

COMMANDER SERIES

T82 / T90

C82 / C90

USERS MANUAL



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The Model and Serial Numbers of your machine are shown on the I.D. name plate. This I.D. plate is mounted on the console of the machine below the throttle switch for LP & Gasoline units and Below the Throttle cable for diesels units. This information is needed when contacting Technical Support or when ordering parts. For your convenience, use the space below to record the Model and Serial Numbers of your machine and the date it was placed into service.

MODEL NUMBER: _____

SERIAL NUMBER: _____

DATE PLACED INTO SERVICE: _____

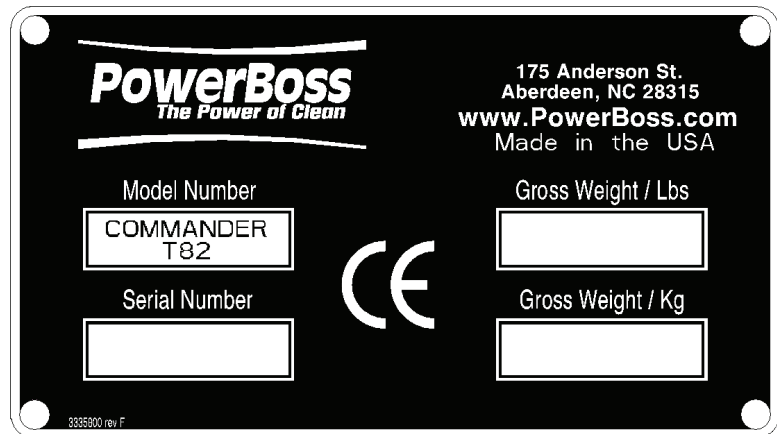
E-mail; techsupport@powerboss.com
Phone Number; Customer Service 800-982-7141

I.D. Name Plate →

How To Read PowerBoss Serial Number

I.E. SN = xxxxx108

XXXXX = Sequence Of Assigned Number
10 = Month (October)
8 = Year (2008)



All information contained in this manual is current at the time of printing. However, due to constant updates and improvements, we reserve the right to make changes at any time without notice.

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PowerBoss®

The Power of Clean

COMMANDER SERIES

82 / 90

USERS MANUAL

OPERATION, MAINTENANCE & TROUBLESHOOTING

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COMMANDER SERIES
T82 / T90
C82 / C90
(LIMITED) PRODUCT WARRANTY

PowerBoss, Inc. (hereafter known as PowerBoss) warrants that these PowerBoss machines will be free from defects in material and workmanship for a period of 24 months or 2,000 operating hours from date of installation, whichever comes first. Poly components are warranted for five (5) years unless used with a cleaning solution in excess of 130°F (54°C), which would void the solution and recovery tank warranty. Written notice of any claimed defect must be given to PowerBoss within the warranty period and within thirty (30) days after such defect is discovered. Liability under this warranty is limited to either replacing or repairing, at PowerBoss's election, any part or parts deemed defective after examination by PowerBoss or an Authorized Service Representative.

For one hundred eighty (180) days from date of installation, PowerBoss will provide repair labor, at no charge, solely through an Authorized Service Representative. Thereafter, labor will be charged. Labor coverage is extended only to those items on which service was performed, and which failed as a result of defects in materials or workmanship. Normal preventative maintenance or adjustments, wearable parts, such as but not limited to flaps, filters, seals, points, plugs or similar items are not eligible for warranty coverage; parts or labor. Brushes are prorated against defects in materials or workmanship for twelve (12) months; hoses are warranted for six (6) months.

Travel is eligible for warranty consideration the first thirty (90) days after installation. The same provisions and exclusions apply to travel coverage as to labor and part eligibility.

This warranty does not extend to the PowerBoss machine, or its parts, that have been subject to misuse, accident or improper handling, installation, maintenance or application, nor does it extend to PowerBoss machine and/or parts which have been repaired or altered outside PowerBoss's plant or the facility of Authorized Service Representative.

Only authorized PowerBoss replacement parts purchased from PowerBoss are eligible for warranty consideration and are warranted against defects in materials and workmanship for the duration of the unit's warranty or thirty (30) days, whichever is longer. (Exception being wearable parts, such as but not limited to flaps, filters, seals, points, plugs or similar items. These items are to be free of defects in materials and workmanship when received and are not eligible for additional warranty consideration.) Damage to the unit, or that incurred as a result of utilization of parts not authorized by or purchased from PowerBoss, is not eligible for warranty reimbursement; parts or labor.

THE WARRANTY SET FORTH HEREIN IS IN LIEU OF AND EXCLUDES ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY OPERATION OF LAW OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND CUSTOMER WAIVES ANY OBLIGATION OR LIABILITY OR POWERBOSS ARISING IN TORT OR STRICT LIABILITY IN TORT, OR FOR LOSS OR USE, REVENUE OR PROFIT WITH RESPECT TO POWERBOSS MACHINE AND/OR PARTS FOR ANY LIABILITY OF CUSTOMER TO ANY THIRD PARTY, OR FOR OTHER DIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

Warranty Information

	Travel*	Labor	Parts	Engine
Walk Behinds				
Battery sweepers	Ninety days	One year	One year	N/A
IC sweepers	Ninety days	One year	One year	Through manufacturer
Battery scrubbers	Ninety days	Two years	Three years	N/A
Riders				
Battery scrubbers	Ninety days	Two years	Three years/2000 hrs	N/A
IC sweeper/scrubbers	Ninety days	Six months	Two years/2000 hrs	Two years/3000 hrs
IC sweepers	Ninety days	Six months	Four years/3000 hrs	Five years/3000 hrs
Exceptions				
Apex series sweepers	Ninety days	One year	One year/1000 hrs	One year/1000 hrs
6X sweeper	Ninety days	Six months	Two years/2000 hrs	Two years/2000 hours

Tank Bladders
 Polypropylene Plastic Tanks
 Batteries

 Chargers
 Replacement Parts
 Travel Time

Eight years/ no additional labor
 Ten years/ no additional labor
 0-3 months full replacement
 4-12 prorated credit
 One-year replacement
 Ninety days
 *Two-hour cap

****Extended Warranties Available****

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

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.



CATUION: 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.

