

PowerBoss®
The Power of Clean

User Manual
Rider Sweeper
Armadillo 6X_(Diesel, Gas, & LPG)
AM7D-III_(Diesel)



PowerBoss®, Minuteman International, Inc.
A Member of the Hako Group

PB# 4100043UM Rev. A 08/14

PREFACE

Thank you for your purchase of the new industry standard for sweepers. PowerBoss® takes great pride in offering the most dependable, reliable and best value in industrial power sweepers and sweeper/scrubbers. We set the standard.

Our Customer Service Department would like to hear from you. If you see any errors, omissions or something that needs clarification in this User Manual, please let us know. We are working hard towards continually improving our processes to bring you the best you deserve.

Please copy the form on next page, fill out and comment on how you found our manual.

Thank you!

The PowerBoss Team

PREFACE



Name: _____
Title: _____
Company Name: _____
Address: _____
Country: _____
Type of equipment or model number: _____
Comments: _____

Please return to:
Customer Service Manager
PowerBoss®, Minuteman International, Inc.
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This is the User Manual for the PowerBoss® Armadillo 6X & PowerBoss® AM7D-III machines.

This manual covers all standard Armadillo 6X & AM7D-III variations beginning, August 2014.

We believe this machine will provide excellent service for many years. Best results can be obtained if:

- The machine is operated with reasonable care.
- The machine is maintained regularly per the maintenance schedule provided in this User Manual.
- The machine is maintained with PowerBoss® supplied or equivalent parts.

All right side and left side references to the machine (except for engine) are determined by facing the direction of forward travel. The front of the engine or engine fan faces the rear of the machine. Some hardware considered to be common or locally available has been omitted from the parts section to make this manual clear. Be sure to use equivalent hardware when replacement becomes necessary.

The Model and Serial Number of your machine is shown on the I.D. name plate. This information is needed when contacting Technical Support or when ordering parts. The I.D. plate is mounted on the console of the machine left of the operator and adjacent the main broom adjustment access door.

Parts may be ordered by phone, fax or email from any PowerBoss® parts and service center. Before ordering parts or supplies, be sure to have your machine model number and serial number handy. For your convenience Fill out the Machine Data block on the next page for future reference.

Example I.D Plate:



MACHINE DATA

Fill out at installation

Machine Serial Number: _____
Engine Serial Number: _____
Sales Rep.: _____
Date of Install: _____

All information contained in this manual is current at the time of printing. Minuteman International, Inc. reserves the right to make changes at any time without notice.

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Armadillo 6X and AM7D-III PB# 4100043UM Rev. A 08/14

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TECHNICAL SPECIFICATIONS

Model/Model No: Armadillo 6X / SW6XKDSDL (Diesel), SW6XKLGAS (Gas), SW6XKLPG (LPG)
AM7D-III / AM7D-III (Diesel)

DIMENSIONS & WEIGHT

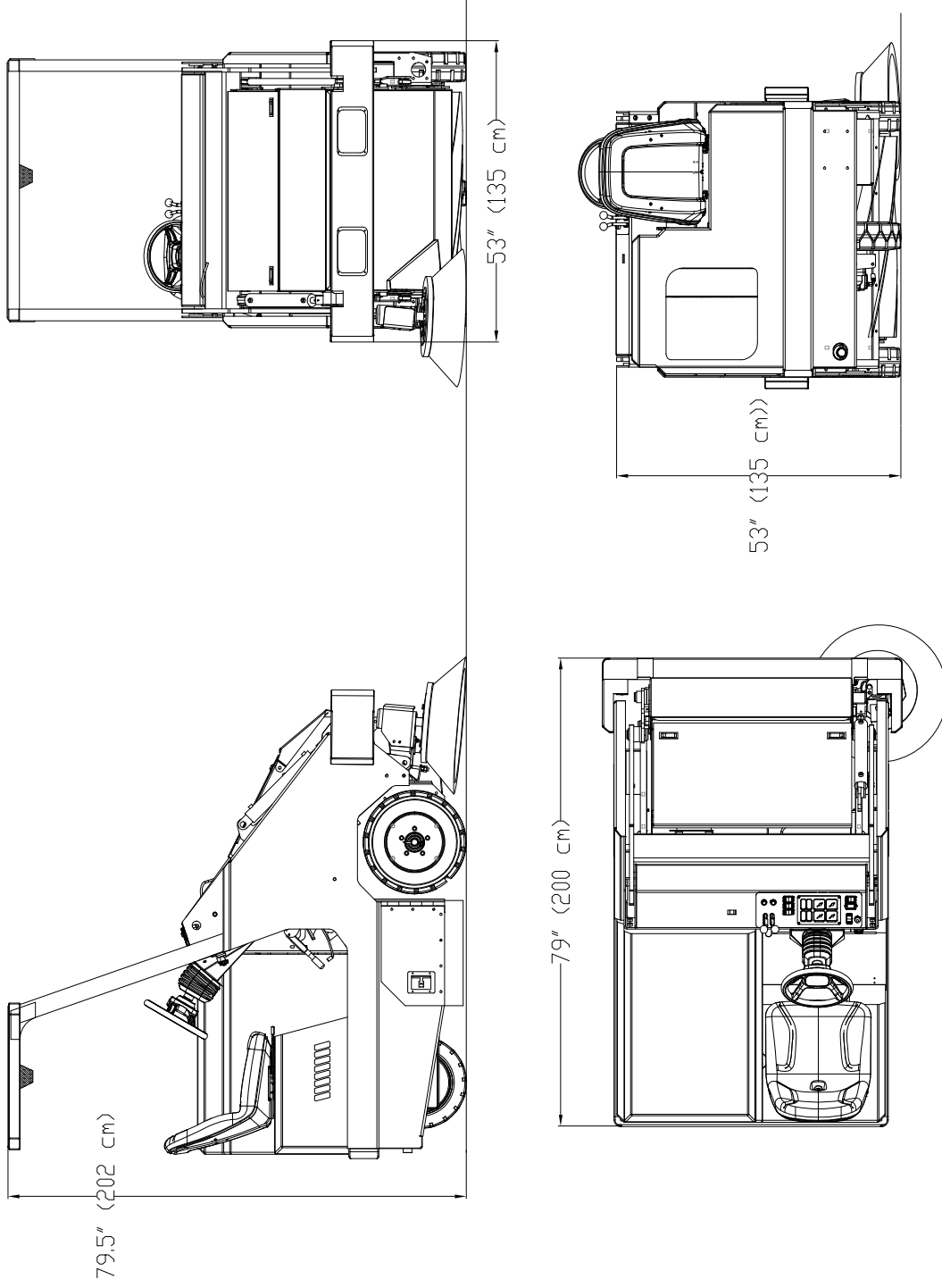
Length 79 inches (200 cm)
Width 53 inch (135 cm)
Height 53 inch (135 cm)
Height w/ overhead guard . . . 79.5 inch (202 cm)
Weight 2547 lbs (1155 kg)
Minimum U-turn 82 inch (208 cm)

SWEEPING SYSTEM

Sweep path. 53 inch (135 cm)
Main broom. 36 inch (91 cm)
Side broom 24 inch (61 cm)
Hopper type high dump
Hopper volume 10 cu ft (.28m²)
Hopper load capacity 650 lbs (295 kg)
Dust control 92 sq ft (8.6 m²)
High dump 60 inch (152 cm)
RTR (rotary trash relocation) . yes

TECHNICAL SPECIFICATIONS

PowerBoss®
The Power of Clean



Armadillo 6X and AM7D-III PB# 4100043UM Rev. A 08/14

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FEATURES

AIR-MOVING SYSTEM

- Dual-phase dust filtration
- Built-in pre-filtering & ultra-fine screen panel filters for dust control
- Aggressive electric filter shakers
- Shock-mounted hydraulic impeller
- Engine area shielded from exhaust air
- Dust Control Filter: 92 Sq. Ft. total

ERGONOMICS SYSTEM

- Roomy, open cockpit with extra comfort
- Adjustable, high-back seat
- Power steering and tilt steering wheel
- Comfortable pedal/controls placement
- Full instrumentation for all functions

DEBRIS-HANDLING SYSTEM

- Direct throw sweeping method
- Oversized hopper with RTR®
- Quick-change, floating 48" main broom & retractable side brooms
- Dual-performance sweep mode
- Multi-Level Hopper Dumping

DRIVE-TRAIN SYSTEM

- Industrial liquid-cooled engine
- Heavy-duty radiator & Tri-phase air cleaner
- Hydraulics protection package
- 4-Core Radiator
- PowerClimb™ All-Terrain Access
(Two 18" OD Solid Front Tires & One 16" OD Solid Rear Tire)

CHASSIS SYSTEM

- Massive One-Piece, unitized steel frame
- Oversized, soft-ride tires
- Eliminates jolts and vibration for component protection*

POWERBOSS® INNOVATIONS

- PowerClimb™ - with oversized tires and extra ground clearance you can easily negotiate rough terrain and speed bumps; even climb sidewalk curbs

ENVIRONMENTAL FRIENDLY FEATURES

CLEAN AIR

High-performance filter system dramatically reduces the release of dust and debris back into the air, dust vacuum ensures that dust is put directly into the hopper, bristle pattern on main broom increases dust control

LOWER EMISSIONS

All gas and LP engines meet Tier 2 specifications, catalyst mufflers, battery operated available, diesel operated available, bio-diesel fuel can be used in Kubota engine

SAFER WORK ENVIRONMENT

Orange machines are highly visible to others in the workplace, simple controls reduce operator error, one-button scrub, horn, fire in hopper indicator, effective braking system, seat equipped with safety shut-off switch, also available: overhead guard, back-up alarm, warning beacon

CLEAN ENERGY

Bio-diesel fuel can be used in Kubota engines

SAFETY INFORMATION

IMPORTANT SAFETY INSTRUCTIONS

Operators must read and understand this manual before operating or maintaining this machine.

Do not operate this machine in flammable or explosive areas.

This machine is designed solely for removing dirt, dust and debris in an outdoor or indoor environment. PowerBoss does not recommend using this machine in any other capacity.

The following information below may cause a potential hazard to the operator and equipment. Read this manual carefully and be aware when these conditions can exist. Take necessary steps to locate all safety devices on the machine and train the personnel operating the machine. Report any machine damage or faulty operation immediately. Do not use machine if it is not in proper operating condition.

FOR SAFETY DURING OPERATION

Keep hands and feet clear of moving parts while machine is in operation.

Make sure all safety devices are in place and operate properly. All covers, doors and latches must be closed and fastened before use.

During operation, attention should be paid to other persons in the work area and especially if small children are present.

Components can cause an explosion when operated near explosive materials or vapor. Do not operate this machine near flammable materials such as solvents, thinners, fuels, grain dust, etc.

Store or park this machine on a level surface only. To prevent unauthorized use, machine should be stored or parked with the key removed.

This machine is designed for level operation only. Do not operate on ramps or inclines greater than 2%.

This machine is not suitable for picking up hazardous dusts.

⚠ CAUTION

Use caution when moving this machine into areas that are below freezing temperatures.

FOR SAFETY WHEN SERVICING OR MAINTAINING MACHINE

Stop on level surface.

Disconnect the power to the machine when servicing. Avoid moving parts. Do not wear loose jackets, shirts, or sleeves when working on machine.

Avoid contact with battery acid. Battery acid can cause burns. When working on or around batteries, wear protective clothing and safety glasses. Remove metal jewelry. Do not lay tools or metal objects on top of battery.

Authorized personnel must perform repairs and maintenance. Use PowerBoss supplied replacement parts.

SAFETY SYMBOLS

Five symbols are used throughout this manual to emphasize various levels of safety information. These symbols and the meaning of each are listed below.

⚠ DANGER

To warn of immediate hazards which will result in severe personal injury or death

⚠ WARNING

To warn of hazards or unsafe practices which could result in severe personal injury or death.

⚠ CAUTION

To warn of hazards or unsafe practices which could result in minor personal injury.

ATTENTION!

To warn of practices which could result in extensive equipment damage.

NOTE: To direct your attention to important equipment information or special instructions for preventing damage to equipment

Symbols at the top of the list are the strongest warnings. However, all symbols represent important information which should be observed to protect you and others from harm and injury, and to prevent damage to the equipment.

SAFETY DECALS

Decals directly attached to various parts of the sweeper are highly visible safety reminders which should be read and observed. Make sure the decals are replaced if they become illegible or damaged.

Located in the drive compartment:
Part Number 3301854

! CAUTION

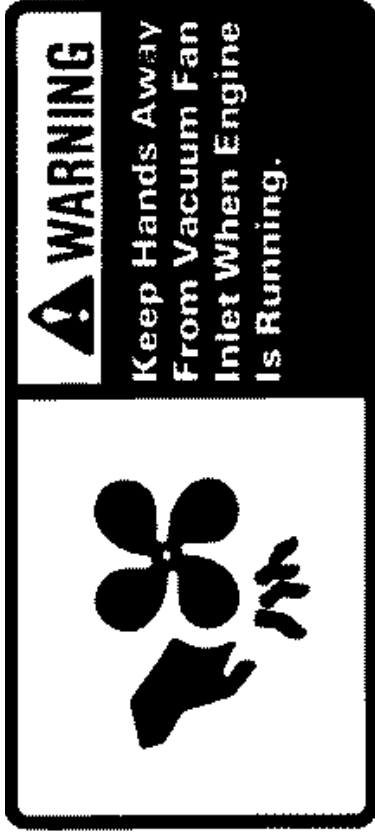
For Your Safety And Safety Of Others:

1. **DO NOT Operate Machine:**
Unless Operation Manual Is Read And Understood.
Unless Authorized And Trained.
In Areas With Flammable Or Explosive Conditions.
Without Adequate Ventilation.
2. Do Not Use Flammable Cleaning Materials.
3. Inspect Vehicle For Fuel Leakage.
4. Drive Slowly On Inclines And Slippery Surfaces.
5. Do Not Power Dump Hopper Unless Vehicle Is On A Level Surface.
6. Before Leaving Vehicle: Lock Parking Brake, Stop Engine, And Remove Key.

SAFETY INFORMATION

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Located at the Impeller:
Part Number 3301729



Located on the High Dump Hopper:
Part Number 3301732



Located on the shroud of the radiator:
Part Number 3301733



BASIC POWERBOSS® SAFETY

PowerBoss® sweepers should never be operated unless:

1. The operator is trained and authorized to operate the equipment and,
2. The equipment is free of malfunctions. Malfunctioning equipment should be removed from service.

DANGER

Keep cigarettes, matches and all other flame sources away from the sweeper. Gasoline, LP gas and diesel fuel are highly flammable. Lead acid batteries are equally dangerous due to the highly explosive hydrogen gas they emit.

WARNING

Before starting the engine, make sure that:

- * You are securely seated in the operator's seat.
- * The parking brake is locked.
- * The directional control pedal is in neutral.
- * The throttle is in idle.
- * Hydraulic controls are in the OFF position.

WARNING

During operation:

- * Keep your hands and body clear of moving parts, especially when the hopper or lift arms are partially or fully raised.
- * Make sure others in the area stay clear of the equipment and moving parts.
- * Never attempt to dump debris from a dock or mezzanine. Dump from ground level only.

SAFETY INFORMATION

WARNING

When leaving the sweeper unattended:

- * Place the controls in the OFF position.
- * Set the parking brake.
- * Shut off the engine.

WARNING

When servicing or repairing the fuel system:

- * Work in a properly ventilated area, do not smoke or allow an open flame near the fuel system.
- * Never bypass safety components unless you are testing them.
- * Never bypass the fuel filter lock, except when testing them (and always reconnect them after testing).
- * Wear gloves to disconnect the tank coupling.

WARNING

During cleaning and maintenance:

- * Always stop the engine and set the parking brake before servicing.
- * Never use detergents or cleansers that are flammable or combustible.
- * Never inflate a pneumatic tire without using a safety cage.
- * Do not attempt any impeller adjustment unless you have shut off the engine. Never place your hands near the intake hoses or inlet when the engine is running.
- * Always engage the safety arm before servicing the hopper. Do not rely on the hydraulic cylinder to keep the hopper raised.
- * Never test for hydraulic hose leaks using your hand or any other part of your body. High pressure leaks can be very dangerous and should only be checked using a piece of paper.

▲ WARNING

Do not operate an LP powered sweeper when any component in the fuel system is malfunctioning or leaking.

▲ WARNING

Replace any defective safety components before operating the sweeper.

▲ CAUTION

Do not drive with the hopper in the raised position except the few feet necessary to position the hopper over the dumpster or receptacle. Driving with the hopper raised reduces visibility and creates conditions for striking over-head objects, throwing the machine off-balance and other hazards.

▲ CAUTION

Travel slowly on grades.

▲ CAUTION

Place a block or chock behind the wheels when parking on inclines.

▲ CAUTION

Use special care when traveling on wet surfaces.

▲ CAUTION

Observe all proper procedures for operation and maintenance of the sweeper, as outlined in this manual.

