

OPERATOR'S AND PARTS MANUAL

Model ZTB

Zero Turn Snowblower



QUALITY YOU CAN SEE, PEOPLE YOU CAN TRUST™



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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 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 snowblower head and drive unit.

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

Snowblower Serial Number:

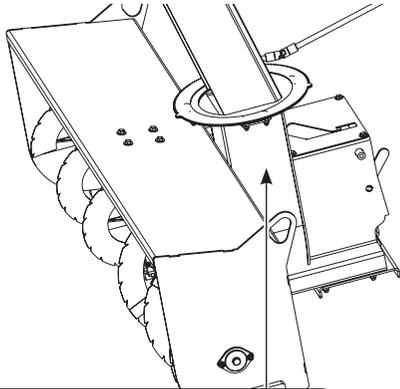


Figure 1

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 you local dealer for replacements.



AVOID INJURY!
SHUT OFF ENGINE AND BE SURE ALL PARTS HAVE STOPPED BEFORE UNBLOCKING DISCHARGE CHUTE.



AVOID INJURY FROM ROTATING AUGER. KEEP HANDS, FEET AND CLOTHING AWAY.

390-150720

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 counterweight recommendations 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 snowblower 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 snowblower 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 snowblower 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 snowblower without proper guards plates, or other safety protective devices in place.
10. Never operate the snowblower 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, 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 snowblower when it is transported or not in use.
15. Use only attachments and accessories approved by the manufacturer (such as wheel weights, counterweights, cabs, and the like).
16. Never operate the snowblower 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 unit 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 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.

CONTROLS AND FEATURES

The snowblower will discharge snow forward or to either side depending on the position angle of the discharge chute.

If the chute adjustment is manual:

1. Use the chute rotation control rod to position the discharge chute.

If the chute adjustment uses the electric actuator:

1. The controls mounted to the handlebar will actuate the movement of the discharge chute.
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.

ASSEMBLY

The ZTB Zero Turn Snowblower is designed to be used with the Zero Turn Tractor.

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.

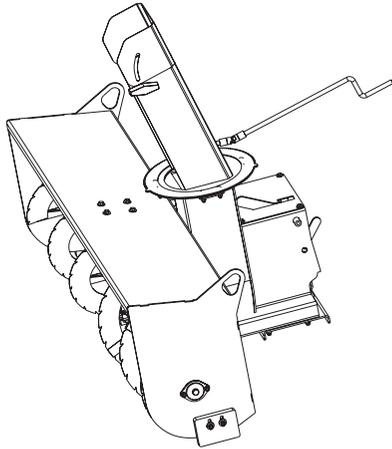


Figure 2

Loose Parts

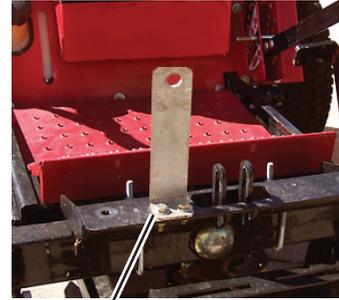
QTY	Description
13	Washer, Flat 5/16
12	Nut, Hex 5/16-18 UNC
4	Poly Slide, Lower
4	Poly Slide, Upper
1	Chute Glide Ring
1	Chute Assembly
1	Snowblower Assembly
1	Manual Chute Rotation Assy or Optional Electric Chute Rotation Assy
2	Poly Skid Shoe for Skid Shoe Install
4	Bolt, 5/16"-18 UNC x 1.50" for Skid Shoe Install
8	Bolt 5/16"-18 UNC x 1.25" for Chute Install

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.



B

Figure 3

The following steps describe how to mount the snowblower head.

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

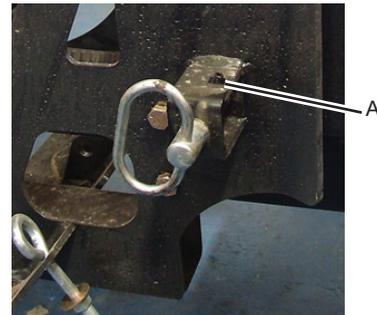


Figure 4

ASSEMBLY

2. Mount the snowblower head.
 - a. Position the snowblower 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 snowblower head.
 - e. Pull and rotate the lock pins to enable them to spring into the holes in the snowblower head. Some movement of the attachment mount may be needed to let the pins spring into lock position.