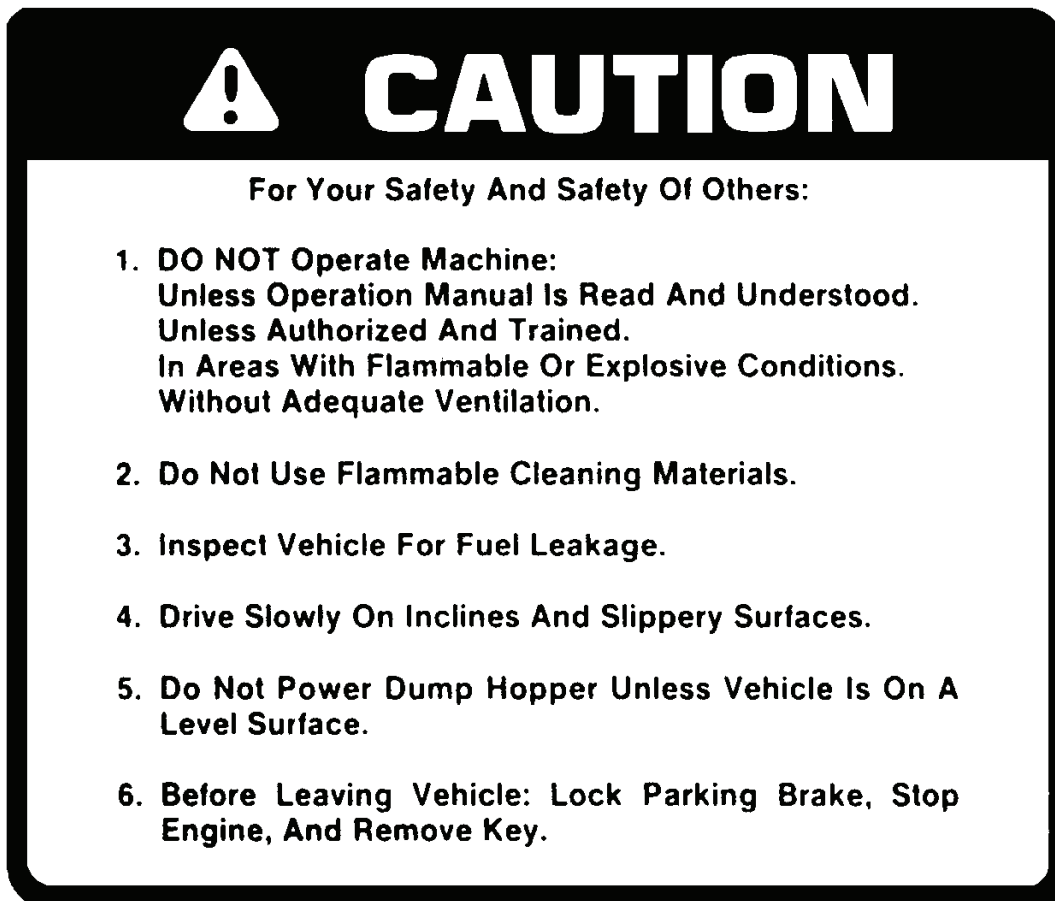


NOTE: To direct your attention to important equipment information or special instructions for preventing damage to equipment

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. The decal below is located in the drive compartment. Other safety decals on you machine appear on the next page.



Follow manufacturers recommendations for safe handling of cleaning materials.

SAFETY DECALS (Continued)

Located On Shroud
of Radiator

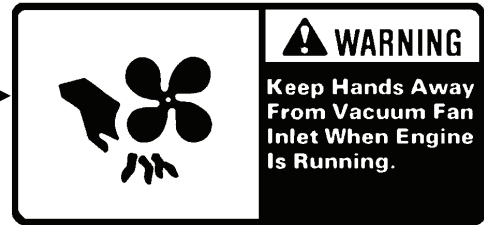


Part Number 301729 →

← Part Number 301733

Part Number 301730 →

Impeller



Engine Fan

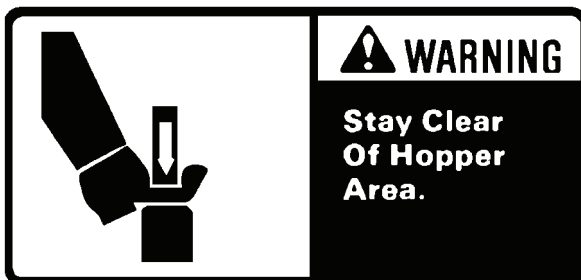


Located On Radiator Shroud



← Part Number 301728

Located On Lift Arm



↑ Part Number 3301731

Located On Secondary Lift Arm



↑ Part Number 3301732

SAFETY

PowerBoss® Sweeper Scrubbers should never be operated unless:

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



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.



1. Before starting the engine, make sure that:

- * ***You have read and understand the User Manual.***
- * ***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.***

2. During operation:

- * ***Keep your hands and body clear of moving parts.***
- * ***Make sure others in the area stay clear of the equipment and moving parts.***

3. When leaving the scrubber unattended:

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

SAFETY (Continued)

4. 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.*
- * Never place your hands near the impeller intake hoses or inlet when the engine is running.*

5. 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 LPG tank coupling.*



6. Do not operate an LPG powered scrubber when any component in the fuel system is malfunctioning or leaking.

7. Replace any defective safety components before operating the scrubber.

SAFETY (Continued)



1. *Travel slowly on grades. NEVER EXCEED 8°*
2. *Place a block or chock behind the wheels when parking on inclines.*
3. *Use special care when traveling on wet surfaces.*

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

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



*Turn the tow valve before pushing or towing.
Never push or tow a machine faster than specified.*

OPERATION AND CONTROLS

IGNITION SWITCH

The three position key switch is used to turn the machine's power **on** and **off**.

STARTING GAS / LP

To start gasoline & LP powered machines, turn the key clockwise to the **START** position. When the engine starts, release the key. To stop the engine, turn the key counter clockwise to the **OFF** position.

HORN

The horn is activated by pressing the horn button located on the right side of the instrument panel. Next to the ignition switch.

FUEL LEVEL GAUGE

The fuel gauge indicates the amount of fuel remaining in the tank for gasoline & diesel units.

BATTERY / AMPERAGE GAUGE

A battery gauge is used on LP & Gasoline units. It indicates the voltage being sent to the battery by the alternator. 13.5v is normal. An Amp. Gauge is used on diesel units, It indicates a charge or discharge of current to the battery.

HOUR METER

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

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.

STARTING DIESEL

The Kubota V1505 engine is equipped with 4 glow plugs to aid in cold starting. To start a cold engine:

- * Turn the ignition key clockwise and hold the glow plug button located on the left side of the instrument panel for 10 - 20 seconds to warm the glow plugs.
- * Turn the key clockwise to the **START** position until the engine starts.
- * When the engine starts, release the key.

NOTE

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

OPERATION AND CONTROLS

THROTTLE

The throttle adjusts the engine speed from idle to the operating speed.

- * The throttle should be in the **IDLE** position when starting the engine and immediately before shutdown.
- * The throttle should be in the **RUN** position during normal operation to ensure proper broom speed.

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.

NOTE

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

PARKING BRAKE

On Optional and Deluxe models, the hand brake is engaged by lifting up on the lever. The parking brake operates the mechanical drum brakes on the front two wheels and is engaged by the brake pedal.

- * **Diesel units equipped with a handbrake is standard.**
- * **Hydraulic brakes are optional and includes a handbrake**

OPERATION AND CONTROLS

BROOM CONTROLS

The broom control lever activates the hydraulic brush circuit. Side broom **OFF** position is achieved by placing the lever on the control valve in the rear portion of the slot. When the side broom is **OFF** the scrub brushes & Main Broom will still be **ON**.

SIDE BROOM OPTIONAL ON C82 & C90

The side broom is used to move debris from the wall edges to the path of the main sweeping broom.

SIDE BROOM HANDLE

The side broom handle located to the right of the instrument panel on the lintel raises and lowers the side broom.

NOTE

Brooms and Brushes may be raised & lowered independently.

NOTE

By placing the broom control lever in the center of the slot. All broom motors are deactivated.

NOTE

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

MAIN BROOM

The Main broom raises and lowers via the handle located left of the instrument panel on the lintel. The decal shows 3 positions, **“RAISE, NORMAL & FLOAT”**

NOTE

FLOAT POSITION SHOULD ONLY BE USED WHEN THE SURFACE IS EXTREMELY UNEVEN! Frequent use of this position will reduce the main broom life.

SCRUB BRUSHES

To operate the scrub brushes, follow these steps:

1. Activate the scrub brushes by putting the broom and brush hydraulic control lever in the **ON** position.
2. Lower the scrubhead to the floor with the scrubhead rocker switch located on the console left of the operator. Press to **“Lower”** Position. Scrubhead is raised by same switch. Press to **“Raise”** position.