▲ CAUTION

Remain alert at all times to people and equipment in and around your area of operation.

SAFETY INFORMATION

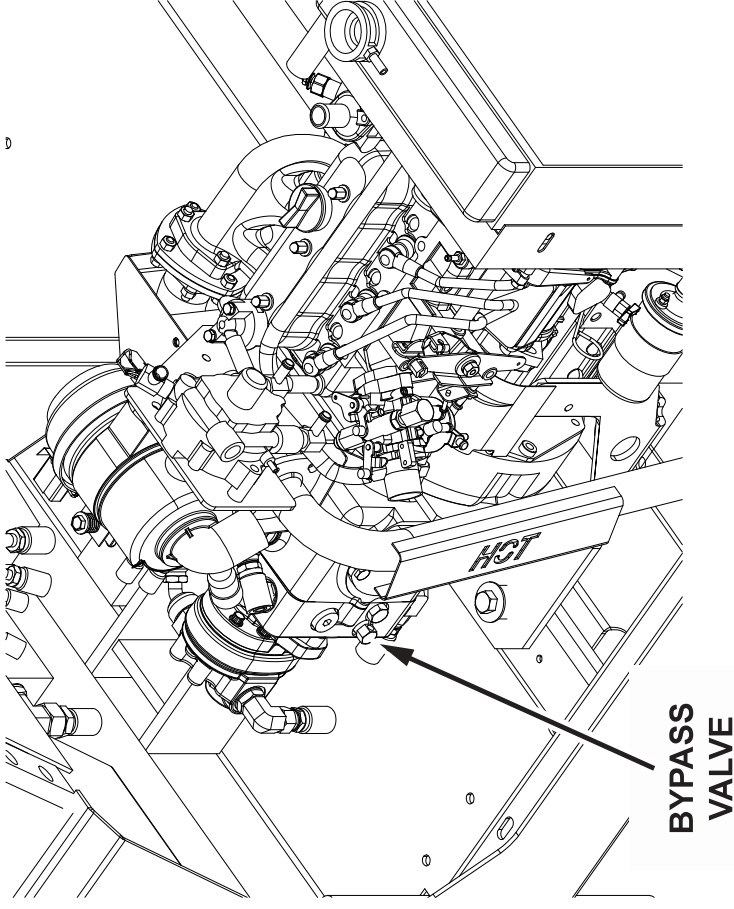
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The Power of Clean

ATTENTION!

Do not operate the #2 RTR lever before the #1 light illuminates.

ATTENTION!

Never push or tow a machine faster than 6 mph. If towing the machine is required, you must first disengage the drive wheel by turning the Bypass Valve out 3 full turns (maximum). The Bypass Valve is located on the side of the Main Hydraulic Pump attached to the engine. Failure to disengage could result in costly damage to the drive system.



MACHINE OPERATION

BASIC OPERATING CONTROLS AND INDICATORS

IGNITION SWITCH

The diesel powered machine has a two position key switch used to turn the machine's electric power on and off. The gasoline and LP units have a three position key switch.

To start gasoline powered machines, turn the key clockwise to the Start position. When the engine starts, release the key. To stop the engine, turn the key to OFF.

To start diesel engines, turn the ignition key clockwise to the on position. Press the Glow Plug Button for 20 seconds. Continue turning ignition key clockwise to the Start position. When engine starts release key.

NOTE: If the engine does not start after 10 seconds, release the key, wait 1 minute and repeat the procedure.

LIGHT SWITCH

The light switch, located on the control panel turns on and off the lights.

HORN

The horn is activated by pressing the horn button located on the right side of the operator.

FUEL LEVEL GAUGE

The fuel gauge indicates the amount of fuel remaining in the tank.

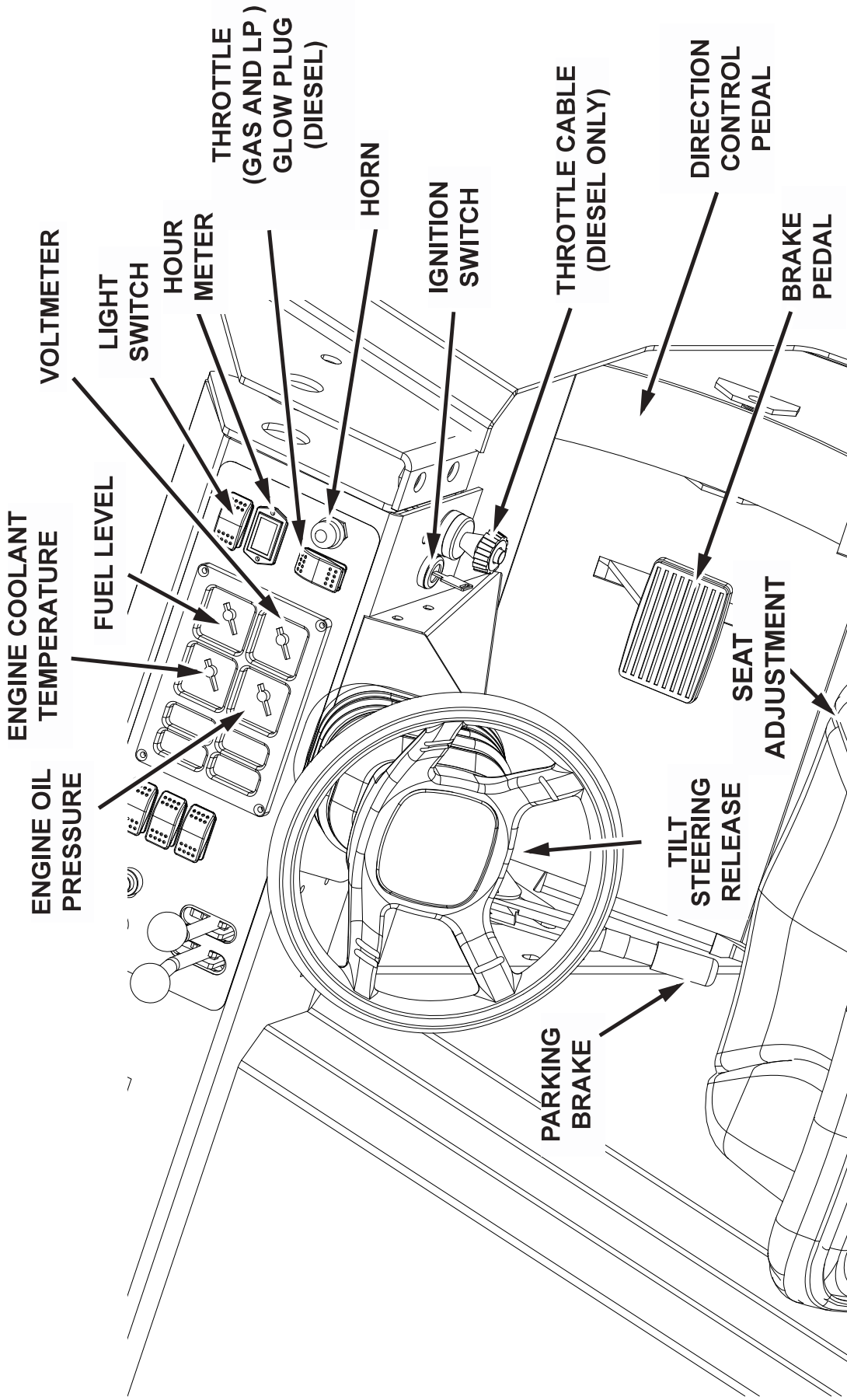
VOLTMETER AMP GAUGE

The Voltmeter used on gas & LP units or Amp Gauge used on diesel units indicates the charging current which is being sent to the battery by the alternator. It also indicates a drop in voltage when the alternator is not charging.

HOUR METER

The hour meter records the number of hours the machine has been operated, providing a helpful guide for performing routine maintenance tasks.

MACHINE OPERATION



ENGINE OIL PRESSURE

The engine oil pressure gauge ranges from 0 psi to 60 psi. A reading below 7 psi indicates problems which may result in damage to the engine.

ENGINE COOLANT TEMPERATURE GAUGE

The engine coolant temperature gauge registers the temperature of the engine coolant. Temperatures above 220°F indicate an overheating engine.

THROTTLE / GLOW PLUG

The throttle adjusts the engine speed from idle to the operating speed. The LP and Gasoline models have a three speed throttle switch with idle, slow and fast selections. The diesel model has an adjustable throttle cable and glow plug switch.

- The throttle should be in the IDLE position when starting the engine and immediately before shutdown.
- Full throttle position should be used during operation to ensure proper broom speed and dust control.

DIRECTIONAL CONTROL PEDAL

The directional control pedal controls the speed and direction of the machine. It is also used for slowing the machine or stopping.

- To propel the machine forward, apply pressure to the front of the pedal, increasing pressure to increase speed.
- To propel the machine backward, apply pressure to the rear of the pedal.
- To slow or stop the machine, move the foot pedal into neutral.
- For emergency stops, move the foot pedal past neutral and into the opposite position.

⚠ CAUTION

Use for emergency stops only! Constant use of this braking method may result in damage to the drive components.

PARKING BRAKE

The parking brake is cable activated. To engage the parking brake pull upward on the hand brake lever located on the left side of the front wall of the operator's compartment. To release the parking brake press the brake pedal and push down on the hand brake lever.

TILT STEERING RELEASE

The steering wheel can be adjusted to provide the most comfortable position for the operator. To adjust the steering wheel press the tilt steering release (just below the wheel in the rubber bellows) and push up or down on the steering wheel. The steering wheel will snap into a set positions.

SEAT ADJUSTMENT

The drivers seat is adjustable to provide the most comfortable position for the operator. The adjustment lever is at the bottom front of the seat. While sitting in the seat, push the lever to the right and pull forward or push back on the seat. Release the lever when the seat is in the proper location.

BRAKE PEDAL

The mechanical drum brakes on the two front wheels are operated by pressing on the brake pedal.

SWEEPING CONTROLS

MAIN BROOM SWITCH

The main broom switch activates and lowers the main broom. When not sweeping, the main broom should be turned off.

NOTE: The hopper must be lowered for the main broom to operate.

SIDE BROOM SWITCH

The side broom switch activates and lowers the side broom. When not sweeping, the side broom should be turned off.

NOTE: The hopper must be lowered for the side broom to operate.

DEBRIS HOPPER DUMP CONTROLS

FILTER SHAKER/VACUUM CONTROL SWITCH

The right side of this switch turns the impeller on. The left side of this switch is used to activate the filter shakers prior to dumping or as needed during sweeping operation. It is located to the left hand side of the instrument panel.

To shake the filter:

1. Bring the machine to a complete stop.
2. Switch off the main and side brooms.
3. Press and hold the filter shaker button for 20 to 30 seconds.
4. Turn the impeller on.
5. Switch the main and side brooms on and resume sweeping.

HIGH DUMP

The two levers on the left of the control panel are used to raise the hopper to any height up to 60" (1.52 m) and dump it.

⚠ CAUTION

Do not leave the hopper in the RAISE position for an extended period of time.

RAISE/LOWER HOPPER LEVER

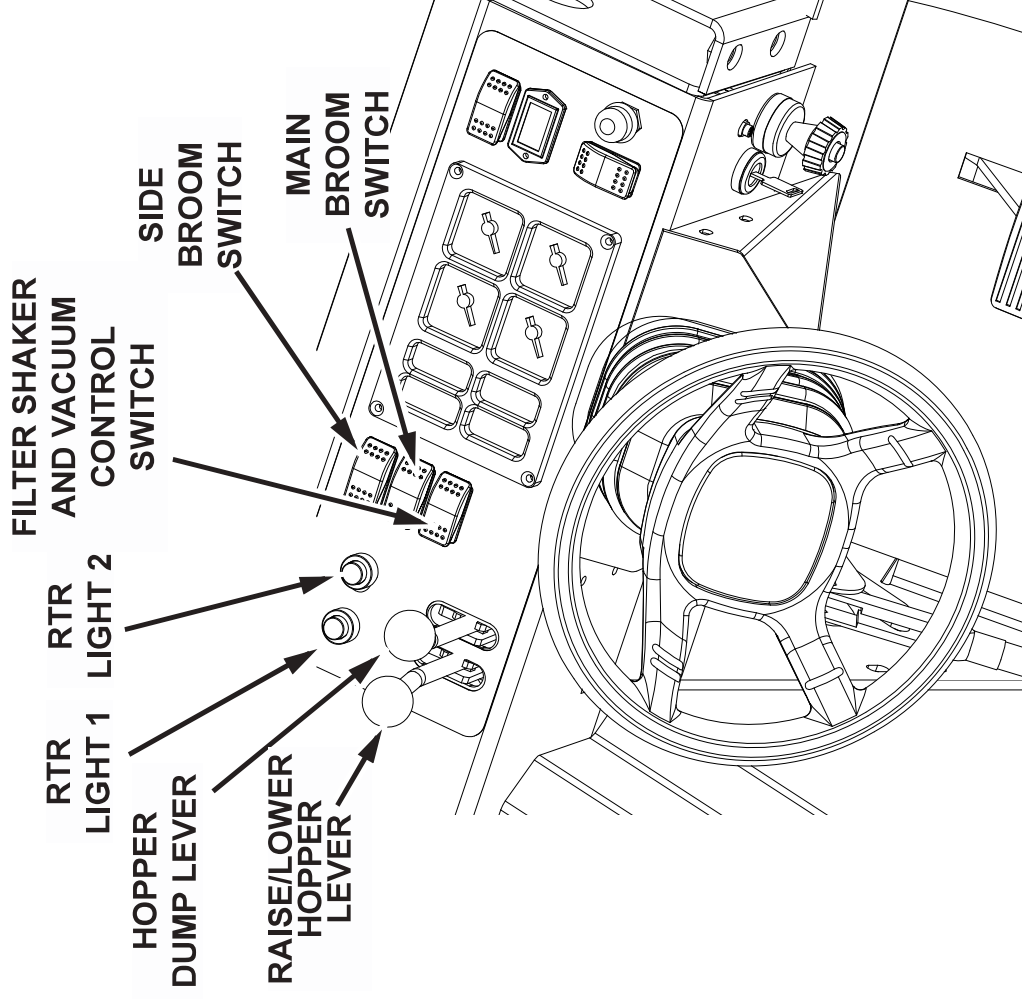
Raises and lowers the hopper

HOPPER DUMP LEVER

Rotates, dumps and returns the hopper to its original position.

RTR LIGHTS 1 & 2

Rotary Trash Relocator (RTR™) is a standard feature on high-dump models. Its purpose is to increase the holding capacity of the debris hopper to make dumping the hopper necessary less frequently.



OPERATING PROCEDURES

PRE-OPERATION CHECKS

Prior to starting the engine, check the following:

1. Engine oil level
 2. Engine coolant level
 3. Fuel level
 4. Hydraulic fluid level
 5. Brakes, steering and directional controls
 6. The floor beneath the machine for signs of fluid leaks
- Fluid levels should be correct. Brakes, steering and directional controls should be functioning properly. Hoses, lines and tanks should be free of damage and leaks.

STARTING



WARNING

Before starting the engine, sit in the operator's seat and make sure the parking brake is locked.

1. Make sure the directional control pedal is in the neutral position.
2. Make sure the throttle is in the idle position.
3. LP and Gasoline-powered: Turn the ignition key to the start position (to the right). When the engine starts, release the button.

Diesel-powered: Press the Glow-plug switch for 15 to 20 seconds, then turn the ignition key to the start position (to the right). When the engine starts, release the button.



CAUTION

If the engine fails to start, do not continue cranking for more than ten seconds. Allow the starter motor to cool between attempts.

TRAVELING

Move the machine forward or backward as follows:

- Forward: Apply pressure to the front of the directional control pedal, increasing pressure to increase speed.
- Reverse: Apply pressure to the rear of the pedal, increasing pressure to increase speed.

SLOWING AND STOPPING

Allow the directional control pedal to move into neutral. The machine will slow and coast to a stop.

OPERATING ON GRADES

1. Always travel slowly.
2. Exercise extreme caution when traveling across or turning on grades.

SWEEPING

1. Turn the impeller switch on.
2. Turn on the main and side broom switches on.
3. Drive the machine over the area to be swept.

EMPTY HOPPER WITH HIGH DUMP FEATURE

1. Drive the machine to the dumping area.
2. Use the directional control pedal to position the machine so that the space between the machine and the container or dumpster is adequate to raise the hopper.
3. Reduce the engine speed.
4. Pull back the raise/lower lever to the RAISE position and hold until the bottom of the hopper is high enough to clear the top of the container.

WARNING

Never place your hands or other body parts near the lift arms when the hopper is operating.

5. Use the directional control pedal to slowly and carefully move the machine forward until the hopper is properly positioned to dump the debris into the container.

 **WARNING**

It is unsafe to travel an extended distance with the hopper raised. Travel only the distance necessary to position the hopper.

