

OPERATOR'S AND PARTS MANUAL

Model ZTS

Zero Turn Sweeper



QUALITY YOU CAN SEE, PEOPLE YOU CAN TRUST™



M-B Companies, Inc.
1615 Wisconsin Ave.
P. O. Box 200
New Holstein, WI 53061-0200
(920) 898-1560 or 800-558-5800
FAX: (920) 898-4588

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MB Companies, Inc.

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INTRODUCTION

OPERATOR'S MANUAL

This manual describes the installation and operation of the M-B Companies Zero Turn Sweeper.

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

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 broom head and drive unit.

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

Broom Serial Number:

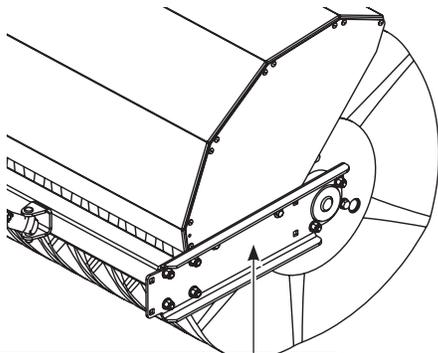


Figure 1

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

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 also 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.

SAFETY

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.
- 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.
- 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.
- Do not operate on wet surfaces. Reduced traction could cause sliding.
- Do not shift to neutral and coast down hills.
- Keep children out of the area and under the watchful care of another responsible adult.
- Be alert and turn unit off if children enter the area.
- Never allow children to operate the unit.
- Use extra care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

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

SAFETY

SLOPE OPERATION

WARNING!



Never operate on slopes greater than 17.6 percent (10°), which is a rise of 3-1/2 feet (106 cm) vertically in 20 feet (607 cm) horizontally.

When operating on slopes use additional wheel weights or counterweights. See your dealer to determine which weights are available and appropriate for your unit.

Select slow ground speed before driving onto slope. Travel UP and DOWN the slope, never across the face, use caution when changing directions and DO NOT START OR STOP ON SLOPE.

Slopes are a major factor related to loss-of-control and tipover accidents, which can result in severe injury or death. All slopes require extra caution. If you cannot back up the slope or if you feel uneasy on it, do not operate on it.

Do

- See your authorized dealer for recommendations regarding counterweights to improve stability.
- Travel up and down slopes, not across.
- Remove obstacles such as large rocks, tree limbs, etc.
- Watch for holes, ruts, or bumps. Uneven terrain could overturn the unit. Snow can hide obstacles.
- Use slow speed. Tires may lose traction on slopes.
- Choose a low gear so that you will not have to stop or shift while on the slope.
- Keep all movement on the slopes slow and gradual.
- Do not make sudden changes in speed or direction.
- Always keep unit in gear especially when traveling downhill.

Do Not

- Do not start or stop on a slope. If tires lose traction, disengage the broom and proceed slowly straight down the slope.
- Do not turn on slopes unless necessary, and then, turn slowly and gradually downhill, if possible.
- Do not operate near drop-offs, ditches, or embankments. The unit could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.

SERVICE AND MAINTENANCE

- Maintain or replace safety and instruction 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 build-up.
- Stop and inspect the equipment if you strike an object. Repair, if necessary, before restarting.
- 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 manufacturer's recommended parts, when necessary.
- Check control operation frequently. Adjust and service as required.
- Use only factory authorized replacement 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 major repairs on this unit unless you have been properly trained. Improper service procedures can result in hazardous operation, equipment damage and voiding of manufacturer's warranty.
- Disengage broom and traction, stop the vehicle engine, and disconnect the spark plug wire(s) before: performing service work or if the unit vibrates abnormally.
- After striking an object, inspect the machine for damage and make repairs before restarting and operating the equipment.

SAFETY

ANSI B71.3-1995 WARNINGS

Training

1. Read the operating and service instruction manual carefully. Be thoroughly familiar with the controls and the proper use of the equipment. Know how to stop the unit and disengage the controls quickly.
2. Never allow children to operate the equipment.
3. Never allow adults to operate the equipment without proper instruction.
4. Keep the area of operation clear of all persons, particularly small children and pets.
5. Exercise caution to avoid slipping or falling especially when operating in reverse.

Preparation

1. Thoroughly inspect the area where the equipment is to be used and remove all doormats, sleds, boards, wires, and other foreign objects.
2. Disengage all clutches and shift into neutral before starting engine (motor).
3. Do not operate the equipment without wearing adequate outer garments. Wear footwear that will improve footing on slippery surfaces.
4. Never attempt to make any adjustments while the engine (motor) is running (except when specifically recommended by the manufacturer).
5. Let engine (motor) and machine adjust to outdoor temperatures before starting to clear snow.
6. Always wear safety glasses or eye shields during operation or while performing an adjustment or repair to protect eye from foreign objects that may be thrown from the machine.

Operation

1. Do not put hands or feet near or under rotating parts. Keep clear of the discharge opening at all times.
2. Exercise extreme caution when operating on or crossing gravel drives, walks, or roads. Stay alert for hidden hazards or traffic.
3. After striking a foreign object, stop the engine (motor), remove the wire from the spark plug, disconnect the cord on electric motors, thoroughly inspect the power broom for any damage, and repair the damage before restarting and operating the power broom.
4. If the unit should start to vibrate abnormally, stop the engine (motor) and check immediately for the cause. Vibration is generally a warning of trouble.
5. Stop the engine (motor) whenever you leave the operating position, before making any repairs, adjustments, or inspections.
6. When cleaning, repairing, or inspecting make certain the broom and all moving parts have stopped. Disconnect the spark plug wire and keep the wire away from the plug to prevent accidental starting.
7. Do not run the engine indoors except for starting the engine or for transporting the power broom in or out of the building. Open the outside doors; exhaust fumes are dangerous.
8. Do not clear snow across the face of slopes. Exercise extreme caution when changing direction on slopes. Do not attempt to clear steep slopes.
9. Never operate the power broom without proper guards plates, or other safety protective devices in place.
10. Never operate the power broom near glass enclosures, automobiles, window wells, drop-offs, and the like without proper adjustment of the discharge angle. Keep children and pets away.

11. Do not overload the machine capacity by attempting to clear snow, sand or dirt at too fast a rate.
12. Never operate the machine at high transport speeds on slippery surfaces. Look behind and use care when backing.
13. Never direct discharge at bystanders or allow anyone in front of the unit.
14. Disengage power to the broom when power broom is transported or not in use.
15. Use only attachments and accessories approved by the manufacturer of the power broom (such as wheel weights, counterweights, cabs, and the like).
16. Never operate the power broom without good visibility or light. Always be sure of your footing, and keep a firm hold on the handles. Walk, never run.

Maintenance and Storage

1. Check shear bolts and other bolts at frequent intervals for proper tightness to be sure the equipment is in safe working condition.
2. Never store the machine with fuel in the fuel tank inside a building where ignition sources are present such as hot water and spacer heaters, clothes dryers, and the like. Allow the engine to cool before storing in any enclosure.
3. Always refer to the operator's guide instructions for important details if the power broom is to be stored for an extended period.
4. Maintain or replace safety and instruction labels as necessary.
5. Run the machine a few minutes after moving snow to prevent freeze-up of the broom assembly.
6. Always observe safe refueling and fuel handling practices when refueling the unit after transportation or storage.
7. Always follow the engine manual instructions for storage preparations before storing the unit for both short and long term periods.
8. Always follow the engine manual instructions for proper start-up procedures when returning the unit to service.

ASSEMBLY

The ZTS Sweeper is designed to be used with Zero Turn lawn tractors.

Do not make any modifications to the attachment, the mounting frame or associated hardware. Any modifications may void the equipment warranty.

PRE-INSPECTION

Review the list below to identify and validate that all the required parts and fasteners are present. Contact M-B Companies if items are missing. Additional fasteners and clips can be purchased locally.

