

# OPERATOR'S MANUAL

## Model CLHT

### Centerline Hydraulic Power Broom



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# INTRODUCTION

## 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 CLHT 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.

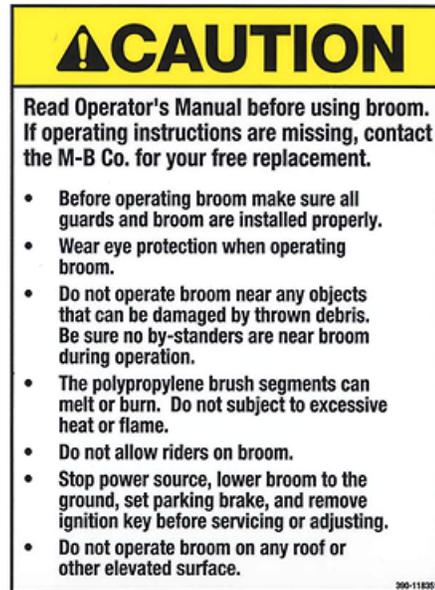
## SAFETY DECALS

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.
- Be aware of discharge direction and do not point discharge at anyone. Do not point the discharge at glass enclosures, automobiles, or windows.

# SAFETY

- 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 drive/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 drive unit 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.
- For engine equipped models, 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 drive unit 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.
- NEVER search for hydraulic leaks with only your hands. Use cardboard or a piece of wood.
- 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.
- For engine equipped models, follow specific engine manufacturer's recommended service intervals for dirty/dusty environments.

# ASSEMBLY AND INSTALLATION

## INSTALLATION

The broom is shipped partially disassembled to conserve shipping space and to package securely to reduce the possibility of damage in transit.

1. Remove all components and hardware from the shipping crate and place in a secure location.

**IMPORTANT!** Mount broom bumper/rail as close to front of truck as possible, without interfering with existing components.

The preferred height from the bottom of the bumper/rail tube to the ground is 17-5/8" for a Pickup truck or 18" for a commercial/municipal dump/plow truck.

2. Mount bumper/rail to front of prime mover (truck) frame with (8) 1/2-13 x 1-3/4" hex head capscrews, (16) 1/2" flat washers and (8) 1/2"-13 lock nuts.
3. Park prime mover (truck) on a flat level surface; preferably concrete or asphalt.
4. Remove end plate from one end of bumper/rail. See Figure 1.

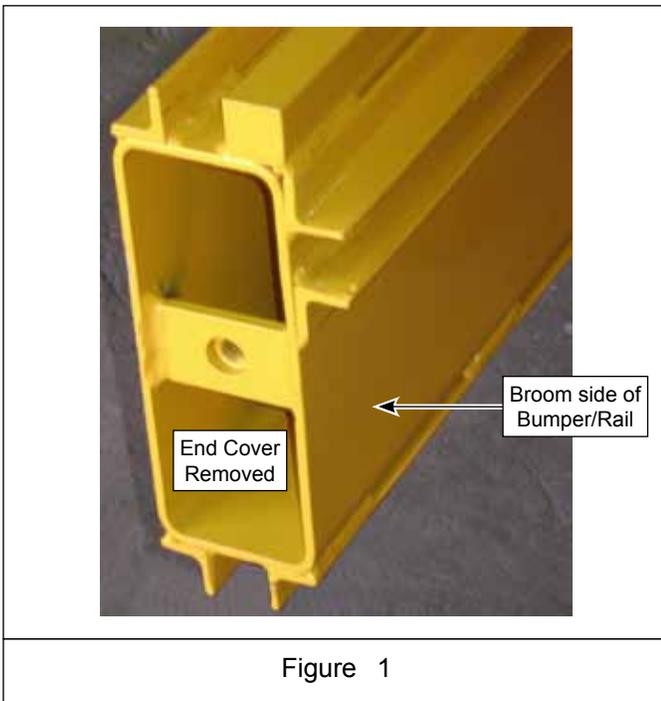


Figure 1

5. Slide swing frame onto bumper, aligning cam rollers (Figure 2) in rails. See Figure 3.

**NOTE:** End plates act as stops and prevent broom assembly from coming off bumper.

6. Install end plate on end of bumper with 1/2" lock washer and 1/2-13 x 1-1/4" hex head capscrew.

**NOTE:** Ensure all storage stands are set to the same height so that the brush assembly sits level.

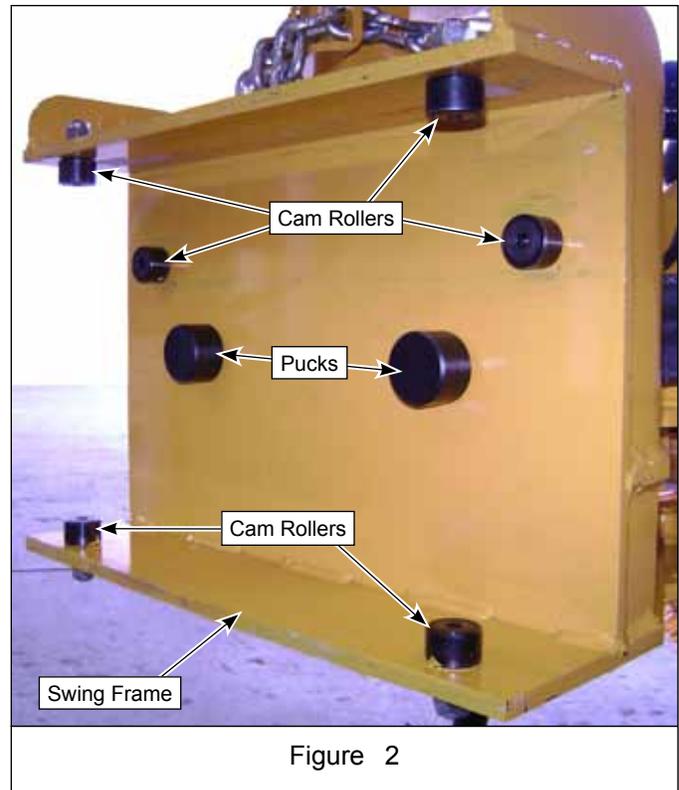


Figure 2

7. Install the storage stands in the brush frame, securing with hitch pins. See Figure 4.
8. Carefully move truck with bumper and swing frame into alignment with brush frame. Guide swing frame into brush frame until holes for center pivot pin align.