6. Shake the filters for 20-30 seconds.
7. To empty debris, pull back the hopper dump lever to the DUMP position to rotate the hopper forward and empty the debris..
8. After the hopper empties, To rotate the hopper back, push the hopper dump lever forward to the RETURN position until the hopper rotates and stops.
9. Slowly back the machine away from the dumpster approximately 5 feet.
10. To lower the hopper, push the raise/lower lever forward to the LOWER position until the hopper stops.

USING ROTARY TRASH RELOCATOR (RTR™)

1. Use the directional control pedal to stop the machine on a level surface.
2. Move the throttle to the IDLE position.

NOTE: As you complete Steps three and four, observe the two red lights labeled 1 and 2 in the upper left corner of the control pane.

- Light 1 illuminates when the hopper reaches the minimum height required to use the RTR™ feature.
 - Light 2 illuminates when the hopper reaches the rotation stop point.
3. Pull back the raise/lower lever to the RAISE position and hold until Light 1 illuminates, then release.

 **WARNING**

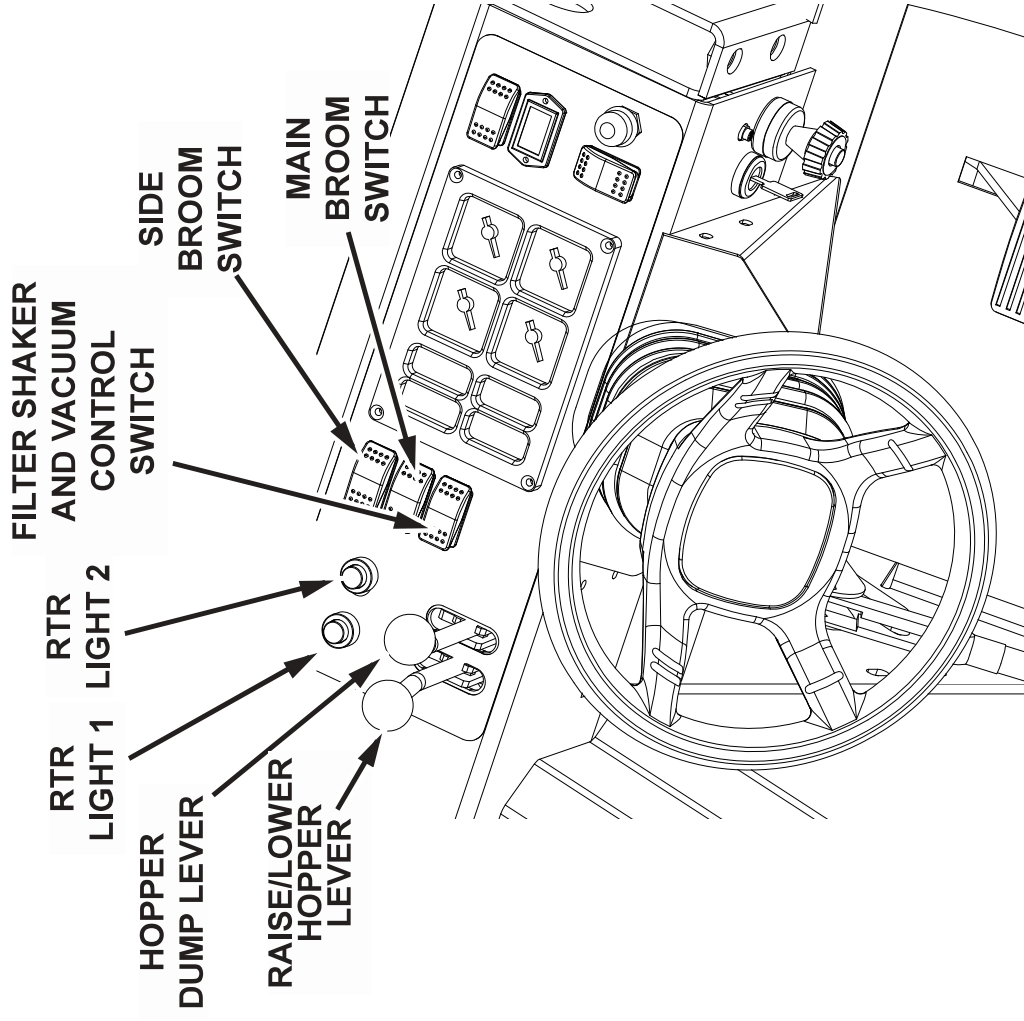
Make sure no one is in the area under or around the hopper.

MACHINE OPERATION

4. Pull back the hopper dump lever to the DUMP position and hold until Light 2 illuminates, then release.

NOTE: This rotates the hopper, causing the debris to move from the rear entrance to the front wall of the hopper. Rotating beyond this point will cause the debris to be dumped from the hopper.

5. Push the hopper dump lever forward to the RETURN position until the hopper rotates back and stops.
6. Push the raise/lower lever forward to the LOWER position until the hopper returns to the normal operating position.
7. Move the throttle to the RUN position and resume sweeping.



TRANSPORTING THE MACHINE

Using a Trailer or Transport Vehicle

1. Position the machine on the transport vehicle or trailer and apply the parking brake.
2. Tie the machine down using the tie down holes in the frame forward of the front wheels and in the rear center of the frame.

NOTE: Attach the tie downs to the frame only.

Pushing the Machine

Push the machine from the front or rear using the bumpers only.

ATTENTION!

Do not tow or push the machine a distance of more than .5 miles (.80 kilometers) or faster than one mile per hour (1.61 km). Exceeding these restrictions may cause damage to the hydraulic system. If towing will exceed the above restrictions, the rear wheel must be raised or supported by a dolly.

PREVENTATIVE MAINTENANCE

INTRODUCTION

Regular maintenance on your sweeper results in better cleaning, faster cleaning and a prolonged service life for the equipment and components. This section contains the following information to help you give your sweeper the maintenance attention it requires:

- A Scheduled Maintenance Chart
- Preventative Maintenance Instructions for Required Scheduled Maintenance Tasks

Because it is extremely important to your safety, you will see the following **WARNING** repeated throughout this section:

⚠ WARNING

Never attempt to perform any service on the equipment or components until the engine is OFF, the parking brake is LOCKED, and the wheels are CHOCKED.

SCHEDULED MAINTENANCE CHART					
FREQUENCY (IN HOURS)		SERVICE (BY MAINTENANCE AREA)			
					DAILY
ENGINE					
		X			Pressure wash engine <i>NOTE: For additional maintenance requirements, refer to the engine manual.</i>
AIR INTAKE SYSTEM					
X					Empty rubber dust cup of air filter element.
X					Check air filter indicator
	X				Clean air filter. <i>NOTE: Clean more often in dusty conditions.</i>
			X		Replace air filter.
ELECTRICAL SYSTEM					
			X		Clean battery top.
COOLANT SYSTEM					
X					Check coolant level and fill as needed.
	X				Inspect radiator fins and clean as needed.
		X			Blow out radiator fins.
				X	Drain and flush the coolant system

PREVENTATIVE MAINTENANCE



SCHEDULED MAINTENANCE CHART						
FREQUENCY (IN HOURS)		SERVICE (BY MAINTENANCE AREA)				
					DAILY	50
STEERING						
					X	Lubricate steering cylinder.
					X	Lubricate steering cylinder rod ends.
					X	Lubricate steering fork assembly
		X				Check for leaks.
LUBRICATION POINTS						
					X	Hood Latches & Hinges Lubricate type - oil
HYDRAULIC SYSTEM						
X						Check hydraulic reservoir gauge and fill as needed.
					X	Replace breather cap filter element.
					X	Replace hydraulic fluid and filter
X						Check functioning of directional control pedal and adjust as needed.
					X	Clean hydraulic fluid strainer in reservoir.
		X				Inspect hydraulic oil cooler fins and clean as needed (if so equipped).

SCHEDULED MAINTENANCE CHART					
FREQUENCY (IN HOURS)					SERVICE (BY MAINTENANCE AREA)
DAILY	50	100	200	500	
SWEEPING COMPONENTS					
X					Inspect brooms for wear and remove strings and debris from bristles and drive assembly.
	X				Inspect broom skirts for wear and adjust or replace as needed.
	X				Rotate main broom end-to-end.
	X				Perform main broom adjustment test and adjust as needed.
X					Inspect the side broom for wear and adjust as needed.
					Replace main and side brooms as needed:
					Main Broom needs to be replaced if bristles are 1" in length or less.
					Side Broom needs to be replaced if bristles are 3" in length.
HOPPER					
X					Check hopper filters and clean or replace as needed.
	X				Check hopper clearance from floor and adjust as needed.
X					Inspect the hopper flaps for wear or damage and replace as needed.
		X			Inspect hopper side and frame seals for wear or damage. Adjust or replace as needed.

PREVENTATIVE MAINTENANCE



SCHEDULED MAINTENANCE CHART				
FREQUENCY (IN HOURS)		SERVICE (BY MAINTENANCE AREA)		
DAILY	50	100	200	500
IMPELLER				
X				Check for hydraulic fluid leaks.
PARKING BRAKE				
		X		Check for proper functioning and adjust as needed.
WHEELS AND TIRES				
X				Visually inspect for wear and damage. Repair or replace as needed.
			X	Check pneumatic tires if equipped, for proper air pressure (95 psi).
	X			Check and tighten lug nuts (torque to 100 ft.-lbs)
MISCELLANEOUS				
			X	Inspect latches and hinges. Tighten and lubricate as needed.
			X	Check anti-static drag chain on rear wall of broom chamber for damage or excessive wear. Replace as needed.
			X	Check side broom lift cable and lift cable for wear.

PREVENTATIVE MAINTENANCE INSTRUCTIONS

ENGINE

Maintenance requirements and service instructions for your sweeper engine are outlined in the following parts of this Maintenance Section:

- Air Intake System
- Electrical System
- Fuel System
- Coolant System
- Lubrication System

All basic maintenance tasks are listed with their recommended frequencies on the Planned Maintenance Chart in this manual. Important additional maintenance requirements and instructions are explained in the engine manual which comes with your machine.

WARNING

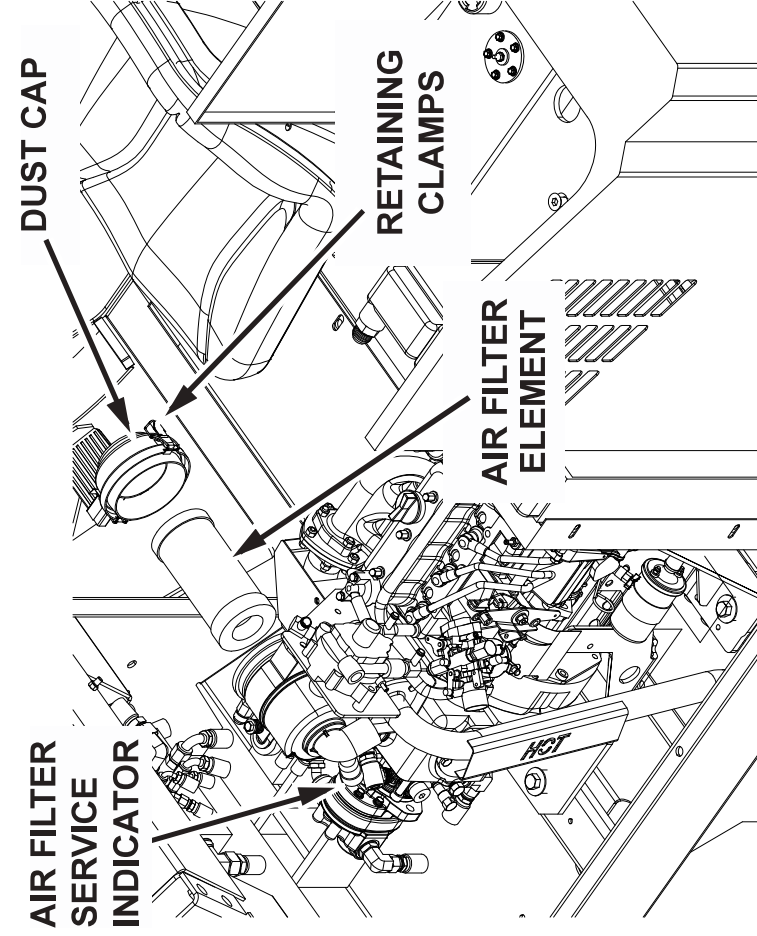
Never attempt to perform any service on the equipment or components until the engine is OFF, the parking brake is LOCKED, and the wheels are CHOCKED.

Air Intake System

Check Air Filter Service Indicator

The air filter service indicator shows when to change the air filter element. Check the indicator on a daily basis. The red indicator gradually becomes visible as the air filter elements load with dirt. It is not necessary to change the air filter elements until the red indicator reaches the top of the service indicator and locks into position.

1. Lift engine cover.
2. Inspect air filter service indicator



NOTE: The indicator may return to the nonviable position when the engine is shut off. To check, reset indicator and turn on the engine, if it locks in visible position again clean or change element.

Air Filter Element Removal

1. Turn off the engine and set the parking brake.
2. Lift the engine cover.
3. Locate the air filter and loosen the retaining clamp.
4. Remove the dust cup.
5. Pull the rubber plug out of the dust cup and empty the contents.
6. Pull the air filter elements out of its housing.

Air Filter Cleaning

1. Once you have removed the air filter elements, empty the dust cup and clean the interior of the air filter housing.
2. Use an air hose to blow out the air filter elements. Air pressure should be 100 psi or less.

Air Filter Inspection

1. After you clean the air filter elements, check the elements for holes by passing a light bulb inside it.

Air Filter Installation

1. Wipe out the air cleaner housing with a damp cloth. Be sure all dirt is removed.
2. Install the cleaned replacement filter elements so that the fins are at the far end of the housing. Be careful not to damage the fins.
3. Replace the rubber plug in the dust cup.
4. Replace dust cup, being sure embossed word “top” on cup is positioned correctly (up).
5. Tighten the ring clamp or retaining clips.
6. Check the condition of intake hoses and clamps. Close engine cover.

ELECTRICAL SYSTEM

Battery Cleaning

1. Combine baking soda and water in a strong solution.
2. Brush the solution over the battery top, including terminals and cable clamps. Make sure the solution does not enter the battery.
3. Using a wire brush, clean the terminal posts and cable clamps.
4. Apply a thin coating of petroleum jelly to the terminals and cable clamps.

Battery Replacement

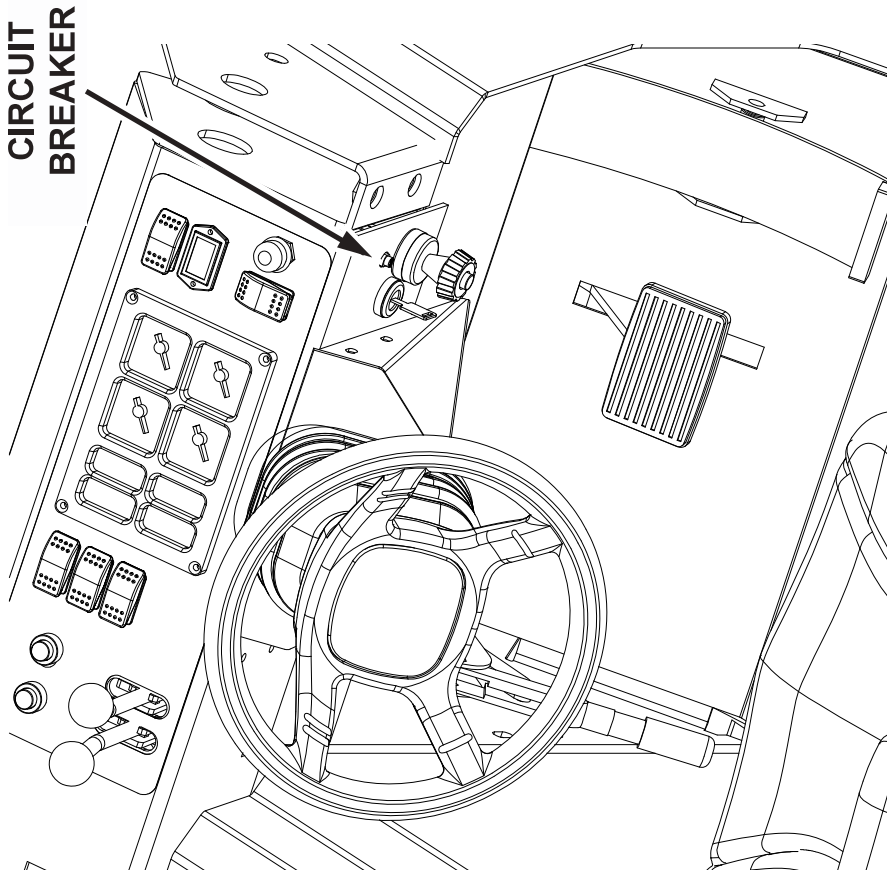
CAUTION

Remove the negative battery cable before you remove the positive battery cable. This is done to prevent accidental electrical shorting which can result in personal injury.

