

# User Manual

## Armadillo 9X Series

**Models:** 9XR, 9XR Europe, & 9XV  
Gasoline, LP & Diesel  
Starting @ Serial No. 18168059



PowerBoss, Inc.  
A Member Of The Hako Group

## **PREFACE**

Thank you for your purchase of the now 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 Publishing 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 toward perfection in our corner of the process to bring you the best you can buy. Please copy the form below, fill out and comment on how you found our catalog.

Thank you.

\*Name \_\_\_\_\_

\*Title: \_\_\_\_\_

\*Company Name: \_\_\_\_\_

\*Address: \_\_\_\_\_

\*Country: \_\_\_\_\_

Type of equipment or model number: \_\_\_\_\_

Comments:

\*Information is optional.

Please return to:

Manager, Publishing Department, International  
PowerBoss, Inc.  
175 Anderson Street  
Aberdeen, North Carolina 28315 USA

Phone (800) 982-7141 Toll Free  
(910) 944-2105 Local

E-Mail - [techsupport@powerboss.com](mailto:techsupport@powerboss.com)

This is the User Manual for the PowerBoss Armadillo SW/9X Series Sweeper.

This manual covers all Standard Armadillo 9X Series machine variations beginning May 2009.

We believe this machine will provide excellent service for many years.

However, the best results will be obtained if:

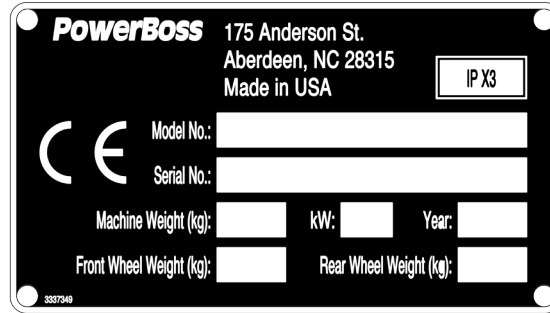
- The machine is operated with reasonable care.
- The machine is maintained regularly per the maintenance schedule provided in the User Manual.
- The machine is maintained with PowerBoss Inc. supplied or equivalent parts.

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 e-mail 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 data block below for future reference.

**Example I.D Plate;**



**MACHINE DATA**  
Fill out at installation

Serial Number: \_\_\_\_\_

Engine Serial Number: \_\_\_\_\_

Sales Rep.: \_\_\_\_\_

Date of Install: \_\_\_\_\_

All information contained in this catalog is current at the time of printing However, PowerBoss reserves the right to make changes at any time without notice.

©2010, PowerBoss, Inc., Printed in USA

## TECHNICAL SPECIFICATIONS

Model Armadillo 9X series

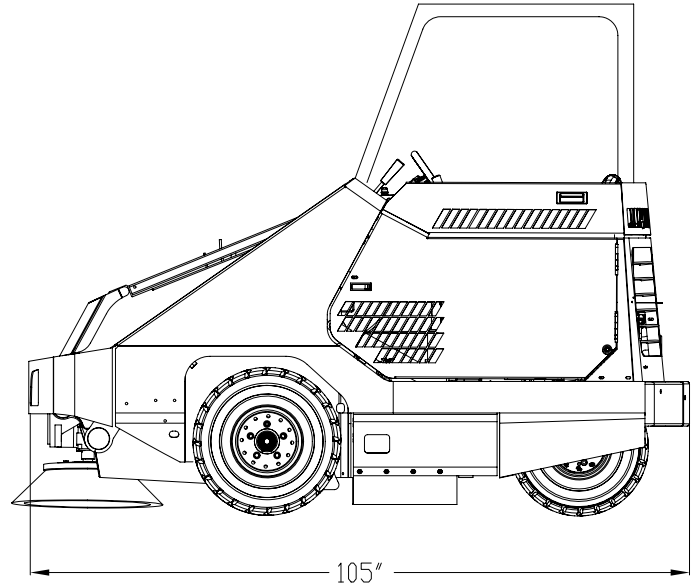
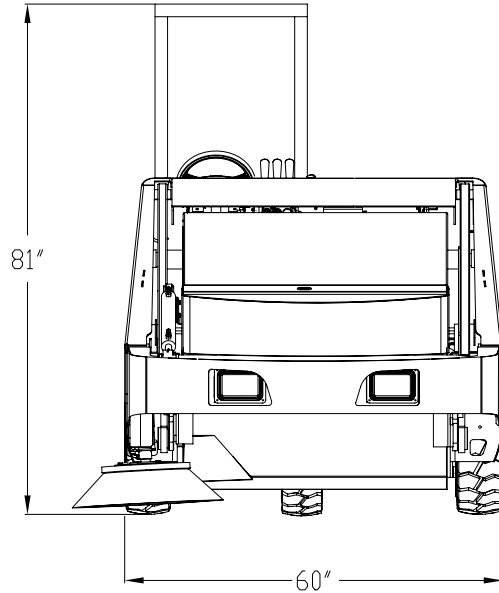
Model No. 9XRGASES / 9XRLPES / 9XRDSLES / 9XRGASESBR / 9XRLPESBR / 9XRDSLESBR  
/ 9XRDSLCE / 9XRLPGCE / 9XNDLXLP / 9XNDLXGAS / 9XKDLXDSL / 9XDLXLPBR /  
9XDLXDSLBR / 9XDLXGASBR

### DIMENSIONS & WEIGHT

Length . . . . . 105 inch  
Width . . . . . 60 inch  
Height . . . . . 55.38 inch  
Height w/ overhead guard . . . 81 inch  
Height w/ cab . . . . . 81 inch  
Weight . . . . . 3500 lbs.  
Minimum U-turn . . . . . 110 inch

### SWEEPING SYSTEM

Productivity . . . . . 184800 sq ft per hour  
Sweep path. . . . . 62 inch  
Main broom. . . . . 48 inch  
Side broom. . . . . 24 inch  
Second side broom. . . . . optional (72 inch path)  
Hopper type . . . . . RTR high dump  
Hopper volume . . . . . 22 cu ft  
Hopper load capacity . . . . . 1500 lbs  
Dust control . . . . . 110 sq ft  
High dump . . . . . 60 inch  
RTR (rotary trash relocation) . yes



## CE DECLARATION OF CONFORMITY

- D** EG-Konformitätserklärung (entsprechend der EG-Richtlinie 2006/42/EG)
- GB** EC Declaration of Conformity (according to Directive 2006/42/EC)
- F** Déclaration de conformité pour la CEE (conforme à la directive de la CEE 2006/42/CEE)
- I** Dichiarazione CE di Conformità (ai sensi della direttiva CEE 2006/42)
- E** CEE Declaración de Conformidad (según la normativa de la CEE 2006/42/CE)

**PowerBoss Inc.** erklären in alleiniger Verantwortung, daß das Produkt,  
declare under our sole responsibility, that the product,  
déclarons sous notre seule responsabilité que le produit,  
Dichiara sotto la propria responsabilità che il prodotto,  
declaramos bajo responsabilidad propia que el producto,

### Machine

Armadillo 9XR LP (9XR LPGCE)

Armadillo 9XR Diesel (9XRDSLCE)

**D** auf das sich diese Erklärung bezieht, den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der EG-Richtlinie 2006/42/EG, sowie den Anforderungen gemäß 2004/108/EG entspricht. Zur sachgerechten Umsetzung der in den EG-Richtlinien genannten Sicherheits- und Gesundheitsanforderungen wurde(n) folgende Norm(en) und /oder technische Spezifikation(en) herangezogen:

**GB** to which this declaration relates corresponds to the relevant basic safety and health requirements of the Directive 2006/42/EC, and to the requirements of the other relevant Directives 2004/108/EC. For the relevant implementation of the safety and health requirements mentioned in the Directives, the following standard(s) and/or technical specification(s) has (have) been respected:



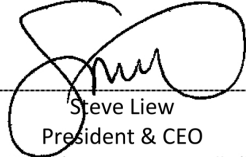
Faisant l'objet de la déclaration est conforme aux prescriptions fondamentales en matière de sécurité et de santé stipulées dans la Directive de la CEE 2006/42/CEE, ainsi qu'aux prescriptions des autres Directives de la CEE établies dans ce domaine 2004/108/CEE. Pour mettre en pratique dans les règles de l'art les prescriptions en matière de sécurité et de santé stipulées dans les Directives de la CEE, il a été tenu compte de la/des norme(s) et/ou de la/des spécification(s) technique(s) suivante(s):

Il est conforme ai requisiti essenziali di sicurezza e di tutela della salute di cui alla Direttiva CEE 2006/42 e sue successive modifiche, nonché ai requisiti di cui alle seguenti Direttive CEE 2004/108. Per la verifica della Conformità di cui alle Direttive sopra menzionate, sono state consultate le seguenti, Norme Armonizzate EN:

El cual se refiere la presente declaración corresponde a las exigencias básicas de la normativa de la CEE 2006/42/CE y referentes a la seguridad y a la sanidad, así como a las exigencias de la demás normativas de la CEE 2004/108/CE. Con el fin de realizar de forma adecuada las exigencias referentes a la seguridad y a la sanidad mencionadas en las normativas de la CEE fué(ron) consultada(s) la(s) siguiente(s) normativa(s) y especificación(es) técnicas(s):

**EN 60335-2-72, EN 55012, EN 61000-6-2**

**Date** 5/19/2010

  
\_\_\_\_\_  
Steve Liew  
President & CEO

Name der autorisierten Person, die für PowerBoss die technischen Unterlagen zusammenstellt:

Name of the person authorized for PowerBoss to compile the technical file:

Personne chargée du suivi du dossier technique:

Nome della persona autorizzata da PowerBoss a compilare il file tecnico:

Nombre de la persona autorizada por PowerBoss para la creación del fichero técnico:

Jeff Pollack

**TABLE OF CONTENTS**

**PREFACE** ..... 2

**TECHNICAL SPECIFICATIONS** ..... 6

**DIMENSIONS & WEIGHT** ..... 6

**SWEEPING SYSTEM** ..... 6

**CE DECLARATION OF CONFORMITY** ..... 8

**FEATURES** ..... 14

**AIR-MOVING SYSTEM** ..... 15

**ERGONOMICS SYSTEM** ..... 15

**DEBRIS-HANDLING SYSTEM** ..... 15

**DRIVE-TRAIN SYSTEM** ..... 15

**CHASSIS SYSTEM** ..... 16

**POWERBOSS INNOVATIONS** ..... 16

**ENVIRONMENTAL FRIENDLY FEATURES** ..... 16

**CLEAN AIR** ..... 16

**LOWER EMISSIONS** ..... 16

**SAFER WORK ENVIRONMENT** ..... 16

**CLEAN ENERGY** ..... 17

**SAFETY INFORMATION** ..... 18

**IMPORTANT SAFETY INSTRUCTIONS** ..... 18

**FOR SAFETY DURING OPERATION** ..... 18

**FOR SAFETY WHEN SERVICING OR MAINTAINING MACHINE** ..... 19

**SAFETY SYMBOLS** ..... 19

**SAFETY DECALS** ..... 20

**BASIC POWERBOSS® SAFETY** ..... 22

**MACHINE OPERATION** ..... 26

**BASIC OPERATING CONTROLS AND INDICATORS** ..... 26

**IGNITION SWITCH** ..... 26

**LIGHT SWITCH** ..... 26

**HORN** ..... 26

**FUEL LEVEL GAUGE** ..... 26

**VOLTMETER AMP GAUGE** ..... 26

**HOUR METER** ..... 26

**ENGINE OIL PRESSURE** ..... 28

**ENGINE COOLANT TEMPERATURE GAUGE** ..... 28

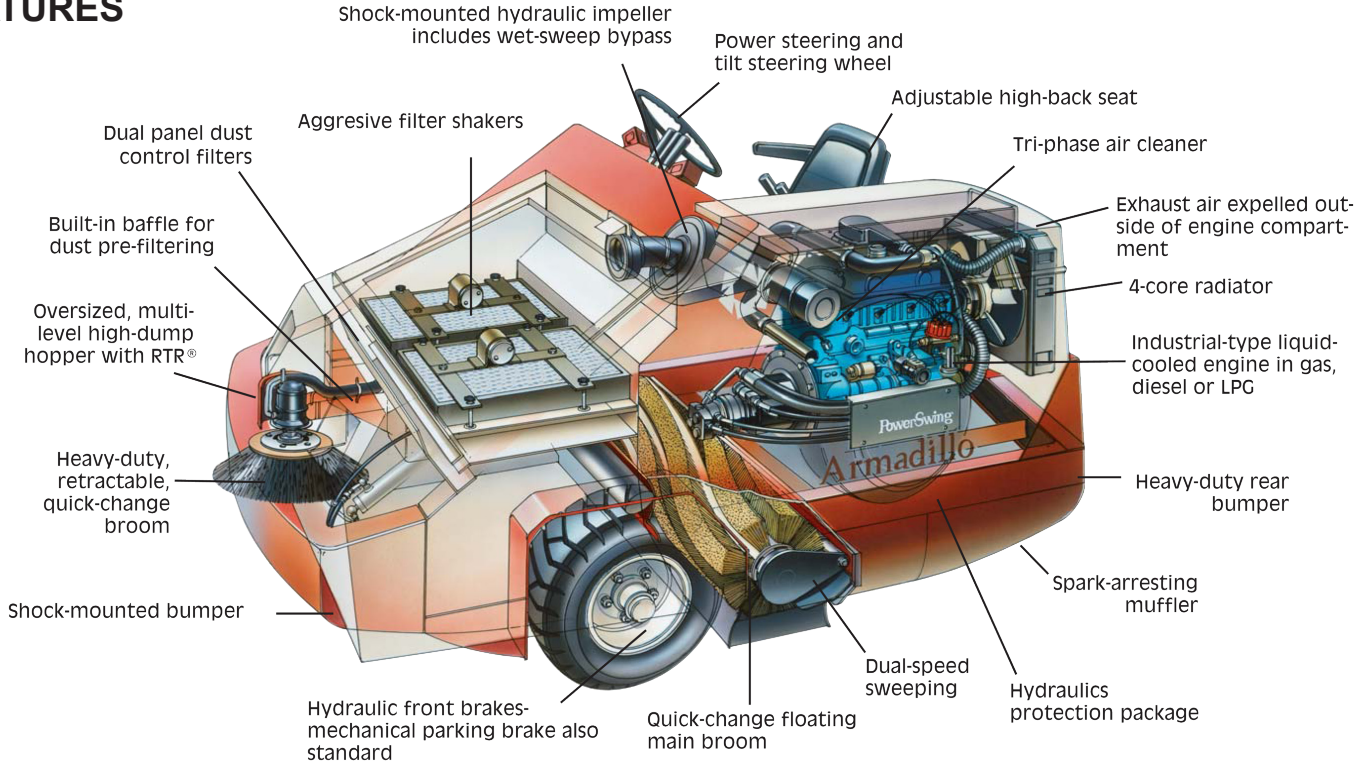
**THROTTLE / GLOW PLUG** ..... 28

DIRECTIONAL CONTROL PEDAL .....	28	OPERATING ON GRADES .....	37
PARKING BRAKE .....	30	SWEEPING .....	37
TILT STEERING LEVER .....	30	EMPTYING THE HOPPER WITH HIGH DUMP FEATURE .....	38
SEAT ADJUSTMENT .....	30	USING THE ROTARY TRASH RELOCATOR (RTR™) .....	39
<b>SWEEPING CONTROLS .....</b>	<b>32</b>	TRANSPORTING THE MACHINE .....	40
BROOM CONTROL LEVER .....	32	Using a Trailer or Transport Vehicle .....	40
MAIN BROOM HANDLE .....	32	Pushing the Machine .....	40
SIDE BROOM HANDLE .....	32	<b>PREVENTATIVE MAINTENANCE .....</b>	<b>41</b>
<b>DEBRIS HOPPER DUMP CONTROLS .....</b>	<b>32</b>	<b>INTRODUCTION .....</b>	<b>41</b>
HOPPER FILTER SHAKER BUTTON .....	32	<b>SCHEDULED MAINTENANCE CHART .....</b>	<b>42</b>
HIGH DUMP .....	34	<b>PREVENTATIVE MAINTENANCE INSTRUCTIONS .....</b>	<b>46</b>
LEVER 1 .....	34	ENGINE .....	46
LEVER 2 .....	34	Air Intake System .....	46
HOPPER UNLOCK BUTTON .....	34	Check Air Filter Service Indicator .....	46
TO RAISE AND DUMP THE HOPPER: .....	34	Air Filter Element Removal .....	47
ROTARY TRASH RELOCATOR (RTR™) .....	34	Air Filter Cleaning .....	48
<b>OPERATING PROCEDURES .....</b>	<b>36</b>	Air Filter Inspection .....	48
PRE-OPERATION CHECKS .....	36	Air Filter Installation .....	48
STARTING .....	36		
SLOWING AND STOPPING .....	37		

ELECTRICAL SYSTEM .....	48	Maintaining Hydraulic Oil Cooler Efficiency .....	56
Battery Cleaning .....	48	Changing The Hydraulic Fluid .....	56
Battery Replacement .....	49	Changing The Hydraulic Fluid Filter .....	57
Circuit Breakers .....	49	Adjusting The Directional Control Return Spring .....	57
Fuses .....	50	SWEEP COMPONENTS .....	58
FUEL SYSTEM .....	51	Broom Door Flap Inspection .....	58
COOLANT SYSTEM .....	52	Broom Door Flap Replacement and Adjustment .....	58
Blowing Out Radiator Fins .....	52	Main Broom Adjustment .....	59
Reverse Flow Flushing .....	52	Main Broom Height Adjustment .....	60
LUBRICATION .....	52	Main Broom Taper Adjustment .....	60
Changing Engine Oil .....	52	Main Broom Replacement .....	61
LUBRICATION POINTS .....	53	Side Broom Angle Adjustment .....	62
Rear Drive Rotary Actuator .....	53	Side Broom Height (Wear) Adjustment .....	62
Engine Mount Pivot .....	53	To Adjust The Side Broom Height For a 9XR or 9XV model: .....	62
Latches & Hinges .....	54	To Adjust The Side Broom Height For a 9XR Europe model: .....	62
Hopper Lift Arm Mounts .....	54	Side Broom Lift Cable Adjustment .....	63
HYDRAULICS SYSTEM .....	56	Side Broom Replacement .....	64
Filling The Fluid Reservoir .....	56	Filter Removal .....	64
Hydraulic Fluid Viscosity Specifications .....	56		

Filter Cleaning .....	65
Filter Replacement.....	65
Vacuum Gasket Mount Adjustment .....	66
Flap Replacement .....	66
Frame Seal Replacement .....	67
Front Frame Seal .....	67
Side Frame Seal.....	67
<b>PARKING BRAKE .....</b>	<b>67</b>
Adjusting The Parking Brake Cable Length .....	68
<b>TIRES .....</b>	<b>69</b>
Changing Solid Tires .....	69
Changing Pneumatic Tires.....	69
<b>MISCELLANEOUS ADJUSTMENTS.....</b>	<b>69</b>
Anti-Static Chain Adjustment .....	69
Latch and Hinge Maintenance .....	70
Cables .....	70
<b>TROUBLESHOOTING .....</b>	<b>71</b>
<b>TROUBLESHOOTING CHART.....</b>	<b>71</b>

**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: 104 Sq. Ft. total
- Timed Electric Filter Shakers
- Clogged Filter Indicator
- Fire-in-hopper Indicator

## 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
- PowerSwing™ engine access for ease of maintenance
- 4-Core Radiator
- PowerClimb™ All-Terrain Access (Two 23" OD Pneumatic Front Tires & One 21" OD Pneumatic Rear Tire)

## **CHASSIS SYSTEM**

- Massive One-Piece, unitized steel frame
- Oversized, soft-ride tires
- PowerFlex™ automotive-type suspension on rear wheel (optional on some models)\*
- Eliminates jolts and vibration for component protection\*

## **POWERBOSS INNOVATIONS**

- PowerSwing™ - a patented system that allows you to rotate the engine out of the body of the sweeper for bench-like maintenance access to all parts, optional on the 9XR
- PowerClimb™ - with oversized tires and extra ground clearance you can easily negotiate rough terrain and speed bumps; even climb sidewalk curbs
- PowerFlex™ - automotive-type rear wheel suspension that minimizes vibration for operator comfort and longer machine life. Optional for 9XV model.