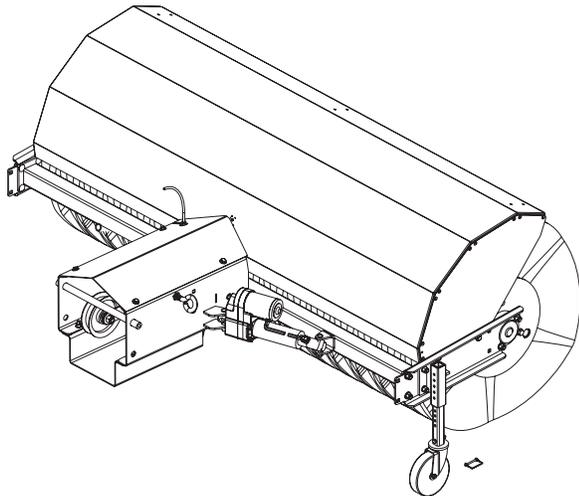


Figure 2

Loose Parts

QTY	Description
2	Caster Wheel, 5" 3/4"
2	HHCS .25-20 UNC x 1.500
1	HHCS 3/8-16 UNC x 1.750
2	Nut, Hex ESNA, 1/4-20 NC
2	Pin, Clevis 1/2 x 2-1/2
2	Tube, Caster
1	Rod Swing CTRL
1	Swing Tube Assy
1	Head Assembly, ZTS 60"
1	Actuator, Linear 4" Stroke Electric Option Only

ASSEMBLY

The attachment mount should already be mounted to the tractor. Installation of the attachment mount is described in the publication for the Zero Turn Attachment Mount to be used with your tractor.

If this tractor will be using the manual lift and swing controls, install the guide bracket.

- a. Position the bracket on top of the front lift assist mount.
- b. Use two bolts with washers and nuts to secure it in place.

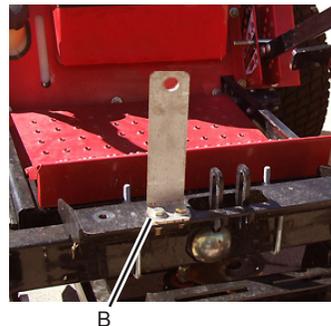


Figure 3

The following steps describe how to mount the broom head.

1. Open the attachment pins.
 - a. Pull out on both pins and rotate to hold them in the out position.

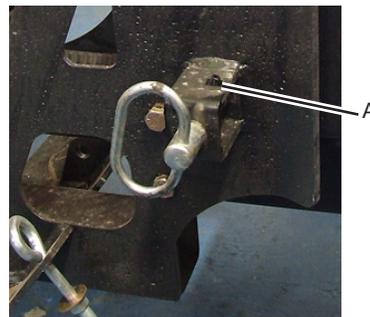


Figure 4

2. Mount the broom head.

ASSEMBLY

- a. Position the broom head to line up with the attachment mount. The V-belt should be kept clear of the contact areas.
- b. Lower the attachment mount to it's lowest level.
- c. Move the tractor forward to engage the top pins in the notch.
- d. Lift the attachment mount to the broom head.
- e. Pull and rotate the lock pins to enable them to spring into the holes in the broom head. Some movement of the attachment mount may be needed to let the pins spring into lock position.

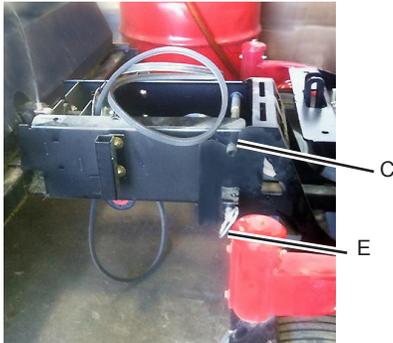


Figure 5

3. Install broom drive belt (Figure 7).
 - a. Release the spring tension on the belt tensioner by pushing in on the tensioner arm.
 - b. Stretch the V-belt from the broom pulley to the bottom pulley on the attachment mount. The belt will fit under the large tension pulley.
 - c. At the broom drive pulley, route the belt under the two bottom pulleys. The V-belt must be positioned narrow side up.
 - d. Place the V-belt over the broom drive pulley.
 - e. Pull on the tensioner arm to spring load the tension pulley.

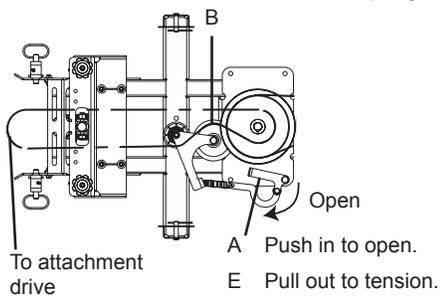


Figure 6

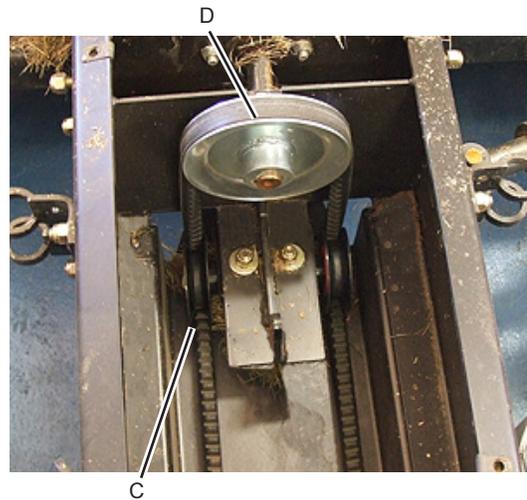


Figure 7

4. To attach the drive belt to the engine, refer to the Attachment Mount Installation manual.

ASSEMBLY

5. Swing Controls

Manual

If this tractor will be using the manual swing controls, assemble the control cable for the release pin.

- Remove the drive assembly cover. Compress the spring against the shaft at the end of the cable. This will create a gap between the spring and the end of the outer cover.
- Insert the shaft into the guide bushing in the drive assembly.
- Move the cable into the slot in the bracket. The gap created by compressing the spring will allow the inner cable to move through the slot. Releasing the spring.
- Mount the manual swing controls on the front lift assist mount. Use two bolts with washers and nuts.
- Route the control lever for the swing control through the round hole on the bracket. Mount the hand lever on the handlebar.
- The swing control lever will go through the manual swing bracket. The end at the broom head will have a swivel assembly attached. Position the swivel assembly in the bracket on the broom head. Insert the pin to secure it in place.

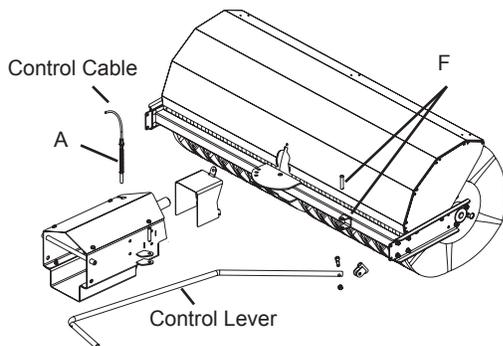


Figure 8

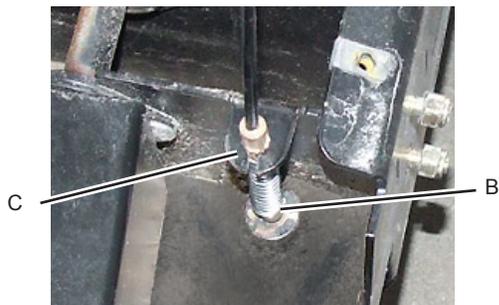


Figure 9

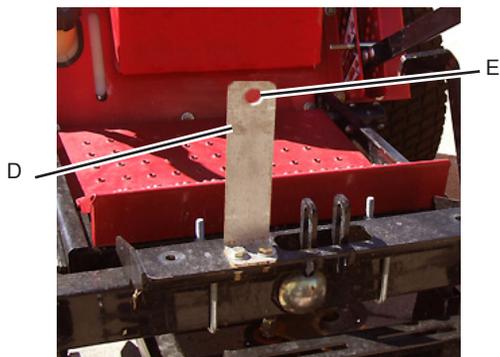


Figure 10

Electric (Optional)

If this tractor will be using the electric actuator for swing controls, mount the actuator.

