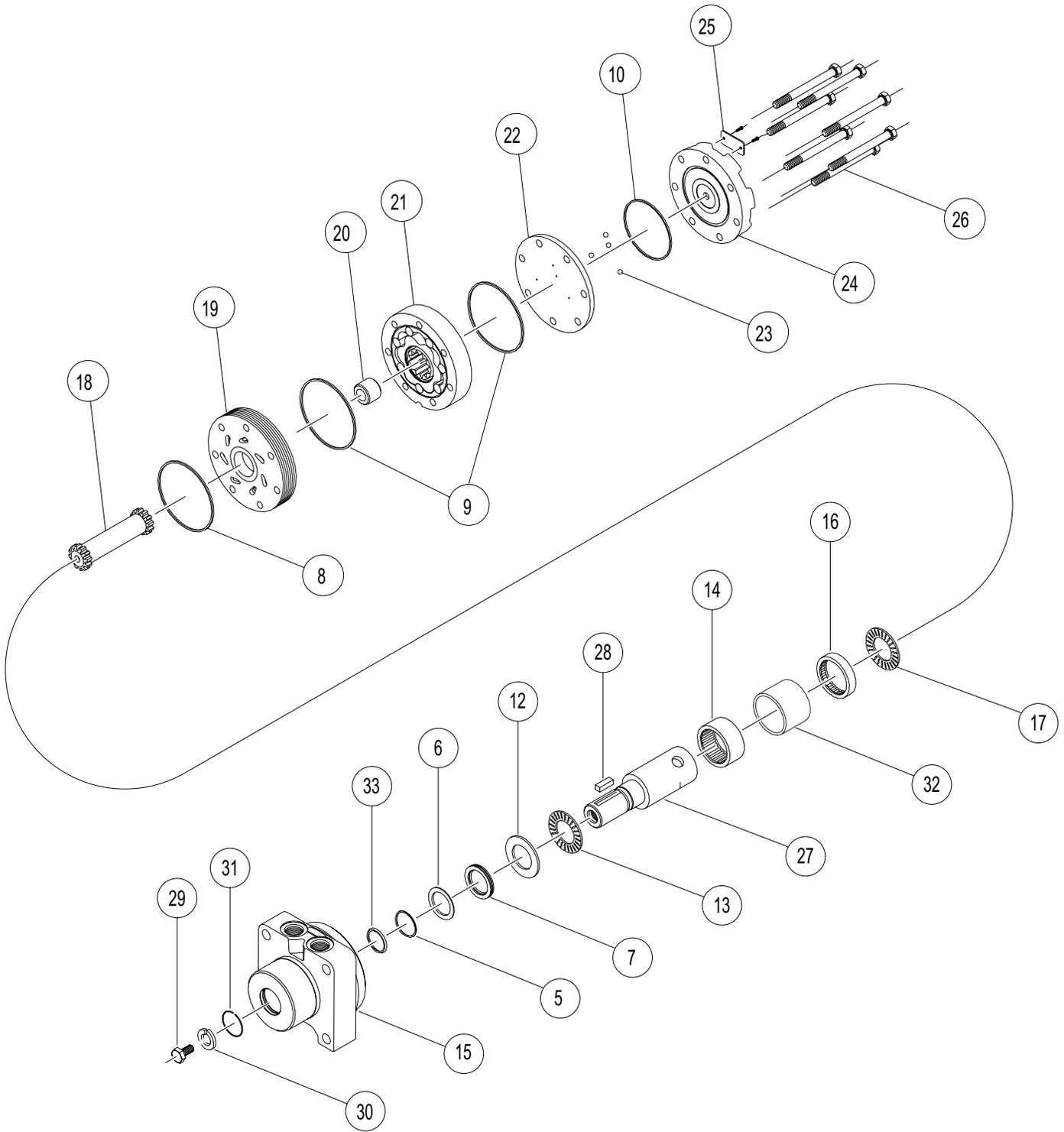
**NOTE:** The motor design that utilizes a seal carrier will use the larger O.D. backup seal and shaft seal.

**HYDRAULIC MOTOR Standard Displacement (201-75209) & Low Displacement (201-75649)**

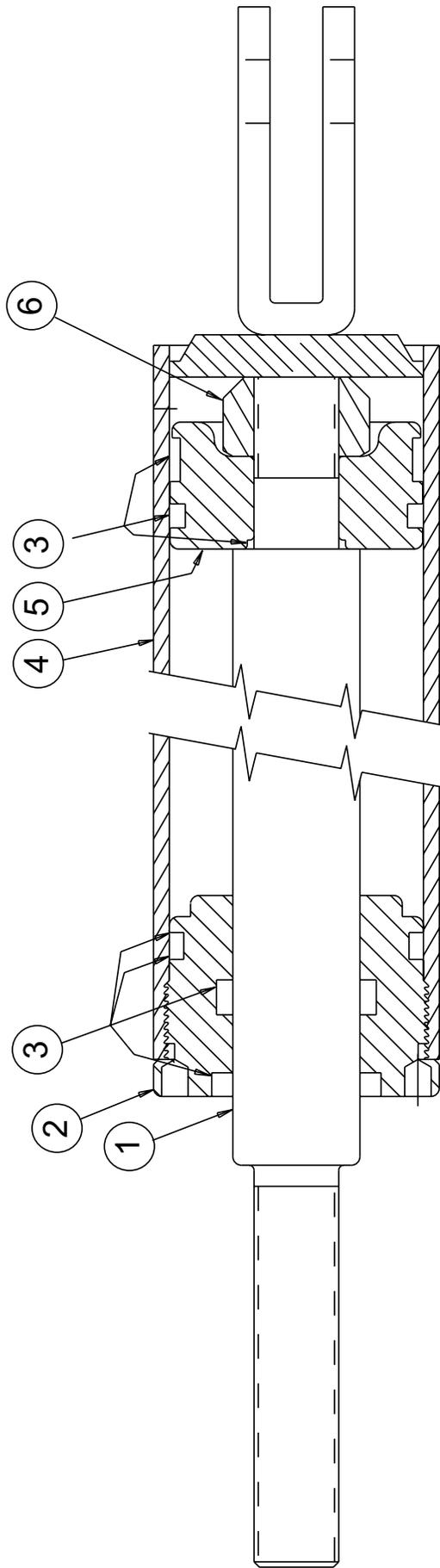
White Drive Products, Inc. • P.O. Box 1127 • Hopkinsville, KY 42241 • Phone: 270.885.1110 • Fax: 270.886.8462