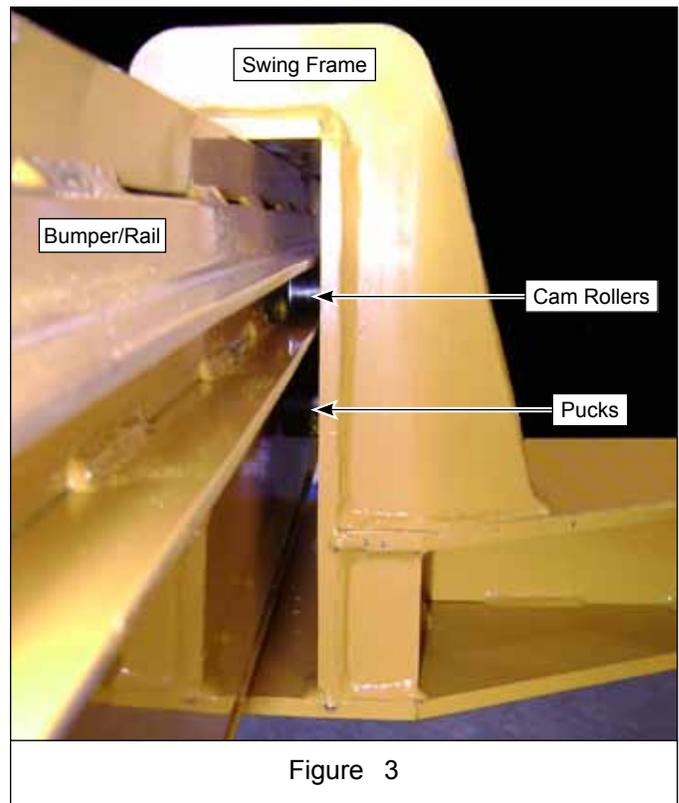


Figure 3

# ASSEMBLY AND INSTALLATION



Figure 4

9. Swing broom to right or left angle (30°). Install hitch pin down through forward hole in top of brush frame, through swing frame and out through bottom of brush frame. Install clip pin through bottom end of hitch pin. See Figure 5.
10. Install lift cylinder on brush frame with two clevis pins and secure with cotter pins.
11. Swing the broom fully to right or left and insert hitch pin with clip pin to lock in place.
12. Move the swing frame to the desired position side-to-side on the bumper rail. Loosen the jam nuts on the two bolts on the inside of the swing frame (Figure 5). Tighten (clockwise) both bolts evenly to force the pucks (Figure 2) against the bumper/rail, locking the swing frame in position. Tighten the jam nuts against the swing frame to lock the bolts in place.

**IMPORTANT!** Remove storage stands before using broom.

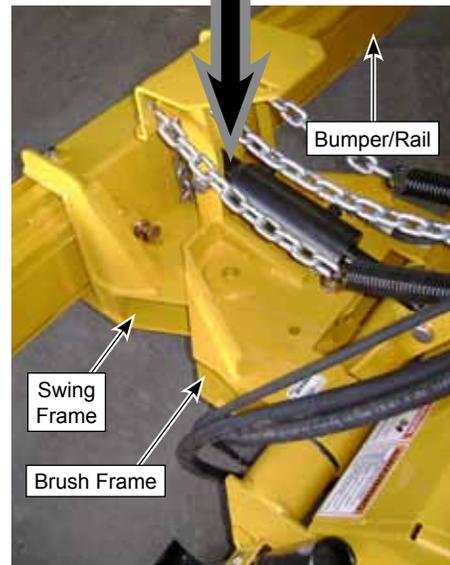
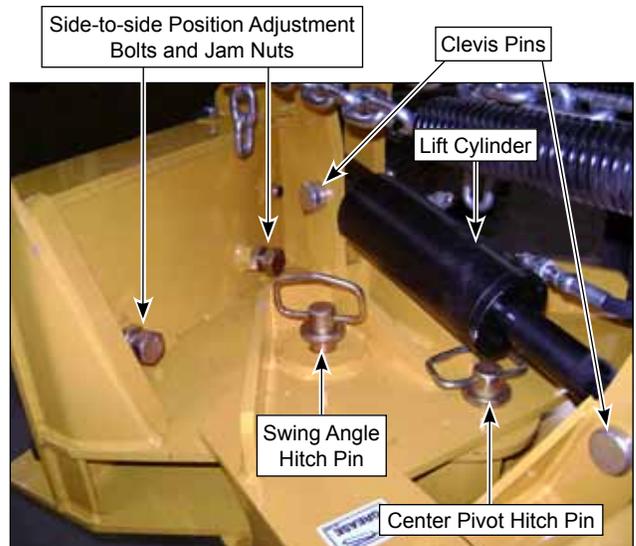


Figure 5

# OPERATION

## PRE-START 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.

## 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.

Cylinder Offset Plates (P/N 401-140784) may be used to extend the usable life of the brush. Once brush wafers are approximately half worn, install offset plates to extend the lift cylinder, allowing the broom to extend downward farther. See Figure 1.

## OPTIONAL ENGINE PALLET

1. Check all fluid levels (i.e. engine oil, hydraulic oil, engine coolant, fuel, etc.) Refer to the engine manufacturer's Owner/Operator Manual and the MAINTENANCE section of this manual for fluid recommendations.
2. Remove the broom head safety chain.

### Starting Instructions:

1. Move switch on the engine to the run position.
2. Set to full choke position when cold starting only.
3. Push starter button or turn key to start position. Do not crank engine for more than 10 seconds continuously.
4. Engine is preset to run at 2800-3000 RPMs.