1. Disconnect the negative (-) cable and then the positive (+) cable.
2. Remove the battery.
3. Install the new battery.
4. Connect the positive (+) battery cable first, then the negative (-) cable.

Circuit Breakers

If a circuit breaker trips, it can be reset by pressing the reset button in the center of the breaker. (The circuit breakers are located on the instrument panel below the steering wheel).

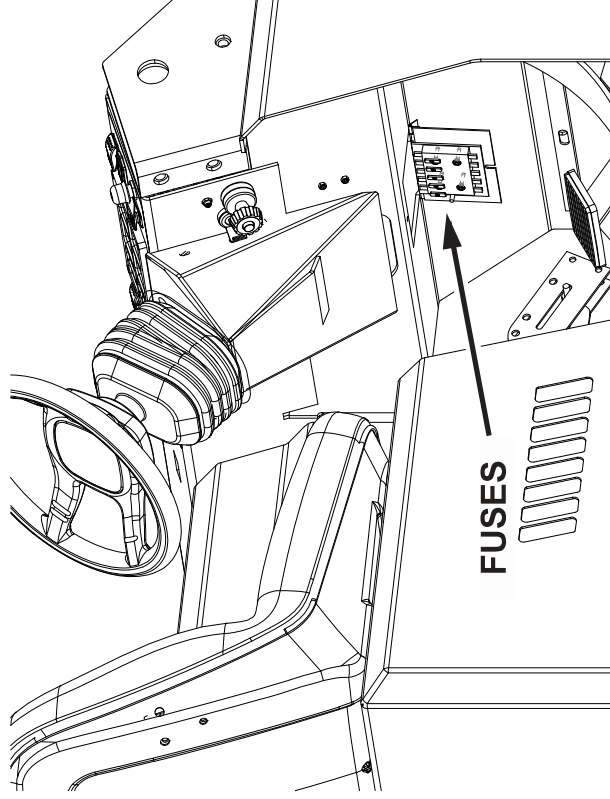


Fuses

Fuses are located in the fuse panel behind the hopper on the fire wall upper right corner when facing the unit

! CAUTION

Safety Arm Must Be Engaged When Checking These Fuses



FUEL SYSTEM

! WARNING

Never attempt to perform any service on the equipment or components until the engine is OFF, the parking brake is LOCKED, and the wheels are CHOCKED.

! WARNING

Never operate an LP powered sweeper when any component in the fuel system is malfunctioning or leaking.

! WARNING

Never bypass safety components unless you are testing them.

! WARNING

Replace any defective safety components before operation the sweeper.

⚠ WARNING
During repair or servicing of the fuel system, work in a properly ventilated area and do not smoke or allow an open flame near the fuel system.

⚠ WARNING
When disconnecting the tank coupling, always wear gloves. LP fuel can freeze bare hands.

⚠ WARNING
Under no circumstances should the fuel filter lock be bypassed, except when testing. After testing, always reconnect lock. Bypassing the fuel filter lock after testing creates a potential fire hazard.

Tier II compliant fuel system Refer to P.S.I Service Manual

Checking the LPG Fuel filter Locks

1. Start the engine. Then remove the vacuum hose going to the fuel filter lock. The solenoid should close, shutting off the fuel supply and stopping the engine.
 - If the engine continues to operate, the fuel filter lock should be replaced.
 - If the engine stops, the fuel filter lock is operating properly.
2. With the engine stopped, let the machine stand while the LPG tank valve is open (the hose is removed from the fuel filter lock). After 10 minutes, try the starter motor.
 - If the engine starts or fires, this indicates a fuel leak has occurred. Replace the fuel filter lock immediately.
 - If the engine simply turns over, this indicates the fuel filter lock is operating correctly.

COOLANT SYSTEM

Blowing Out Radiator Fins

NOTE: Make sure radiator is cool before blowing out the radiator fins with compressed air.

Reverse Flow Flushing

1. At the engine, disconnect the hoses.
2. Make sure the radiator cap is on tight.
3. Using a hose clamp, attach a flushing gun onto the lower hose.
4. Turn on the water and fill the radiator.
5. To keep from damaging the radiator, apply air pressure slowly and carefully.
6. Shut off the air pressure, refill the radiator with water, and reapply the air pressure. You will need to repeat these steps until water flushed from the radiator runs out clear.
7. Inspect and clean the radiator cap.
8. Inspect and reconnect the hoses.
9. Refill the radiator with coolant.

NOTE: Use a 50/50 mixture of water and an anti-freeze with an ethylene glycol base.

Changing Engine Oil

Gasoline and LP Engines: Use any SF or SG rated oil meeting API specifications and suited to seasonal temperatures.

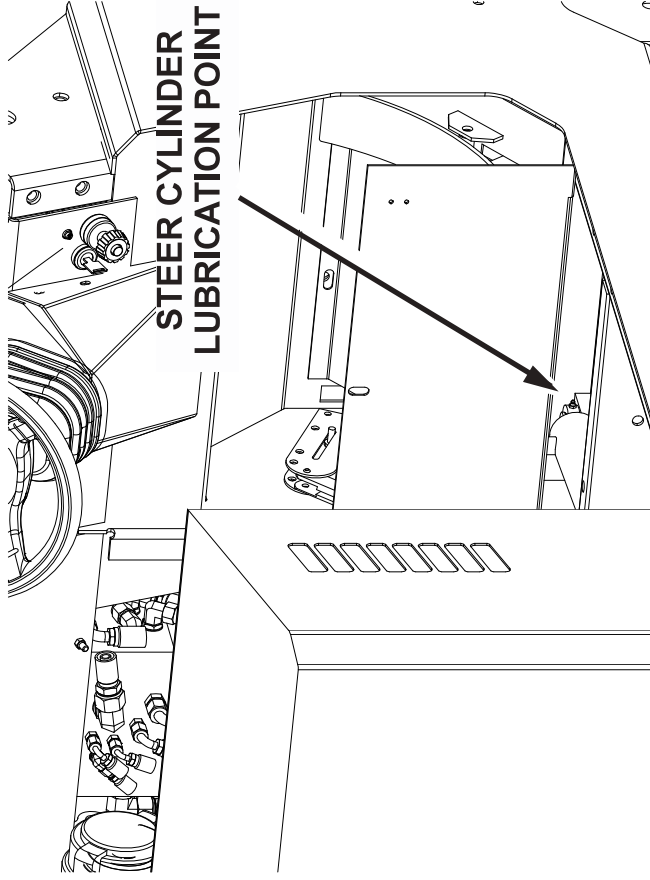
Refer to the Engine Manufacturer's Operator Manual for these specifications.

1. Place a drain pan under the lowest end of the engine.
2. Remove the drain plug and allow the oil to drain into the pan.
3. Remove the used oil filter and replace with a new one.
4. Dispose of the oil and oil filter in an approved manner.
5. Remove the engine oil cap, add oil in the amounts listed in the engine manual, then secure the cap.

STEERING

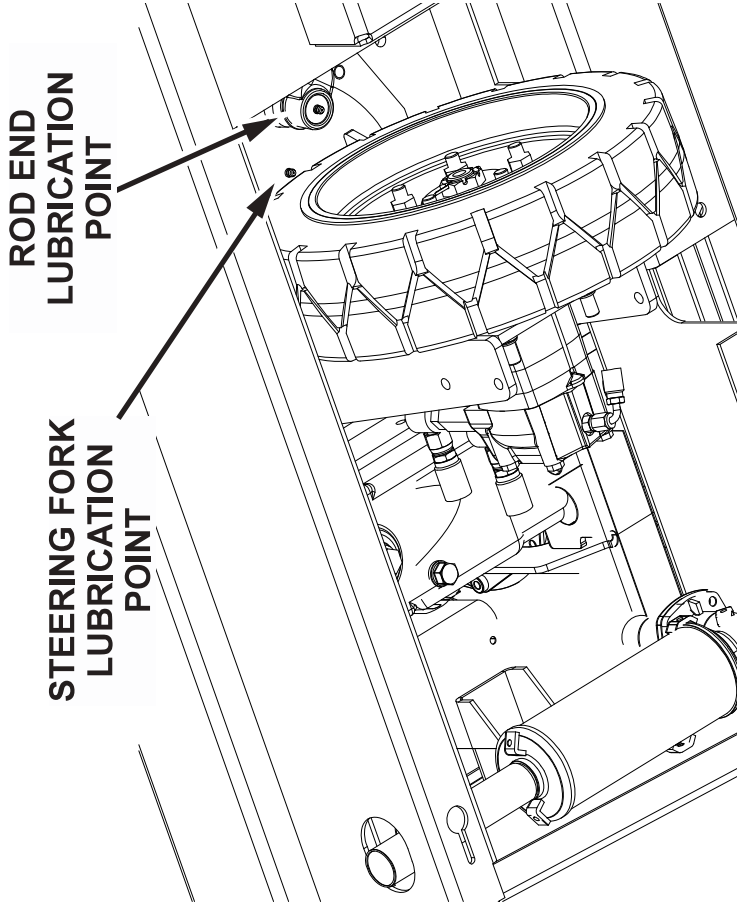
Steering Cylinder

1. Open engine cover.
2. Remove screw and washer in lower portion of the floor board and rotate up.
3. Grease fitting located mounting end of cylinder.



Steering Fork Assembly and Rod End

The steering fork assembly and rod end lubrication points are located under the rear on the machine above the rear drive wheel.



LUBRICATION POINTS

Latches & Hinges

The hinges and latches and all doors and covers should be lubricated with oil every 500 hours. There are numerous hinges and latches, make sure to lubricate all of the following:

- Engine cover
- Main Broom Doors
- Seat Tracks

HYDRAULICS SYSTEM

Filling The Fluid Reservoir

! CAUTION

**DO NOT OVERFILL HYDRAULIC RESEVOIR TANK!
DO NOT USE TRANSMISSION FLUID!**

NOTE: Fill the hydraulic fluid reservoir when the machine is cool and the hopper is in the lowered position.

1. Open the engine cover.
2. Remove the dipstick. Fluid level should be between the high and low marks on the dipstick.

3. If the fluid level is not acceptable, add hydraulic fluid.

! CAUTION

**Minuteman International, Inc. recommends using:
Mobil DTE 10 Excel 32 hydraulic oil or equivalent.**

Mobil DTE 10 Excel 32 - Viscosity, ASTM D 445

cSt @ 40°C (104° F): 32.7

cSt @ 100°C (212° F): 6.63

Changing The Hydraulic Fluid

1. Turn off the engine and engage the parking brake.
2. Place a drain pan on the floor below the reservoir.
3. Remove the drain plug located on the bottom rear of the reservoir and allow the fluid to drain.
4. Discard the fluid in an approved manner, then replace and retighten the drain plug.

5. Remove the filler / breather cap located on top of the reservoir and fill the reservoir with approved hydraulic fluid.

NOTE: Ten (10) gallons (US) of fluid are required.

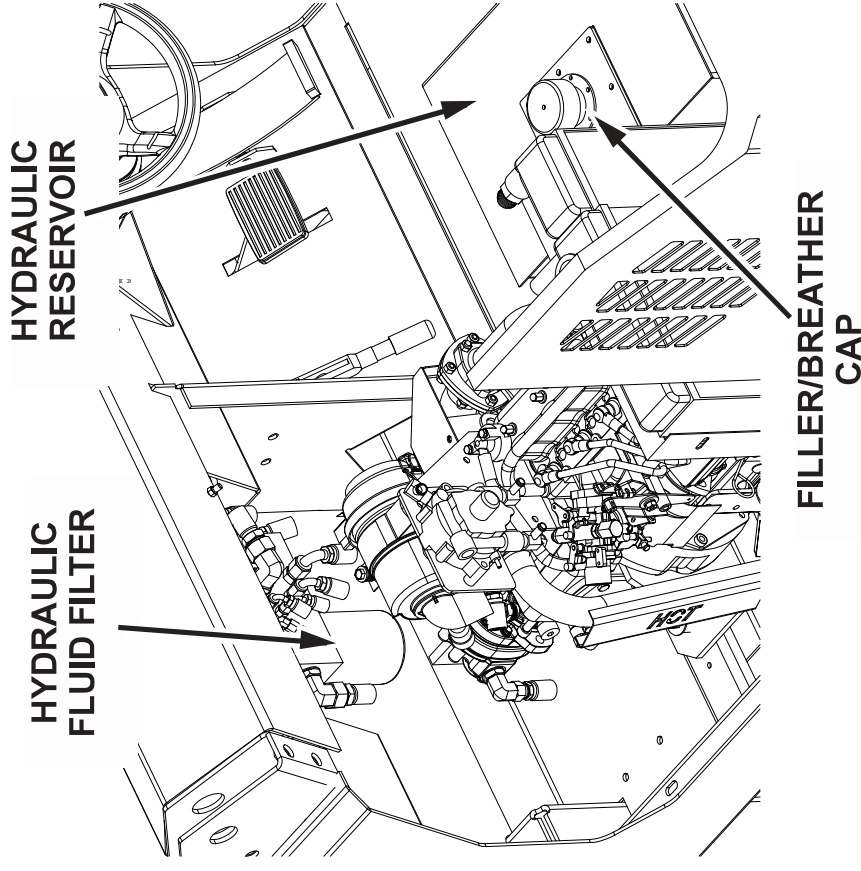
6. Install the filler cap assembly.
7. Check the drain plug for leakage.

Changing The Hydraulic Fluid Filter

1. Turn off the engine and engage the parking brake.
2. Open the engine cover.
3. Unscrew the oil filter cartridge from the hydraulic manifold assembly and discard in an approved manner.
4. Apply a thin coating of fluid to the seal of a new filter element.
5. Thread onto the mount and hand tighten.
6. Tighten an additional one-half turn beyond hand tight.

NOTE: Do not over tighten.

7. Start the machine, shut it off, then check for leakage.

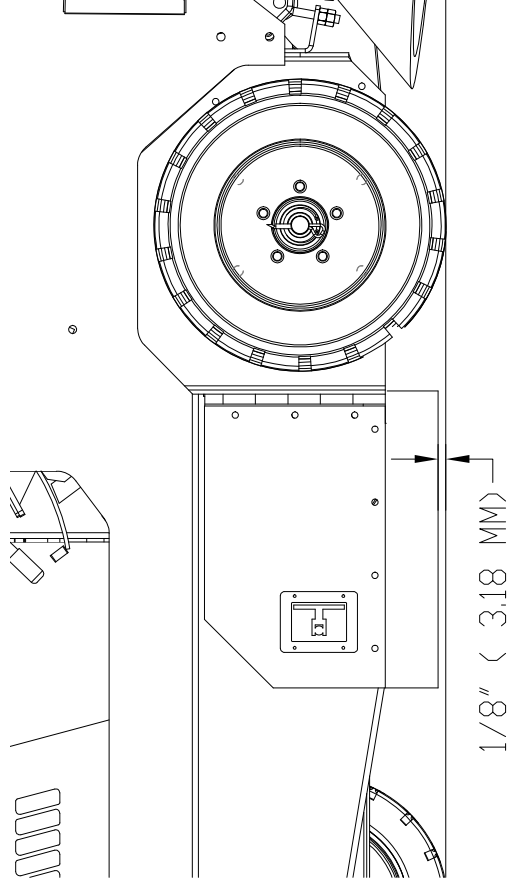


SWEEP COMPONENTS

Broom Door Flap Inspection

NOTE: Perform this inspection when the machine is parked on a level surface.

1. Turn the machine off and lock the parking brake.
2. Inspect broom door flaps for wear and damage. Flap clearance should be $\frac{1}{8}$ " (3.18 mm) above the floor.
3. Worn and damaged flaps should be replaced immediately to maintain proper dust control.



Broom Door Flap Replacement and Adjustment

The flaps are attached to the broom doors by a retainer bar, hex bolts and nuts. To remove the flaps, remove the nuts, bolts and retainer bar. To adjust the flaps, loosen the nuts and bolts, slide the flap up or down as needed. Retighten the nuts and bolts.

Main Broom Adjustment

NOTE: Perform this adjustment on a flat, smooth test surface.