NOTE

***The scrubhead gauge is a visual indication of the scrub deck position and not the amount of pressure on the floor.**

OPERATION AND CONTROLS

HOPPER CONTROLS

On Commander Series T82 & T90 The Hopper is hydraulically controlled. ***The broom control lever must be in the off position to use hopper controls***, There are Three levers Grouped together located on the lintel connecting a hydraulic valve. Two spools on the control valve activates The hopper Lift, Lower & Rotation functions. These Spools are Inside A Red Outline On The Decal Marked “**High Dump**”



NEVER GET BENEATH A RAISED HOPPER WITHOUT SAFETY ARM IN PLACE!

HOPPER RAISE

TO RAISE HOPPER; With engine Running, Pull Back On Lever On Far Left To “**Raise**” Position. Release Lever @ desired Height. Hopper Will Stop At That Position.

HOPPER LOWER

TO LOWER HOPPER; Push Lever On Far Left To The “**Lower**” Position. Hopper Should Rest On Stops.
The Engine Does Not Have To Be Running To Lower Hopper.

HOPPER ROTATE DUMP

TO ROTATE HOPPER; With Engine Running And Hopper Raised, Pull Back On The Center Lever To The “**Dump**” Position, Hopper Will Rotate Out.

HOPPER ROTATE RETURN

TO RETURN HOPPER; With Engine Running Push The Center Lever Forward To The “**Return**” Position, Hopper Will Rotate Back.

RTR FUNCTION

RTR LIGHTS; “Rotary Trash Relocation”

Located On The Upper Left Of The Instrument Panel Are Two Red Lights Marked # 1 & # 2. These Lights Are Indicators For Hopper Height. And Trash Location.

Light # 1 When Illuminated Indicates Hopper Is At A Safe Height To Rotate The Hopper Clearing The Frame To **Relocate Trash** To The Front Of Hopper. This Will Clear The Hopper Loading Opening.

Light # 2 When Illuminated Indicates Hopper Is At A Height Of 61.0” For Dumping Into A Standard Dumpster.



***Turn The Machine OFF And Set The Parking Brake.
Always Use Proper Lifting Techniques***

C82 & C90 MANUAL HOPPER REMOVAL

1. Grasp the handles on top of the hopper.
2. Lift the hopper straight up, about 3 inches (76.2 mm) until the support brackets clear the frame.
3. Remove the hopper and dump debris.
4. Replace the hopper.

OPERATION AND CONTROLS

STARTING SOLUTION FLOW

Start the flow of solution to the floor by;

- Moving the solution lever located on the console left of the operator. Move the lever towards the front of unit, adjusting to the desired amount of flow. This is a gravity feed system. Maximum flow is 3 gpm.



Drive Forward Slowly *Use care when driving on wet surfaces. Always travel slowly on grades.*

FILLING THE SOLUTION TANK

To fill the solution tank follow these steps:

1. Park the machine on a level area and lock the parking brake.
2. Make sure the solution delivery valve is closed via the solution lever.
- 3.** Open the top door of the machine and remove the plug @ the Auto fill Assembly. Connect a garden hose to the AutoFill Assembly. Turn on faucet for clean water solution. The water will shut off when the proper level is achieved. Disconnect garden hose replace the plug @ auto fill connector and close top door.

OR

Unscrew the smallest (6 inch) cap located on the top of the solution tank. Fill the tank with cleaning water solution. When the tank is full, close the door and replace the cap.



Never use detergents or cleaners that are flammable or combustible. Always wear safety glasses and protective clothing when using chemicals of any kind.

It is recommended to use PowerBoss chemicals which are specially formulated for use in power scrubbers.

OPERATION AND CONTROLS

SQUEEGEE

To Lower The Squeegee;

Press the rocker switch marked “**SQUEEGEE**” to the Lower Position. This switch is located on the console to the left of the operator

NOTE

*When using the squeegee or scrubbing with the unit, the throttle cable (standard for diesel) or (rocker switch standard for LP & Gasoline) engines should be @ the high position for maximum engine Rpm's with Impeller on.

IMPELLER

To Turn On Vacuum Impeller;

To the left of the operator on the console is a single lever marked “**Impeller**” move lever forward to the on position.

DRAINING THE RECOVERY TANK

Follow These Steps To Drain Recovery Tank:

1. Park the machine on a level surface at an approved drainage site with the left rear of the machine beside the drain access.
2. Engage the parking brake.
3. Turn the machine **OFF**.
4. Open the left scrubhead access door.
5. Remove the flexible drain hose from its storage hook. Pull out the drain hose for the required reach to the access.
6. Place the end of the drain hose on or in the approved drain access.
7. Loosen and remove the drain plug.
8. Drain the tank completely and reinstall the plug.
9. Reposition the drain hose on its storage hook.

OPERATING AND CONTROLS

CLEANING THE RECOVERY TANK

NOTE

To Clean The Recovery Tank, Proceed As Follows:

The Recovery Tank Should Be Cleaned After Every Shift.

1. Position the machine at an approved drain area.
2. Engage the parking brake.
3. Shut off the machine.
4. Remove the two 9" access caps at the rear of the unit.
5. Remove the drain hose and position it over the approved drain opening.
6. Loosen and remove the drain plug.
7. Spray the tank with clean water, flushing all sludge out of the access ports.
8. Remove the ball and float. Rinse and reinstall.
9. Drain the tank completely and reinstall the drain plug.
10. Return the drain hose to the storage hook at the left side scrub door area beneath the floor pan.
11. Replace the 9" access caps removed in step four.

SQUEEGEE WAND OPTION

This attachment allows the operator to vacuum spills and standing water in areas which the machine cannot maneuver.

To Operate The Squeegee Wand Follow These Steps:

1. Remove the hose from the squeegee tool.
2. Attach the adapter to the squeegee hose.
3. Connect the squeegee wand to the adapter.
4. Turn on impeller
5. Set the engine at a high speed and vacuum the spills or standing water.

STARTING ENGINE

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.



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

STARTING

1. Make sure the directional control pedal is in the neutral position.
2. Make sure the throttle is in the idle position.
3. To start **Gasoline or LP Powered** machines, turn the key clockwise to the **START** position. When the engine starts, release the key. To stop the engine, turn the key counterclockwise to the **OFF** position.

Diesel-Powered: The diesel engine is equipped with glow plugs to aid in cold starting.

- * Turn the ignition key clockwise to the on position and hold glow plug button for 10 to 20 seconds to warm the glow plugs
 - * Turn the key further clockwise to the **START** position until the engine starts.
4. Allow the engine to warm for approximately two minutes.

NOTE

If the engine fails to start after 10 seconds, release the key, wait one (1) minute and repeat the procedure.

SLOWING AND STOPPING

1. Allow the directional control pedal to move into the neutral position. The machine will slow and coast to a stop.
2. Always travel slowly.



***Exercise extreme caution when traveling across or turning on grades**

***Do not exceed an 8° grade**

OPTIONAL BLOWER The blower can move debris from hard-to-reach areas into the path of the sweeper using forced air. To operate; With unit running @ high Rpm's and impeller on, take the wand in hand and pull the blower control knob out. Aim at desired debris. Return wand and knob to normal position when done.

TRANSPORTING THE MACHINE

1. Position the machine on the transport vehicle or trailer and apply the parking brake and or foot brake.
2. Chain the machine down using the two (2) tie-down holes in the frame in front of both front wheels and one (1) @ the rear center of the frame extension bumper.



Turn The Machine OFF And Set The Parking Brake Chock Wheels.

PUSHING

Attach Tie Downs To The Frame & Extension Bumper Only!