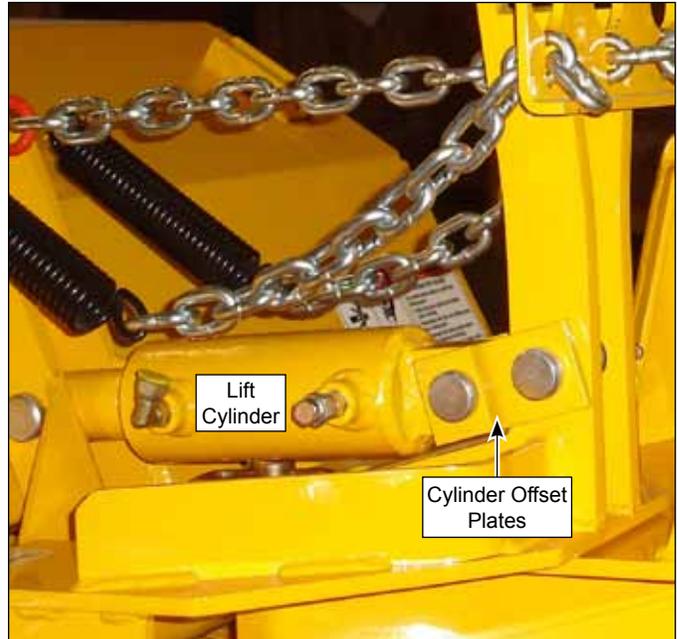


Figure 1

## TRAVEL PROCEDURE

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

- Set broom rotation control to the OFF position.
- Use the lift control to bring the broom to the fully raised position.

**NOTE:** Mark the current operating position of the down travel limit chain before adjusting for traveling. Return chain to the marked position before operating broom.

- Adjust (shorten) the down travel limit chain to secure the broom in the raised position.
- Raise the broom 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.

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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.

## PATTERN ADJUSTMENT

1. Park prime mover (truck) on a flat level surface; preferably concrete or asphalt.

**NOTE:** All broom operations (raise/lower and rotation start/stop) are made by the prime mover (truck) or the optional, MB-supplied hydraulic controls.

2. Lift the broom to the fully raised position.
3. Disconnect the down travel limit chain from the center adjustment slot in the brush frame. See Figure 1.

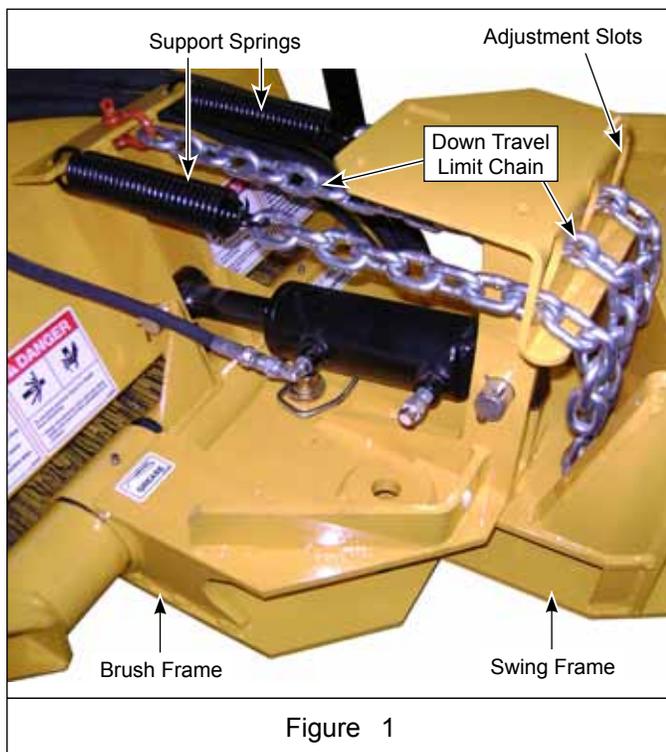


Figure 1

4. Lower the broom to the fully lowered position.
5. Connect the travel limit chain to the center adjustment slot in the brush frame, allowing 1" - 2" slack in chain.

**DANGER!** Ensure all personnel and equipment are clear of broom before starting brush rotation.

6. Start brush rotation and allow to rotate for 30 seconds in the down position while stationary.
7. Stop brush rotation, raise broom fully and back unit away from brushed area.

8. Measure the width of the brush mark/pattern. The 'cleaned' contact patch should be 2" - 4" for the entire length of the broom. See Figure 2.

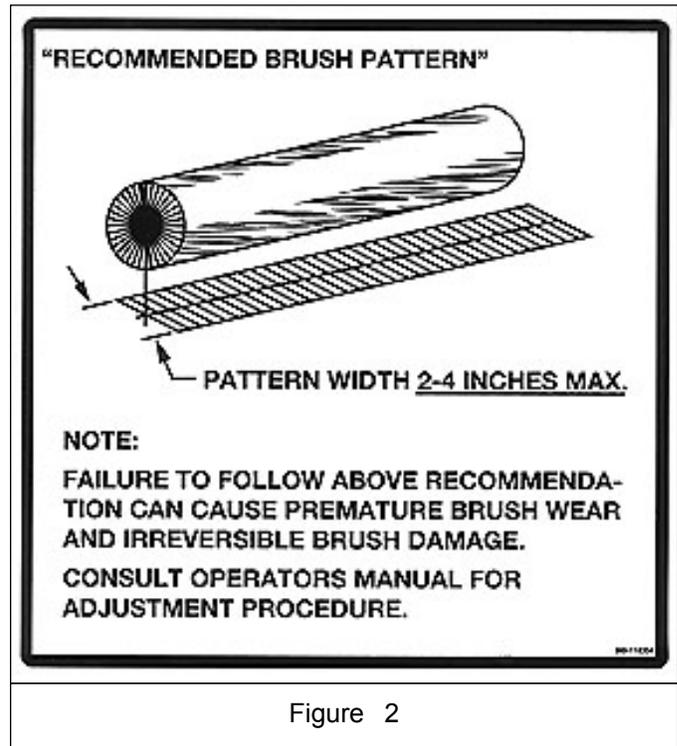


Figure 2

**NOTE:** Support spring chain lengths should be equal to ensure broom sits level.

9. If pattern is greater than 4", increase support spring tension. If pattern is less than 2", decrease support spring tension. Increase or decrease the two spring chain lengths in the outer adjustment slots in the brush frame. See Figure 1.
10. If spring tension has been adjusted, repeats steps 6 through 8 to check brush pattern again.