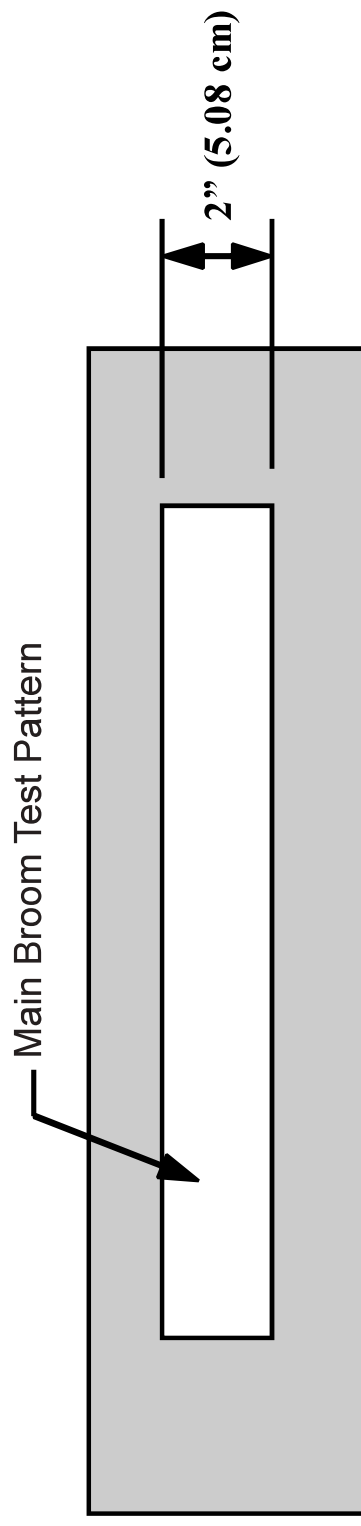
1. Drive the machine onto the test surface with the main broom turned off.
2. Set the parking brake.
3. Push the main broom switch to the ON position to activate and lower the main broom.
4. Open the throttle to full.

5. Allow about 45 seconds for the broom to operate, then push the main broom switch to the off position to deactivate and raise the broom.

NOTE: Test time will vary according to the test surface used.

6. Drive the machine clear of the test site.
7. Examine the polished pattern made by the broom on the test area.

NOTE: A rectangular shape the length of the main broom, 2" (5.08 cm) wide, indicates the main broom is properly adjusted. A pattern smaller than 2" (5.08 cm) indicates need for lower adjustment. A pattern wider than 2" (5.08 cm) indicates a need for higher adjustment. If pattern is tapered from end to end instead of rectangular, see "[Main Broom Taper Adjustment](#)" on [page 51](#).



Main Broom Height Adjustment

1. Engage the parking brake.

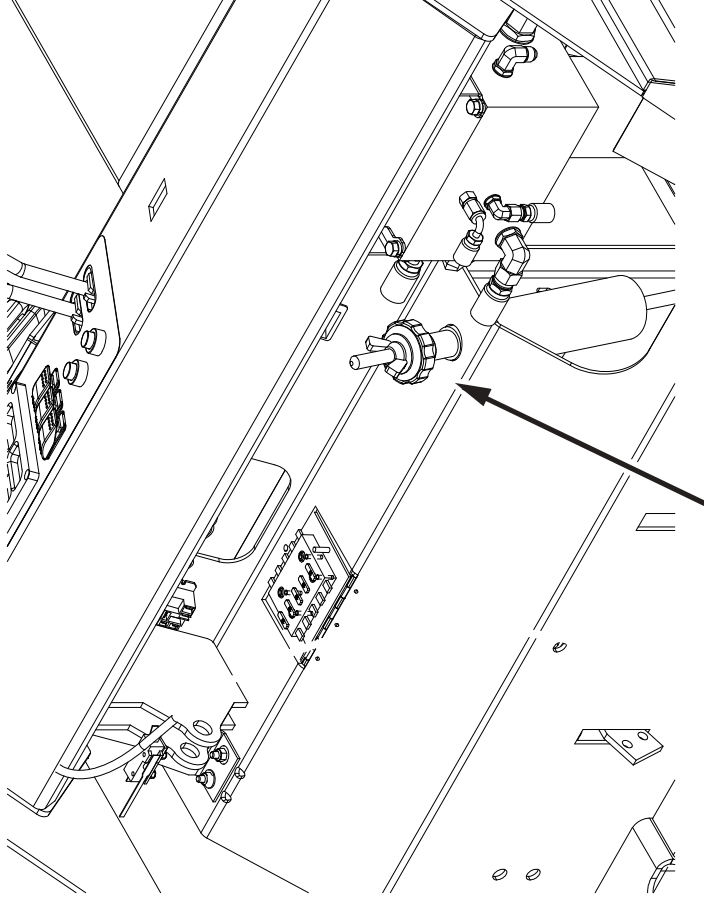
NOTE: The adjustment knob is located behind the hopper.

2. Raise the hopper and set the safety arm.

▲ WARNING

Do not rely upon the hydraulic cylinders to keep the hopper raised for maintenance. Always engage the safety arm before servicing the hopper.

4. Loosen the wing nut and turn the adjustment knob clockwise to raise the main broom or counterclockwise to lower the main broom.
5. Tighten the wing nut.
6. Remove the safety arm and lower the hopper.
7. Repeat the main broom adjustment test to see that the broom is properly adjusted.



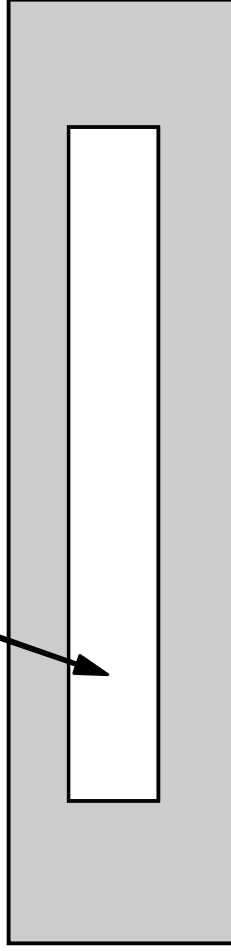
**MAIN BROOM
ADJUSTMENT KNOB**

Main Broom Taper Adjustment

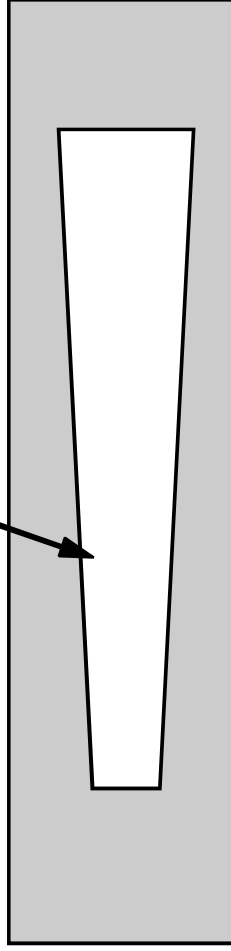
NOTE: It is not usually necessary to perform this adjustment. However, if the main broom adjustment test shows a pattern that is tapered in length (one end is wider than the other), perform the procedures which follow.

The taper can be adjusted from either the left or right side of the machine.

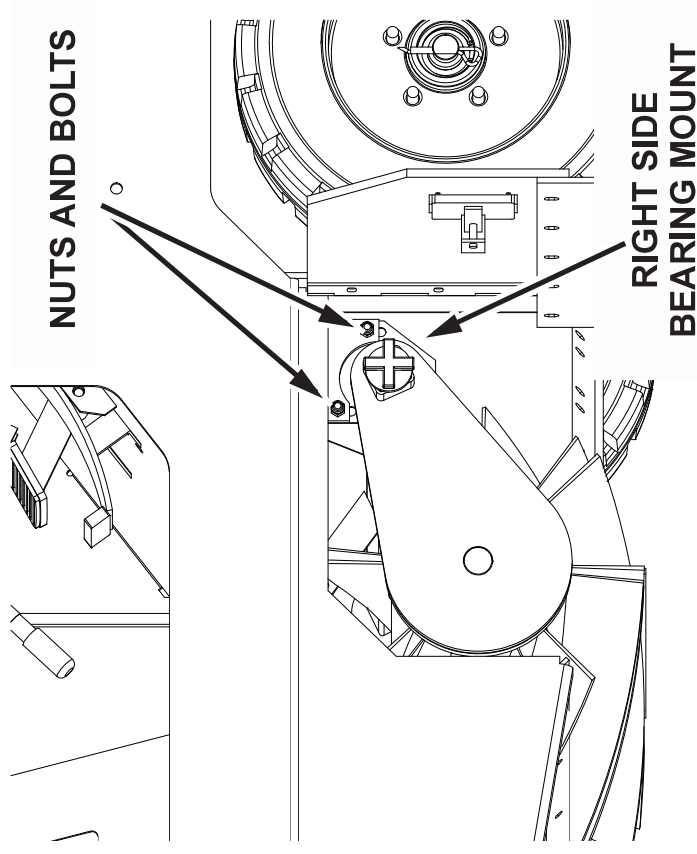
Correct Taper Pattern

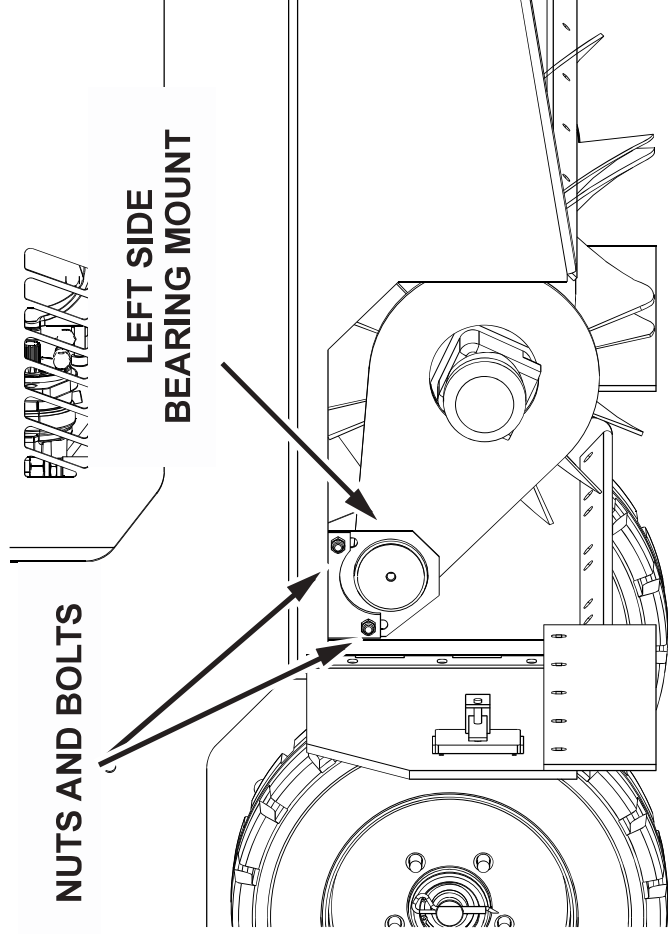


Incorrect Taper Pattern



1. Turn the engine off and lock the parking brake.
2. Open the right or left main broom door.
3. Loosen the nuts and bolt securing the bearing mount to the angle mount on the frame.
4. If the pattern was wider on this side of the machine, adjust the bearing mount up. If the pattern was smaller on this side of the machine adjust the bearing mount down.





Main Broom Replacement

NOTE: Broom should be replaced if bristles worn to a length of 1 inch; 2.54 cm or less.

1. Turn the engine off and lock the parking brake.
2. Push the main broom Switch to the ON position
3. Open the right main broom chamber door (the door on the driver's side).
4. Remove the knob and washer on the main broom idler mount.
5. Pull the main broom idler mount straight out to remove.
6. Grasp the main broom by the plastic drive hub, pull the main broom straight out and clear of the broom chamber.
7. Depending on broom condition, you can either rotate the old broom end-to-end and re-install it or you can install a new broom. Slide the main broom into the broom chamber and align the broom with the metal drive hub located at the far side of the broom chamber.

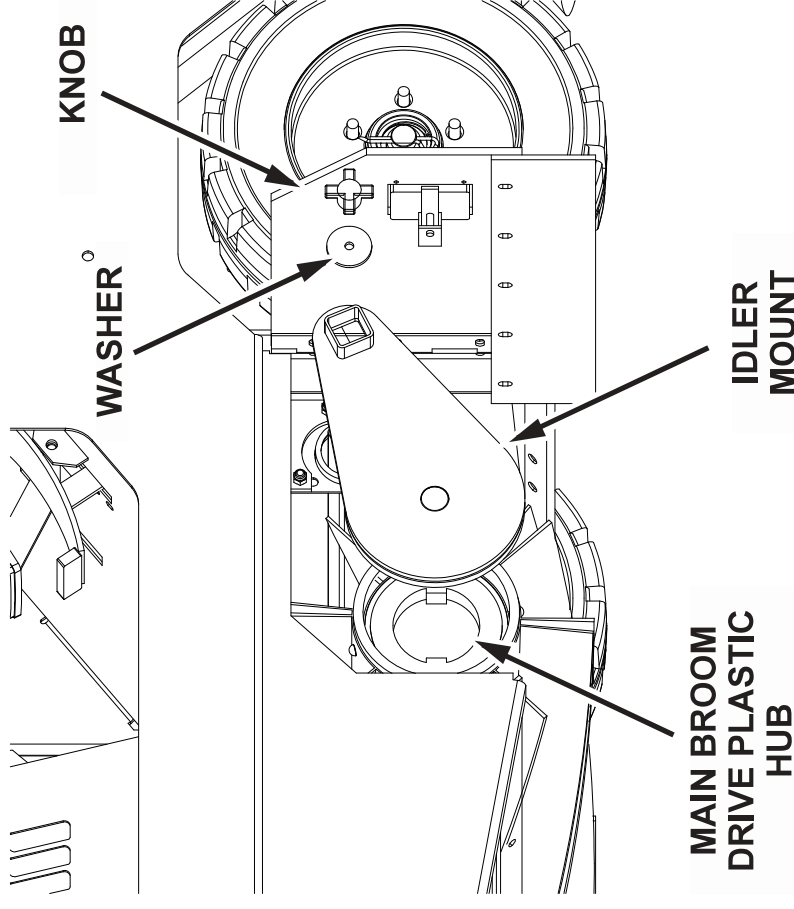
5. After adjustment, tighten the bolt and nut securing the bearing mount.
6. Repeat the main broom adjustment test to see that the broom is properly adjusted.

PREVENTATIVE MAINTENANCE

PowerBoss®
The Power of Clean

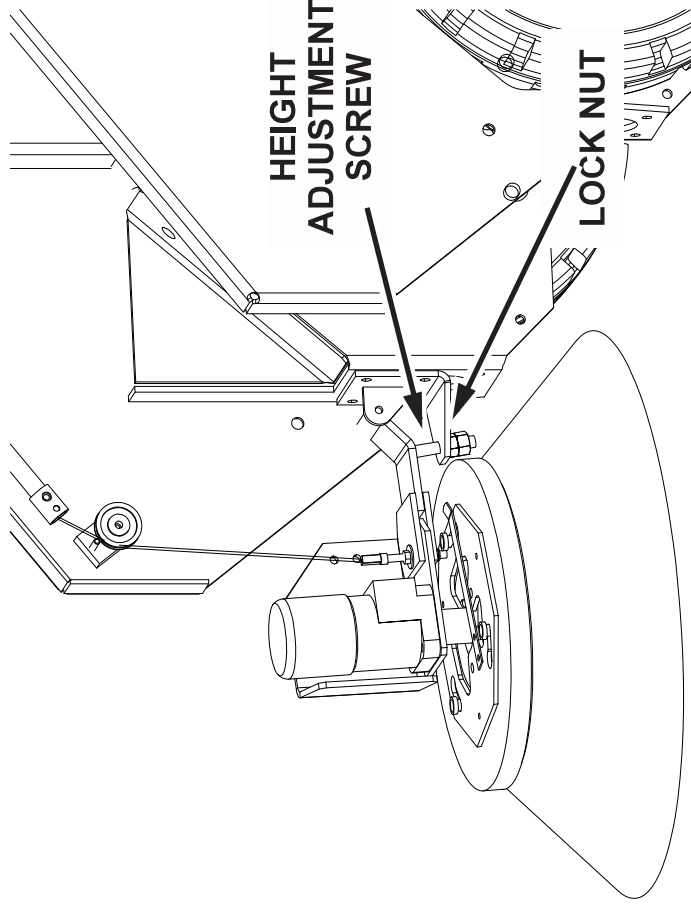
NOTE: If a worn broom is being replaced, install the new broom by first adjusting the broom arms up, to better match the position of the drive hub with the hub on the new broom (refer to **“Main Broom Adjustment”**).

8. Once the broom is started onto the drive hubs, rotate the broom counter-clockwise while pushing lightly against the broom.
9. Once the broom is fully engaged, replace the idler hub while aligning the seats in the idler hub with the broom’s drive hub ears.
10. Install the retaining knob and washer into position and tighten.
11. Close and latch the right broom door.
12. Perform a main broom adjustment test and adjust as needed.

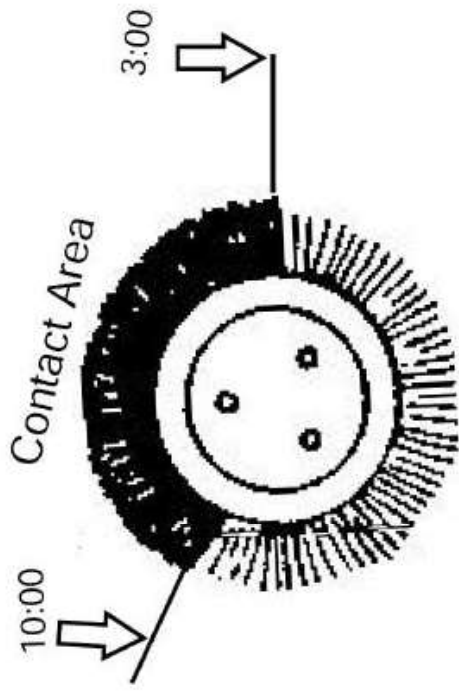


Side Broom Height (Wear) Adjustment

1. Drive the machine onto the test surface with the side broom turned off.
2. Set the parking brake.
3. Turn the side broom switch on to activate and lower the side broom.