Push the machine from the rear using bumper only.



The propulsion pump is equipped with a tow valve located on the top of the pump. To engage the tow valve:

1. Turn the flat-sided shaft at the top of the pump 90°.
2. Valve must be returned to its original position for normal operation the machine.



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.

PLANNED MAINTENANCE CHART INTRODUCTION

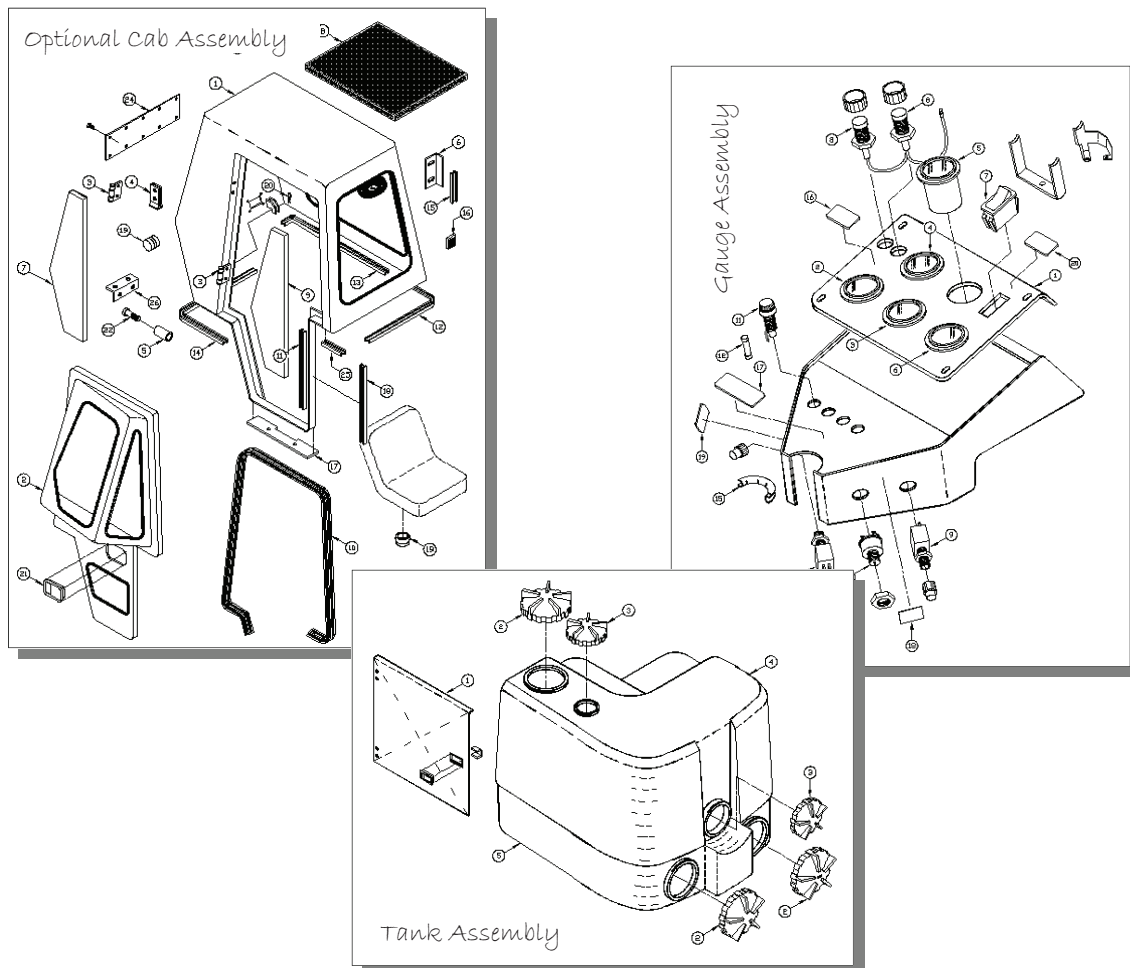
Regular maintenance on your sweeper results in better cleaning, faster cleaning and a prolonged service life for the equipment and components. This section contains the following information to help you give your sweeper the maintenance attention it requires:

- A Planned Maintenance Chart
- Service Instructions for Required Maintenance Tasks

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



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.



**PLANNED MAINTENANCE CHART (GM1.6L Engine)
(Kubota V1505)**

100 Hrs.	200 Hrs.	300 Hrs.	400 Hrs.	500 Hrs.	600 Hrs.	700 Hrs.	800 Hrs.	900 Hrs.	1000 Hrs.	Operation
Daily										Oil, Engine, Check Level
Daily										Coolant, Check Level ⁷
Daily										Fuel, Oil and Coolant Leaks
X	X	X	X	X	X	X	X	X	X	Oil, Engine, Change ¹
X	X	X	X	X	X	X	X	X	X	Oil Filter, Change ¹
			X				X			Air Cleaner, Replace Element ¹
X	X	X	X	X	X	X	X	X	X	Battery, Check Charge and Level
X	X	X	X	X	X	X	X	X	X	Crankcase Vent System Breather Cap, Clean ⁴
	X		X		X		X		X	Radiator, Inspect and Clean Exterior ¹
	X		X		X		X		X	Battery Cables, Clean
	X		X		X		X		X	Fan, Alternator Belts, Check and Adjust Tension ^{5,6}
			X				X			Fuel Filter, Replace ^{1,4}
			X				X			Cooling System, Check or Refill ^{3,7}
			X				X			Idle Speed, Check and Adjust
			X				X			Spark Plugs, Clean, Adjust and Test or Replace
							X			PCV Valve, Replace
				X						Coolant—Replace 24 Months or
							X			Intake Manifold Bolts, Torque ³
										All Bolts and Nuts, Check for Tightness ³
			X							Valve Clearance, Check and Adjust ³

- 1 More frequent intervals may be required in dusty areas—50 hours for oil and filter.
- 2 Mechanical governor (belt driven).
- 3 Seasonal or as required.
- 4 If so equipped.
- 5 Replace worn, frayed, cracked or damaged belts.
- 6 Check engine coolant condition and protection, hoses and clamps annually—prior to cold weather

NOTE: Scheduled Maintenance beyond 1000 hours should be continued at the same intervals as before.

PLANNED MAINTENANCE CHART

FREQUENCY (IN HOURS)					SERVICE (BY MAINTENANCE AREA)
DAILY	50	100	200	500	
		X			<p>ENGINE</p> <p>Pressure wash engine</p> <p>Oil Change</p> <p><i>For additional maintenance requirements, refer to respective engine manual</i></p> <p>AIR INTAKE SYSTEM</p> <p>Empty rubber dust cup of air filter element.</p> <p>Clean air filter. <i>NOTE: Clean more often in dusty conditions.</i></p> <p>Replace air filter.</p> <p>ELECTRICAL SYSTEM</p> <p>Check electrolyte level in battery cells and fill as needed.</p> <p>Clean battery top.</p> <p>COOLANT SYSTEM</p> <p>Check coolant level and fill as needed.</p> <p>Inspect radiator fins and clean as needed.</p> <p>Blow out radiator fins.</p> <p>Drain and flush the coolant system</p>
		X			
X			X		
			X		
		X			
			X		
X				X	
	X				
		X			
				X	

PLANNED MAINTENANCE CHART (Continued)

FREQUENCY (IN HOURS)					SERVICE (BY MAINTENANCE AREA)
DAILY	50	100	200	500	
					HYDRAULIC SYSTEM
X					Check hydraulic reservoir dip stick 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).
		X			Blow out hydraulic oil cooler fins with compressed air (if so equipped).
					SWEEPING COMPONENTS (If Applicable)
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.
					<i>Replace main and side brooms as needed. Main Broom—Bristles are 1" in length. Side Broom—Bristles are 3" in length.</i>