**500 SERIES MOTOR DESIGN WITH EXCLUDER SEAL  
(REFER TO FIGURE 4)**



**HYDRAULIC MOTOR  
Standard Displacement (201-75209)  
Low Displacement (201-75649)**



Item	Description	Part Number	Quantity
1	Cylinder Rod	203-92002	1
2	Head Gland	203-92003	1
3	Seal Kit	203-92006	1
4	Cylinder Barrel	203-92001	1
5	Piston	203-92005	1
6	Locknut	203-92004	1
7	Nut, Cylinder Rod (Not Shown)	371-02772	1

## LIFT CYLINDER (203-72275)

## LIMITED WARRANTY

Limited Warranty: Subject to the limitations set forth herein, M-B Companies, Inc. ("M-B") warrants its products to be free from defects in material and workmanship for a period of twelve (12) months from the date of delivery of the product to its original owner, except that the warranty is twelve (12) months solely for the following products: Truck Mounted Pavement Marking Equipment, Airport Snow Removal Products, Attachment Products, Brushes, MSV Multi-Service Vehicles. Parts shall have a ninety (90) day warranty. This warranty is not transferable without the written consent of M-B.

Notice: M-B's obligations under this Limited Warranty are conditioned on M-B receiving, within the warranty period, written notice from Buyer specifying the nature of any alleged defect and requesting corrective action by Seller.

Remedies: M-B, at its option, will repair or replace, or provide a credit to Buyer for, defective warranted items. If requested by M-B, products or parts for which a warranty claim is made shall be returned, transportation prepaid, to M-B's factory. Buyer shall not return any product for repair, replacement or credit without M-B's advance written consent.

Other Manufacturer's Warranty: On products furnished by M-B, but manufactured by any other manufacturer, the warranty of said manufacturer, if any, will be assigned to Buyer, if the said warranty is assignable. However, M-B does not represent or guarantee that such manufacturer will comply with any of the terms of the warranty of such manufacturer.

Exclusions: Any improper use, operation beyond capacity, or substitution of parts not approved by M-B, or alteration or repair by others in such a manner as in M-B's judgment materially and/or adversely affects the product shall void this warranty. This warranty does not apply to defects caused by damage or unreasonable use while in the possession of the owner, including but not limited to: failure to provide reasonable and necessary maintenance, normal wear, routine tune ups or adjustments, improper handling or accidents, operation at speed or load conditions contrary to published specifications, improper or insufficient lubrication, or improper storage.

Seller manufactures power brooms that mount to many makes and models of equipment. Seller attempts to ensure that the mounting frames fit correctly. However, the large number of tractor models, types and options currently available, compounded by frequent manufacturer design changes, may prevent Seller from supplying a frame that fits every unit correctly. Therefore, unless Buyer supplies drawing which detail the attachment points on the specific unit to which the broom will be mounted, Seller will not be responsible for the fit of the mounting frame.

The batteries, tires, rubber material, brushes and material normally consumed in operation, and major components such as engines, air compressors, and hydraulic pumps and motors are excluded from this warranty but may be covered to the extent of any warranty received by M-B from its supplier if permitted by the terms of such warranty.

Limitations of liability: M-B shall not be liable for any incidental, consequential, punitive or special damages of any kind, including, but not limited to, consequential labor costs or transportation charges in connection with the repair or replacement of defective parts, or lost time profits or expense which may have accrued because of said defect.

M-B disclaims all other warranties, whether express or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. This warranty is exclusive remedy of buyer. This warranty cannot be extended, broadened or changed in any respect except in writing by an authorized officer of M-B.

Notwithstanding anything in this warranty is to the contrary, in no event shall M-B's total liability hereunder exceed the purchased price of the particular product.

AIRPORT SNOW REMOVAL EQUIPMENT  
1200 Park Street  
Chilton, WI 53014  
800-558-5800

PAVEMENT MARKING EQUIPMENT-PA  
79 Montgomery Street  
Montgomery, PA 17752  
888-323-2900

PAVEMENT MARKING EQUIPMENT-OR  
2490 Ewald Avenue SE  
Salem, OR 97302  
800-253-2909

ATTACHMENTS DIVISION  
1615 Wisconsin Avenue  
New Holstein, WI 53061  
800-558-5800



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