4. Side Broom should make contact with floor in the "10 to 3 o'clock position.



5. If not, turn side broom switch to the off position and loosen the lock nut.
6. Adjust the screw up or down until proper floor contact is made in the "10 to 3 o'clock" position. Turn broom on and off as needed.

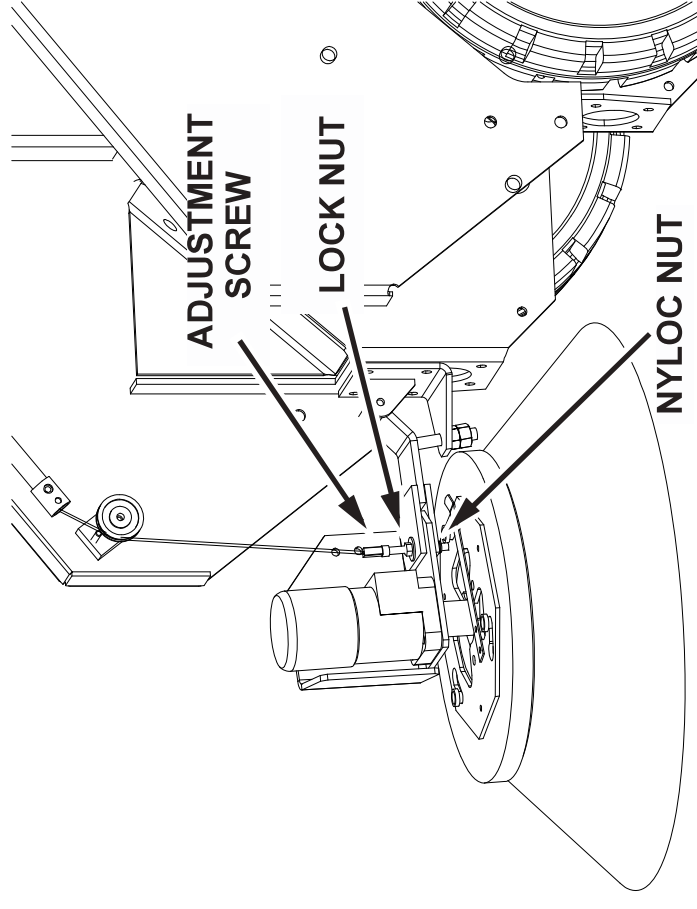
NOTE: The side broom lift cable may have to adjusted if the cable does not allow the broom to make proper contact with the floor.

7. After adjustment, tighten the lock nut.

Side Broom Lift Cable Adjustment

The lift cable may need to be adjusted if the cable does not allow the broom to make proper contact with the floor or the broom touches the floor when turned off.

1. Loosen the lock nut.
2. Hold the nyloc nut with a wrench.
3. If the broom touches the floor when turned off, turn the adjustment screw clockwise to raise the broom up.
4. If the cable does not allow the broom to make proper contact with the floor turn the adjustment screw counterclockwise to lower the broom.
5. After the broom lift cable has been properly adjusted tighten the lock nut.

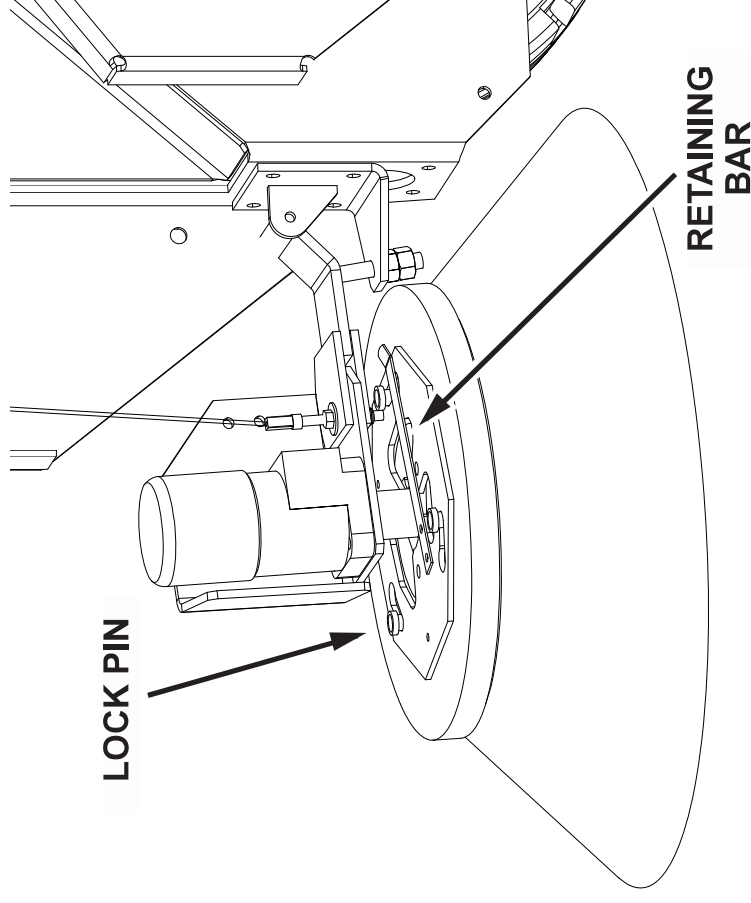


Side Broom Replacement

NOTE: Broom should be replaced if bristles worn to a length of 3 inches; 7.62 cm or less.

NOTE: The side broom features a quick release mechanism which enables the operator to remove the brush in seconds.

1. Turn the side broom switch to the off position to deactivate and raise the broom.
2. Turn the side broom by hand until the brush retainer bar is accessible.
3. Lift the bar and turn the broom clockwise (about one eighth of a turn) until the lock pins in the broom disengage from the drive plate.
4. Install the new broom by positioning the three drive pins into the pilot holes of the drive plate.
5. Lift and rotate the broom until the broom retainer bar springs into the locked position.
6. Check to make sure all three drive pins are properly engaged.



HOPPER

NOTE: It is not usually necessary to remove the hopper on high dump models. However, if it becomes necessary for maintenance or to install an option, use the following procedure to remove:

Hopper Removal

1. Park the machine on a level surface and engage the parking brake.
2. Raise the hopper and position the high dump hopper dolly, a platform truck or similar four wheeled cart under the hopper.
3. Set the hopper down on the truck and turn the engine off.
4. Cycle the rotation control handle (#2) in both positions to relieve any residual hydraulic pressure.
5. Remove three bolts, washers, nuts and backing plate.
6. Disconnect the wire harness connections at the right side of the hopper.

7. While spreading the dump arms slightly, roll the hopper away from the machine.

Hopper Replacement

1. Position the hopper on the dolly so as to align the mounting holes in the sides of the hopper with the rotation mounts on the arms. Lift arms should be positioned about $\frac{1}{3}$ of the way up.
2. Engage the lift arm rotation plates with the mounting bolts on each side of the hopper.
3. Start the machine and lift the hopper.
4. Drive away from the hopper dolly or cart.
5. Lower the hopper.
6. Engage the wire connections at the right side of the hopper.

Floor Clearance and Dump Angle Adjustment

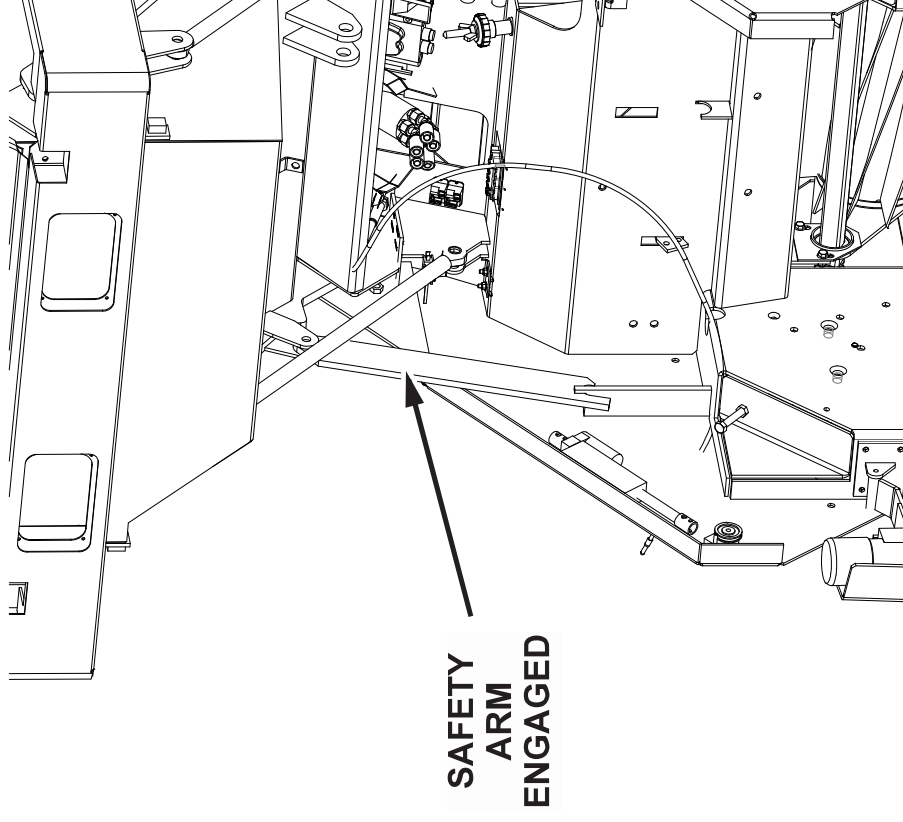
NOTE: In order to perform properly, the hopper must maintain a distance of 3½" (8.89 cm) from the floor to the rear hopper entrance lip. The front of the hopper should be adjusted so that the front bumper aligns with the hopper frame where the two meet. When properly adjusted, the front edge of the hopper will be 5" (12.7 cm) to 6" (15.24 cm) from the floor.

1. Park the machine on a level surface, shut off the engine and engage the parking brake.

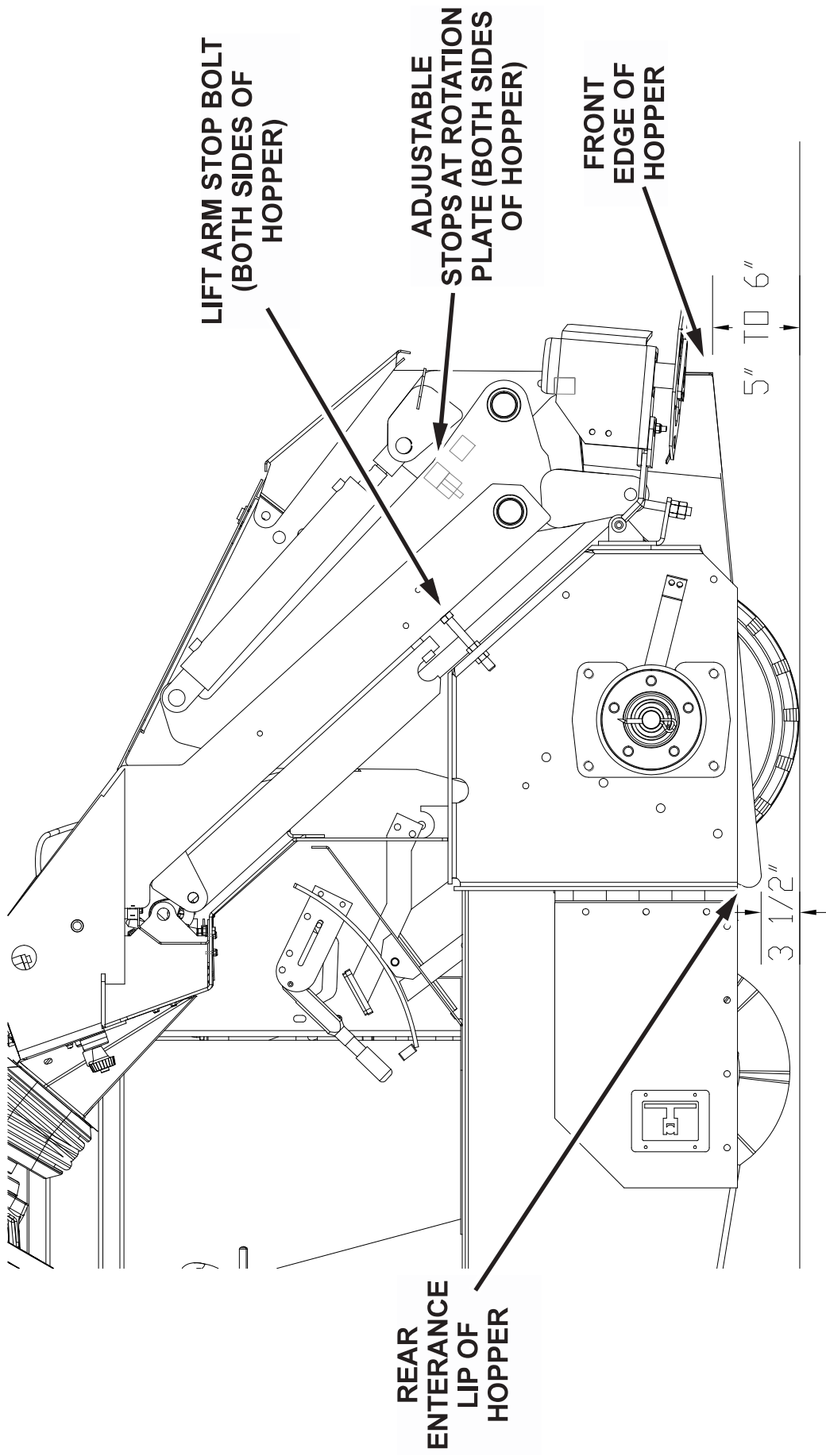
 **WARNING**

Do not rely upon the hydraulic cylinders to keep the hopper raised for maintenance. Always engage the safety arm before servicing the hopper.

2. Adjust the lift arm stop bolts located on top of the wheel wells as low as possible while still allowing the side broom assembly to clear the lift arms when the hopper is in the NORMAL position. Be sure that both lift arms contact the stop bolts at the same time.



NOTE: This may involve raising and lowering the hopper several times.



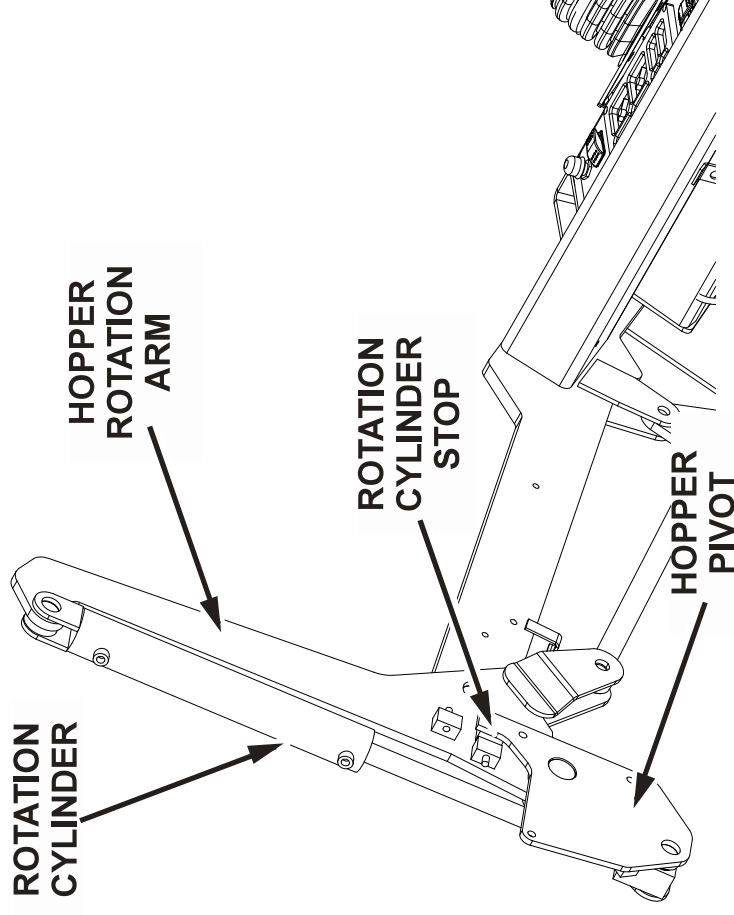
3. After adjustment, with the hopper down, use the two adjustable stops located on the rotation plates on both sides of the hopper to establish 3½" (8.89 cm) clearance between the rear hopper entrance lip and the floor.