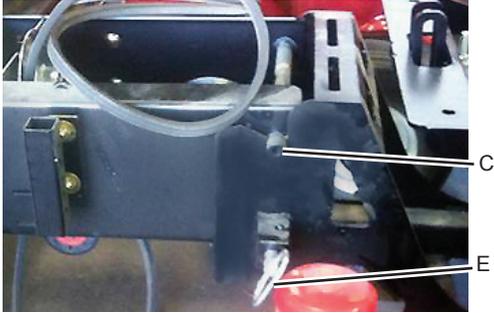


Figure 5

3. Install snowblower drive belt.
 - a. Release the spring tension on the belt tensioner by pushing in on the tensioner arm.
 - b. Stretch the V-belt from the snowblower pulley to the bottom center pulley on the attachment mount. The belt will fit under the large tension pulley.
 - c. Loosen the nut and bolt on the bracket that holds the bearing for the drive belt.
 - d. Swivel the bearing away from the pulley.
 - e. At the snowblower drive pulley, route the belt over the flat pulleys then under the two bottom pulleys. The V-belt must be positioned narrow side up.
 - f. Place the V-belt over the snowblower drive pulley.
 - g. Pull on the tensioner arm to spring load the tension pulley.
 - h. Swivel the bearing and position it to make contact with the top (flat side) of the belt.
 - i. Tighten the bolt and nut to hold the bearing lightly against the belt. The bearing will keep the drive belt from jumping out of the pulley.
 - j. Secure the top cover plate over the pulleys

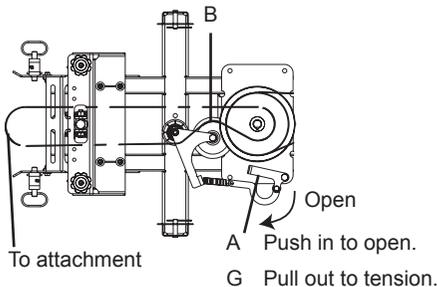


Figure 6

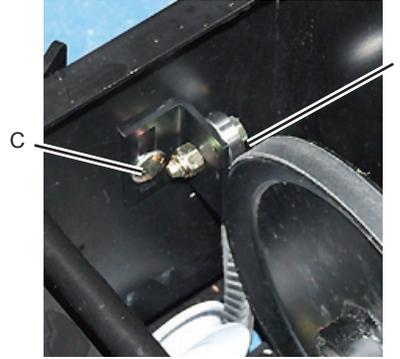


Figure 7

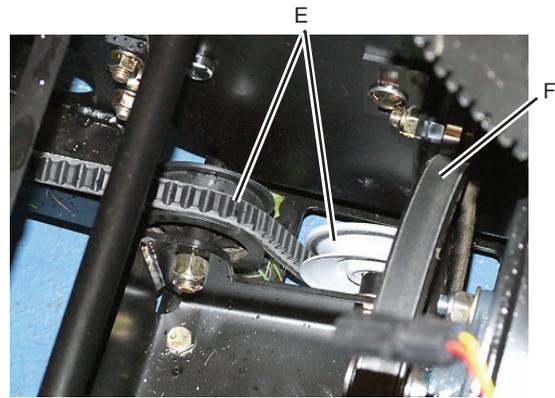


Figure 8

4. To attach the drive belt to the engine, refer to the Attachment Mount Installation manual.
- The snowblower head is now mounted.

ASSEMBLY

To Assemble the Discharge Chute

Manual (Standard)

- Place the glide ring on top of the mounting flange. Line up the bolt holes.
- Place the discharge chute on top of the glide ring. The teeth in the plate will mesh with the gear of the manual crank. The bolt holes must line up.
- Insert 5/16 carriage bolts through the four pairs of mounting holes.

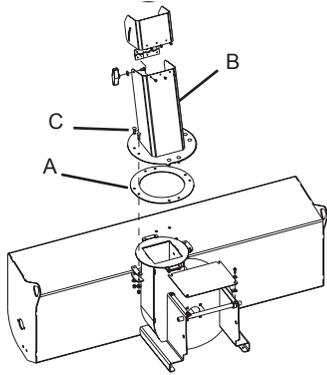


Figure 9

- Position one of the upper slide (narrower) pieces onto the bolts.
- Position one of the lower slide pieces onto the bolts.
- Secure with a flat washer and a locking nut.