PLANNED MAINTENANCE CHART (Continued)

FREQUENCY (IN HOURS)					SERVICE (BY MAINTENANCE AREA)
DAILY	50	100	200	500	
X		X			<p>HOPPER</p> <p>Inspect the hopper flaps for wear or damage and replace as needed.</p> <p>Inspect hopper side and frame seals for wear or damage. Adjust or replace as needed.</p> <p>STEERING</p> <p>X Lubricate steering cylinder rod ends.</p> <p>X Lubricate steering fork assembly.</p> <p>Check for leaks.</p> <p>PARKING BRAKE (If Applicable)</p> <p>Check for proper functioning and adjust as needed.</p> <p>TANKS</p> <p>Check squeegee tool and vacuum hose for clogs.</p>
	X				
X			X		

PLANNED MAINTENANCE CHART (Continued)

FREQUENCY (IN HOURS)					SERVICE (BY MAINTENANCE AREA)
DAILY	50	100	200	500	
X					<p>TIRES</p> <p>Visually inspect for wear and damage. Repair or replace as needed.</p>
		X			<p>MISCELLANEOUS</p> <p>Inspect latches and hinges. Tighten and lubricate as needed.</p>
			X		<p>Check anti-static drag chain on rear wall of broom chamber for damage or excessive wear. Replace as needed.</p>
				X	<p>Check side broom lift cable and brake cable for wear.</p>
X					<p>IMPELLER</p> <p>Check for hydraulic fluid leaks.</p>
	X				<p>SCRUB AND WATER PICK-UP COMPONENTS</p> <p>Inspect disc scrub brushes and replace as needed. Maximum wear = 1/2"</p>
X					<p>Inspect squeegee flare and adjust as needed.</p>
	X				<p>Check the rear squeegee blade for wear. (Turn or replace as needed.)</p>

SERVICE INSTRUCTIONS INTRODUCTION

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.



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.

SERVICE INSTRUCTIONS (CONTINUED) AIR INTAKE SYSTEM

AIR FILTER REMOVAL

1. Turn off the engine and set the parking brake and or foot brake.
2. Lift the engine cover.
3. Locate the air filter and unclamp the retaining clamps or the ring 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 out of its housing.

AIR FILTER CLEANING

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

AIR FILTER INSPECTION

1. After you clean the air filter, check it for holes by passing a light bulb in side 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 so that the fins are at the far end of the housing. Be careful not to damage the fins.
3. Replace the wing nut with the rubber gasket and tighten (if so equipped). **Be sure the Radial Seal Element seats properly.**
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 clamps.
7. Check the condition of intake hoses and clamps. Close engine cover.

SERVICE INSTRUCTIONS (CONTINUED) 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 coating of dielectric or petroleum jelly to the terminals and cable clamps.

BATTERY REPLACEMENT



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 BREAKER / FUSES

If the circuit breaker trips, it can be reset by pressing the reset button in the center of the breaker. (The circuit breaker is located on the instrument panel below the steering wheel. There are three (3) replaceable fuses located next to the circuit breaker.)

Circuit Breaker 45 Amp.

1. Filter Shaker Motors, Horn, Fuel Gauge, Option Connector
2. Oil Pressure Gauge, Temperature Gauge, Hour Meter
3. Head Lights, Tail Lights, Gauge Lights

An auxiliary fuse panel (for the scrubhead lift, squeegee and options) is located inside the engine compartment to the right of the battery.

SERVICE INSTRUCTIONS (CONTINUED) FUEL SYSTEM

REFER TO ENGINE SERVICE MANUAL
“NOT INCLUDED WITH THIS USER MANUAL”

CONTACT POWERBOSS @

- techsupport@powerboss.com
- 1-800-982-7141

⚠ WARNING

1. ***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.***
2. ***Never operate an LPG powered sweeper when any component in the fuel system is malfunctioning or leaking.***
3. ***Never bypass safety components unless you are testing them.***
4. ***Replace any defective safety components before operating the sweeper.***
5. ***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.***
6. ***When disconnecting the LPG tank coupling, always wear gloves. LPG fuel can freeze bare hands.***
7. ***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.***

SERVICE INSTRUCTIONS (CONTINUED) COOLANT SYSTEM

BLOWING OUT RADIATOR FINS

NOTE

Use maximum compressed air pressure of 100 p.s.i. to blow out radiator fins with.

REVERSE FLOW FLUSHING

1. At the engine, disconnect the radiator hoses.
2. Make sure the radiator cap is on tight.
3. Using a hose clamp, clamp 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.

ATTENTION! Plain Water, Alcohol or Methanol base antifreeze is not recommended for use in the cooling system at anytime!

SERVICE INSTRUCTIONS (CONTINUED) LUBRICATION

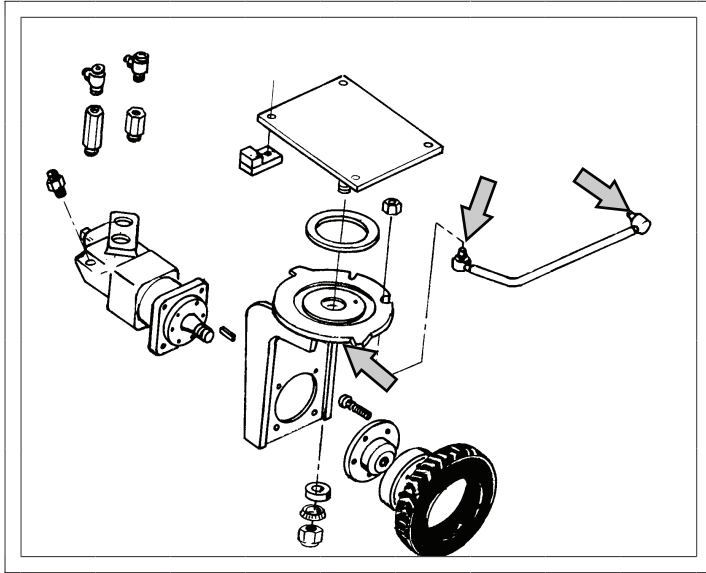
CHANGING ENGINE OIL

1. Place a drain pan under the engine's drain plug located @ the front of the broom chamber.
2. Remove the drain plug and allow the oil to drain completely into the pan and replace plug.
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

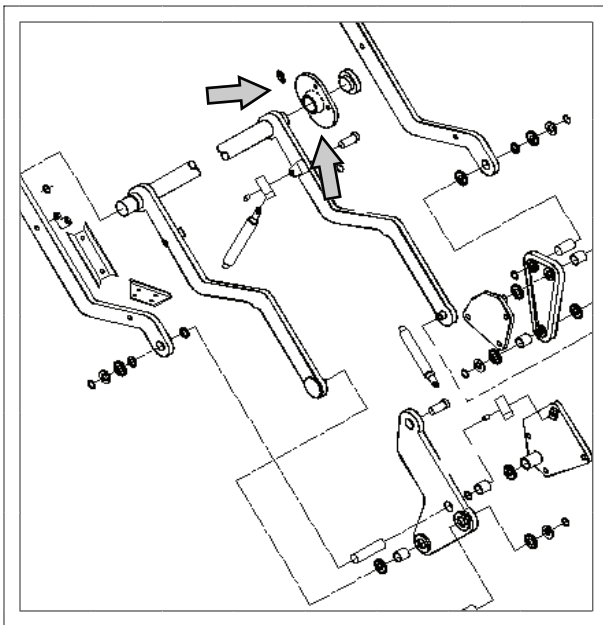
Lubrication	Type of Lubrication	Frequency (In Hours)
Steering Cylinder (2 fittings)	Grease	500
Steering Fork Assembly	Grease	500
Dump Arm Mounts	Grease	100