## **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.

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 301854

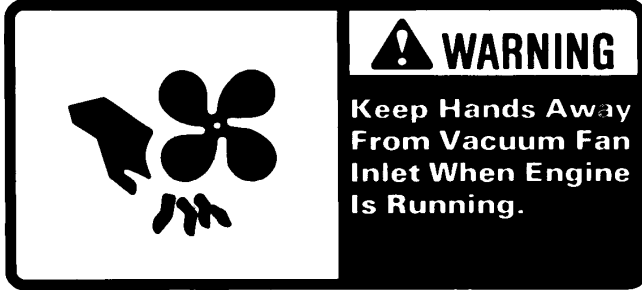


## **CAUTION**

**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.**

Located at the Impeller:  
Part Number 301729



Located on the High Dump Hopper:  
Part Number 301732



Located on the shroud of the radiator:  
Part Number 301733



## **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.**

### **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.



**ATTENTION!**

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

**ATTENTION!**

Never push or tow a machine faster than 6 mph.

**ATTENTION!**

Engage tow valve before towing or pushing.

## **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.

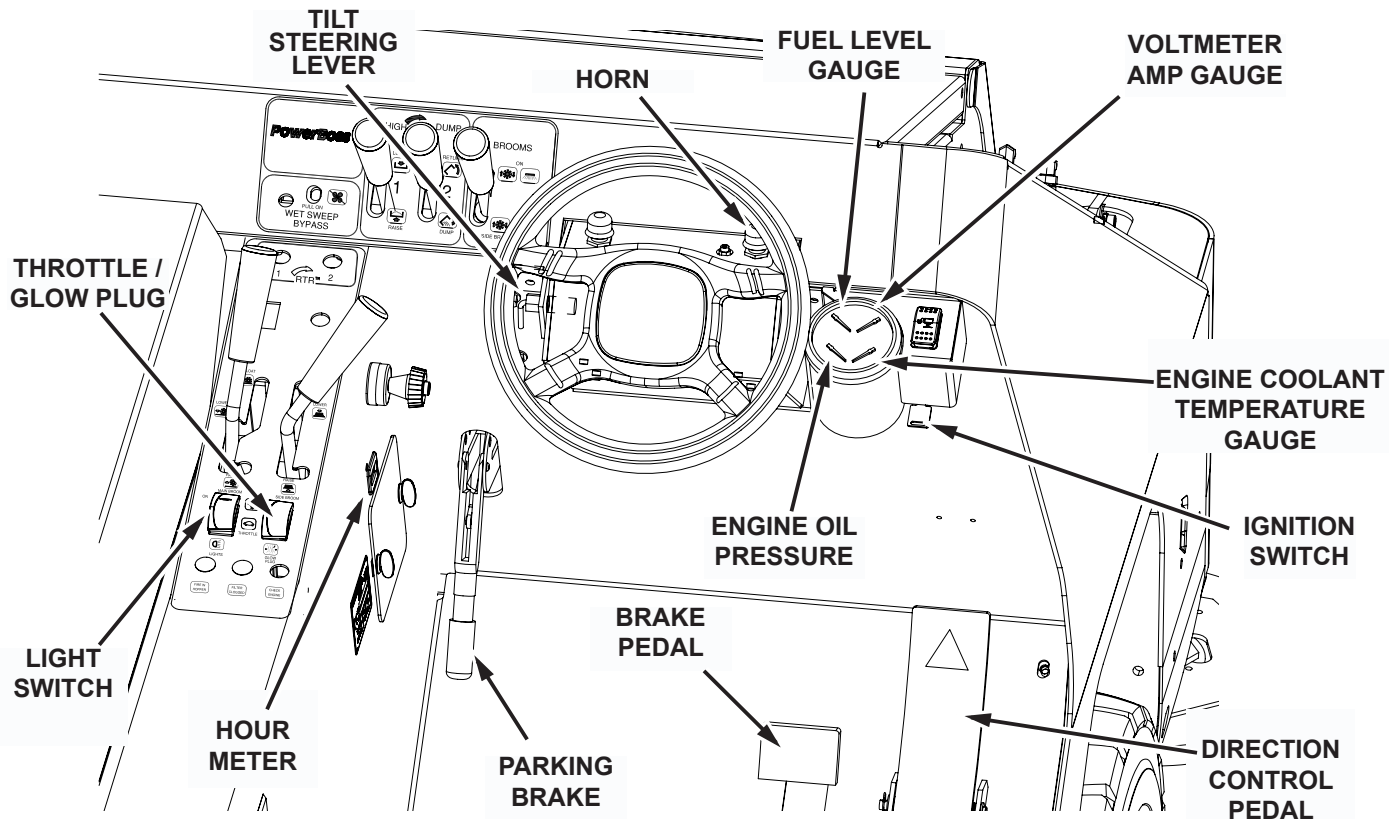
#### **VOLTMETER AMP GAUGE**

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.

#### **HOURLY 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 a two speed throttle idle and fast settings and glow plug.

- 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**

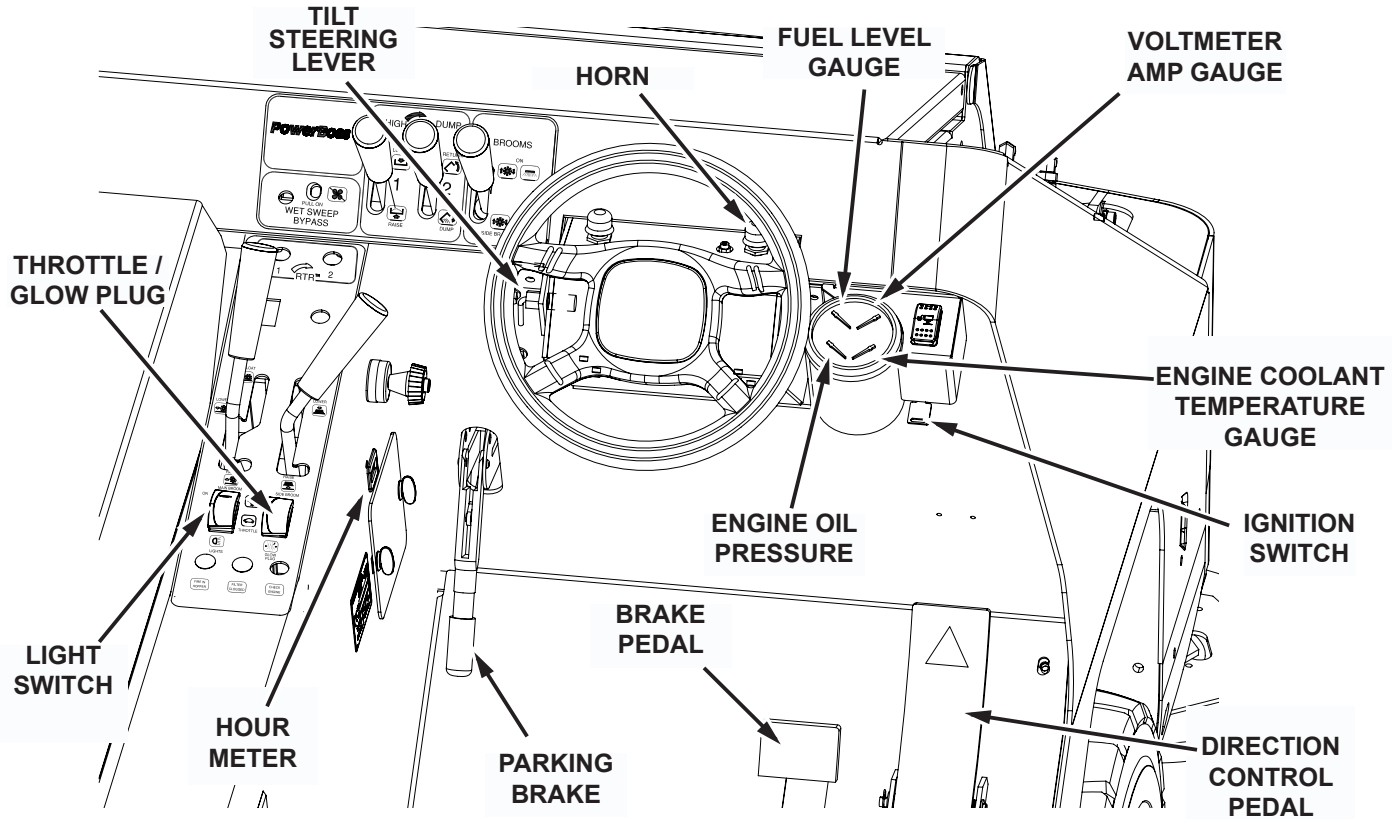
The directional control pedal controls the speed and direction of the machine. It is also used for slowing the machine or stopping.

- 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.**

The sweeper is equipped with a speed limiter. A stop is mounted under the directional control pedal and can be raised to reduce the maximum speed.