- Position the actuator as shown.
- Insert one of the pivot pins and lock it in place with a clip.
- Insert the second pivot pin and lock it in place with a clip.
- Connect the electrical plug to the wiring harness from the control box mounted to the handlebars.

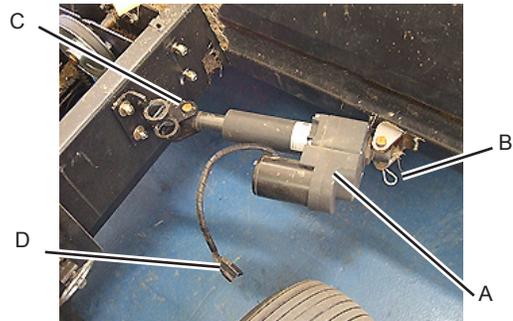


Figure 11

6. Attach the casters.

- Raise the attachment mount. The casters should already be assembled. The illustration can be used to aid in assembly if needed.

The caster mounting bracket can be mounted in any of three positions:

Position 1 - Medium and heavy snow

Position 2 - Light to medium snow

Position 3 - Light snow and thatching

Attach a bracket on each side.

- Slide the post into the bracket part way. Use the clip to hold it in place. Repeat for the second caster. The height should be the same for both casters.

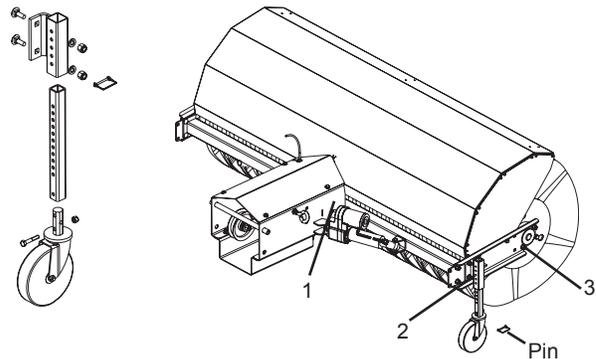


Figure 12

The installation is complete. Refer to the Adjustments section for broom pattern, attachment frame and V-belt adjustments.

CONTROLS AND FEATURES

The broom will push debris forward or to either side depending on the position angle. The broom may need to be raised to adjust the angle

If the angle adjustment is manual:

1. Pull on the angle lock cable to release the head.
2. Use the swing control rod to position the broom head. The broom may need to be raised to adjust the angle.
3. Release the angle lock cable. The lock pin will drop into the position opening.

If the angle adjustment uses the electric actuator:

1. The controls mounted to the handlebar will actuate the movement.
2. Press the rocker switch to move.

The lifting and lowering of the attachment may be controlled manually or electrically.

If the lift/lower is manually controlled:

1. Use the mower deck hand lever to lift/lower.
2. Consult tractor Owner's manual for operation.

If the lift/lower is electrically controlled:

1. Use the electric rocker switch on the handlebar to actuate.
2. Press the rocker switch to lift or lower.

OPERATION

CHECKS BEFORE EACH START-UP

1. Make sure all safety guards are in place and all nuts, bolts and clips are secure.
2. Check the engine oil level. See your engine Owner's Manual for procedure and specifications.
3. Check the casters to make sure they are set at the desired height.
4. Make sure that the broom is angled in the proper direction. See the Service section for adjustment procedures and troubleshooting.
5. Check the tractor controls for smooth operation. See the tractor Owner's manual for procedures and operation.

OPERATING THE POWER BROOM

WARNING!

Do not operate the attachment without working knowledge of the tractor's controls. Property damage or personal injury may result.



1. Review the Operator's manual for the tractor.
2. Start the tractor and allow it to warm up. The speed of the broom is controlled by the speed of the engine.
3. Raise the broom.
4. Refer to tractor Owner's Manual for proper PTO engagement procedure. Engage the PTO.
5. Lower the broom to begin sweeping.

WARNING!

The broom discharge can cause property damage and injury to bystanders. Discharge toward open areas only.



ENGINE SPEED

Broom speed is adjusted by engine rpm. Adjust broom speed as needed.

BRUSH ANGLE ADJUSTMENT

Assess the discharge area. Position the broom head as needed.

OPTIONAL EQUIPMENT

DIRT DEFLECTOR INSTALLATION

See Figure 13 Dirt Deflector Installation.

1. Position deflector straps (2) over broom hood (1) and secure each strap with one bolt (3) washer (4) and nut (5) in the top hole of the strap and broom hood.
2. Attach strap support (6) to each deflector strap. Position the support strap at the lower edge of the deflector strap and secure with one bolt (3) and nut (5) in each support strap.
3. Position the deflector (7) and upper support strap (8) over the broom hood and deflector strap assembly. Secure the deflector through the second hole at the top of the deflector strap and broom hood using one bolt (9), two washers (4) and a nut (5).

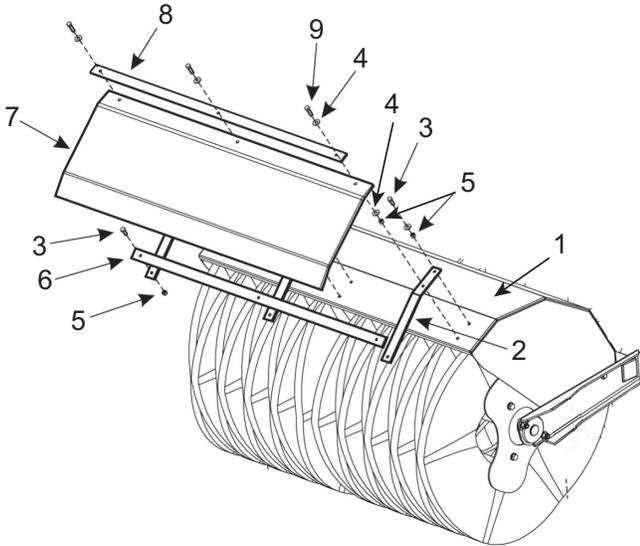


Figure 13 Dirt Deflector Installation

ADJUSTMENT AND SERVICE

BRUSH HEIGHT ADJUSTMENT

CAUTION!



If brush height is set too low, the brush can drive machine rearward when attachment clutch is engaged. Engage brush slowly with brush set at proper height.

For hard surfaces, adjust the caster wheels so that the brush just touches surface. The brush works best with the brush properly leveled. To adjust the brush height:

1. With the brush off, move to a dusty, flat surface. Leave the engine running.
2. Start the brush at a slow speed. Run the brush in a stationary position for 30 seconds.
3. Lift the brush head assembly off the ground and reverse the unit to move it away from the swept area.
4. Stop engine and allow all moving parts to stop.
5. Check the width of the swept area. The brush pattern should be 2-3 inches wide, running the length of the brush. (See Figure 14 Brush Sweeping Pattern)