NOTE: The stop on the driver's side is located immediately below the cylinder rod end and is threaded into the cylinder mount arm. The stop on the left side is located directly above the arm rotation plate.

4. After the 3½" (8.89 cm) clearance is established, make sure both stops make contact simultaneously. The lower front edge of the hopper should be 5" (12.7 cm) to 6" (15.24 cm) from the floor. A balanced adjustment of both sets of adjustment bolts is required to correctly adjust the hopper in the lower position. If the bumper is lower than the frame, after the hopper is correctly adjusted, loosen the bumper attachment bolts and reposition the front bumper.
5. Raise the hopper and rotate fully.
6. Turn the engine off.

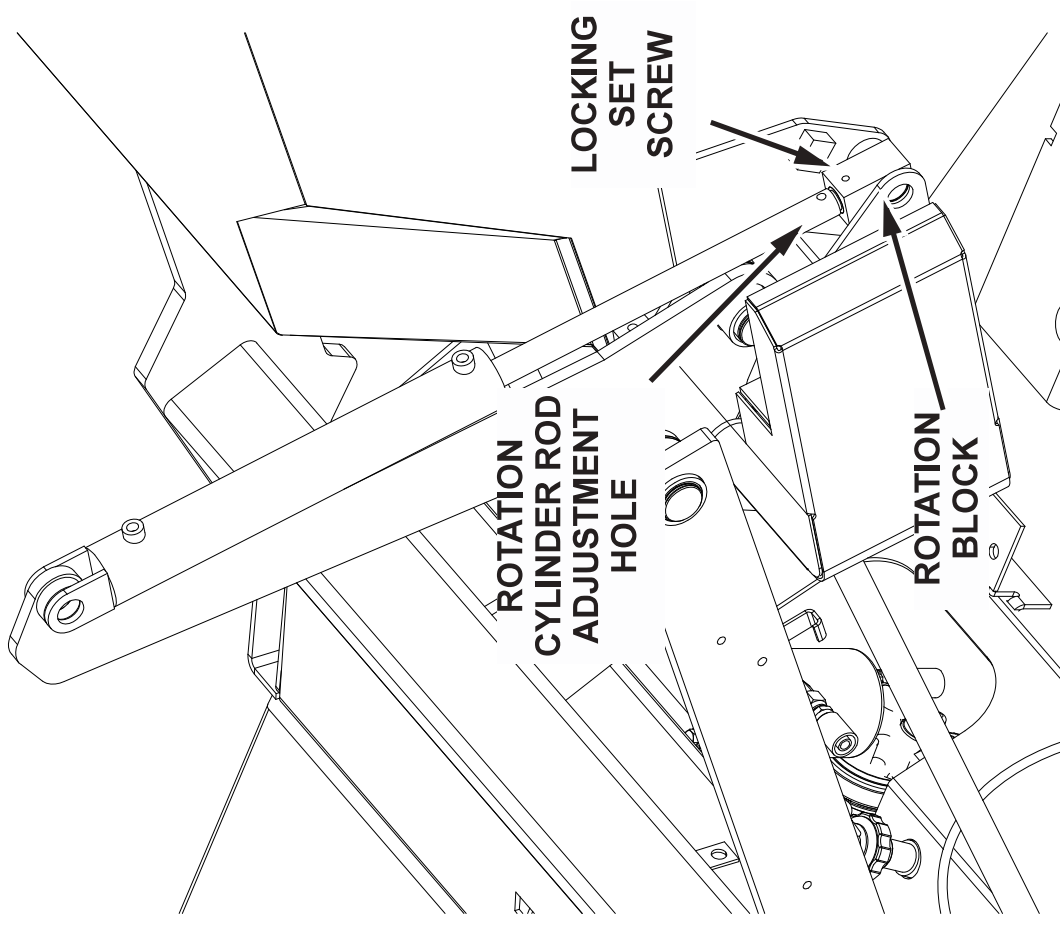
⚠ WARNING

Do not rely upon the hydraulic cylinders to keep the hopper raised for maintenance. Always engage the safety arm before servicing the hopper.



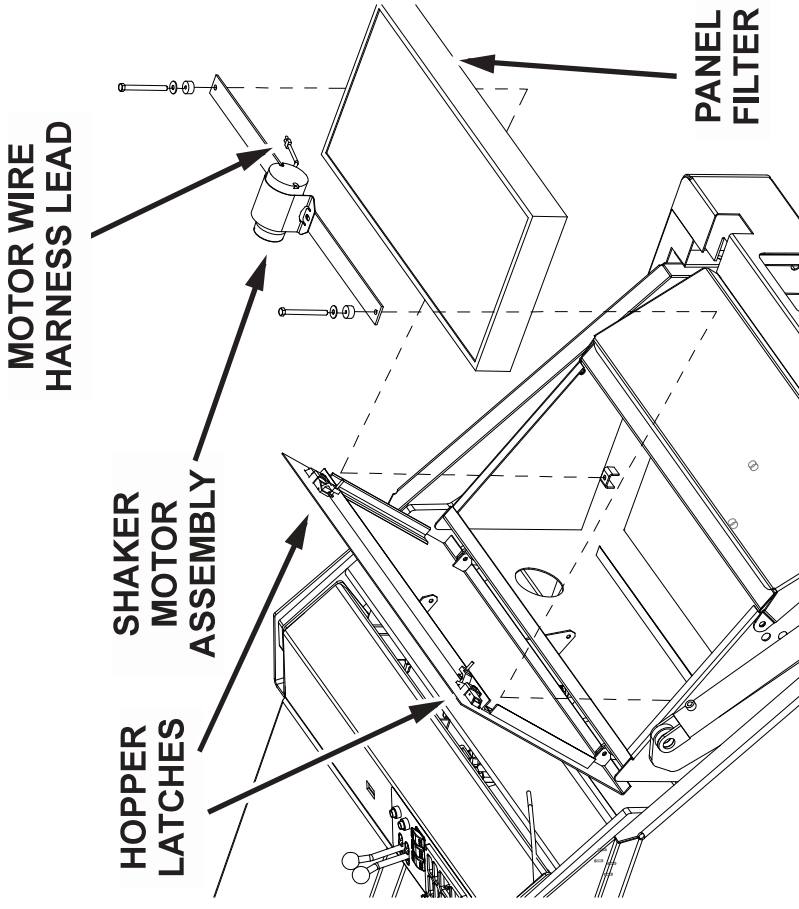
PREVENTATIVE MAINTENANCE

7. Adjust the rotation cylinder stops on the hopper rotation arms on each side of the hopper so that clearance between the lift arms and the cut-outs in the bumper is $\frac{1}{4}$ " (6.35 mm) maximum.
8. Loosen the locking set screw in the bottom side of the rotation block.
9. Using the hole in the cylinder rod, turn the rod to adjust the cylinder extended length to match the hopper rotation stops.
10. Tighten the set screw.
11. Rotate the hopper back, remove the safety arm and lower the hopper.



Filter Removal

1. Release the latches on the hopper cover and raise the cover.
2. Disconnect the wire harness leading to the filter shaker motor.
3. Unscrew the two screws (each attached using one conical washer and an isolator) securing the filter retainer bars to the hopper.
4. Remove the shaker motor assembly and filter retainer bars.
5. Lift out the panel filter.



Filter Cleaning

The dust control filter is a polyester type element filter. It may be vacuumed, blown out with compressed air, tapped against the floor or washed with soap and water.

1. If blown out with compressed air, use 100 psi or less.
2. If washed with soap and water, use 40 psi water pressure or less.

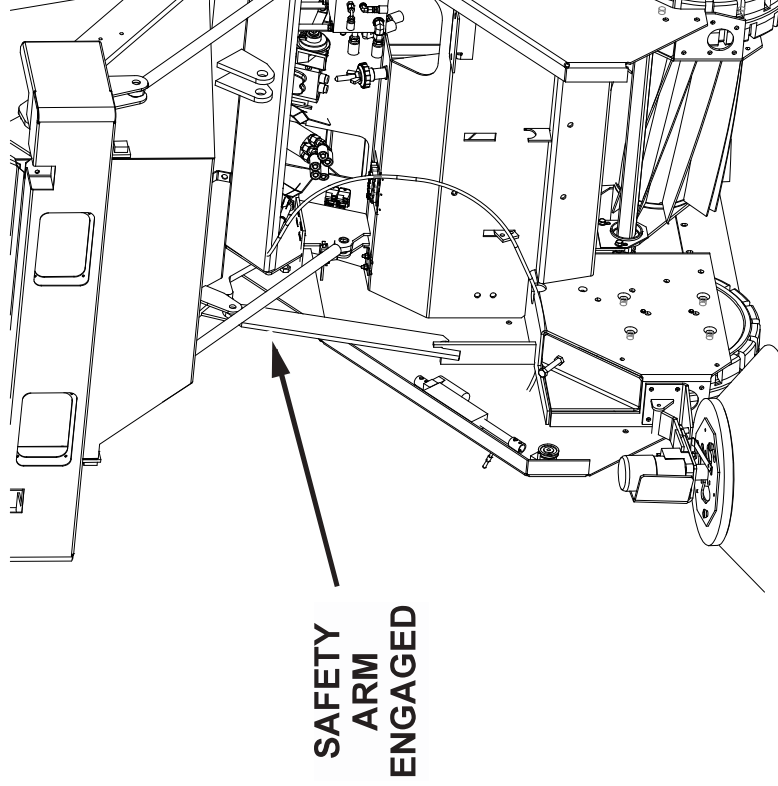
NOTE: Make sure the filters are thoroughly dried while standing on their side before installing in the hopper. Do not install or use a wet filter.

Filter Replacement

1. Insert the panel filter.
2. Install the shaker motor assembly.
3. Install and tighten the two filter retaining screws and isolators.
4. Hook the wire harness to the filter shaker motors.
5. Close the hopper cover and secure the latch.

Vacuum Gasket Mount Adjustment

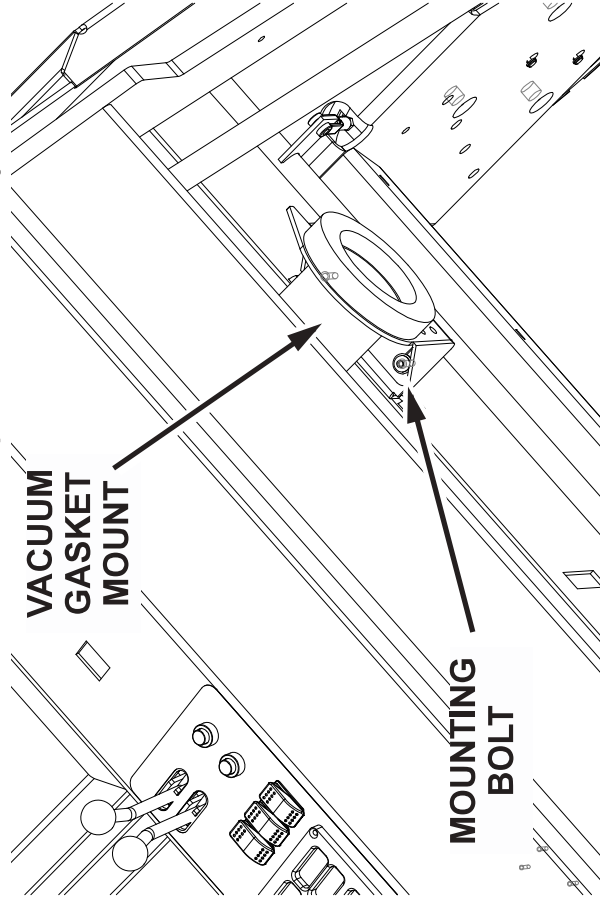
1. With the hopper in the normal position, observe contact between the back of the hopper and gasket. If complete seal is not maintained, raise the high dump hopper.



WARNING

Do not rely upon the hydraulic cylinders to keep the hopper raised for maintenance. Always engage the safety arm before servicing the hopper.

2. Loosen the mounting bolts in the gasket mount. Move the assembly toward the hopper. Tighten the bolts. Test and repeat if necessary.



Flap Replacement

Flaps located at the entrance lip and on the sides of the hopper must be replaced when worn or damaged. The flap panels may be replaced separately.

1. Park the machine on a level surface and engage the parking brake.
2. Raise the hopper.



WARNING

Do not rely upon the hydraulic cylinders to keep the hopper raised for maintenance. Always engage the safety arm before servicing the hopper.

3. Turn off the engine
4. Remove the flap retaining angle and worn or damaged flaps.
5. Install the new flaps.
6. Replace the retaining angle.

Frame Seal Replacement

Front Frame Seal

The hopper frame seal bolts to the front edge of the frame. Install a new seal by folding it in half to align the holes. Doubled edge with holes goes on the bottom. Support the seal straight up while bolting the retainer bar in place. The seal should fall over the retainer bar after installation. Be certain that the seal edges are aligned to prevent twisting of the seal.

Side Frame Seal

The side frame seals should clear the floor by at least $\frac{1}{8}$ " (3.18 cm). If the bottom of a side seal measures $\frac{1}{2}$ " (1.27 cm) or more above the floor, readjust it or replace it by removing the bolts on the inside of the wheel wells, installing a new seal, and securing it with the bolts. The double edge with the holes goes toward the front.

PARKING BRAKE

Normal adjustment of the parking brake can be accomplished from the operator compartment. Locate the knurled handle on the parking brake lever. Turn the handle clockwise to increase brake tension.

NOTE: Two or three turns is usually adequate. DO NOT OVERTIGHTEN.

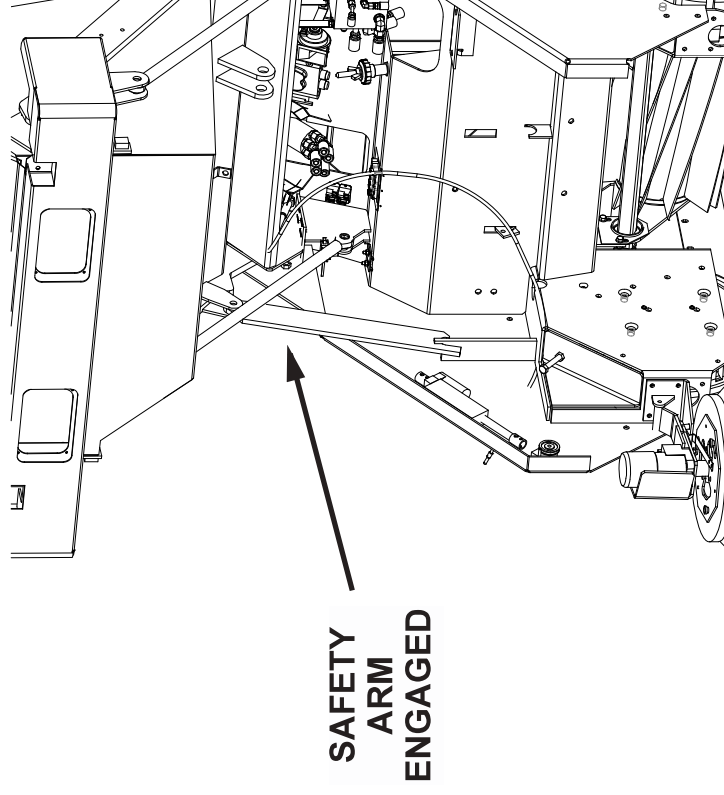
If this adjustment becomes ineffective, it will be necessary to adjust the cable length.

Adjusting The Parking Brake Cable Length

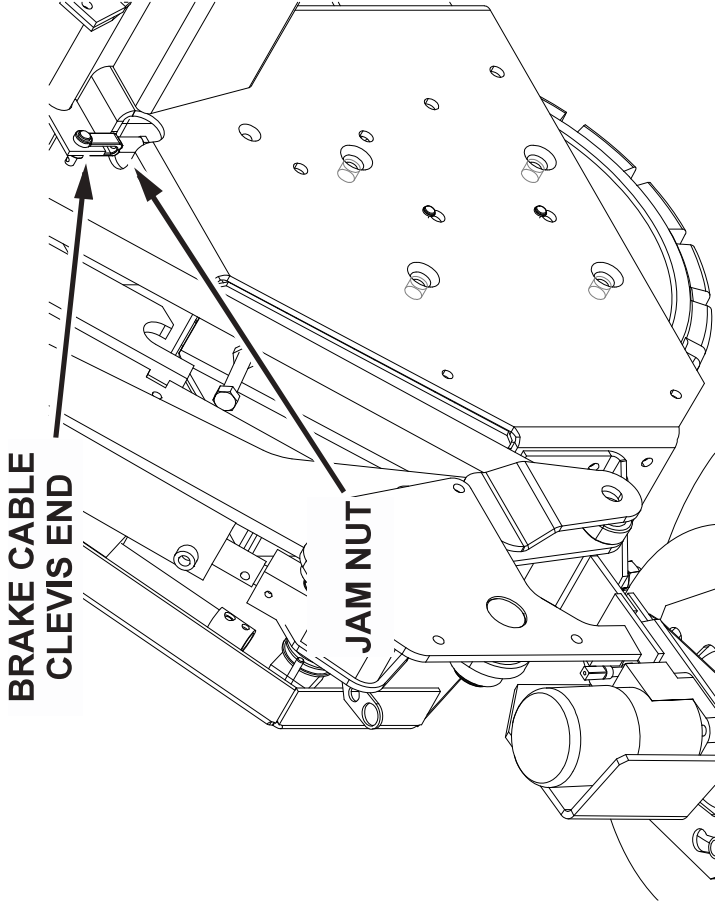
1. Park the machine on a level surface and chock the wheels.
2. Place the parking brake lever in the "OFF" position.
3. Turn the knurled handle counter-clockwise as far as possible.