## **PARKING BRAKE**

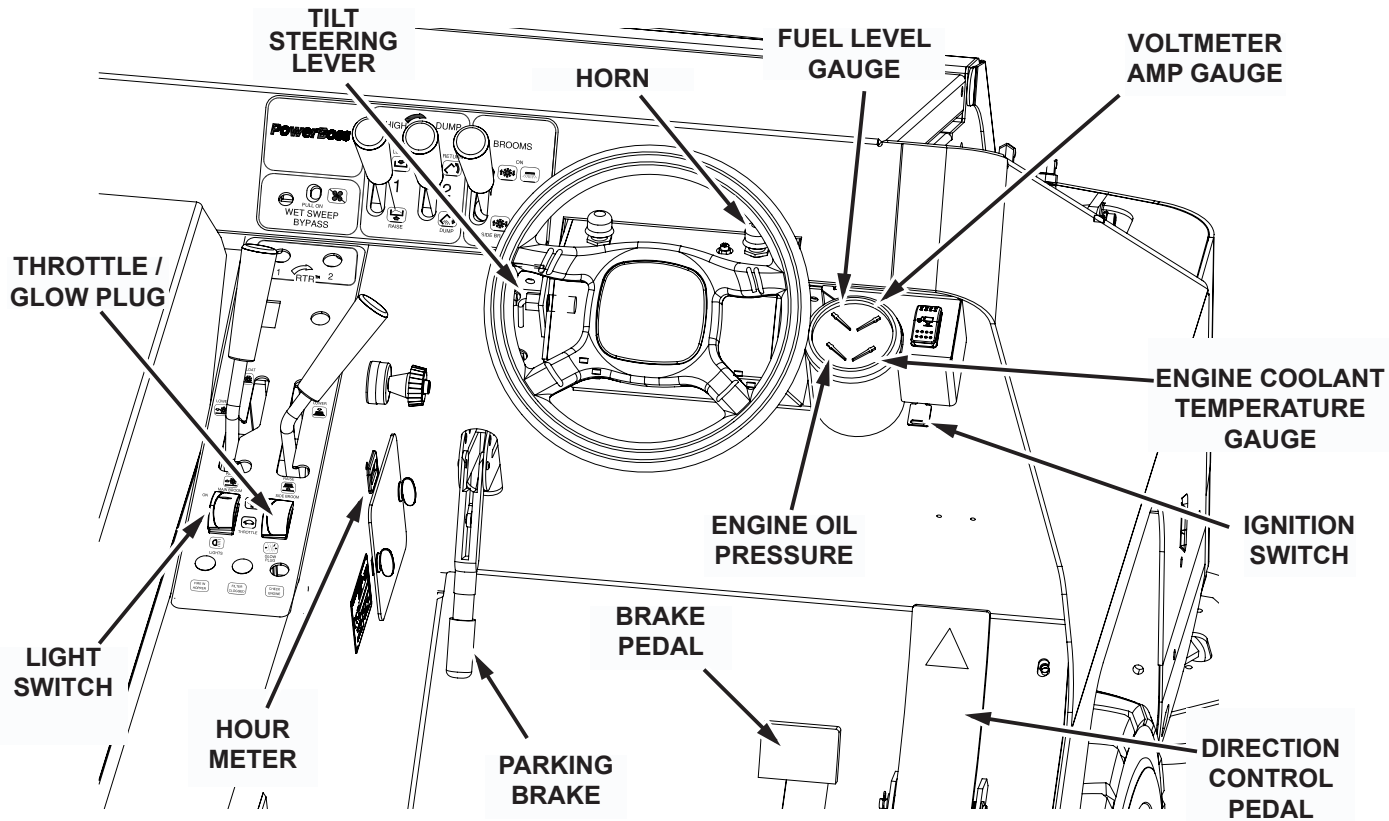
The hydraulic drum brakes on the two front wheels are operated by pressing on the brake pedal. The parking brake is cable activated. To engage the parking brake pull upward on the hand brake lever located on the left side of the front wall of the operator's compartment. To release the parking brake press the brake pedal and push down on the hand brake lever.

## **TILT STEERING LEVER**

The steering wheel can be adjusted to provide the most comfortable position for the operator. To adjust the steering wheel pull out the lever and push up or down on the steering wheel, the lever will snap back 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.



## **SWEEPING CONTROLS**

### **BROOM CONTROL LEVER**

The broom control lever activates the brooms. (“Side Broom OFF” position activates the main broom only.)

**NOTE: The main broom and side broom may be lowered independently.**

**NOTE: The “OFF” position is achieved by placing the broom control lever in the center of the slot. Both broom motors (main & side) are de-activated by taking this action.**

### **MAIN BROOM HANDLE**

The main broom handle to the immediate left of the driver raises and lowers the main broom. For normal sweeping, position the handle at the LOWER position on the handle slot.

**NOTE: Extensive use of the FLOAT position reduces broom life.**

- For extremely uneven floor, position the handle

at the FLOAT position on the handle slot.

- When not sweeping, position and lock the handle to the RAISE position on the handle slot.

### **SIDE BROOM HANDLE**

The side broom handle to the immediate left of the driver raises and lowers the side broom.

- When not sweeping, the side broom should remain in the RAISE position.
- To lower the side broom, position the handle to the LOWER position in the handle slot.

## **DEBRIS HOPPER DUMP CONTROLS**

### **HOPPER FILTER SHAKER BUTTON**

This button 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:

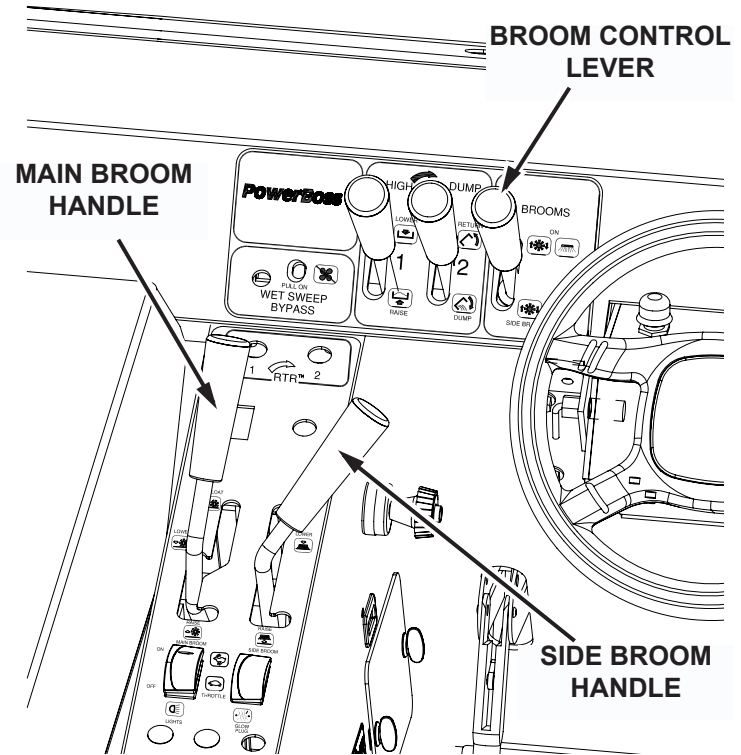
1. Bring the machine to a complete stop.



2. Place the broom control lever in the OFF position.
3. Press and hold the filter shaker button for 20 to 30 seconds.
4. Place the broom control lever in the ON position and resume sweeping.

**⚠ CAUTION**

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



## **HIGH DUMP**

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

### **LEVER 1**

Raises and lowers the hopper

### **LEVER 2**

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

## **HOPPER UNLOCK BUTTON**

If equipped the unlock hopper button must be pressed to raise and lower the hopper. The 9XR Europe machine is equipped with a two handed hopper operation.

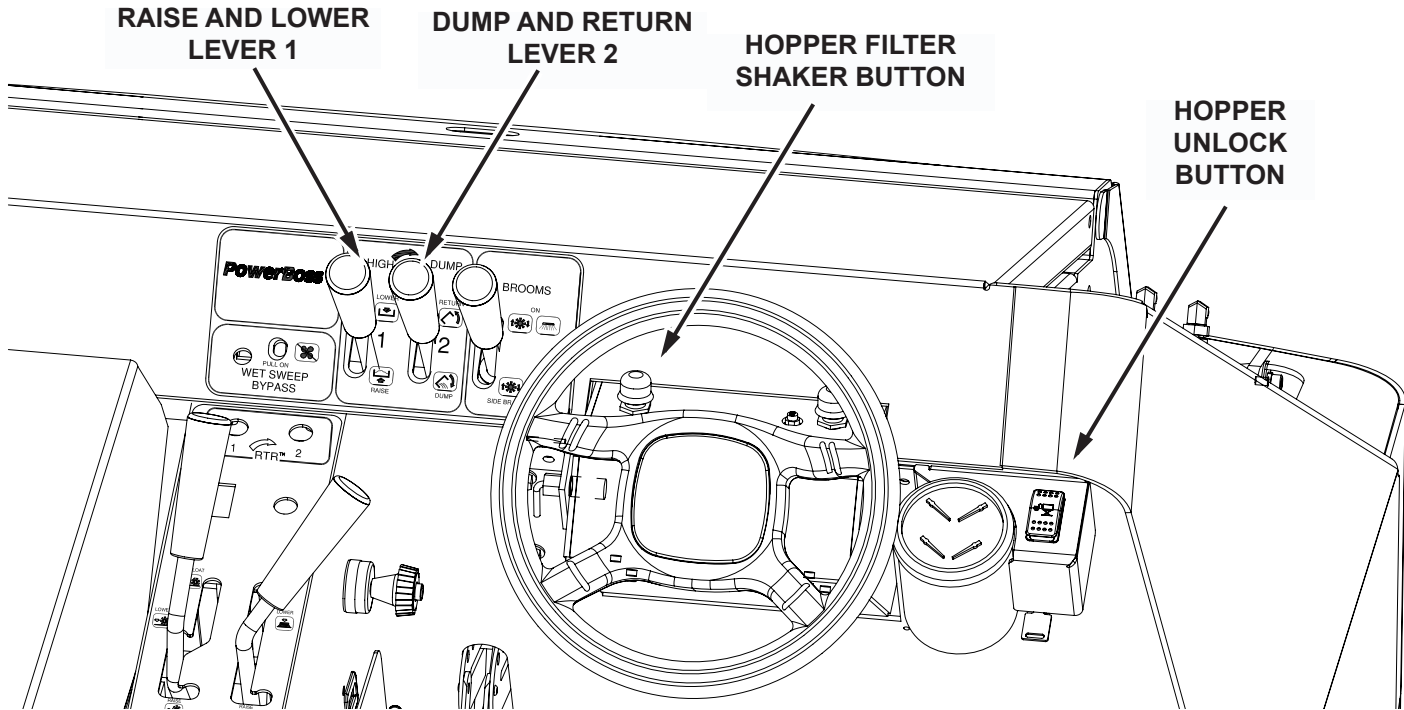
## **TO RAISE AND DUMP THE HOPPER:**

1. Pull back Lever 1 to the RAISE position (press and hold the unlock hopper button if equipped) and hold until the hopper raises to the proper height for the dumpster or container.