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.

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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 an ISO 32 or greater hydraulic fluid, dependant upon operating temperatures, 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.

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 1-1/2" 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" carriage bolts, flat washers and lock nuts attaching pillow block 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.

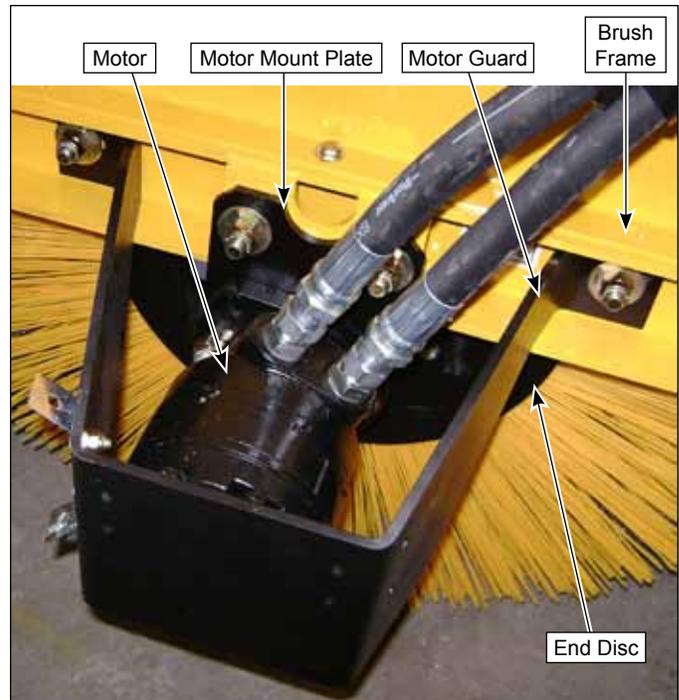


Figure 1

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.