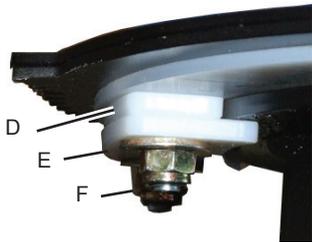


Figure 10

NOTE: The standard discharge chute will have a manual crank. When the crank is turned, the chute discharge is redirected. This standard configuration uses a glide ring as a bearing surface for the chute. Assemble the chute rotation rod and gear to the body of the snowblower.

- Mount the bracket for the manual swing controls on the front lift assist mount. Use two bolts with washers and nuts.
- The swing control rod will go through the hole of the manual swing bracket.
- Attach the plate to the side of the chute opening.

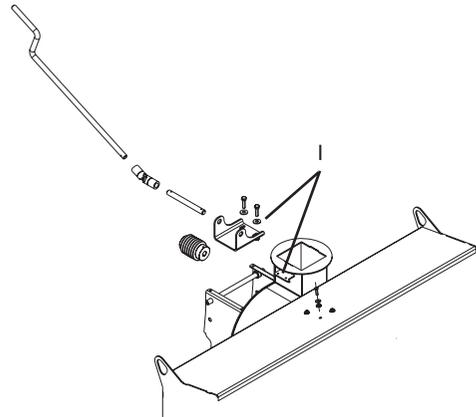


Figure 11

ASSEMBLY

Electric (Optional)

- Place the glide ring on top of the mounting flange. Line up the bolt holes.
- Place the discharge chute on top of the glide ring. The teeth in the plate will not contact the electric drive. Rotate the chute so the discharge is facing forward.
- Place the gear plate for the electric drive over the top of the chute. Lower it until it is flat and the teeth engage the electric drive. Some adjustment may be needed to have all the bolt holes line up. Insert 5/16 carriage bolts through the four pairs of mounting holes.

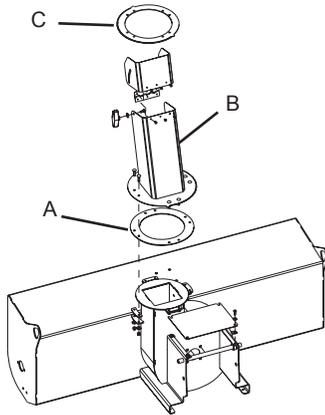


Figure 12

- Position one of the upper slide (narrower) pieces onto the bolts.
- Position one of the lower slide pieces onto the bolts.
- Secure with a flat washer and a locking nut.

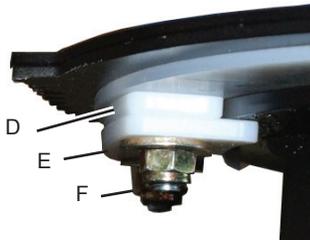


Figure 13

- When all four slides are installed, the chute should be able to rotate smoothly but should not be a loose fit.
- Position the actuator as shown and bolt it to the plate.
- Attach the plate to the side of the chute opening.
- Connect the electrical plug to the wiring harness from the control box mounted to the handlebars.

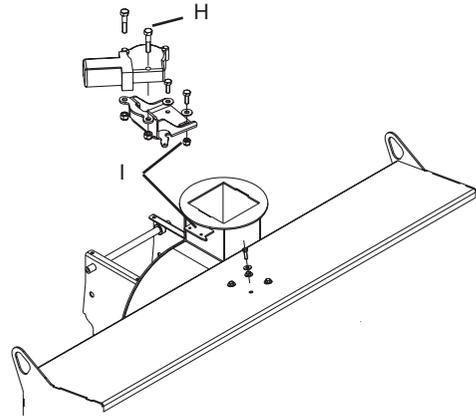


Figure 14

The assembly is complete.

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 skid shoes to make sure they are set at the desired height.
4. Make sure that the discharge chute 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 SNOWBLOWER

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 ribbon and discharge impeller are controlled by the speed of the engine.
3. Refer to the tractor Owner's Manual for proper engagement of the PTO. Engage the PTO.
4. Move forward to start clearing snow.