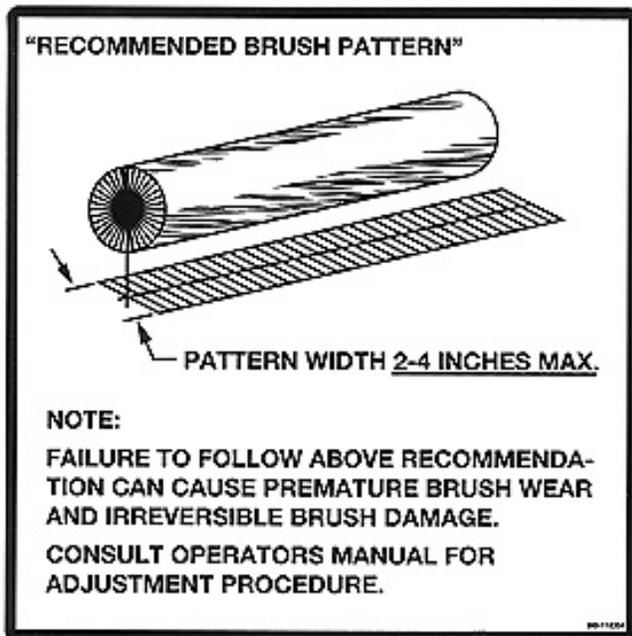
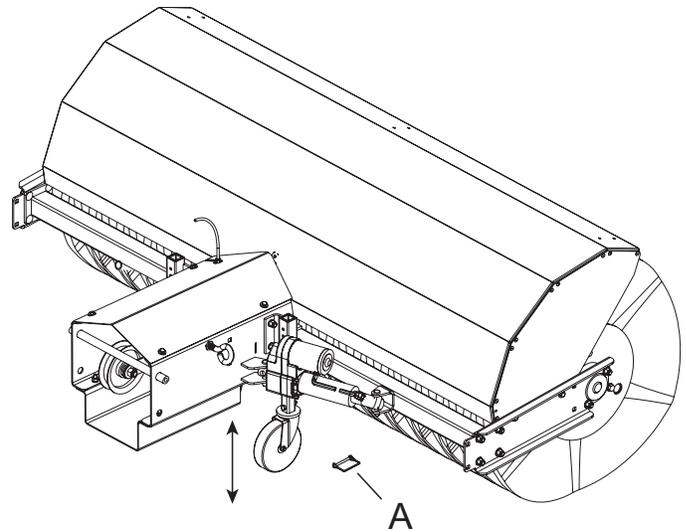


Figure 14 Brush Sweeping Pattern

6. To adjust:
 - a. Remove the caster wheel lock pin. (See A, Figure 15 Pattern Adjustment).
 - b. Raise or lower the caster wheel as needed.
 - c. Insert the caster wheel lock pin into the hole in the caster bracket and through the caster tube. Use the attached spring clip to secure the pin.

NOTE: If using the power broom for turf applications, less ground contact is required.



A. Caster Wheel Lock Pin

Figure 15 Pattern Adjustment

Adjust for Wear

As the broom core wears the diameter of the broom is smaller. The brush pattern will become smaller causing the sweeping action to be ineffective.

To regain the correct brush pattern, the casters are raised up.

BELT REPLACEMENT

The tension on the two belts is maintained by the tension pulleys. Over time the belts will wear and may pull apart.

Visually inspect the belts for signs of wear. The belts may become narrow and ride low in the pulleys. Also look for frayed edges and parts missing.

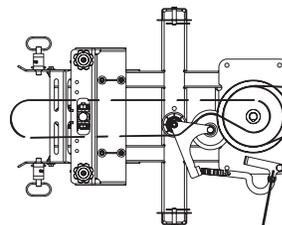
WARNING!

Do not work on drive belts while the engine is running. Turn off the engine and allow parts to cool.



To replace the belts:

1. Lower the attachment to its lowest position.
2. Release the two tension pulleys.



Push in to release.

Figure 16

3. Remove the rear belt to the engine. Refer to the Attachment Mount Installation manual.
4. Remove the front belt.
5. The front belt is installed first by placing it over the center pulley.

ADJUSTMENT AND SERVICE

- Route the belt from the lower center pulley under the tension pulley.
- Position the belt under the two front pulleys and up to the broom drive pulley.

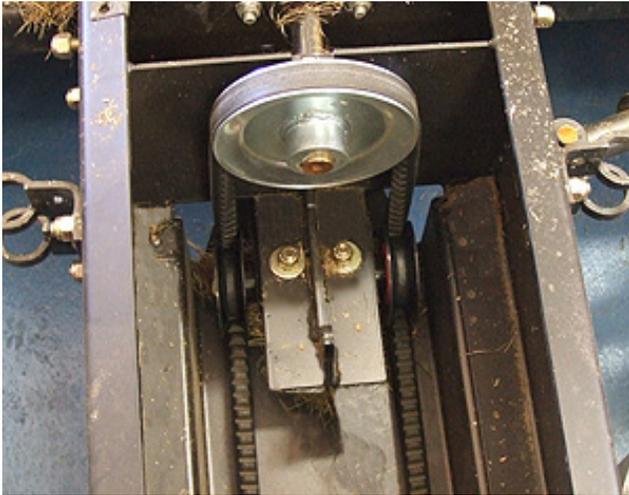


Figure 17

- When the belt is in position, pull out on the lever to engage the tensioner.
- To install the rear V-belt to the engine pulley refer to the Attachment Mount Installation manual.

SHEAR PIN REPLACEMENT

DANGER! Do not go near the broom when the engine is running. Do not run the engine with any cover or guard removed.

Under most circumstances, if the broom strikes an object which could cause damage to the unit, the shear pin(s) will break. This protects the gear box and other parts from damage. The shear pins are located on the broom shaft.

See Figure 18 Shear Pin Replacement.

To replace the shear pins:

- Tap out the broken pin(s) with a pin punch.

IMPORTANT! Do NOT replace shear pins with anything other than the correct grade replacement shear pin. Use of bolts, screws or a harder shear pin will lead to damaged equipment.

- Install new shear pin(s) and secure with nut.

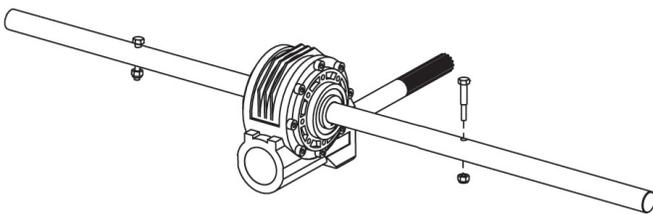


Figure 18 Shear Pin Replacement

BRUSH SEGMENT REPLACEMENT

- Remove bolts from broom bearings at both ends of the support shaft (Figure 19 Brush Removal).

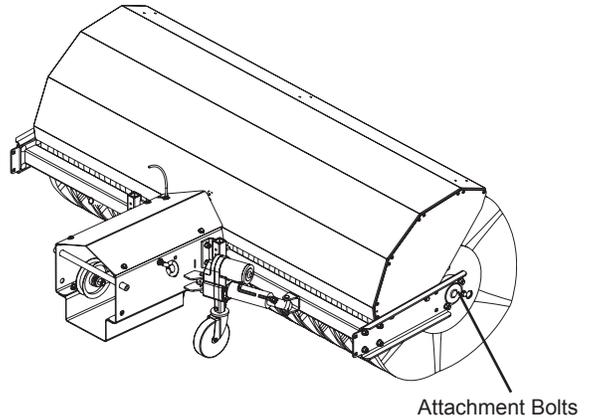


Figure 19 Brush Removal

- Loosen bearing setscrews and slide bearings inwards toward the center of broom.
- Move power unit backwards away from the brush assembly. The brush and gearbox will pull free from the drive pulley shaft.

IMPORTANT! Support splined drive shaft to prevent damage.