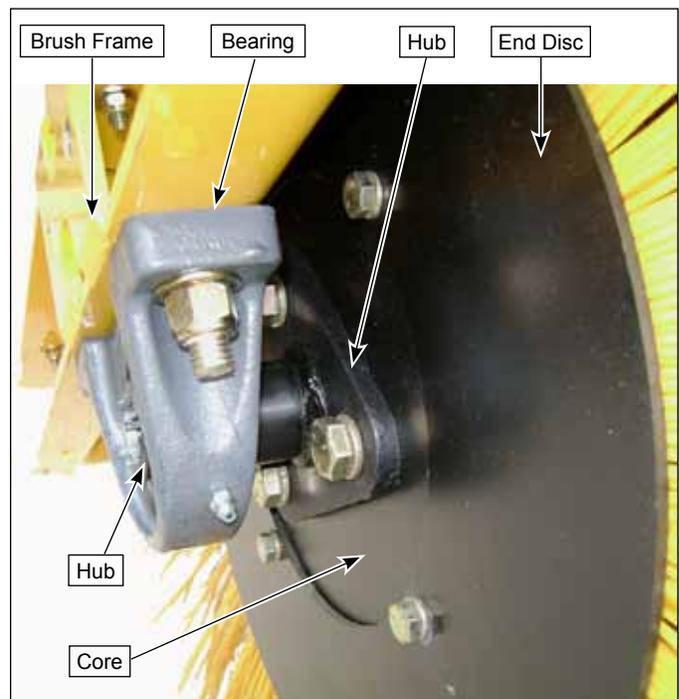


Figure 2

# MAINTENANCE

## Brush Installation

1. Stand core in upright position and begin filling by sliding a 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.

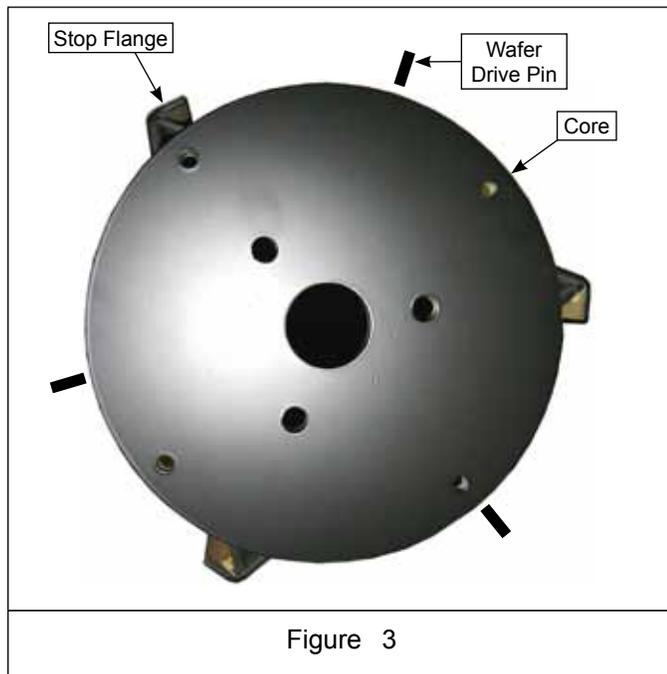


Figure 3

**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 brush wafer.

**NOTE:** Always start and finish with a brush 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.

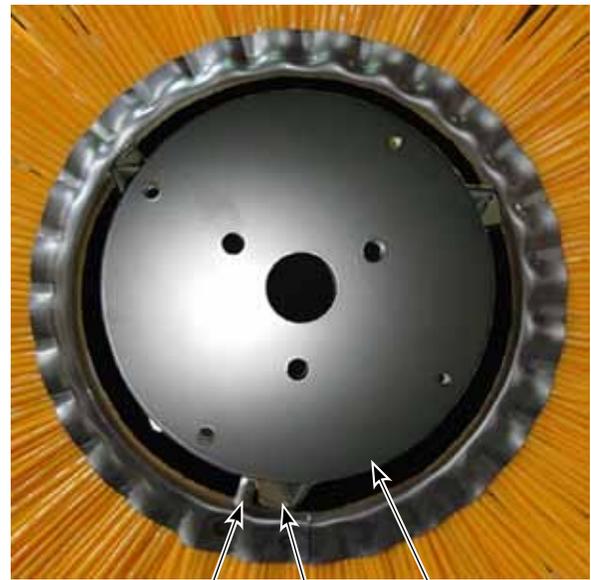


Figure 4

## Core Installation

1. Position refilled core in front of the broom head. Lift the broom head high enough to place the filled core back into its original position. Once in place, lower broom head down onto the pillow block bearing at each end of the core.
2. Install 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 vehicle (truck) or auxiliary engine pallet 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. Pattern adjustment not set.</li> <li>2. One pattern tension spring worn/ stretched more than the other.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust pattern tension springs chain lengths.</li> <li>2. Replace both pattern tension springs.</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 vehicle ground speed and brush speed for swept 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. Brush rotating too slowly.</li> <li>5. Vehicle 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 vehicle speed.</li> <li>4. Increase engine speed.</li> <li>5. Slow down vehicle speed.</li> <li>6. Adjust brush pattern to be 2"-4" wide. Refer to the <b>Setup and Adjustments</b> section of this manual.</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 vehicle or auxiliary engine pallet 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 vehicle or auxiliary engine pallet instructional manual.</li> </ol>
Hydraulic pump making noise.	<ol style="list-style-type: none"> <li>1. Pump intake blocked/restricted.</li> <li>2. Shaft seal leaking.</li> <li>3. Pressure side restricted</li> </ol>	<ol style="list-style-type: none"> <li>1. Check inlet lines for obstructions.</li> <li>2. Check and repair as necessary.</li> <li>3. Check lines for obstructions.</li> </ol>

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# SPECIFICATIONS

Model:	CLHT
Brush Diameter	32"
Brush Length:	2' (24"), 3' (36"), 4' (48")
Brush Drive:	<p>Single Motor (standard ) for prime mover with 12 to 20 GPM rated for 4500 in.lbs torque.                      Optional Low Flow Motor for prime mover with 8 to 11 GPM rated at 3200 in.lbs torque.</p> <p>(Hoses are provided from broom motor to bulkhead fittings. Customer to provide hoses and couplers to connect prime mover hydraulics to bulkhead and lift cylinder. Does not include hydraulic valve(s) on prime mover. Brush rotation On/Off with prime mover valve/controls.)</p>
Brush Speed	200 RPM Maximum
Brush Angle:	Maximum 30° left/right. Bumper/rail mounting allows manual side-shifting of broom.
Shipping Weight:	
2' (24")	400
3' (36")	450
4' (48")	500
Brush Filament:	Combo (Poly/Wire) standard, or Poly (polypropylene)
Lift Method	Hydraulic
Swing Method	<p>Manual</p> <p>Hydraulic                      (Hydraulic cylinder only. Customer must provide hydraulic hoses, coupler and valve to swing cylinder.)</p> <p>Electric/Hydraulic Swing                      (Valve and control box actuate the swing cylinder. Voltage must be specified.)</p>
Mounting:	<p>Bumper/Rail mounted to prime mover with two integrated brackets.                      (Broom includes storage stands for use when dismounted from bumper/rail.)</p>
Options	<p>Dirt Deflector (Hood)</p> <p>Sprinkler System (Voltage must be specified.)</p> <p>Hydraulic Side Shift</p>

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# SERVICE PARTS

Part Number	Description
907-168162	Refill Kit, 32" x 2', Wafer, Poly
907-168163	Refill Kit, 32" x 2', Wafer, Poly/Wire Combo
907-137238	Refill Kit, 32" x 3', Wafer, Poly
907-132726	Refill Kit, 32" x 3', Wafer, Poly/Wire Combo
907-168164	Refill Kit, 32" x 4', Wafer, Poly
907-137227	Refill Kit, 32" x 4', Wafer, Poly/Wire Combo
401-132066	Guard, Motor
201-75209	Hydraulic Motor, Standard Flow (18.3 CID)
201-75649	Hydraulic Motor, Low Flow (12.4 CID)
201-92028	Shaft, Hydraulic Motor (Std. and Low Flow)
201-92039	Seal Kit, Hydraulic Motor (Std. and Low Flow)
600-68509	Bearing, Core Hub Support
410-93199	Hub, Splined, Core Support
400-64724	End Disc, Core
203-55105	Cylinder, Lift
203-55105-01	Seal Kit, Lift Cylinder
401-140784	Plate, Offset, Lift Cylinder
382-66481	Springs, Support
383-132017	Pin, Hitch, 1" x 7-3/4" (Manual Swing)
380-126676	Pin, Lynch, 3/16" (Manual Swing)
203-92083	Cylinder, Swing (Optional)
203-169503	Seal Kit, Swing Cylinder
380-140297	Pin, Swing (Hydraulic Swing)

Part Number	Description
410-94050	Storage Stand
380-76379	Clevis Pin, Storage Stand
380-84739	Hair Clip, Clevis Pin
390-92000	Flag, 6' Safety
401-150749	Bracket, Flag Mounting
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:

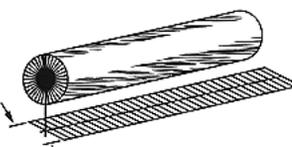
Main 920-898-4588  
Attachments 920-898-1085  
Brush Dept. 920-898-1082



# CLHT Decals

5

**"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

FOR BEST PERFORMANCE OF THIS POWER BROOM, USE **M-B TOUGH BRUSH** REFILLS ONLY.