2. To empty debris, pull back Lever 2 (press and hold the unlock hopper button if equipped) to the DUMP position to rotate the hopper forward and empty the debris.
3. To rotate the hopper back, push Lever 2 forward (press and hold the unlock hopper button if equipped) to the RETURN position until the hopper rotates and stops.
4. To lower the hopper, push Lever 1 forward (press and hold the unlock hopper button if equipped) to the LOWER position until the hopper stops.

## **ROTARY TRASH RELOCATOR (RTR™)**

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.**

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. Lower the Brooms
  - When sweeping extremely uneven floors, position the main broom handle at FLOAT on the handle slot.
  - Lower the side broom by positioning the side broom handle at LOWER in the handle slot.
  - Lower the main broom by positioning the main broom handle to LOWER on the handle slot.
2. Activate the broom motors.
  - Activate both main and side broom motors by pushing the broom and brush control lever to the ON position.
  - Activate the main broom motor by pulling the broom and brush control lever to the SIDE BROOM OFF position.

**NOTE: Broom control lever must be in the center OFF position.**

3. Drive the machine over the area to be swept.

## **EMPTYING THE 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 Lever 1 (press and hold the unlock hopper button if equipped) 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. Pull back Lever 2 to the DUMP position to rotate the hopper forward and empty the debris.
7. After the hopper empties, push Lever 2 forward (press and hold the unlock hopper button if equipped) to the RETURN position until the hopper rotates and stops.
8. Slowly back the machine away from the dumpster approximately 5 feet.
9. Push Lever 1 forward (press and hold the unlock hopper button if equipped) to the LOWER position until the hopper stops.

## USING THE 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 Lever 1 (press and hold the unlock hopper button if equipped) 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.**

4. Pull back Lever 2 to the DUMP position (press and hold the unlock hopper button if equipped) 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 Lever 2 forward (press and hold the unlock hopper button if equipped) to the RETURN position until the hopper rotates back and stops.
6. Push Lever 1 forward (press and hold the unlock hopper button if equipped) 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	50	100	200	500	
<b>ENGINE</b>					
		X			Pressure wash engine <i>NOTE: For additional maintenance requirements, refer to the engine manual.</i>
<b>AIR INTAKE SYSTEM</b>					
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.
<b>ELECTRICAL SYSTEM</b>					
			X		Clean battery top.
<b>COOLANT SYSTEM</b>					
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

<b>SCHEDULED MAINTENANCE CHART</b>					
<b>FREQUENCY (IN HOURS)</b>					<b>SERVICE (BY MAINTENANCE AREA)</b>
<b>DAILY</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>500</b>	
<b>LUBRICATION POINTS</b>					
	<b>X</b>				Rear Drive Rotary Actuator (2 fittings) Lubricate type - grease (Do not Pressure wash actuator)
				<b>X</b>	Engine Mount Pivot (1 fitting) Lubricate type - grease
				<b>X</b>	Hood Latches & Hinges Lubricate type - oil
				<b>X</b>	Hopper Lift Arm Mounts (2 fittings on each mount) Lubricate type - lithium grease
<b>IMPELLER</b>					
<b>X</b>					Check for hydraulic fluid leaks.
<b>HYDRAULIC SYSTEM</b>					
<b>X</b>					Check hydraulic reservoir gauge and fill as needed.
				<b>X</b>	Replace breather cap filter element.
				<b>X</b>	Replace hydraulic fluid and filter
<b>X</b>					Check functioning of directional control pedal and adjust as needed.
				<b>X</b>	Clean hydraulic fluid strainer in reservoir.
	<b>X</b>				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	
		X			Blow out hydraulic oil cooler fins with compressed air (if so equipped).
<b>SWEEPING COMPONENTS</b>					
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 replace if bristles are 1" in length or less. Side Broom needs to be replaced if bristles are 3" in length.
<b>HOPPER</b>					
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.

<b>SCHEDULED MAINTENANCE CHART</b>					
<b>FREQUENCY (IN HOURS)</b>					<b>SERVICE (BY MAINTENANCE AREA)</b>
<b>DAILY</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>500</b>	
		X			Inspect hopper side and frame seals for wear or damage. Adjust or replace as needed.
<b>STEERING</b>					
	X				Check for leaks.
<b>PARKING BRAKE</b>					
			X		Check for proper functioning and adjust as needed.
<b>TIRES</b>					
X					Visually inspect for wear and damage. Repair or replace as needed.
			X		Check pneumatic tires for proper air pressure (95 psi).
<b>MISCELLANEOUS</b>					
				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**

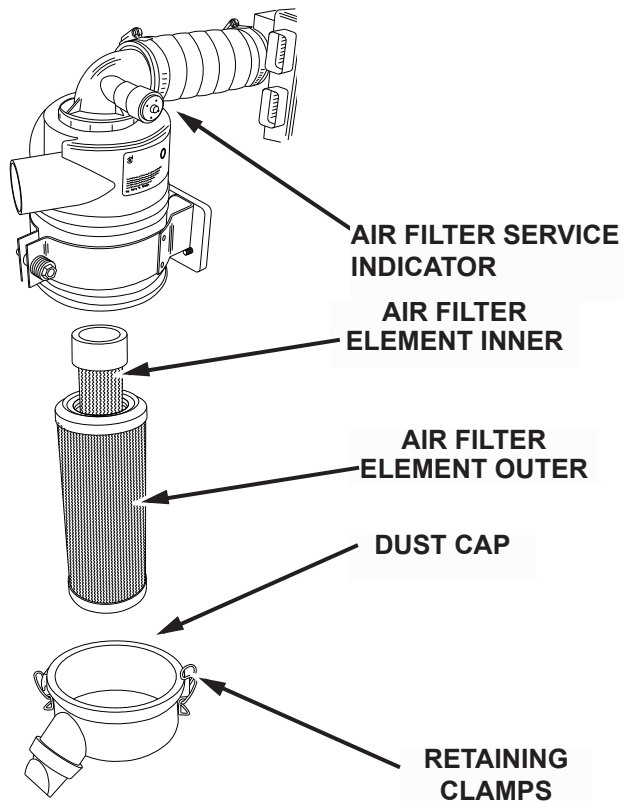
**Never attempt to perform any service on the equipment or components until the engine is OFF, the parking brake is LOCKED, and the wheels are CHOCKED.**

### 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.

**NOTE:** The diesel engine has a screw type retaining clamp. The gas and LP engines have two lever retaining clamps.

4. Remove the dust cup.
5. Pull the rubber plug out of the dust cup and empty the contents.

**NOTE:** The Diesel engine has a wing nut holding the air filter element in place, remove the wing nut first.

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 wing nut and tighten it (Diesel only).
4. Replace the rubber plug in the dust cup.

5. Replace dust cup, being sure embossed word “top” on cup is positioned correctly (up).
6. Tighten the ring clamp or retaining clips.
7. 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

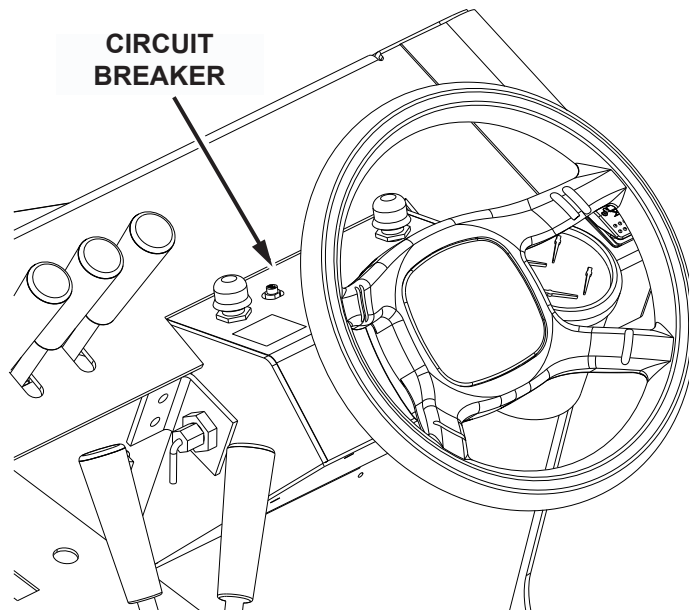
**⚠ CAUTION**

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).