WARNING! The snowblower discharge can cause property damage and injury to by-standers. Discharge toward open areas only.



ENGINE SPEED

Larger amounts of snow are removed as engine speed increases. Adjust speed as needed.

DISCHARGE ANGLE ADJUSTMENT

To change the angle of the discharge:

1. Slow down or stop forward movement. Rotate the discharge chute to the direction needed.
2. Move forward as needed.

NOTE: The top of the deflector is manually adjusted. This controls the height of the discharge.

For manual systems:

1. Use the swing control rod to change the position of the discharge chute.

For electric systems:

1. Press the electric rocker switch on the handle bars to position the discharge chute.

ADJUSTMENT AND SERVICE

SCRAPER HEIGHT ADJUSTMENT

The height of the scraper blade (cutting edge) will determine the quality of snow removal. The scraper blade mounting position is fixed and cannot be adjusted. The position of the skid shoes is adjusted vertically to change the scraper blade clearance height.

If the skid shoes are positioned too far down, the scraper blade will not clear all the snow. If skid shoes are set too high, the scraper blade will wear and allow the ribbon (auger) to make contact with the ground. Mismatched skid shoe heights will cause uneven clearing of snow.

WARNING! When making repairs or adjustments, the tractor engine must be OFF if the snowblower is connected.



1. Park the tractor with the mounted snowblower on a hard, flat, level surface; preferably concrete or asphalt.
2. Raise snowblower high enough to allow placement of shims listed in step 3.
If using the snowblower on gravel or uneven surfaces, a minimum gap of 1" (25 mm) is recommended to minimize the scraping of unwanted debris. This will help avoid running gravel through the snowblower. Allow 1/8" (3 mm) between scraper blade and hard, smooth surfaces. Use appropriate shims when adjusting height.
3. Place shims between scraper blade and hard, smooth ground surface.
4. Lower snowblower onto ground/shims.
5. Shut off the tractor. Remove key from ignition and apply parking brake.
6. Loosen the two lock nuts and carriage bolts for mounting each skid shoe.
7. Push the skid shoes downward to make solid contact with the ground. Tighten all mounting locknuts and bolts.
8. Remove shims from below scraper blade.
9. With the skid shoes on the ground, check the clearance between scraper blade and ground surface. The ribbon must not be in contact with ground.

NOTE: If the skid shoes are wearing unevenly they can be switched to the opposite side. When the skid shoes are worn out they must be replaced.

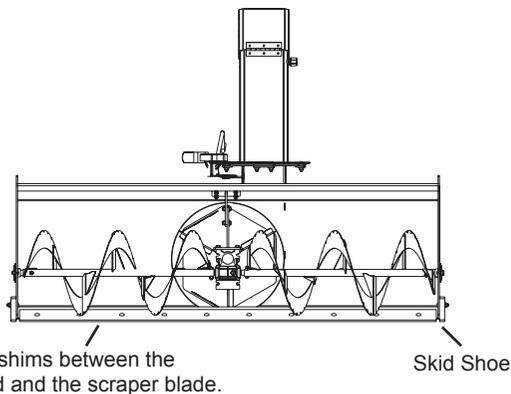


Figure 15

DISCHARGE CHUTE GLIDE RING

The glide ring provides a sliding surface for the discharge chute rotation. To clean and lubricate or replace the glide ring, the discharge chute must be removed.

WARNING! When making repairs or adjustments on the snowblower, the tractor engine must be off if the snowblower is connected.



1. Support the discharge chute. Remove the nuts from all four of the poly slide hold downs. The poly slides should be removed and cleaned.
2. Lift the discharge up to remove the glide ring.
3. Clean or replace the glide ring. When reinstalling the glide ring the bottom side should be lubricated with a spray grease.
4. Place the discharge chute in position. Line up the carriage bolts with the glide ring and the teeth in the plate with the rotation drive gear.
5. Place the upper and lower poly slide pieces in place and secure with a washer and locking nut.
6. Tighten the nuts so the chute rotates smoothly and is not a loose fit.