9

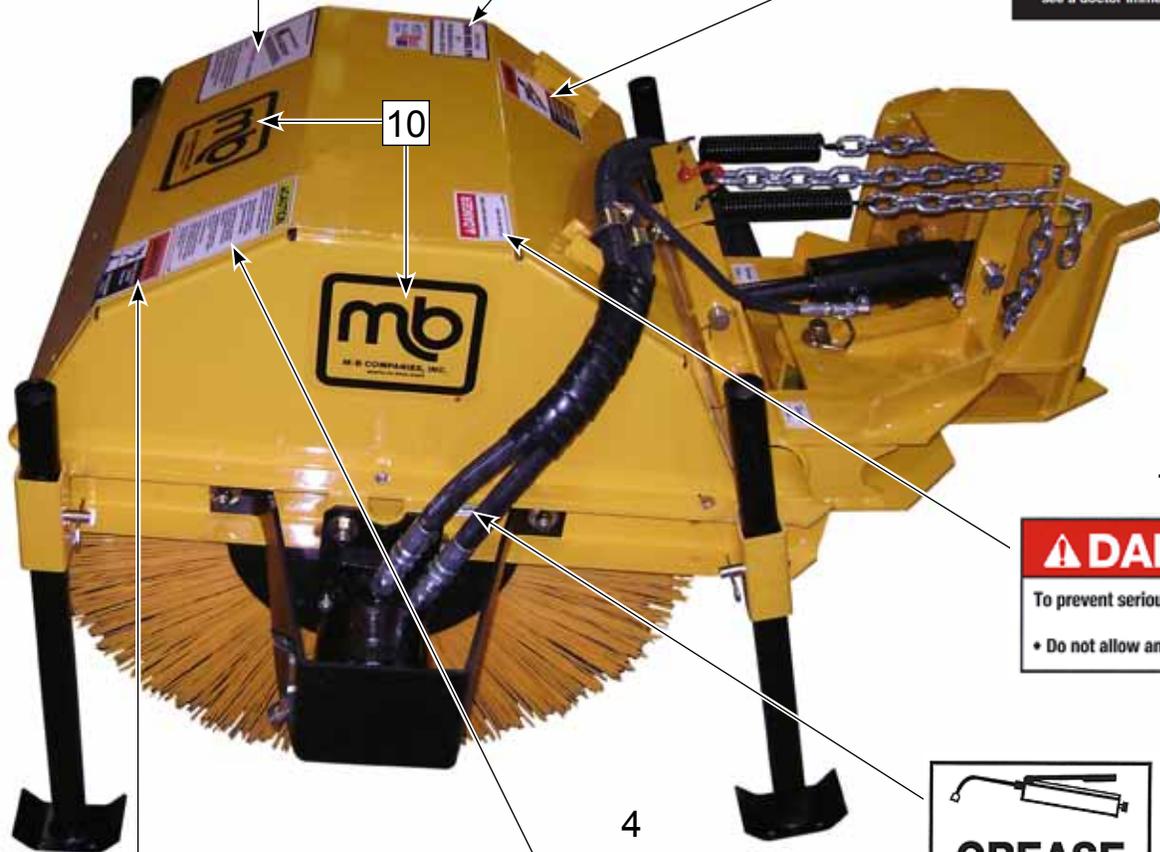
**WARNING**



**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.

390-169221



10

1

**DANGER**

To prevent serious injury or death:

- Do not allow any riders

390-169221

4

**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

**GREASE**



390-118356

7

(Both Sides)

8

**WARNING**



**FLYING OBJECTS HAZARD**  
Keep Clear



**ENTANGLEMENT HAZARD**  
Keep Clear

390-169222

# CLHT Decals

1

**! DANGER**

To prevent serious injury or death:

- Do not allow any riders

390-118221

9

**! 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.

390-118221

3

**! 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.

390-118221

3

**! 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.

390-118221



2

**! DANGER**



To prevent serious injury or death from pinching:

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

390-118203

2

**! DANGER**



To prevent serious injury or death from pinching:

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

390-118203

7



**GREASE**

390-118258

7



**GREASE**

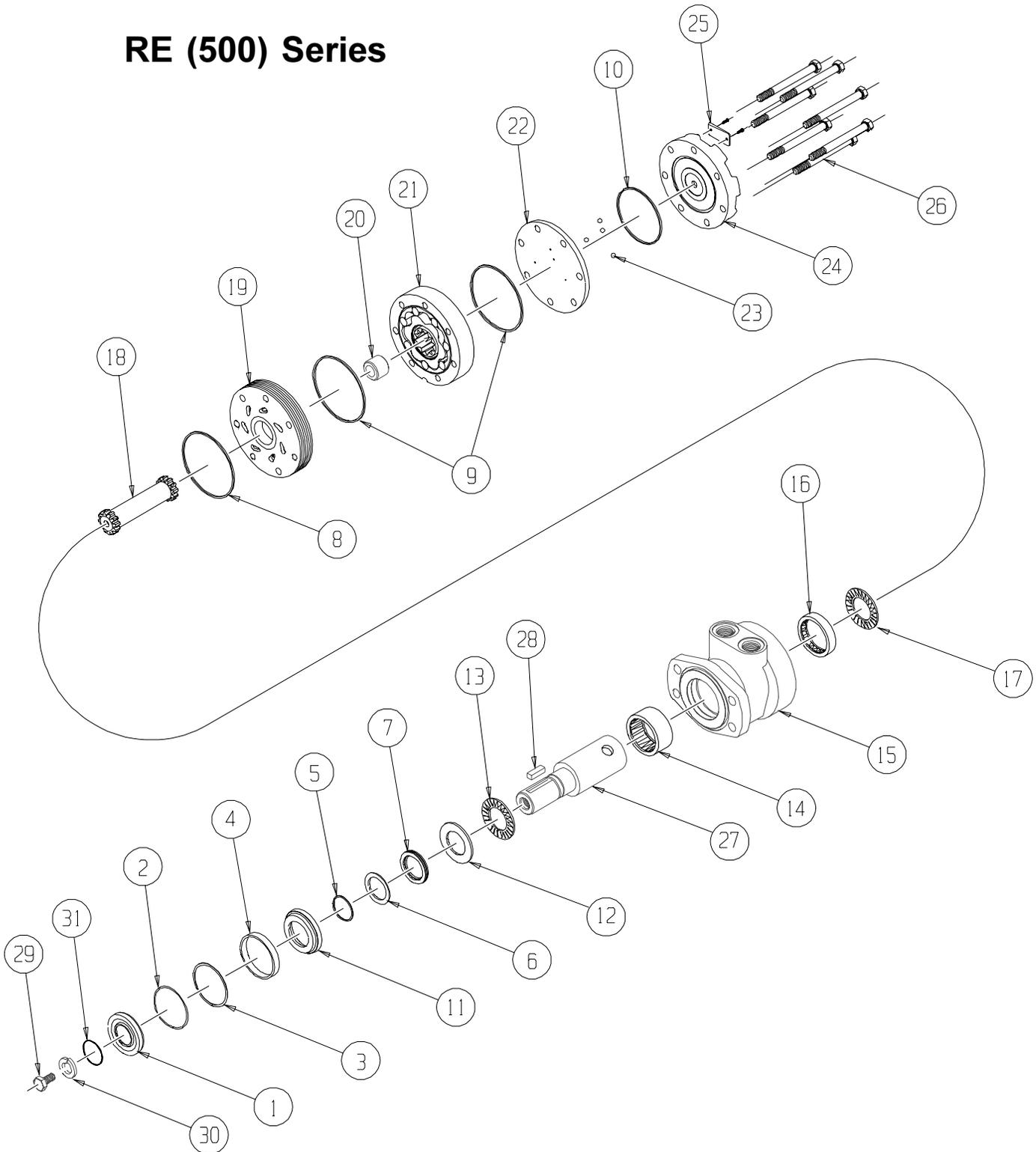
390-118258

## CLHT Decals

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

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

**RE (500) Series**



**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	



## Standard Displacement (201-75209)

## Low Displacement (201-75649)

## SERVICE INSTRUCTIONS FOR THE RE [500 &amp; 501] SERIES MOTORS

For Use With Seal Kits: 500444001, 500444002, 500444112

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.

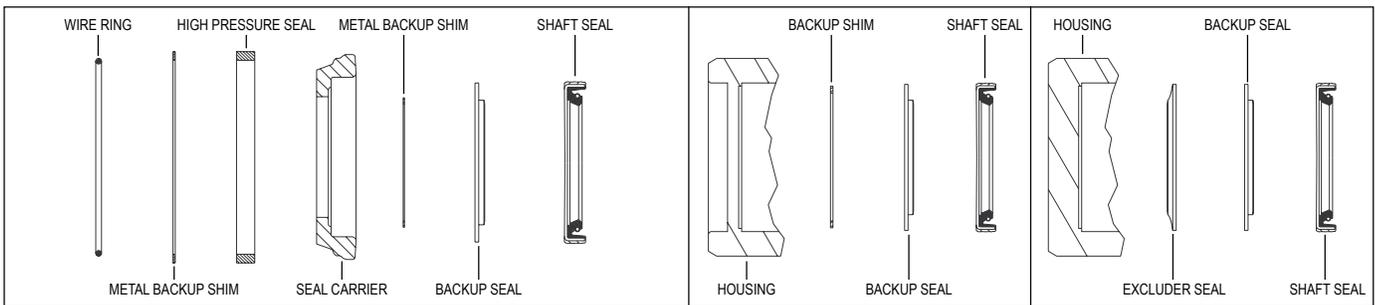
- E)** Place shaft (27) on a clean flat surface with output end facing up. Place thrust bearing (13) (NOTE: If thrust bearing has integral washer, make sure washer surface faces down.) Then thrust washer (12) on shaft (See Technical Bulletin PI444004 to determine correct thrust washer to use). Lightly 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). Then remove the bearing spacer (32). To remove the front housing bearing (14), flip the housing over and place a screwdriver or small chisel in between a roller in the bearing and rest it on the bottom of the bearing cage. Strike the chisel or screwdriver with a hammer just until the cage stretches or chips enough to allow the rollers to fall out. Clear away all rollers, then replace the housing in vise upside down and use the slide and hammer to remove bearing making sure that no finger of the puller is pulling on the weak point caused when removing the roller bearings. 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 if present 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

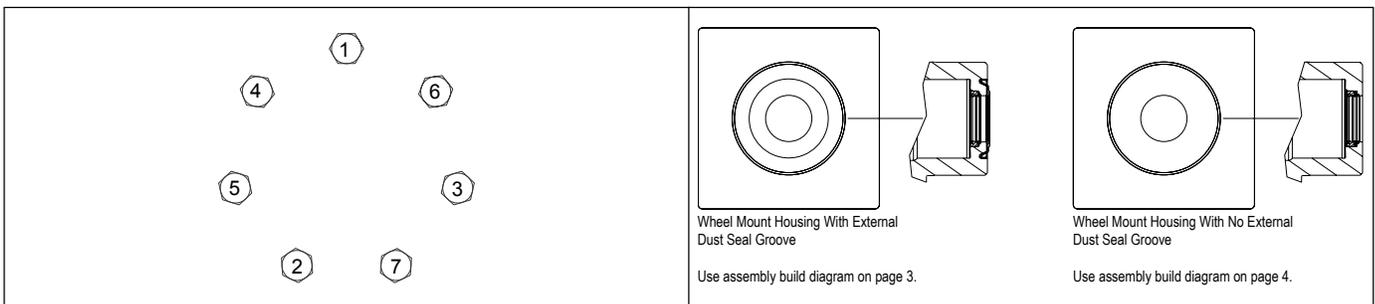
models that use an internal excluder seal.