WARNING

Do not rely upon the hydraulic cylinders to keep the hopper raised for maintenance. Always engage the safety arm before servicing in the area of the hopper.



4. Raise the hopper and engage the safety arm.
5. Locate both the cable clevis ends for the brake cables.



6. Disconnect the clevis ends from the bar.
7. Loosen the jam nuts at the base of the clevis.

8. Turn the clevis clockwise three or four complete turns.
9. Tighten the jam nuts and re-install the clevis ends onto the bar.
10. Repeat steps 5 through 9 for the opposite side brake.
11. Adjust the knurled handle on the parking brake lever.

TIRES

Changing Solid Tires

NOTE: The procedures which follow apply to SOLID TIRES ONLY.

1. Remove the tire from the vehicle by removing the five inner lug nuts.
2. Remove the ten hex head bolts and nuts.
3. Press the tire from the rim.
4. Press the large rim half into the new tire.
5. Mount the small rim half and secure with hex head bolts.
6. Reinstall the tire on the machine

Changing Pneumatic Tires

! CAUTION

Changing pneumatic tires must be performed in a safety cage and require special tools, PowerBoss, Inc. recommends that you have these tires changed by a professional tire dealer. (They are to be inflated to 110 psi.)

Latch and Hinge Maintenance

Latches and hinges should be inspected after every 500 hours of use. Retighten and oil if necessary.

Cables

Inspect all cables for wear every 500 hours.

MISCELLANEOUS ADJUSTMENTS

Anti-Static Chain Adjustment

Each machine is equipped with an anti-static chain bolted to the back wall of the broom chamber. This should remain in contact with the floor at all times. Inspect the chain every 200 operating hours. Replace if at least one link does not drag the surface of the floor.

TROUBLESHOOTING CHART		
PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
Engine overheats. NOTE: If coolant loss has not occurred, check for malfunction of the temperature sending unit.	Low coolant level.	Supply coolant.
	Clogged radiator.	Flush radiator.
	Loose fan belt.	Tighten belt.
	Defective thermostat.	Replace thermostat.
Brushes do not turn or turn very slowly.	Hydraulic system problem:	See Hydraulics System Problems in this section.
	Motor	
	Control valve	
	Gear pump	
Little or no vacuum in brush compartment.	Relief valve	Clean filters.
	Filters clogged.	Repair leaks; clear obstructions or replace hose.
	Leak or clog in hose from impeller.	
	Impeller failure.	Check and repair.

TROUBLESHOOTING CHART		
PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
PowerBoss® moves slowly or does not move.	Parking brake is on.	Release brake.
	Directional control pedal jammed, damaged, or not adjusted properly.	Clear jam or adjust linkage.
	Tires skidding from contact with oil or grease.	Clean tires or drive through a solvent absorbing substance.
	Wheels jammed.	Clear jam.
	Low hydraulic fluid level.	Add hydraulic fluid.
	Hydraulic fluid temperature too high and too thin caused by excessive load, climbing, high environment temperatures, worn pump, or improper fluid.	Use the proper weight oil or the operation conditions; check pump.
	Damaged or worn pump drive coupling.	Replace damaged item.
	Other problems with the hydraulics system: pump failure, motor failure, relief valve leaking or stuck open.	See Hydraulics System Problems in this section.

TROUBLESHOOTING CHART		
PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
Loss of dust control.	Debris in hose or impeller inlet.	Clean.
	Broom skirts or seal worn.	Replace.
	Skirt clearance from floor exceeds 1/8".	Adjust clearance.
	Dust control filters clogged.	Clean filters.
	Filter seals worn or missing.	Replace.
	Poor seal with vacuum gasket.	Visually check and adjust, if necessary.
	Hopper full.	Dump hopper.
	Broom(s) out of adjustment.	Adjust.
	Broom bristles worn.	Check broom for wear and adjustment.
Sweeper unit leaving debris.	Poor performance of broom drive mechanism.	Check for jam in broom chamber.
	Broom lift arms hung up with debris.	Clear out debris.
	Hopper flaps damaged or missing.	Replace or adjust clearance.
	Hopper out of adjustment.	Check hopper clearance.
	Dust control filters clogged.	Clean filters.

TROUBLESHOOTING CHART		
PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
Hopper does not raise or lower.	Hydraulics system problem:	See Hydraulics Systems Problems in this section.
	Control valve	
	Gear pump	
	Lift cylinder	
	Relief valve	
	Hopper arms binding.	
Hopper lift cylinder failure.	Hopper load too heavy	Lubricate or adjust arm linkage.
	Line to cylinder leaking.	Dump more frequently.
	Piston seals leaking.	Tighten fittings or replace hose.
	Bent piston rod.	Replace seals.
		Replace rod.
		Dump more frequently.
Hopper does not rotate or rotates too slowly.	Hopper load too heavy.	See Hydraulics System Problems in this section.
	Hydraulics system problem:	
	Control valve	
	Gear pump	
	Lift cylinder	
	Relief valve	

TROUBLESHOOTING CHART		
PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
Hydraulic control valve failure	Misaligned control linkage.	Align.
	Foreign matter in spool bore.	Remove spool and clean bore.
	Valve seals Leaking.	Replace seals.
	O-rings leaking.	Replace O-rings
	Relief valve stuck open.	Clean or replace relief valve.
	Motor leaking.	Replace seals.
Hydraulic motor failure.	Drive link malfunction.	Replace drive link.
	Output shaft malfunction.	Replace output shaft and bearings.
	Pump leaking.	Replace seals or RR Pump
Hydraulic gear pump failure.	Gears worn or scored.	Rebuild pump or RR Pump
	Relief valve stuck.	Clean or replace (at control valve).
	Oil supply low.	Check and fill.
	Oil strainer clogged.	Replace strainer (inside reservoir).
	Incorrect oil.	Use recommended viscosity oil.
	Damage due to entry of air into hydraulic system.	Maintain correct hydraulic fluid level in reservoir. Keep suction hose fittings tight..

TROUBLESHOOTING CHART			
PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)	
Hydraulic variable displacement pump failure.	Pump leaking.	Replace seals.	
	Relief valve(s) stuck.	Clean or replace relief valve(s) at the pump.	
	Drive coupling malfunction.	Replace defective gears.	
	Control linkage out of adjustment.	Check to see if linkage is binding unfastened.	
	Charge pump gears worn or scored.	Replace defective gears.	
	Damage due to entry of air into hydraulic system.	Maintain correct hydraulic fluid level in reservoir. Keep suction hose fittings tight.	
	Hydraulic system noisy.	Air in system.	Check fluid level in reservoir; check for loose connections or leaks.
		Relief valve dirty or damaged.	Clean or replace.
		Loose suction line.	Tighten fittings.
		Clogged section filter or pump inlet line.	Replace filter, clear line; change fluid in reservoir if dirty and flush system.
	Internal pump or motor damage.	Inspect and repair.	

TROUBLESHOOTING CHART		
PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
Curb broom does not rotate	Fuse blown	Check fuses and replace any blown fuses
	Switch is bad	Replace switch
	Wiring	Inspect wiring for burnt or damaged wires. Check wire continuity. Repair or replace wiring.
	Solenoid 3B stuck or not functioning	Test solenoid is functioning, See “Hydraulic manifold Solenoids” on page 79. If solenoid not functioning replace.
Curb broom does not raise or lower.	Fuse blown	Check fuses and replace any blown fuses
	Switch is bad	Replace switch
	Wiring	Inspect wiring for burnt or damaged wires. Check wire continuity. Repair or replace wiring.
	Actuator not functioning	Replace actuator.

TROUBLESHOOTING CHART		
PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
Main broom does not rotate	Fuse blown	Check fuses and replace any blown fuses
	Switch is bad	Replace switch
	Wiring	Inspect wiring for burnt or damaged wires. Check wire continuity. Repair or replace wiring.
	Solenoid 3C stuck or not functioning	Test solenoid is functioning, See “Hydraulic manifold Solenoids” on page 79. If solenoid not functioning replace.
Main broom does not raise or lower	Fuse blown	Check fuses and replace any blown fuses
	Switch is bad	Replace switch
	Wiring	Inspect wiring for burnt or damaged wires. Check wire continuity. Repair or replace wiring.
	Solenoid 4 stuck or not functioning	Test solenoid is functioning, See “Hydraulic manifold Solenoids” on page 79. If solenoid not functioning replace.

TROUBLESHOOTING CHART

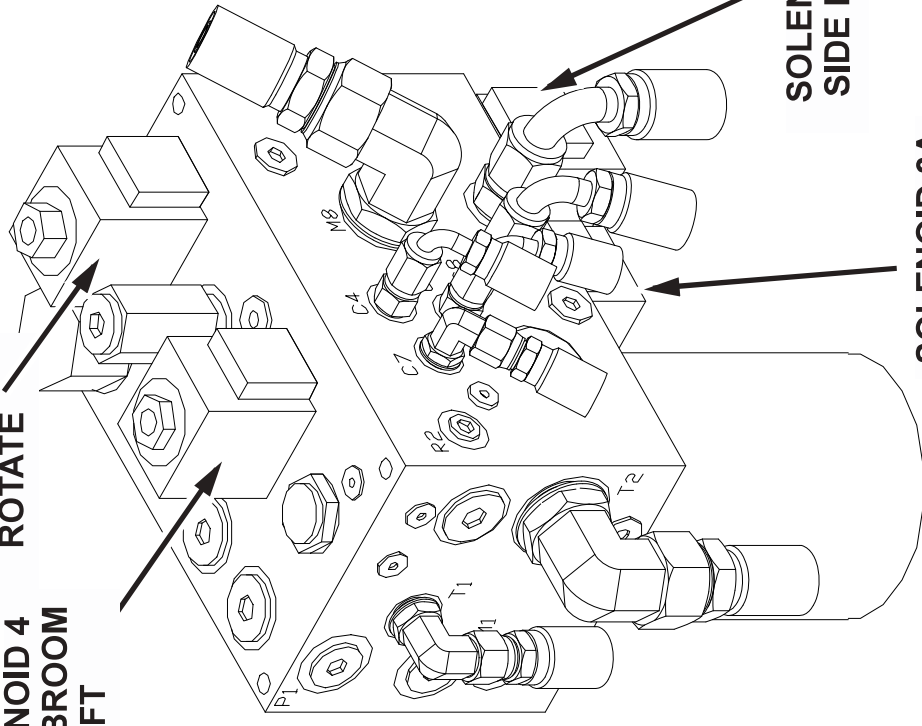
PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
Impeller does not turn on.	Fuse blown	Check fuses and replace any blown fuses
	Switch is bad	Replace switch
	Wiring	Inspect wiring for burnt or damaged wires. Check wire continuity. Repair or replace wiring.
	Solenoid 3A stuck or not functioning	Test solenoid is functioning, See “Hydraulic manifold Solenoids” on page 79. If solenoid not functioning replace.

HYDRAULIC MANIFOLD SOLENOIDS

The curb broom, main broom, main broom lift, and impeller are activated when certain solenoids are energized. Solenoids are remotely signaled by pushing the desired switch on the control panel. When troubleshooting the electro-hydraulic system, it is important to determine if the problem is electrical or mechanical. The electrical side should be eliminated first. When a function is summoned, the corresponding solenoid is energized and emit a magnetic field. A small steel washer will stick to an energized coil. Be sure that only the required solenoid is energized. If the solenoid is correct, the problem is mechanical.

**SOLENOID 3C
MAIN BROOM
ROTATE**

**SOLENOID 4
MAIN BROOM
LIFT**



**SOLENOID 3B
SIDE BROOM**

**SOLENOID 3A
IMPELLER**

Revision J
Effective January 2014
PowerBoss Made Simple Industrial Limited Warranty

Minuteman International owner of PowerBoss warrants to the original purchaser/user that the product is free from defects in workmanship and materials under normal use. PowerBoss will, at its option, repair or replace without charge, parts that fail under normal use and service when operated and maintained in accordance with the applicable operation and instruction manuals. All warranty claims must be submitted through and approved by factory authorized repair stations.

This warranty does not apply to normal wear, or to items whose life is dependent on their use and care. Parts not manufactured by PowerBoss are covered by and subject to the warranties and/or guarantees of their manufacturers. Please contact Minuteman International for procedures in warranty claims against these manufacturers.

Special warning to purchaser -- Use of replacement parts not manufactured by PowerBoss or its designated licensees, will void all warranties expressed or implied. A potential health hazard exists without original equipment replacement.

All warranted items become the sole property of Minuteman International or PowerBoss or its original manufacturer, whichever the case may be.

PowerBoss disclaims any implied warranty, including the warranty of merchantability and the warranty of fitness for a particular purpose. PowerBoss assumes no responsibility for any special, incidental or consequential damages.

This limited warranty is applicable only in the U.S.A. and Canada, and is extended only to the original user/purchaser of this product. Customers outside the U.S.A. and Canada should contact their local distributor for export warranty policies. PowerBoss is not responsible for costs or repairs performed by persons other than those specifically authorized by PowerBoss. This warranty does not apply to damage from transportation, alterations by unauthorized persons, misuse or abuse of the equipment, use of non-compatible chemicals, or damage to property, or loss of income due to malfunctions of the product. If a difficulty develops with this machine, you should contact the dealer from whom it was purchased.

This warranty gives you specific legal rights, and you may have other rights, which vary from state to state. Some states do not allow the exclusion or limitation of special, incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.

WARRANTY



	Travel *	Labor	Parts	Engine	Extended Warranty	Costs
Walk Behind						****
Battery Sweepers	90 Days	12 months	12 months	N/A	N/A	-
IC Sweepers	90 Days	12 months	12 months	Through Eng. Mfg.	N/A	-
Battery Scrubbers	90 Days	24 months	36 months	N/A	N/A	-
Riders						
Battery Scrubbers	90 Days	24 months	36 months or 2000 hr.	N/A	36 months parts + 24 labor (or 3000 Hours)	5%
IC Sweeper/Scrubbers 82 & 90	90 Days	6 months	24 months or 2000 hr.	24 months or 3000 hrs**	36 months parts + 24 months labor (or 3000 Hours) + 180 days travel	5%
I.C. Sweepers 9X, 10X	90 days	6 months	48 months or 3000 hrs.	60 months or 3000 hrs**	48 months parts + 24 months labor (or 3000 Hours) + 180 days travel	5%
NAUTILUS Scrubber	180 Days	24 months	36 months or 2000 hr.	36 months or 2000 hrs**	48 months parts + 24 months labor (or 3000 Hours) + 180 days travel	3%
All Rider, I.C. (excluding APEX series)					Bumper to Bumper. 5000 hr max. 48 months parts, 48 months labor, 180 days travel	8%
Exceptions						
Apex Series Sweeper	90 Days	12 months	12 months or 1000 hr.	12 months or 1000 hrs**	24 months parts + 24 months labor (or 2000 Hours)	5%
6X Sweeper	90 Days	6 months	24 months or 2000 hr.	24 months or 2000 hours**	36 months parts + 24 months labor (or 3000 Hours) + 180 day travel	5%

Tank Bladders

Polyethylene plastic tanks

Batteries

Chargers

Aftermarket Replacement parts

**Two-Hour Cap Per Service Call

***Through Engine Manufacturer. See Section 3 of Warranty Manual for Engine Warranty Exceptions

Extended Warranty MUST Be Signed Up Within 30 Days of Delivery to End User

(Dealer Has 1Year From Receiving Machine To Sign Up For Extended Warranty)

Eight years/ no additional labor

Ten years/ no additional labor

0-3 months full replacement, 4-12 prorated credit

One-year replacement

Ninety days from date of purchase

*** All above labor and travel reimbursed at 65% or 75% of the published shop rate.



“The Power of Clean”

**PowerBoss® Is a Full Line Manufacturer of Sweepers and Scrubbers,
for Industrial Facilities.**

PowerBoss®, Minuteman International, Inc. 14N845 U.S. Route 20 Pingree Grove Illinois 60140
Phone: 800-323-9420 www.PowerBoss.com email: tech@powerboss.com

A Member of the Hako Group

Armadillo 6X and AM7D-III PB# 4100043UM Rev. A 08/14

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