- Stand broom assembly on one end. (See Figure 20 Brush Assembly)

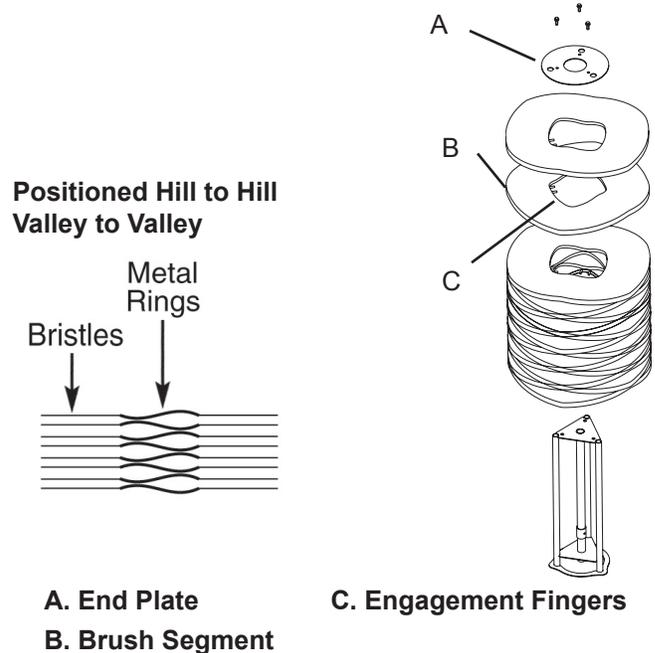


Figure 20 Brush Assembly

- Remove the three bolts from the end plate (See A, Figure 20 Brush Assembly).
- Remove used broom segments.
- Install new broom segments. Position the segment cores to provide hill to hill valley to valley contact.

NOTE: Align segment engagement fingers (C, Figure 20 Brush Assembly) on alternating support shafts. This will evenly spread rotating force through the drive system.

- Reinstall broom assembly.

IMPORTANT! Fully tighten the bearing setscrews before operating the power broom.

MAINTENANCE

MAINTENANCE SCHEDULE

Maintenance Required	Service Interval	Notes
Lubricate center pulley bearings	10 Hours	Use 10W Oil and Automotive Lithium Grease
Lubricate spline shaft for driveline	Yearly	Use Automotive Lithium Grease
Lubricate lock pin on manual swing	Yearly	Use Automotive Lithium Grease
Check/Change engine oil**	Check oil before each use**	None
Replace spark plug**	Yearly**	None
Check drive linkage and belt tension	Before each use	None
Lubricate pivot and friction points	10 Hours	Use 10W Oil

** See your engine owner's manual for engine-related information.

LUBRICATION

NOTE: Grease points are noted with an applicable decal.



Grease bearings and pivot points per the MAINTENANCE SCHEDULE using Chevron Ultra Duty II, Grade 2; or equivalent high-temp grease.

IMPORTANT! It is very important that grease fittings on the broom shaft are lubricated regularly. If broom rusts to shaft, damage to worm gear may occur if shear pins do not break. To prevent wheels rusting to axles, it is also necessary to remove the wheels and grease the axles regularly.

1. Apply medium weight (10W) oil to points shown.
2. Remove wheels and grease axles once each year.
3. Grease broom drive universal joint.

NOTE: Access is best gained from underneath machine.
4. Grease broom pivot pin.

Generally, all moving metal parts should be oiled where contact is made with other parts. Keep oil and grease off belts, pulley grooves, drive disc, and friction disc.

LUBRICATION NOTES:



Grease locations indicated by grease gun symbol. Use grease fittings when present. Disassemble parts to apply grease to moving parts when grease fittings are not installed.



Oil locations indicated by oil can symbol. Do not allow oil to drip onto traction drive or friction disc.

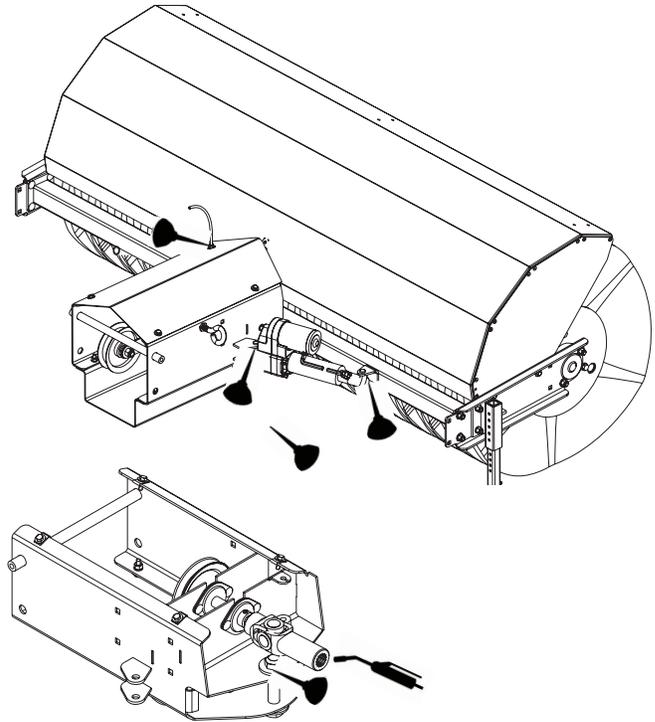


Figure 21

STORAGE

TEMPORARY STORAGE (30 DAYS OR LESS)

Here is a checklist of things to do when storing your unit temporarily or in between uses:

- Always store the broom in a supported position on the caster wheels, 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.
- Properly clean the unit before storage and remove snow, dirt, debris, salt, etc. to extend paint life.
- If the unit is power-washed, all lubrication points should be greased before storage. Refer to MAINTENANCE section.
- If the unit can't be stored on a reasonable level surface, chock the wheels.

LONG TERM STORAGE (LONGER THAN 30 DAYS)

Before you store your unit for the off-season, read the Maintenance and Storage instructions in the Safety section, then perform the following steps:

1. Coat all bare metal surfaces with paint or light coat of oil to prevent rusting.
2. Clean external surfaces.
3. Completely lubricate as outlined in the **MAINTENANCE** section.

TROUBLESHOOTING

This section provides troubleshooting and service instructions. Locate the problem and check the possible cause/remedy in the order listed.

Also, refer to the engine manufacturer's Owner's Manual for additional information.

For problems not covered here, contact your local dealer.

IMPORTANT!

Before performing any adjustment or service to power broom, stop the engine and wait for moving parts to stop. Remove the key. To prevent accidental starting, disconnect the spark plug wire and fasten away from the plug.

Trouble	Possible Cause	Remedy
Brush does not clean hard surface.	1. Casters improperly adjusted.	1. RAISE casters (this lowers the broom).
Broom does not rotate.	1. Broom Control not engaged. 2. Engine clutch not engaging. 3. Broom drive belt slipping. 4. Broken belt. 5. Shear pin broken.	1. Engage Broom Control. 2. Check clutch operation. Repair if needed. 3. Check broom drive belt adjustment. 4. Replace belt. 5. Replace shear pin.
Excessive vibration.	1. Loose parts or damaged broom assembly.	1. Tighten all hardware. Replace broom assembly if necessary. If vibration continues, see your dealer.
Surface not being cleared.	1. Broom pattern is too small.	1. Adjust broom pattern.

SERVICE PARTS

Part Number	Description
430-97417	Kit, Cable and Lever Assy, Swing Control
100-140487	Caster Wheel
??	V-Belt, Engine to Pulley
??	V-Belt, Broom Drive
600-132224	Driveline Bearing
505-172290	3" V-Groove Idler Pulley for Broom Drive
505-172311	9" V-Groove Center Pulley
505-172322	4" V-Groove Center Pulley
600-160526	4 Bolt Bearing
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.