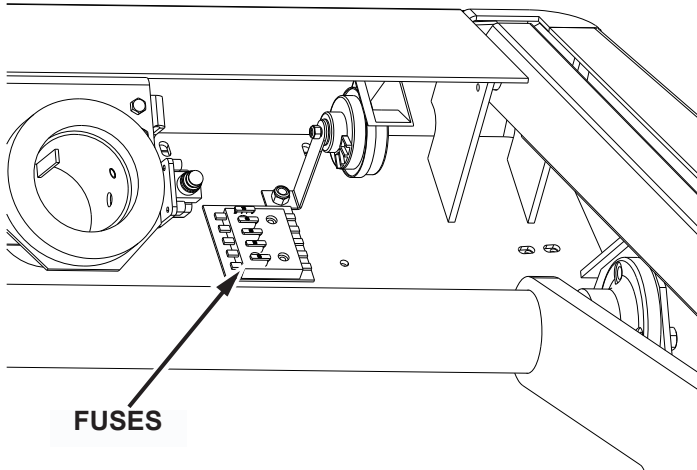


## Fuses

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

## **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.

## **LUBRICATION**

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.

### **Changing Engine Oil**

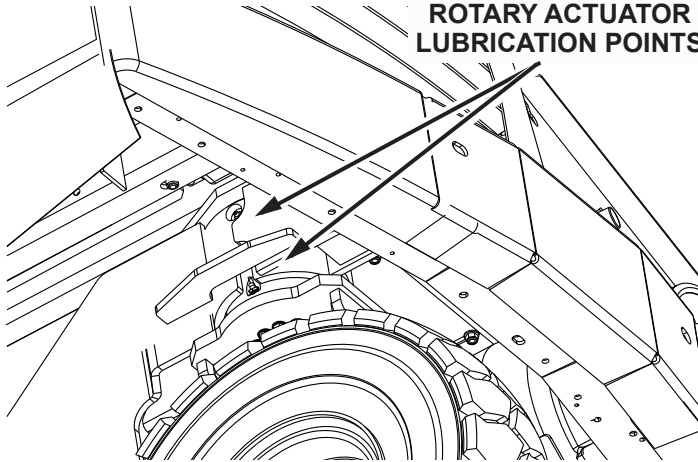
1. Place a drain pan under the lowest end of the engine.
2. Remove the drain plug and allow the oil to drain into the pan.
3. Remove the used oil filter and replace with a new one.
4. Dispose of the oil and oil filter in an approved manner.
5. Remove the engine oil cap, add oil in the amounts listed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

## LUBRICATION POINTS

### Rear Drive Rotary Actuator

The rear drive rotary actuator must be lubricated every 50 hours with grease, There are two grease points on the actuator.

**REAR DRIVE  
ROTARY ACTUATOR  
LUBRICATION POINTS**

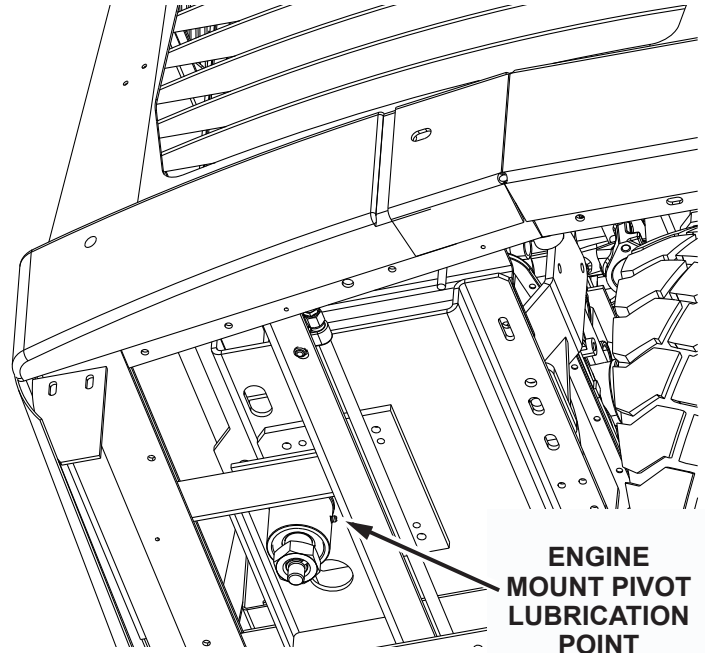


**! CAUTION**

**Do not pressure wash actuator. Pressure washing can damage actuator.**

### Engine Mount Pivot

The engine mount pivot must be lubricated every 500 hours with grease, There is one lubrication point on the pivot located underneath the engine.



**ENGINE  
MOUNT PIVOT  
LUBRICATION  
POINT**

### 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
- Side Door
- Main Broom Door
- Seat Hinge
- Engine latch

### Hopper Lift Arm Mounts

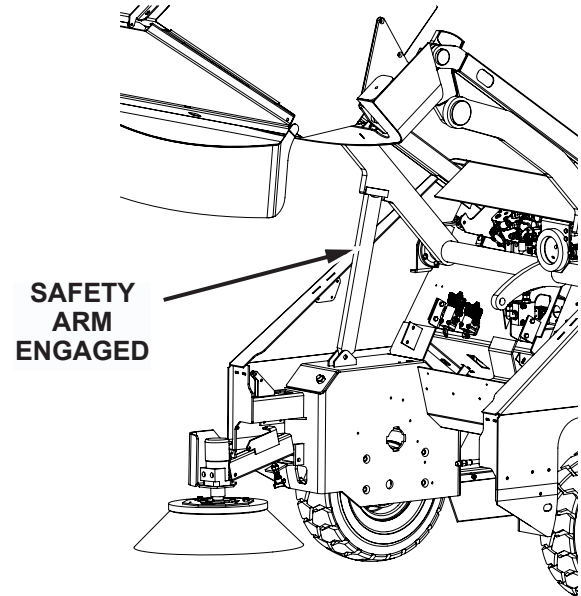
The hopper lift arm mounts must be lubricated every 500 hours with lithium grease, There are two lubrication point on each mount.

1. Park the machine on a level surface.

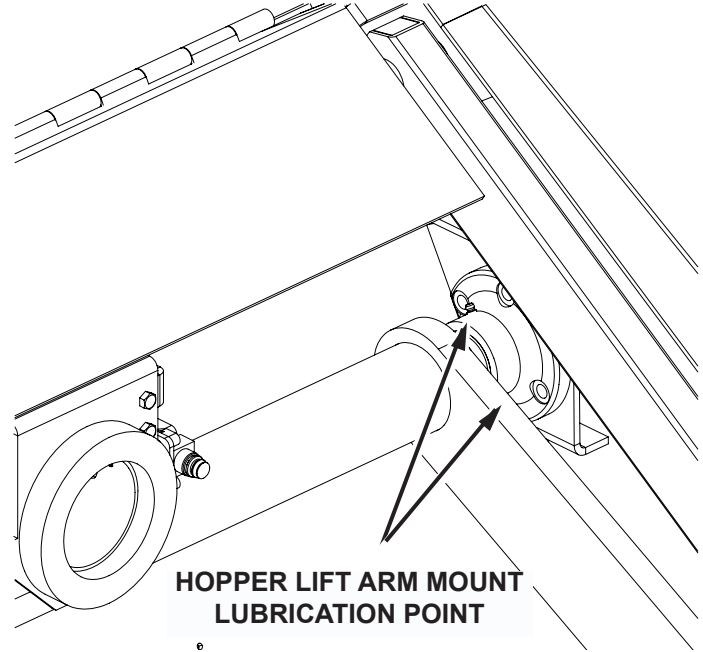
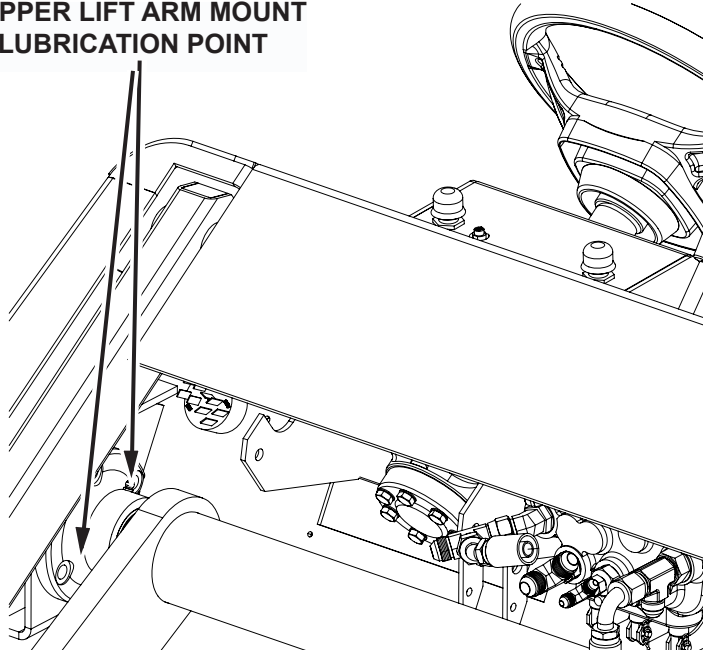
**⚠ WARNING**

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

3. Raise the hopper and engage the safety arm
4. Shut off the engine and engage the parking brake.
5. Locate and grease the hopper lift arm lubrication points.



**HOPPER LIFT ARM MOUNT  
LUBRICATION POINT**



## HYDRAULICS SYSTEM

### Filling The Fluid Reservoir

**NOTE:** The reservoir is located inside the machine and is accessible by tilting the operator's seat forward.

1. When the machine is cool and the hopper is in the lowered position, remove the dipstick. Fluid level should be between the high and low marks on the dipstick.