- J)** 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. Place housing (15) in vice with the seven bolt assembly holes facing up. If model uses an excluder seal (33), place it in the recess of housing, if not, place the metal shim (5) in recess. 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**

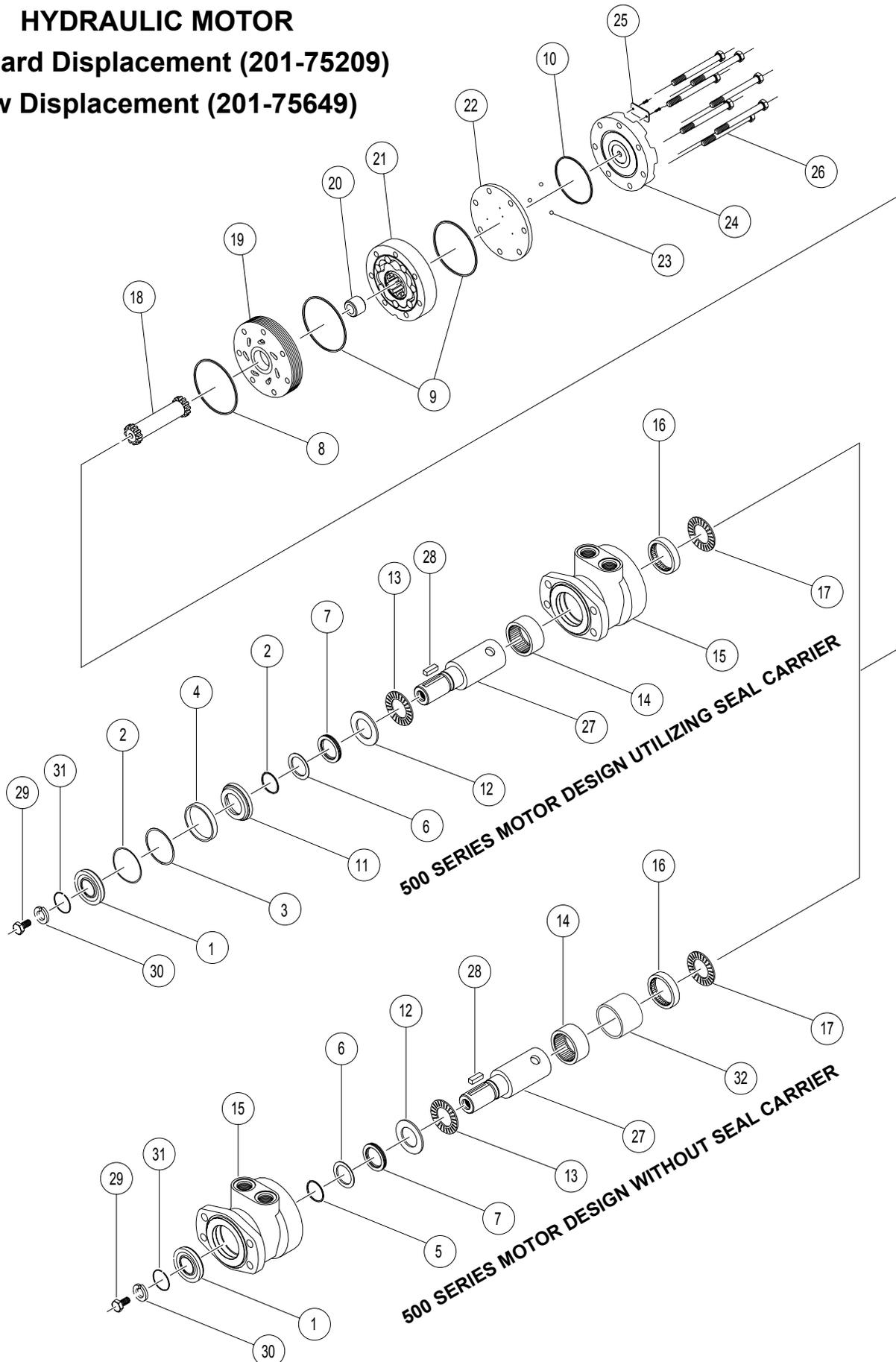
- |                         |                             |                           |   |
|-------------------------|-----------------------------|---------------------------|---|
| 1. 1 Dust Seal          | 12. 2 Thrust Washer         | 23. Steel Balls (3)       | 1 Included in seal kit(s):<br>500444001, 500444002, 500444112 |
| 2. 1 Split Wire Ring    | 13. Front Thrust Bearing    | 24. Endcover              | 2 Included in seal kit(s):<br>500444001                       |
| 3. 1 Metal Backup Shim  | 14. 3 Front Housing Bearing | 25. I.D. Tag Assembly     | 3 Included in seal kit(s):<br>500444112                       |
| 4. 1 High Pressure Seal | 15. Housing                 | 26. Assembly Bolts (7)    | 4 Included in seal kit(s):<br>500444002, 500444112            |
| 5. 1 Metal Backup Shim  | 16. 3 Rear Housing Bearing  | 27. Shaft                 |   |
| 6. 1 Backup Seal (2)    | 17. Rear Thrust Bearing     | 28. Shaft Key             |   |
| 7. 1 Shaft Seal (2)     | 18. Drive Link              | 29. Shaft Bolt            |   |
| 8. 1 Housing Seal       | 19. Manifold                | 30. Lock Washer           |   |
| 9. 1 Body Seals (2)     | 20. Drive Link Spacer       | 31. Wire Ring             |   |
| 10. 1 Endcover Seal     | 21. Rotor Assembly          | 32. Bearing Spacer        |   |
| 11. 2 Seal Carrier      | 22. Balance Plate           | 33. 4 Excluder Shaft Seal |   |

**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)



500 SERIES MOTOR DESIGN UTILIZING SEAL CARRIER

500 SERIES MOTOR DESIGN WITHOUT SEAL CARRIER





## 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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