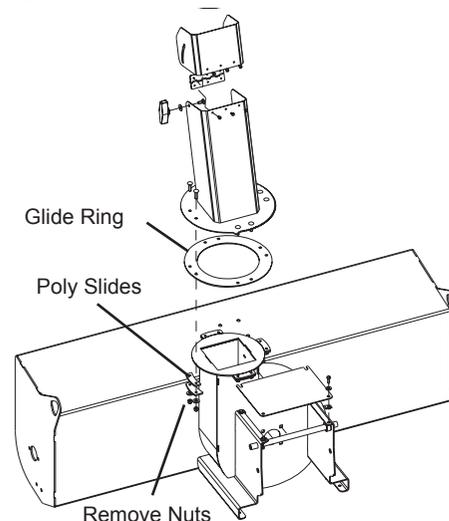


Figure 16

ADJUSTMENT AND SERVICE

REMOVE RIBBON AND GEARBOX

The two ribbons and gearbox are held in place with two shafts on the ends and a bracket on the top of the gearbox.

WARNING!



When making repairs or adjustments on the snowblower, the tractor engine must be off if the snowblower is attached.

1. Remove the bolts at each end that hold the shaft in the bearing.
2. Pull the two shafts out. The bearings may need to be removed.
3. Remove the bolts that hold the gearbox to the top bracket.

NOTE: If the impeller is going to be removed the brackets will be removed

4. The shaft from the gearbox to the impeller is connected with a shear bolt. Remove the shear bolt
5. The ribbon/gearbox assembly can be pulled straight out.
6. To remove the ribbons from the gearbox, the shaft bolts are removed.

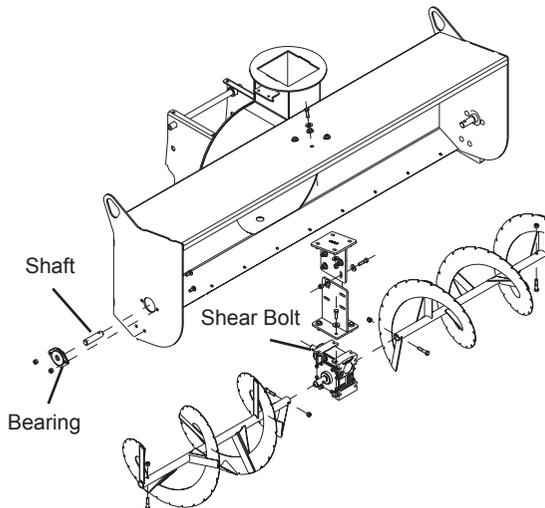


Figure 17

The reassembly is the reverse order of the removal.

CAUTION!



A shear bolt must be used to connect the impeller to the gearbox. Do not overtighten. The outer tube must not tighten onto the inner shaft. Failure to follow this instruction may damage the snowblower.

REMOVE THE IMPELLER

Access to the impeller is gained by first removing the ribbon/gearbox assembly.

1. Remove the V-belt from the drive pulley. Remove the shear bolt pulley.
2. Loosen the set screw in the bearing.
3. Pull the impeller out.

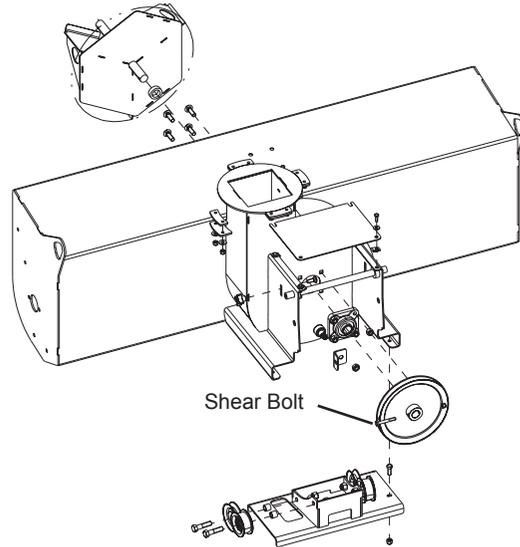


Figure 18

To reassemble:

1. Clean the shaft. Apply a light coat of grease to prevent corrosion.
2. Place spacer over the shaft and insert the shaft into the bearing. Tighten the bearing set screw.
3. Install the pulley.
4. Install shear bolt.

MAINTENANCE

MAINTENANCE SCHEDULE

Maintenance Required	Service Interval	Notes
Clean and lubricate discharge chute glide ring	Annually - More often if needed	Use spray grease
Change oil in gear case	Annually - More often if needed	

STORAGE

TEMPORARY STORAGE (30 DAYS OR LESS)

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

- 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.