SERVICE INSTRUCTIONS (CONTINUED)
LUBRICATION POINTS (C o n t i n u e d)

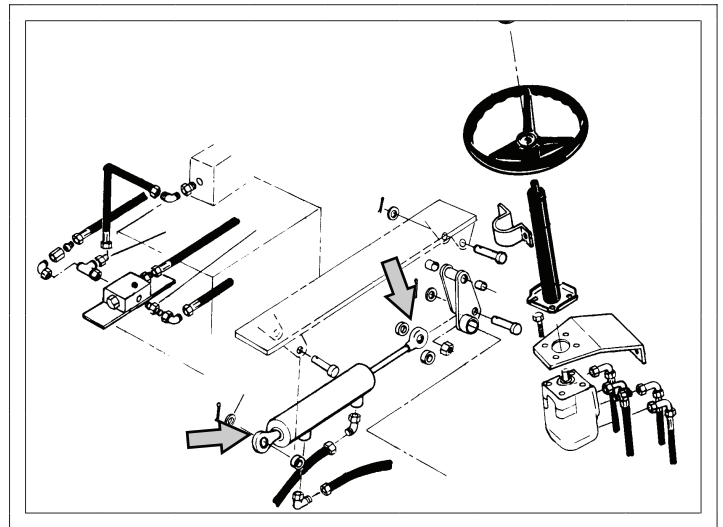


↑
Indicates location
of grease fittings

Steering Fork & Drive Tire



Dump Arm Mounts



Power Steering

SERVICE INSTRUCTIONS (CONTINUED) HYDRAULICS SYSTEM

FILLING THE HYDRAULIC FLUID RESERVOIR

NOTE

The reservoir is located inside the machine and is accessible through the top side door.

1. When the machine is cool remove the fill cap and check the dipstick at attached to the fill cap. The hydraulic fluid should be at the notch on the dipstick.
2. If the fluid level is not acceptable, add hydraulic fluid.

CAUTION

DO NOT OVERFILL! DO NOT USE TRANSMISSION FLUID INSTEAD OF HYDRAULIC FLUID. HYDRAULIC OIL MUST MEET THE SPECIFICATIONS LISTED TO ENSURE PROPER PERFORMANCE.

HYDRAULIC FLUID VISCOSITY SPECIFICATIONS

SUS @100° F 510-560
SUS @ 210° F 78-84
Exxon[®] XD-3™ 15W-40 or equal.

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 hose and fitting 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 reinstall the hose and fitting.
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. Check the dipstick to ensure the proper level is achieved.
7. Install a new filler / breather cap assembly.
8. Check for leakage.

SERVICE INSTRUCTIONS (CONTINUED) HYDRAULICS SYSTEM (CONTINUED)

CHANGING THE HYDRAULIC FLUID FILTER

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

NOTE Do not over tighten.

6. 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 also an indicator that the directional control return spring needs adjusting. If this occurs, perform the procedure which follows:

NOTE

On C82 & C90 models, remove the hopper. On high dump T82 & T90 models, raise the hopper and engage the safety arm.

1. Turn off the engine, engage the parking brake and chock both wheels.

⚠ WARNING

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

2. Jack the rear of the machine so that the rear tire just clears the floor. Use two jack stands to support the machine.
3. 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 the “rabbit” position.
7. Turn the adjusting bolts while watching the rear wheel. Continue to adjust until the rear wheel does not turn in either direction.
8. Open the throttle to the “tornado” position. Push the directional control pedal forward and backward to be sure the pump stays in neutral.
9. Retighten all the locking nuts and bolts.
10. Turn the engine off and lower the machine to the floor.

SERVICE INSTRUCTIONS (CONTINUED) 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 PATTERN CHECK

NOTE

Perform this check on a flat, smooth test surface.

1. Drive the machine onto the test surface
2. Set the parking brake and put the brush switch in the on position.
3. Push the broom control lever to the **ON** position to activate the broom motor and open the throttle to the "rabbit" or "tornado" position.
4. depress Fwd/Rev pedal just enough to turn on brush motor
5. Allow about 45 seconds for the broom to operate, then deactivate the broom motor and raise the broom.

NOTE

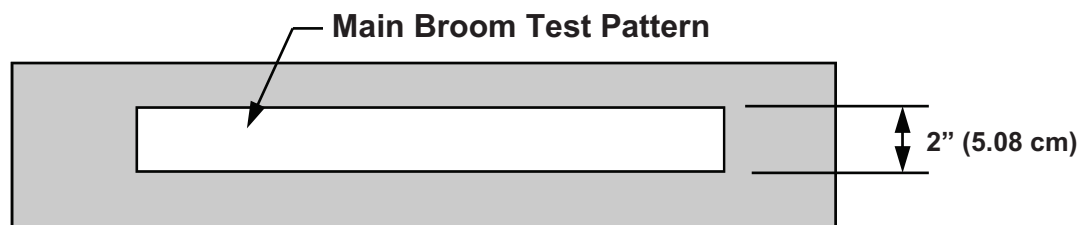
Test time will vary according to the test surface used.

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

SERVICE INSTRUCTIONS (CONTINUED) SWEEP COMPONENTS (CONTINUED)

NOTE

A rectangular shape the length of the main broom, 2" (5.08 cm) wide, indicates the 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 **NORMAL** position.

NOTE

The adjustment knob is located in the engine compartment on the broom rod pivot.

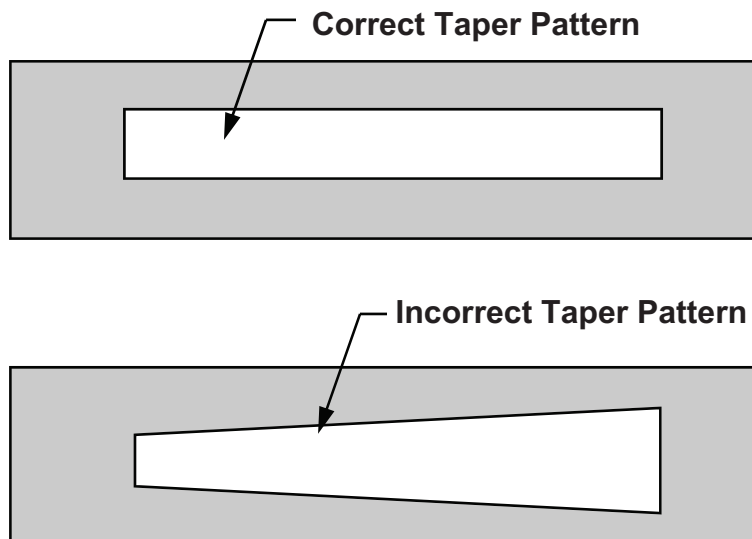
3. Turn the broom adjusting knob clockwise one-eighth turn to free the wing nut.
4. Turn the wing nut counter-clockwise to allow space for adjustment.
5. Make a lower or higher adjustment with the knob as required.
6. Retighten the wing nut.
7. Repeat the broom adjustment test to see that the broom is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

SERVICE INSTRUCTIONS (CONTINUED) SWEEP COMPONENTS (CONTINUED)

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.