### **CAUTION**

**DO NOT OVERFILL! DO NOT USE TRANSMISSION FLUID** PowerBoss, Inc. recommends 15w-40w motor oil We Currently use **EXXON XD-3**

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

### Hydraulic Fluid Viscosity Specifications

SUS @ 100° F 510-560

SUS @ 210° F 78-84

### Maintaining Hydraulic Oil Cooler Efficiency

Your machine is equipped with a hydraulic oil cooler, it is integrated with the radiator and utilizes exhausted radiator air from the engine fan to cool the hydraulic fluid. To maintain its efficiency, periodically blow out the radiator & oil cooler fins with compressed air. 100 p.s.i. is maximum

### 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.



- 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.**

- Install the filler cap assembly.
- Check the drain plug for leakage.

### Changing The Hydraulic Fluid Filter

- Turn off the engine and engage the parking brake.
- Unscrew the oil filter cartridge from the mount and discard in an approved manner.
- Apply a thin coating of fluid to the seal of a new filter element.
- Thread onto the mount and hand tighten.
- Tighten an additional one-half turn beyond hand tight.

**NOTE: Do not over tighten.**

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

### Adjusting The Directional Control Return Spring

You may encounter “creeping” problems from time to time. Creeping means the machine moves backward or forward when the forward/reverse pedal is in neutral. A grinding noise when the engine is shut down is a so an indicator that the directional control return spring needs adjusting. If this occurs, perform the procedure which follows:

- Turn off the engine, engage the parking brake and chock both wheels.
- Jack the rear of the machine so that the rear tire just clears the floor. Use two jack stands to support the machine.

 **WARNING**

**DO NOT USE A JACK ALONE TO HOLD THE MACHINE!!!**

- Locate the forward / reverse adjustment bracket mounted beneath the pump on the pump mounting plate.

4. Slightly loosen the bolt on the center of the bracket.
5. Loosen the locking nut on each of the adjusting bolts on the side of the bracket closest to the pump mounting plate.
6. From the operator's seat, start the engine and run at half throttle.
7. Turn the adjusting bolts while watching the rear wheel. Continue to adjust until the rear wheel does not turn in either direction.
8. Fully open the throttle. Push the directional control pedal forward and backward to be sure the pump stays in neutral. Check the wheel again and adjust as needed until the wheel remains motionless.
9. Retighten all the locking nuts and bolts.
10. Turn the engine off and lower the machine to the floor.

## 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

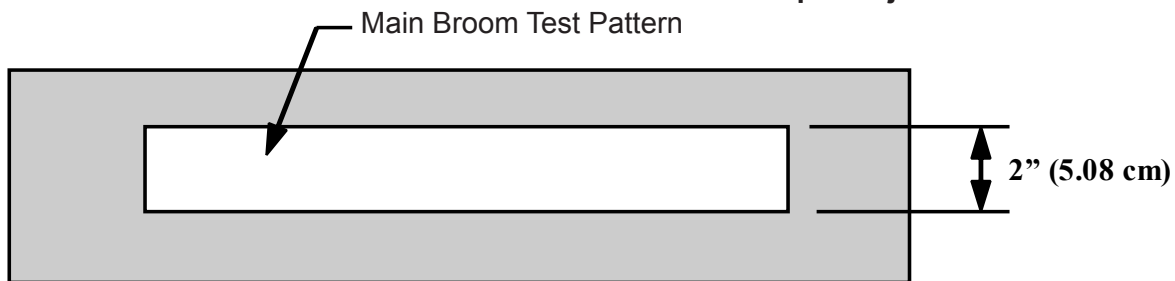
**NOTE: Perform this adjustment on a flat, smooth test surface.**

1. Drive the machine onto the test surface with the main broom in the RAISE position.
2. Set the parking brake and position the main broom to the NORMAL position.
3. Push the broom control switch to the ON position to activate the broom motor and open the throttle to full RPM.
4. Allow about 45 seconds for the broom to operate, then deactivate the broom motor and raise the broom.

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

5. Drive the machine clear of the test site.
6. 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 Taper Adjustment on the next page.**



## Main Broom Height Adjustment

1. Turn the machine off and lock the parking brake.
2. Position the main broom lever in the LOWER position.

**NOTE: The adjustment knob is located in the engine compartment on the broom control handle pivot.**

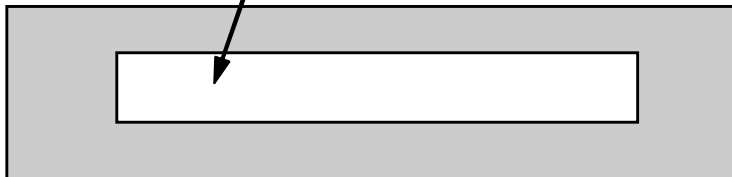
3. Turn the broom adjusting knob clockwise one-eighth turn to free the wing nut.
4. Turn the wing nut counter-clockwise to allow space for adjustment.
5. Make a lower or higher adjustment with the knob as required.
6. Retighten the wing nut.
7. Repeat the main broom adjustment test to see that the broom is properly adjusted.

## Main Broom Taper Adjustment

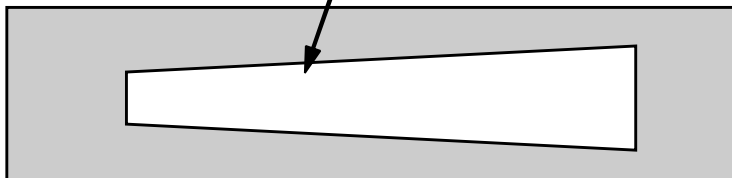
**NOTE: It is not usually necessary to perform this adjustment. However, if the main broom adjustment test shows a pattern that is tapered in length (one end is wider than the other), perform the procedures which follow.**

1. Locate the adjusting screws directly beneath the hydraulic pump.
2. Loosen the jam nuts on the adjusting screws, and loosen the retaining bolt on the inside of the mounting bracket.
3. Use the adjusting screws to raise or lower the left end of the main broom. (The right end of the broom remains fixed. All adjustments affect the left end of the broom.)
4. After adjustment, tighten the retainer bolt and adjusting screws.
5. Repeat the main broom adjustment test to see that the broom is properly adjusted.

Correct Taper Pattern



Incorrect Taper Pattern



## 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 control lever to the LOWER position
3. Open the left broom chamber door (the door opposite the driver's seat).
4. Using a  $\frac{3}{4}$ " wrench, remove the hex bolt 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.

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.

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 bolt into position and tighten with the wrench.
11. Close and latch the left broom door.
12. Perform a main broom adjustment test and adjust as needed.

### **Side Broom Angle Adjustment**

The angle adjustment is controlled with a stop bolt. This stop bolt is located at the top front of the side broom arm (under the spring). To increase the angle of the side broom, loosen the jam nut and turn the stop bolt counter-clockwise. Be sure to retighten the jam nut back down once the adjustment is made.

### **Side Broom Height (Wear) Adjustment**

The height of the side broom is adjusted with the use of a stop bolt located at the lower rear of the curb broom arm. As the side broom wears, it will be necessary to lower the arm. There are two style adjustment screws. The 9XR and 9XV models have an adjustment screw and locking nut. The 9XR Europe model has a spring loaded screw with a knob.

#### **To Adjust The Side Broom Height For a 9XR or 9XV model:**

To lower the side broom, loosen the jam nut on the stop bolt. Turn the stop bolt in a counter-clockwise direction, check the side broom for proper contact and re-tighten the jam nut.

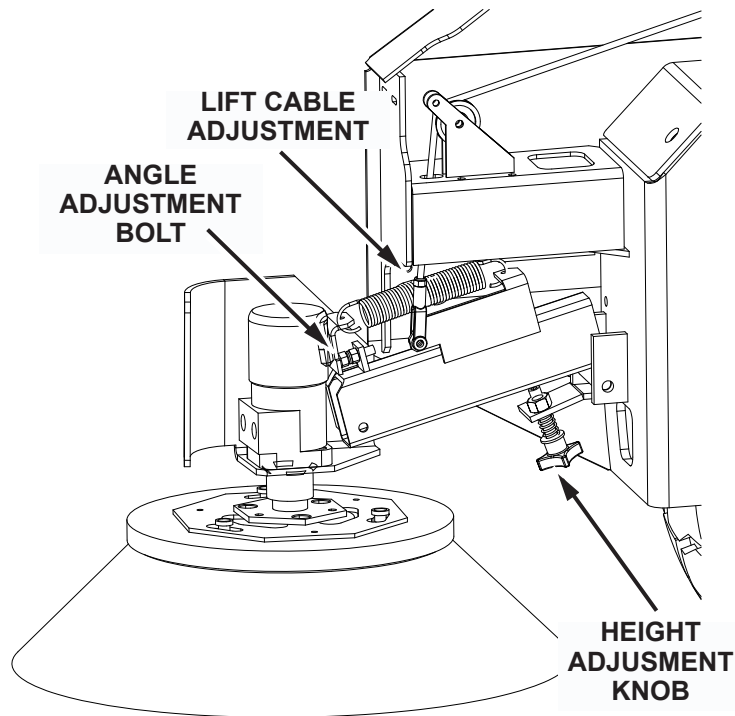
#### **To Adjust The Side Broom Height For a 9XR Europe model:**

To lower the side broom, turn the knob in a counter-clockwise direction, check the side broom for proper contact.

## Side Broom Lift Cable Adjustment

This adjustment is made at the cable clevis attached to the side broom assembly. It controls the height of the side broom in the RAISED position. This adjustment must be made with the hopper fully lowered.

1. Pull the side broom lever into the RAISED position.
2. Loosen the locknut on the threaded rod at the clevis.
3. Turn the threaded rod in or out to set the side broom in the maximum raised position.
4. Secure the cable adjustment by tightening the locknut.