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, 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
Ribbon does not rotate.	<ol style="list-style-type: none"> 1. Drive belt is slipping. 2. Shear bolt is broken. 3. Engine clutch not engaging. 	<ol style="list-style-type: none"> 1. Check belt-tighten or replace. 2. Check for jam up in ribbon and impeller. Replace shear bolt. 3. Check clutch operation. Repair if needed
Excessive vibration.	<ol style="list-style-type: none"> 1. Loose parts or damaged assembly. 	<ol style="list-style-type: none"> 1. Tighten all hardware. Check rotating parts for damage. If vibration continues.

SERVICE PARTS

Part Number	Description
716-172325	Motor, Chute Rotation
401-172342	Gear, Manual Chute Rotation
401-172272	Skid Shoe Block
401-172265	60" Cutting Edge
401-172334	Chute Glide Ring
600-160526	Drive Shaft Bearing
600-132224	Ribbon Bearing

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

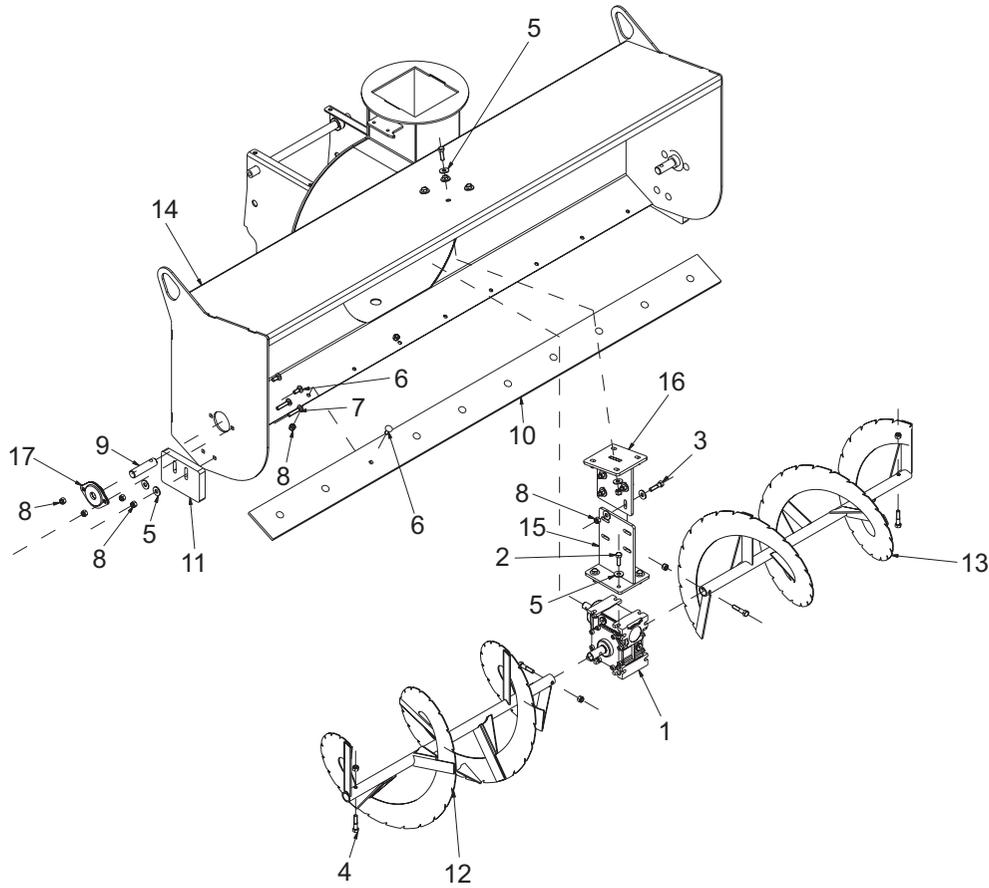
M-B Co.
1615 Wisconsin Ave.
P.O. Box 200
New Holstein, WI 53061-0200