Main Broom Taper Patterns

1. Locate the hex-shaped adjustment bar on the left rear wall of the broom chamber underneath the machine.
2. Loosen the retaining bolt on the right side of the hex bar.
3. Grasp the hex bar with a wrench and rotate it 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, re-tighten the bolt.
5. Repeat the main broom adjustment test to see that the broom is properly adjusted.

SERVICE INSTRUCTIONS (CONTINUED) Sweep COMPONENTS (CONTINUED)

MAIN BROOM REPLACEMENT

(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 broom switch to the off position
3. Open the left broom chamber door (the door opposite the driver's seat).
4. Remove the knob 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 knob and tighten into position.
11. Perform a main broom adjustment test and adjust as needed.

SERVICE INSTRUCTIONS (CONTINUED) SWEEP COMPONENTS

NOTE Side Broom Is Optional On C82 & C90 Units

SIDE BROOM ANGLE ADJUSTMENT

The angle adjustment is controlled with a bolt located on the inside of side broom arm assembly. By turning this bolt, the angle at which the bristles contact the floor can be changed. The optimum angle is 6 degrees.

SIDE BROOM HEIGHT (WEAR) ADJUSTMENT

The height of the side broom can be adjusted as follows. By positioning the side broom handle in the **LOWER** position. Loosen the side broom adjusting nuts located on the exterior of the side broom arm assembly. Adjust the side broom height by sliding the broom assembly up or down until proper floor contact is made in the “10 to 3 o’clock” position. After the adjustment, tighten the adjusting nut.

SIDE BROOM LIFT CABLE ADJUSTMENT

This adjustment is made at the hex-shaped adjustment bar attached to the side broom lift lever in the engine compartment. It controls the height of the side broom in the **RAISED** position. On high dump models this adjustment must be made with the hopper full lowered.

1. Pull the side broom lever into the **RAISED** position.
2. Loosen the locknut on the hex bar.
3. Turn the cable in or out of the hex bar as necessary to set the side broom in the maximum raised position.
4. Secure the cable adjustment by tightening the locknut against the hex bar.

SERVICE INSTRUCTIONS (CONTINUED) SWEEP COMPONENTS (CONTINUED)

SIDE BROOM REPLACEMENT (OPTIONAL ON C82 & C90) (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.

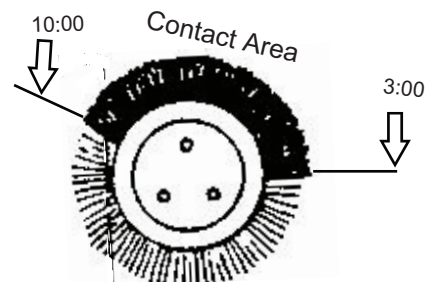
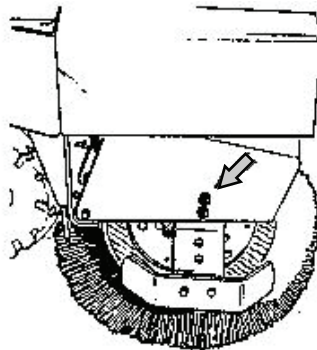
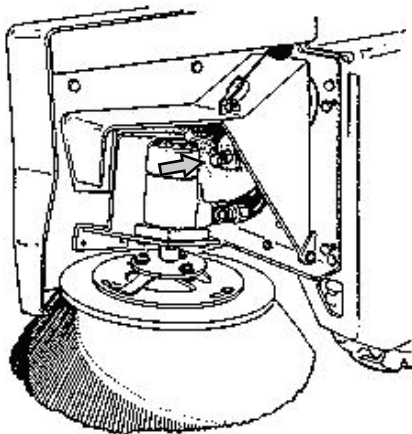
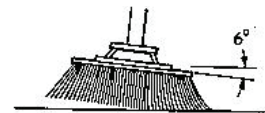
1. Turn the side broom by hand until the brush retainer bar is accessible.
2. Lift the bar and turn the broom clockwise (about one eighth of a turn) until the lock pins in the broom disengage from the drive plate.
3. Install the new broom by positioning the three drive pins into the pilot holes of the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

NOTE:

This adjustment is controlled by a bolt located on the inside of the side broom arm assembly. By turning this bolt, the angle at which the bristles contact the floor can be changed. The optimum angle is 6°.

Side Broom Height (Wear) Adjustment

1. Stop the engine and lock the parking brake.
2. Position the side broom handle in LOWER position.
3. Loosen the side broom adjusting nuts located on the exterior of the side broom arm assembly.
4. Adjust the side broom height by sliding the broom assembly up or down until proper floor contact is made.
5. After adjustment, tighten the adjusting nut.



SERVICE INSTRUCTIONS (CONTINUED) SCRUB & WATER PICK-UP COMPONENTS



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

SCRUB BRUSH REPLACEMENT

The **Power-Dive** scrub brush features a quick release mechanism which enables the operator to remove the brush in seconds.

NOTE

Brushes should be replaced when the bristles are less than ½” (12.77 mm) long.

1. Raise the scrubhead.
2. Turn the scrub brush by hand until the brush locking spring is accessible.
3. Squeeze the ends of the locking spring using a downward motion and the brush will release from the driver.
4. Install the new brush by positioning the socket in the brush with the driver the on the scrub motor
5. Lift the brush until the brush retainer springs over the driver locking it into position
6. Check to make sure that the brush is properly engaged.

SERVICE INSTRUCTIONS (CONTINUED) SCRUB & WATER PICK-UP COMPONENTS

SCRUBHEAD GAUGE ADJUSTMENT

1. Raise the scrubhead to the full **UP** position.
2. Locate the linkage attached to the frame above the scrubhead.
3. Loosen the set screw (the bolt running through the arm).
4. Turn the potentiometer shaft until the gauge needle points to the white dot at the left of the gauge.
5. Re-tighten the set screw. **DO NOT OVER TIGHTEN!**

NOTE

A gauge that is nonfunctional does not indicate that the scrubhead is nonfunctional. The scrubhead will continue to operate.

SERVICE INSTRUCTIONS (CONTINUED) MAIN SQUEEGEE COMPONENTS

CHECKING AND ADJUSTING THE REAR MAIN SQUEEGEE FLARE

NOTE Perform check # 18 before proceeding to make adjustments

1. Park the machine on a flat surface. Lower the squeegee.
2. Turn the machine off and engage the parking brake.
3. Open the access doors to the disc scrub brushes.
4. Locate & remove the pull pins for the side squeegees, remove the side squeegees.
5. Lower the squeegee assembly
6. Release the quick-disconnect at the back of the rear squeegee.
7. Loosen the locking nut on the squeegee caster and screw the caster up until it clears the floor. With the squeegee straight up on the floor (no flare), adjust the caster until it clears the floor by ½" (12.7 mm). Use a ½" (12.7 mm) shim spacer of metal or wood as a feeler gauge for this procedure. This is a starting reference.
8. Locate the squeegee lift arms on each side of the machine.
9. Loosen the bolt which attaches the upper squeegee lift arm to the squeegee mounting plate on each side.
10. Locate and loosen both jam nuts on each squeegee tilt adjustment link and back them away from the gussets. The rear squeegee is now free to be aligned with the floor. Lift the squeegee tool by hand and allow it to rest back on the floor, this will seat the tool to the floor. Again it should stand straight on the floor with **no flare**.
11. Check the squeegee rubber to make sure the squeegee makes contact with the floor all the way around.
12. At each squeegee arm mount, turn the two jam nuts on the tilt adjusting link until they both make contact with the mounting plate on each side.
13. Tighten the jam nuts on each mount plate. Then tighten the bolt on top of each of the two upper squeegee arms.
14. Tighten the nut on the caster.
17. Reattach the squeegee lift linkage.
18. With the squeegee in the down position, Impeller on drive the machine forward approximately two feet (.61 meters) and set foot brake. Examine the flare in the squeegee rubber to see that it is uniform around the entire parabola. If not, go through Steps 4-17
19. Test unit for water pick up

NOTE Raising the squeegee caster allows for more flare, use the tilt adjustments to even the flare.