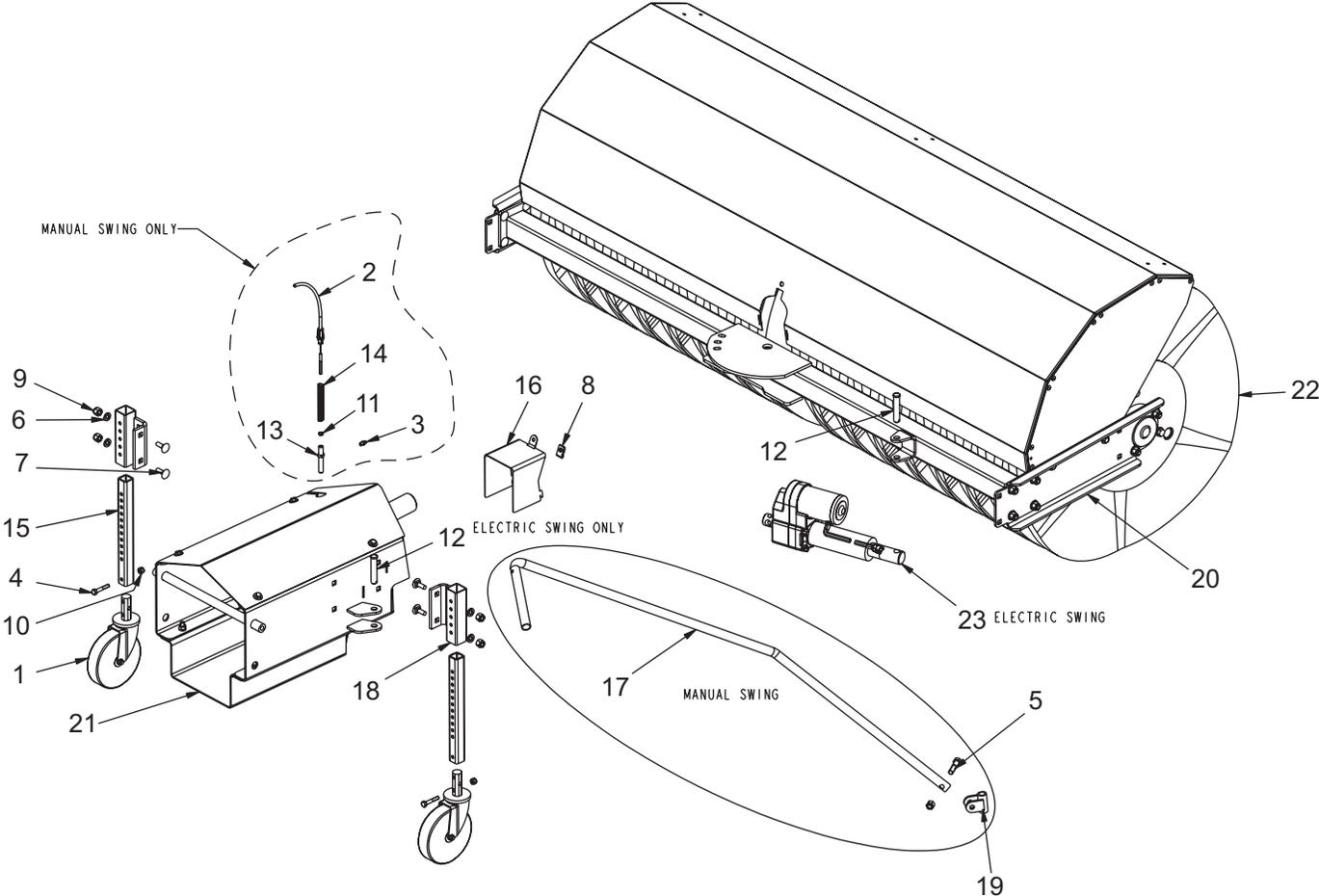
M-B Co.
 1615 Wisconsin Ave.
 P.O. Box 200
 New Holstein, WI 53061-0200

website: www.m-bco.com
 email: 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

PARTS LIST

BROOM HEAD ASSEMBLY



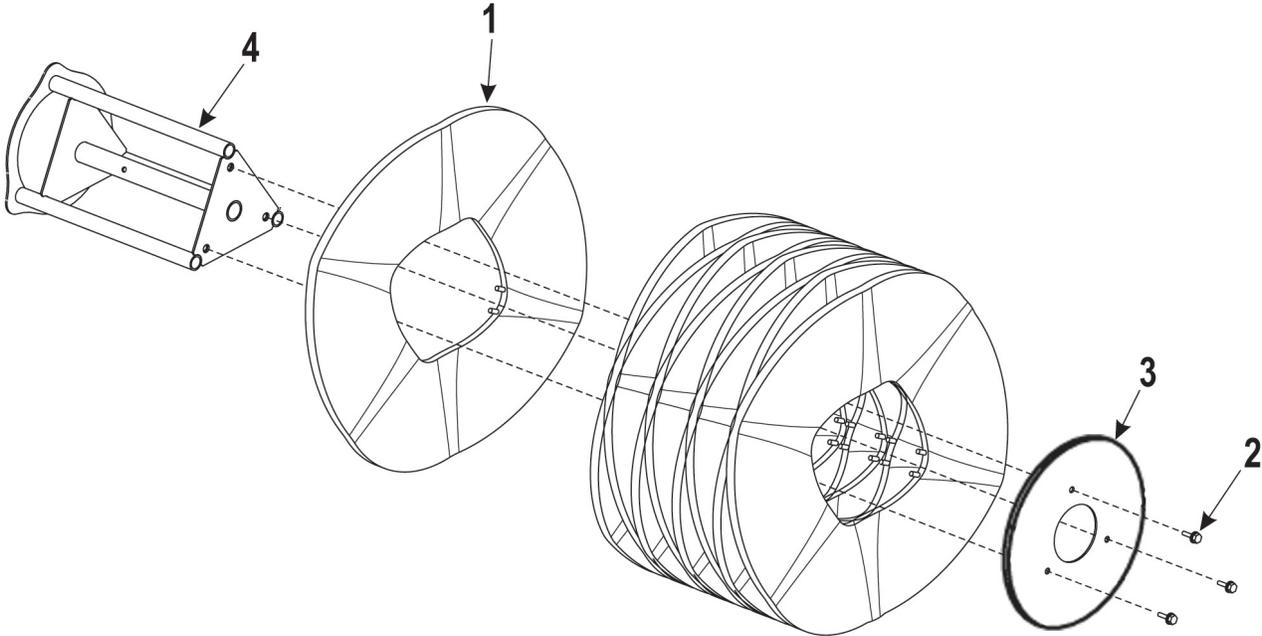
PARTS LIST

BROOM HEAD ASSEMBLY

Item	Part Number	Description	Qty
1	100-140487	Caster Wheel, 5" 3/4" Expandable Stem	2
2	106-169430	Cable, Control Swing, MCD	1
3	206-72100	Grease Zerk 1/4-28	1
4	311-11500	HHCS 0.25-20 UNC x 1.500	2
5	311-31750	HHCS 3/8-16 UNC x 1.750	1
6	351-30000	Washer, Lock - 3/8 YLW Zinc PL	4
7	370-92047	Carriage Bolt 3/8-16 UNC x 1	4
8	371-169215	Nut 1/4-20 Clip-On, Tapped Hole	1
9	371-81297	Nut, Hex, ESNA, 3/8-16 UNC	5
10	371-81299	Nut, Hex, ESNA, 1/4-20 NC	2
11	371-81807	Nut, Hex, 10-24	1
12	380-133671	Pin, Clevis 1/2 x 2-1/2	2
13	380-140544	Pin, Swing MCD, Trigger Release	1
14	382-140710	Spring, Compression 0.51" OD x 3.5" Long	1
15	401-172238	Tube, Caster	2
16	401-172282	Guard, PTO, ZTS	1
17	401-172692	Rod Swing CTRL	1
18	410-172251	Caster Bracket WU	2
19	410-172538	Swing Tube Assy, ZTS	1
20	430-97620	Head Assembly, ZTS 60"	1
21	430-97622	ZTS Mounting Frame Group	1
22	430-97642	Core Assembly 5' ZTS, Poly	2
23	708-176177	Actuator, Linear 4" Stroke	1