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

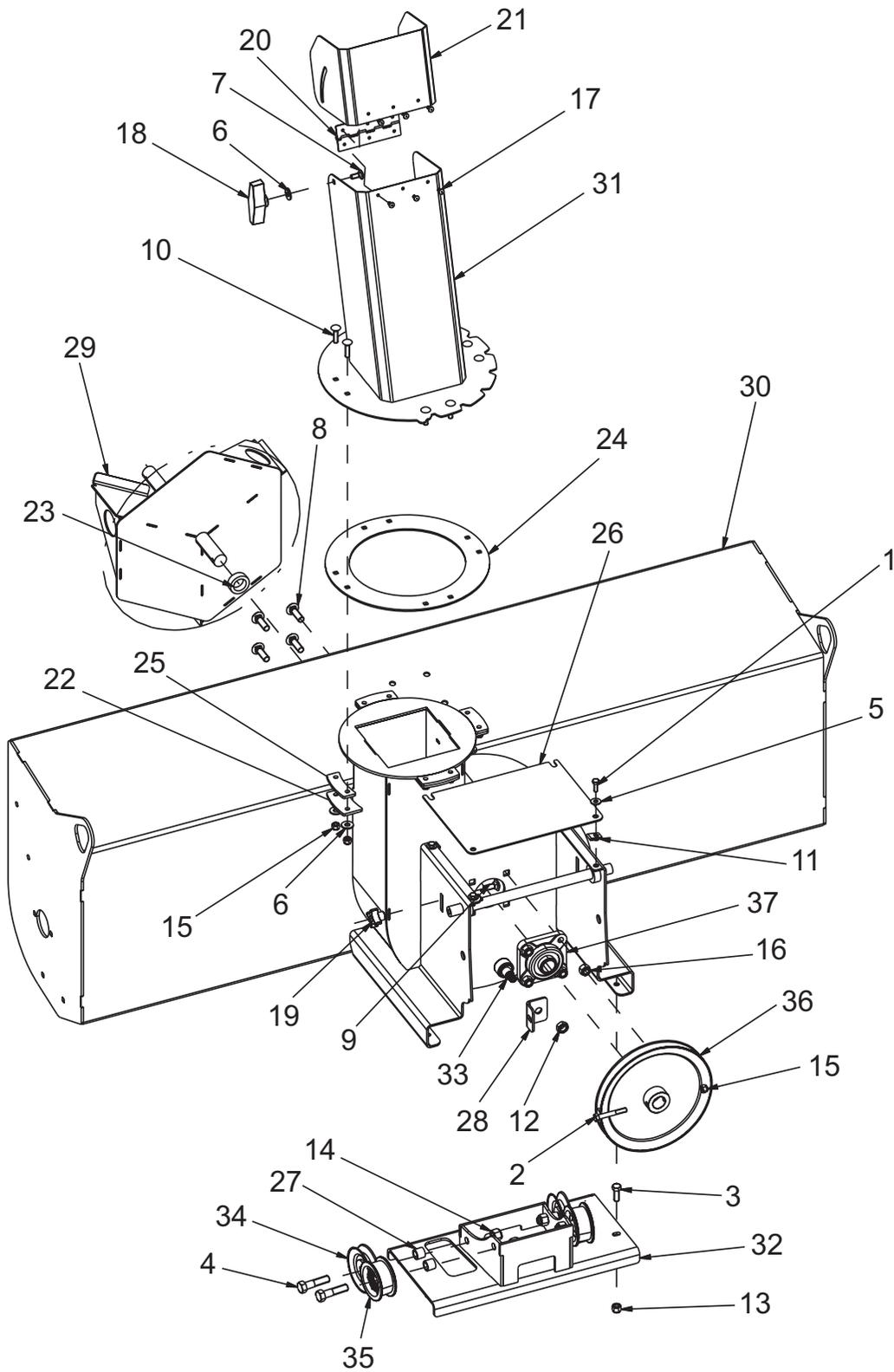
SNOWBLOWER RIBBON



Item	Part Number	Description	Qty
1	501-160695	Gearbox, Reducer, ZSB	1
2	311-21000	HHCS .31-18 UNC x 1.000	8
3	311-21250	HHCS .31-18 UNC x 1.250	4
4	311-21500	HHCS .31-18 UNC x 1.500	4
5	341-20000	Washer, Flat - 5/16 STD Zinc PL	24
6	370-126976	Carriage Bolt 5/16-18 UNC x .75	14
7	370-172347	Carriage Bolt 5/16-18 UNC x 1.500	4
8	371-81620	Nut, Hex, ESNA, 5/16-18-UNC	34
9	401-160392	Shaft, Auger	2
10	401-172265	Cutting Edge, 60" ZTB	1
11	401-172272	Block, Skid Shoe, Snowblower, 60"	2
12	410-160644	Auger Weldment, RH, 60" ZSB	1
13	410-160645	Auger Weldment, LH, 60 ZSB	1
14	410-172245	Snowblower, W. U. 60"	1
15	410-172669	Gearbox Mount Bottom	1
16	410-172750	Gearbox Mount Top	1
17	600-132224	Bearing, 3/4" Flangette	2

PARTS LIST

SNOWBLOWER BODY



PARTS LIST

SNOWBLOWER BODY

Item	Part Number	Description	Qty
1	311-10750	HHCS .25-20 UNC x 0.750	4
2	311-22250	HHCS .31-18 UNC x 2.250	1
3	311-31000	HHCS 3/8-16 UNC x 1.000	4
4	311-52000	HHCS .50-13 UNC x 2.000	4
5	341-10000	Washer, Flat - 1/4 STD Zinc PL	4
6	341-20000	Washer, Flat - 5/16 STD Zinc PL	9
7	370-126976	Carriage Bolt 5/16-18 UNC x .75	1
8	370-172288	Carriage Bolt 7/16-20 UNC x 1.50	4
9	370-92047	Carriage Bolt 3/8-16 UNC x 1	1
10	370-92106	Carriage Bolt 5/16-18 UNC x 1.25	8
11	371-169215	Nut, 1/4-20 Clip-On, Tapped Hole	4
12	371-81296	Nut-LK-CTR 1/2-20 UNF	1