## Side Broom Replacement

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

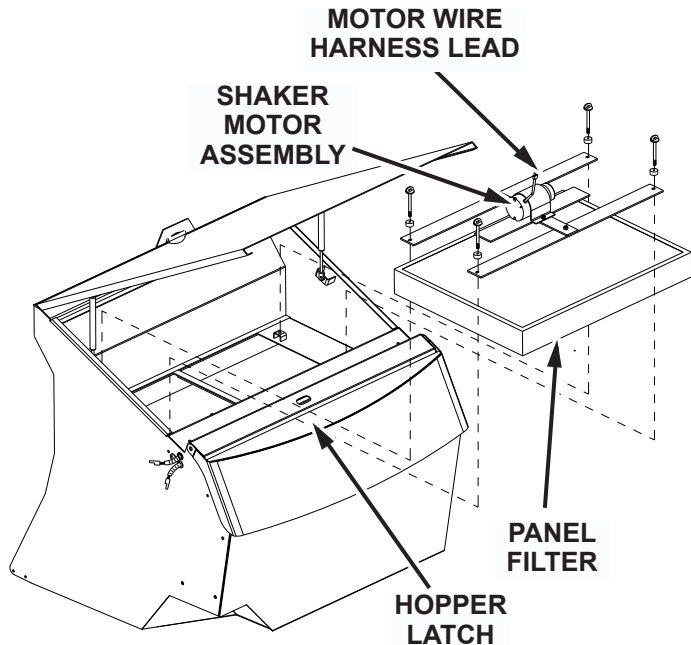
**NOTE: The side broom features a quick release mechanism which enables the operator to remove the brush in seconds.**

1. Raise the side broom and lock in the RAISE position.
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 the drive pins are properly engaged.

## Filter Removal

1. Release the latch on the hopper cover and raise the cover.
2. Disconnect the wire harness leading to the filter shaker motor.
3. Unscrew the four 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.

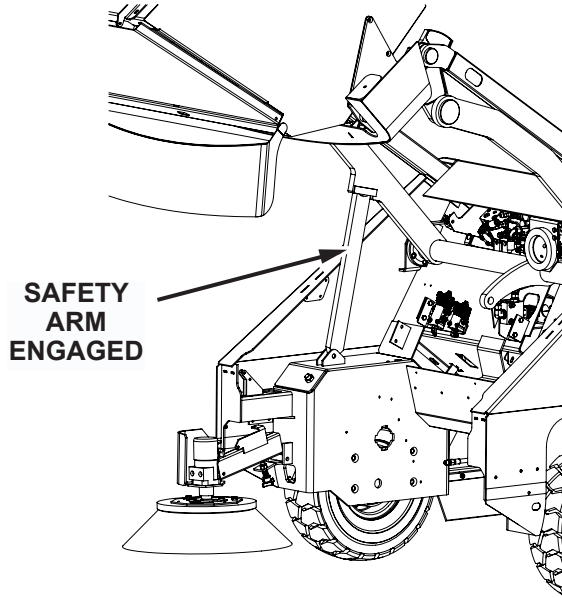
**NOTE:** Make sure the filters are thoroughly dried while standing on their side before installing in the hopper. Do not install or use a wet filter.

## Filter Replacement

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

## Vacuum Gasket Mount Adjustment

- 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.**

7. 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 engine pan. 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

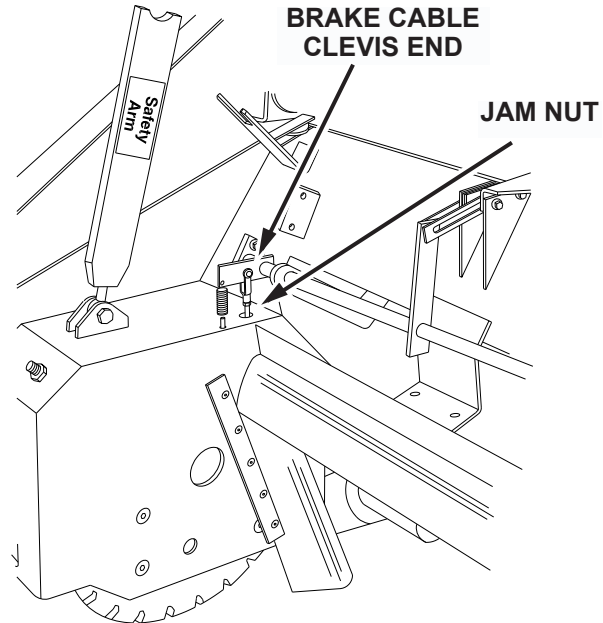
1. Park the machine on a level surface and chock the wheels.
2. Place the parking brake lever in the “OFF” position.
3. Turn the knurled handle counter-clockwise as far as possible.

**⚠ 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 the cable clevis ends for the parking 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. 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.)**

### 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.

### **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.

## TROUBLESHOOTING

This section provides information to assist in identifying maintenance trouble and provides possible causes and actions to correct the problem. Many of the solution require servicing your machine, they can be found in the service manual for you unit. Service must be preformed by an approved authorized repair station.

TROUBLESHOOTING CHART		
PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
Engine will not start or runs roughly after start.      NOTE: On machines with LP fuel, also check the following:	Battery dead.	Recharge or replace battery.
	Machine out of fuel.	Refuel
	Fuel filter plugged.	Clean or replace filter.
	Fuel line broken or obstructed.	Blow fuel line out with compressed air.
	Dirty air filter.	Clean or replace air filter.
	Problems with spark plugs, ignition points, ignition coil ignition switch, carburetor, regulator, wiring harness.	Review engine manual for maintenance and troubleshooting procedures.
	Tank valve not fully opened.	Open the valve slowly.
	Fuel tank type does not match fuel supply.	Use the correct tank type for the fuel supply.
Fuel tank and lines are covered with frost.	Open shut-off valve slowly to ¼ open, start.	
Defective vacuum lock-off.	Replace or repair.	

**TROUBLESHOOTING CHART**

<b>PROBLEM</b>	<b>POSSIBLE CAUSE(S)</b>	<b>SOLUTION(S)</b>
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.
PowerBoss® creeps in neutral.	Directional control pedal return spring is out of adjustment.	Perform the adjustment procedures.
Brushes do not turn or turn very slowly.	Hydraulic system problem:	See Hydraulics System Problems in this section.
	Motor	
	Control valve	
	Gear pump	
	Relief valve	
Little or no vacuum in brush compartment.	Filters clogged.	Clean filters.
	Leak or clog in hose from impeller.	Repair leaks; clear obstructions or replace hose.
	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**

<b>PROBLEM</b>	<b>POSSIBLE CAUSE(S)</b>	<b>SOLUTION(S)</b>
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.

## TROUBLESHOOTING CHART

PROBLEM	POSSIBLE CAUSE(S)	SOLUTION(S)
Sweeper unit leaving debris.	Hopper full.	Dump hopper.
	Broom(s) out of adjustment.	Adjust.
	Broom bristles worn.	Check broom for wear and adjustment.
	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.
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.	Lubricate or adjust arm linkage.

**TROUBLESHOOTING CHART**

<b>PROBLEM</b>	<b>POSSIBLE CAUSE(S)</b>	<b>SOLUTION(S)</b>
Hopper lift cylinder failure.	Line to cylinder leaking.	Tighten fittings or replace hose.
	Piston seals leaking.	Replace seals.
	Bent piston rod.	Replace rod.
Hopper does not rotate or rotates too slowly.	Hopper load too heavy.	Dump more frequently.
	Hydraulics system problem:	See Hydraulics System Problems in this section.
	Control valve	
	Gear pump	
	Lift cylinder	
Relief valve		
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.
Hydraulic motor failure.	Motor leaking.	Replace seals.
	Drive link malfunction.	Replace drive link.
	Output shaft malfunction.	Replace output shaft and bearings.

**TROUBLESHOOTING CHART**

<b>PROBLEM</b>	<b>POSSIBLE CAUSE(S)</b>	<b>SOLUTION(S)</b>
Hydraulic gear pump failure.	Pump leaking.	Replace seals or RR Pump
	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..

**Revision F**

**Effective November 1, 2008**

**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
<b>Walk behinds</b>						
Battery sweepers	Ninety days	One year	One year	N/A	2 years Parts + Labor (or 2000 Hours)	2%
IC sweepers	Ninety days	One year	One year	Through manufacturer	2 years Parts + Labor (or 2000 Hours)	2%
Battery scrubbers	Ninety days	Two years	Three years	N/A	3 Years Parts + Labor (or 3000 Hours)	2%
<b>Riders</b>						
Battery scrubbers	Ninety days	Two years	Three years/2000 hrs	N/A	3 Years Parts + Labor (or 3000 Hours)	2%
IC sweeper/scrubbers	Ninety days	Six months	Two years/2000 hrs	Two years/3000 hrs**	2 years Parts + Labor (or 2000 Hours)	3%
IC sweepers	Ninety days	Six months	Four years/3000 hrs	Five years/3000 hrs**	4 Years Parts + 2 Years Labor (or 4000 Hours)	3%
<b>Exceptions</b>						
Apex series sweeper	Ninety days	One year	One year/1000 hrs	One year/1000 hrs**	2 years Parts + Labor (or 2000 Hours)	3%
6X sweeper	Ninety days	Six months	Two years/2000 hrs	Two years/2000 hours**	2 years Parts + Labor (or 2000 Hours)	3%

**Tank Bladders** Eight years/ no additional labor  
**Polypropylene plastic tanks** Ten years/ no additional labor  
**Batteries** 0-3 months full replacement, 4-12 prorated credit  
**Chargers** One-year replacement  
**Replacement parts** Ninety days

\*Two-hour cap

\*\*Through engine manufacturer. See section 3 of warranty manual for engine warranty exceptions

\*\*\* Based upon dealer's certification status

Extended Warranty MUST be signed up within 30 days of delivery to End User (Dealer has 1Year from Receiving Machine to Sign up extended Warranty)

Extended Warranty Cost is based on Invoice Price multiplied by the Percentage listed in the Extended Warranty Column

*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.**