PARTS LIST

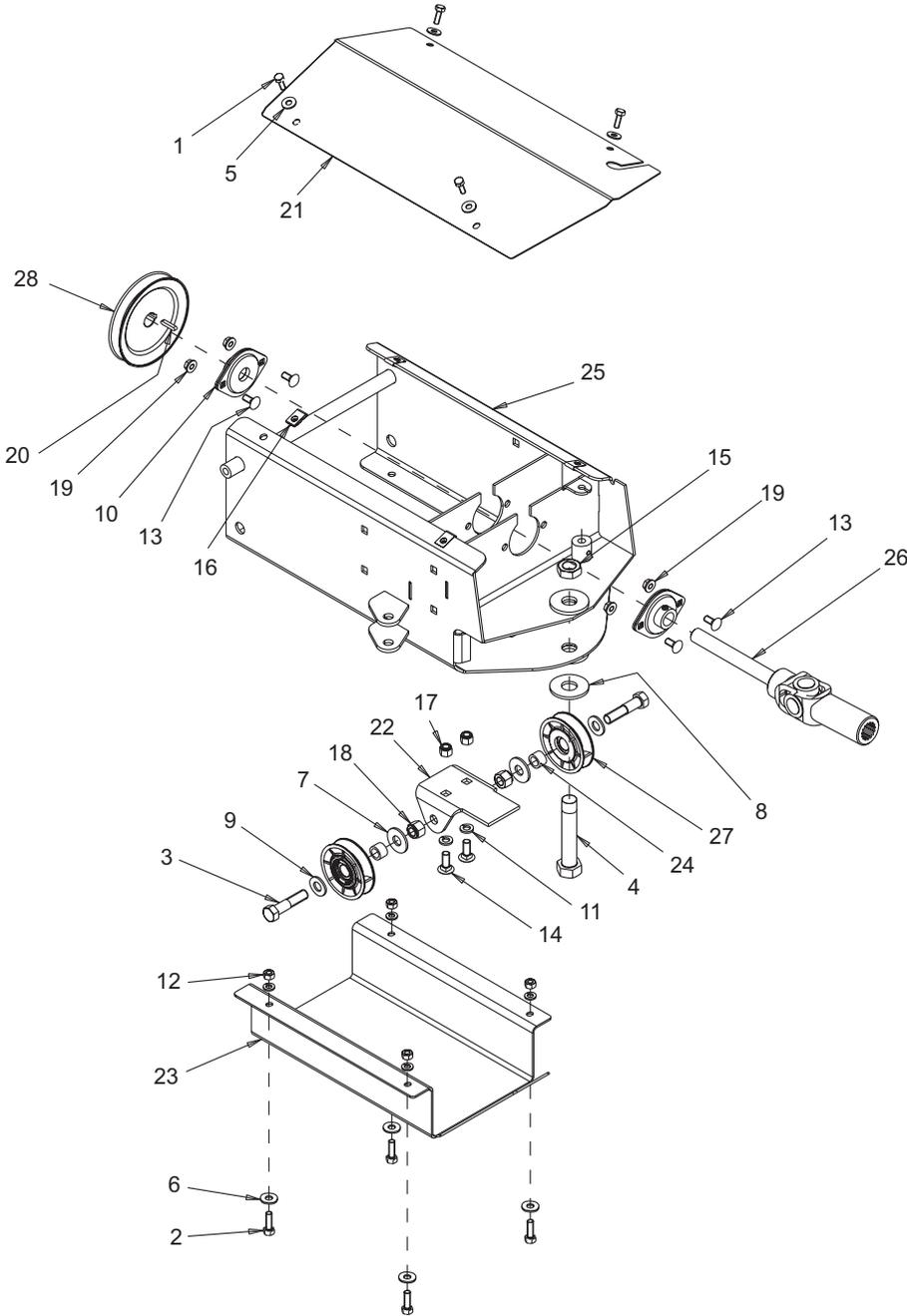
BRUSH ASSEMBLY



Item	Part Number	Description	Qty
1	101-129541	Segment, Poly, 25" x 10", Conv Yellow	15
2	370-126977	HHCS, Serrated Flange, 3/8-16 x 1 Plated, 3' or 4' Brush	3
3	401-147887	Plate, End Retainer, 3' or 4' Brush	2
4	410-172451	Core, Weldment 5' ZTS	1

PARTS LIST

BROOM DRIVE ASSEMBLY



PARTS LIST

BROOM DRIVE ASSEMBLY

Item	Part Number	Description	Qty
1	311-10750	HHCS .25-20 UNC x 0.750	4
2	311-21000	HHCS .31-18 UNC x 1.000	4
3	311-52250	HHCS .50-13 UNC x 2.250	2
4	313-84000	HHCS .75-16 UNF x 4.000	1
5	341-10000	Washer, Flat - 1/4 STD Zinc PL	4
6	341-20000	Washer, Flat - 5/16 STD Zinc PL	4
7	341-50000	Washer, Flat - 1/2 STD Zinc PL	2
8	341-80000	Washer, Flat - 3/4 STD Zinc PL	1
9	343-50000	Washer, SAE 1/2	2
10	600-132224	Bearing, 3/4" Flangette	2
11	351-30000	Washer, Lock - 3/8 YLW Zinc PL	2
12	361-20000	Nut, Hex, UNC, 5/16-18	4
13	370-126976	Carriage Bolt 5/16-18 UNC x .75	4
14	370-92047	Carriage Bolt 3/8-16 UNC x 1	2
15	371-132408	Nut, Hex, Center-Lock, Unplated 3/4 UNF	1
16	371-169215	Nut, 1/4-20 Clip-On, Tapped Hole	4
17	371-81297	Nut, Hex, ESNA, 3/8-16 UNC	2
18	371-81417	Nut, Hex, ESNA, 1/2-13-UNC	2
19	371-92059	Nut, Flanged 5/16-18 Plated Locking	4
20	386-91174	Key, Round End .1875 x 1	1
21	401-172307	Cover, Mount, ZTS	1
22	401-172481	Trolley, Pulley	1
23	401-172519	Cover, Lower	1
24	401-172523	Spacer, Tube Steel	2
25	410-172274	MTG Frame, Zero Turn Sweeper	1
26	502-129543	Driveline, Series 07 3/4 Keyd x 1-15 SPLNA	1
27	505-172290	3" V-Groove, Idler Pulley	2
28	505-172359	Pulley 5"	1

PARTS LIST

DECALS

1



2



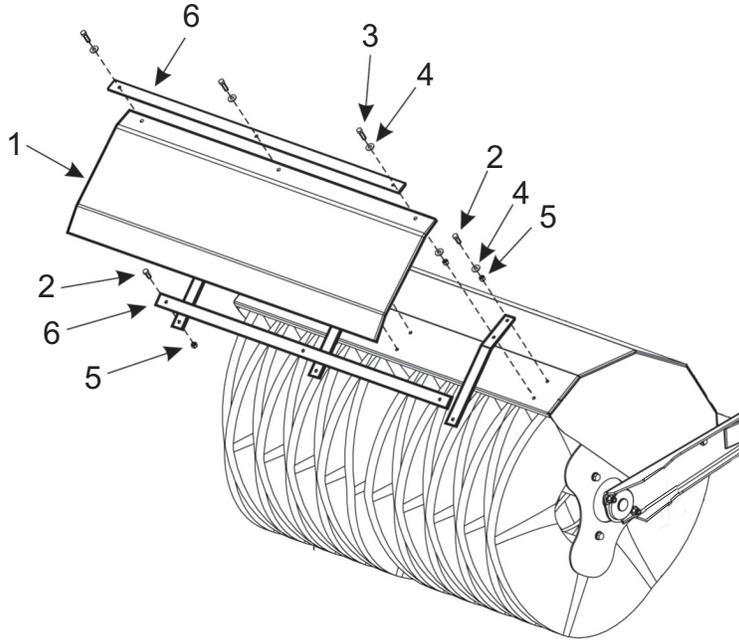
3



Item	Part Number	Description	Qty
1	390-140501	Decal, Made In USA	1
2	390-169222	Decal, Warning, Flying Objects Hazard	1
3	390-118352	Decal, Warning, Moving Parts Hazard	2
Not Shown	390-117897	Decal, M-B	1

PARTS LIST

DIRT DEFLECTOR ASSEMBLY (OPTION)