13	371-81297	Nut, Hex, ESNA, 3/8-16 UNC	4
14	371-81417	Nut, Hex, ESNA, 1/2-13-UNC	4
15	371-81620	Nut, Hex, ESNA, 5/16-18-UNC	9
16	371-82080	Nut, Hex, ESNA, 7/16-14 UNC	4
17	380-169217	Rivet, 3/16 Pop Aluminum	6
18	384-160444	Knob, Threaded, Female, 5/16-18 UNC	1
19	384-176079	Knob, Phenolic 4 Leg w/ 3/8-16 Insert	1
20	401-160339	Hinge, Deflector Chute	1
21	401-160676	Deflector, Chute	1
22	401-160693	Poly Slide, Lower, Center, Chute	4
23	401-169900	Spacer	1
24	401-172334	Chute Glide Ring	1
25	401-172336	Poly Slide, Upper	4
26	401-172378	Plate, Cover, Mount, ZSB	1
27	401-172554	Spacer, .51 ID .63 OAL	4
28	401-176078	Plate, Roller Bracket	1
29	410-172192	Impeller, 60" ZSB	1
30	410-172245	Snowblower, W.U., 60"	1
31	410-172270	Chute W.U., ZSB	1
32	410-176172	Mount, ZSB Pulleys	1
33	600-176055	Cam Follower Eccentric, 1.25 OD	1
34	505-172610	Pulley, 3.50" Idler	2
35	505-172697	Idler Pulley, Flat	2
36	505-172767	Pulley, 9" O.D., 1" I.D. w/Shear Pin Hole	1
37	600-160526	Bearing, 4-Bolt	1

PARTS LIST

DECALS

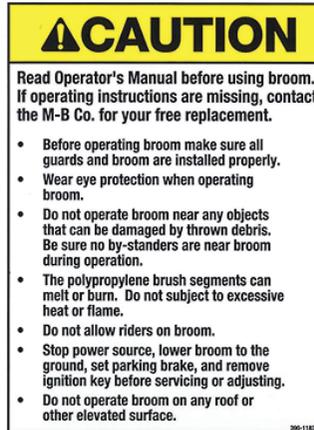
1



2



3



4



Item	Part Number	Description	Qty
1	390-118356	Decal, Grease Point	1
2	390-118349	Decal, Danger, No Riders	1
3	390-118351	Decal, Caution, Read Operator's Manual	1
4	390-118352	Decal, Warning, Moving Parts Hazard	2
Not Shown	390-117897	Decal, M-B	1

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.

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