Item	Part Number	Description	Qty
	430-96354	Deflector Kit, 3'	
	430-96468	Deflector Kit, 4'	
1	101-132985	Deflector, 3'	1
	101-143141	Deflector, 4'	1
2	311-10750	Capscrew, Hex Head, 1/4-20 x 3/4"	10
3	311-11000	Capscrew, Hex Head, 1/4-20 x 1"	6
4	341-10000	Washer, Flat, 1/4"	9
5	371-81299	Lock Nut, 1/4"-20	12
6	401-132986	Strap, Support	3

FASTENER TORQUE RECOMMENDATION

TORQUE FOR STANDARD FASTENERS

Nominal Dia. (in.)	Threads per inch	 Grade 2			 Grade 5			 Grade 8			 Grade 9		
		Tightening Torque			Tightening Torque			Tightening Torque			Tightening Torque		
		Lubed	Dry Plated	Dry Plain	Lubed	Dry Plated	Dry Plain	Lubed	Dry Plated	Dry Plain	Lubed	Dry Plated	Dry Plain
		K = 0.15	K = 0.17	K = 0.20	K = 0.15	K = 0.17	K = 0.20	K = 0.15	K = 0.17	K = 0.20	K = 0.15	K = 0.17	K = 0.20
Unified Coarse Thread Series													
1/4	20	49 in-lbs	59 in-lbs	66 in-lbs	76 in-lbs	86 in-lbs	101 in-lbs	107 in-lbs	122 in-lbs	143 in-lbs	126 in-lbs	143 in-lbs	168 in-lbs
5/16	18	101	122	135	157	178	209	221	251	295	259	294	346
3/8	16	15 ft-lbs	18 ft-lbs	20 ft-lbs	23 ft-lbs	26 ft-lbs	31 ft-lbs	33 ft-lbs	37 ft-lbs	44 ft-lbs	38 ft-lbs	43 ft-lbs	51 ft-lbs
7/16	14	24	29	32	37	42	49	52	59	70	61	70	82
1/2	13	37	44	49	57	64	75	80	90	106	94	106	125
9/16	12	53	63	70	82	92	109	115	130	154	135	153	180
5/8	11	73	87	97	113	126	150	159	180	212	186	211	248
3/4	10	129	155	172	200	227	267	282	320	376	331	375	441
7/8	9	125	160	167	322	365	429	455	615	606	633	604	710
1	8	187	225	250	483	547	644	681	722	909	799	905	1065
1-1/8	7	266	319	354	596	675	794	966	1095	1288	1132	1283	1510
1-1/4	7	375	450	500	840	952	1121	1363	1545	1817	1597	1810	2130
1-1/2	6	652	783	869	1462	1657	1950	2371	2688	3162	2779	3150	3706
Fine Thread Series													
1/4	28	56 in-lbs	68 in-lbs	75 in-lbs	87 in-lbs	99 in-lbs	116 in-lbs	123 in-lbs	139 in-lbs	164 in-lbs	144 in-lbs	163 in-lbs	192 in-lbs
5/16	24	112	135	150	174	197	231	245	278	327	287	325	383
3/8	24	17 ft-lbs	20 ft-lbs	23 ft-lbs	26 ft-lbs	30 ft-lbs	35 ft-lbs	37 ft-lbs	42 ft-lbs	49 ft-lbs	43 ft-lbs	49 ft-lbs	58 ft-lbs
7/16	20	27	32	36	41	47	55	58	66	78	68	78	91
1/2	20	41	49	55	64	72	85	90	102	120	105	120	141
9/16	18	59	71	78	91	103	121	126	146	171	151	171	201
5/8	18	82	99	110	127	144	170	180	204	240	211	239	281
3/4	16	144	173	192	223	253	297	315	357	420	369	418	492
7/8	14	138	165	184	355	403	474	502	568	669	588	666	784
1	14	210	252	280	542	614	722	765	867	1020	896	1016	1195
1-1/8	12	298	357	397	668	757	890	1083	1227	1444	1269	1439	1693
1-1/4	12	415	493	553	930	1055	1241	1509	1710	2012	1768	2004	2358
1-1/2	12	734	880	978	1645	1865	2194	2668	3024	3557	3127	3544	4169
Torque values for 1/4 and 5/16-in series are in inch -pounds. All other torque values are in foot-pounds Torque values calculated from formulas $T=KDF$, where K = 0.15 for "lubricated" conditions K = 0.17 for zinc plated and dry conditions K = 0.20 for plain and dry conditions D = Nominal Diameter F = Clamp Load													

FASTENER TORQUE RECOMMENDATION

TORQUE-TENSION RELATIONSHIP FOR METRIC FASTENERS

Nominal Dia.	Pitch	 Class 4.6			 Class 8.8			 Class 10.9			 Class 12.9	
		Tightening Torque			Tightening Torque			Tightening Torque			Tightening Torque	
		Lubed	Dry Plated	Dry Plain	Lubed	Dry Plated	Dry Plain	Lubed	Dry Plated	Dry Plain	Lubed	Dry Plain
(mm)		K = 0.15 (ft-lbs)	K = 0.17 (ft-lbs)	K = 0.20 (ft-lbs)	K = 0.15 (ft-lbs)	K = 0.17 (ft-lbs)	K = 0.20 (ft-lbs)	K = 0.15 (ft-lbs)	K = 0.17 (ft-lbs)	K = 0.20 (ft-lbs)	K = 0.15	K = 0.20
3	0.5	0.28	0.32	0.38	0.73	0.82	0.97	1.0	1.2	1.4	1.2	1.6
3.5	0.6	0.44	0.50	0.59	1.1	1.3	1.5	1.6	1.9	2.2	1.9	2.5
4	0.7	0.66	0.74	0.87	1.7	1.9	2.3	2.4	2.7	3.2	2.8	3.8
5	0.8	1.3	1.5	1.8	3.4	3.9	4.5	4.9	5.5	6.5	5.7	7.6
6	1	2.3	2.6	3.0	5.8	6.6	7.7	8.3	9.4	11	9.7	13
6	1.25	2.1	2.3	2.7	5.3	6.0	7.0	7.6	8.6	10	8.8	12
7	1	3.8	4.3	5.0	9.7	11	13	14	16	19	16	22
8	1	5.9	6.6	7.8	15	17	20	22	24	29	25	34
8	1.25	5.5	6.2	7.3	14	16	19	20	23	27	24	31
10	1.25	11	13	15	29	33	39	42	48	56	49	66
10	1.5	11	12	14	28	32	37	40	45	53	47	62
12	1.25	21	23	28	53	60	71	76	86	101	89	119
12	1.5	20	22	26	51	58	68	73	82	97	85	113
12	1.75	19	21	25	49	55	65	70	79	93	81	108
14	1.25	26	29	34	66	75	89	95	106	127	111	148
14	1.5	28	32	37	72	82	96	103	117	138	121	161
14	2	30	34	40	78	88	104	111	126	148	130	173
16	1.5	50	57	67	129	146	171	184	208	245	215	287
16	2	47	53	62	121	137	161	173	196	230	202	269
18	1.5	73	82	97	187	212	249	266	303	357	313	417
18	2.5	65	73	86	167	189	222	239	270	318	279	372
20	2.5	91	104	122	236	267	314	337	382	449	394	525

Clamp load calculated as 75% of the proof load for specified bolts.
 All Torque values are listed in foot-pounds
 Torque values calculated from formulas $T=KDF$, where
 K = 0.15 for "lubricated" conditions
 K = 0.17 for zinc plated and dry conditions
 K = 0.20 for plain and dry conditions
 D = Nominal Diameter
 F = Clamp Load

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



WWW.M-BCO.COM

M-B Companies, Inc.
1615 Wisconsin Ave.
P. O. Box 200
New Holstein, WI 53061-0200
(920) 898-1560 or 800-558-5800
FAX: (920) 898-4588