SERVICE INSTRUCTIONS (CONTINUED)

MAIN SQUEEGEE COMPONENTS (Continued)

TURNING OR REPLACING THE REAR SQUEEGEE BLADE

The rear blade on the main squeegee frame has four different edges that may be used: the front and back lower edge and the front and back upper edge. When the edge in use becomes worn to the midpoint of thickness, turn the rubber to an unused edge in the order indicated: **1. Front Lower Edge, 2. Opposite Lower Edge, 3. Front upper Edge and 4. Opposite Upper Edge.** Removal and replacement instructions follow. This procedure can be performed with the squeegee tool on or off the machine.

NOTE

Removal and replacement of the inner squeegee rubber is easier if the squeegee frame is removed from the machine.

1. Unlatch the clamping strap at the center of the squeegee frame and remove the 2 outer knobs.
2. Remove the metal strap, the two back-up strips and the outer squeegee blade.
3. Turn the side ends of the squeegee blade 180°, or turn the rubber upside down to expose an unused edge. Reposition the blade on the pins of the squeegee frame.
4. Reposition the first back-up strip using the top holes.
5. Reposition the second back-up strip using the bottom holes.
6. Reposition the metal strap and reattach the two outer knobs.
7. Relatch the straps at the center being careful not to bunch the blade.

NOTE

Replace the back-up strips only if they lose their elasticity.

MAIN SQUEEGEE TOOL REMOVAL

All machines are equipped with auto-squeegee lift. To remove the squeegee tool, proceed as follows:

1. Engage the parking brake and chock the wheels.
2. Lower squeegee & pull the pin at the rear of the squeegee tool.
3. Remove the knobs at the square lift arms supports.
4. Disconnect the vacuum hose from the squeegee.
5. Lift the supports up off the pins on the squeegee frames and slide the squeegee away from the machine.

SERVICE INSTRUCTIONS (CONTINUED) MAIN SQUEEGEE COMPONENTS (Continued)

MAIN SQUEEGEE TOOL INSTALLATION

1. At the back of the machine, push the squeegee under the machine into position.
2. Attach the lift arms to the supports onto the pins on the squeegee frame.
3. On each side of the squeegee, attach the hand knobs (one on each side) to the squeegee frame supports.
4. Connect the quick-release pin to the squeegee.
5. Connect the vacuum hose to the squeegee.

INNER SQUEEGEE REPLACEMENT

The inner squeegee is a component of the rear squeegee assembly. When the squeegee is down, locked and the rear squeegee blade is flared, check to see if the inner squeegee has become too worn to make proper even contact with the floor.

1. Remove the main squeegee tool (see removal instructions).
2. Remove the nuts on the front of the inner squeegee frame.
3. Remove the strap and the inner squeegee rubber.
4. Install the new inner squeegee rubber.
5. Position the strap and secure with the nuts.

AUTO SQUEEGEE LIFT MECHANISM

Bearing Replacement: If any binding occurs in the lift apparatus, replace the bushings, spacers and fiber glide bearings located on the squeegee lift assembly as necessary.

NOTE

Bent components may cause binding.

SERVICE INSTRUCTIONS (CONTINUED) HOPPER

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

T82 / T90 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 the three bolts, washers and nuts from each side.
6. Remove the precleaner with backing plates.
7. Disconnect the wire connections at the right side of the hopper.
8. While spreading the dump arms slightly, roll the hopper away from the machine.

T82 / T90 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.
7. Be sure to tighten all bolts

HOPPER FILTER REMOVAL

1. Release the latch on the hopper hood and raise the hood.
2. Disconnect the wire harness leading to the filter shaker motor.
3. Remove the four bolts securing the shaker motor assembly to the hopper.
4. Remove the shaker motor assembly.
5. Lift out the panel filters.

SERVICE INSTRUCTIONS (CONTINUED) HOPPER (CONTINUED)

HOPPER 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 filter is thoroughly dried while standing on its side before installing in the hopper. Do not install or use a wet filter. Drying time is approximately 72 hours if air dried.

HOPPER FILTER REPLACEMENT

1. Insert the panel filter.
2. Install the shaker motor assemblies.
3. Install and tighten the four filter retaining bolts and isolators.
4. Hook the wire harness to the filter shaker motors.
5. Close the hopper cover and secure the latches.

C82 / C90 TWIN HOPPER

REMOVING AND DUMPING HOPPER



The hopper is manually lifted from the frame of the C82 & C90. Use standard lifting practices when performing this.

1. Grasp the lifting handles @ the top of hopper
2. Lift upwards approximately 3.0" for hangers to clear frame
3. Pull out and dump in an approve container
4. Reverse method for installation

NOTE

- **EARLY C82 / C90 UNITS HAVE A SINGLE HOPPER**
- **FILTERS ARE NOT USED IN THE C82 & C90 HOPPERS**

SERVICE INSTRUCTIONS (CONTINUED) TWIN HOPPER

FLAP REPLACEMENT

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

FLOOR CLEARANCE

In order to perform properly, the hopper (on both the low and high dump models) 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.

FRAME SEALS 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 ⅛" (3.18 cm). If the bottom of a side seal measures ½" (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.

SERVICE INSTRUCTIONS (CONTINUED) HOPPER (CONTINUED)

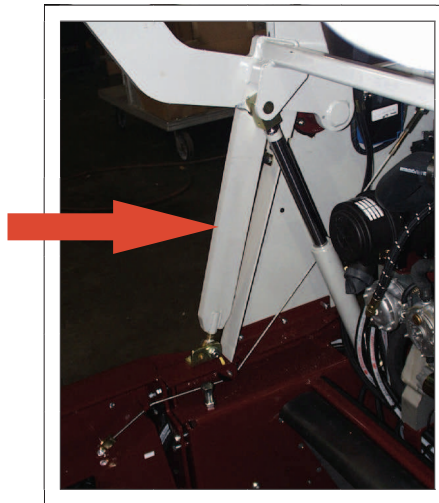
ADJUSTING MAXIMUM HOPPER DUMP ANGLE

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



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

SAFETY ARM
ENGAGED



2. Preliminary adjustment of the lift arm stop bolts located on top of the wheel wells should be @ 2 1/8" ultimately being 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 3 1/2" (8.89 cm) clearance between the rear hopper entrance lip and the floor. Use a 2x4 board as a feeler gauge for this measurement.

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.

SERVICE INSTRUCTIONS (CONTINUED) HOPPER (CONTINUED)

ADJUSTING MAXIMUM HOPPER DUMP ANGLE (Continued)

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 engine off.



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

7. Adjust the stops on the hopper mounts on each side of the hopper so that clearance between the lift arms and the cut-outs in the bumper is ¼" (6.35 mm) maximum.
8. Loosen the locking set screw in the bottom side of the rotation cylinder rod end.
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.

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.



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

SERVICE INSTRUCTIONS (CONTINUED) BRAKES

Normal adjustment of the optional hand 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 to loosen the tension as far as possible.
4. Locate the cable clevis ends for the parking brake cables in the left front wheel well.
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.

CABLE ADJUSTMENT FOR STANDARD BRAKE

1. Locate the parking brake cable in the top of the left wheel well opening.
2. Loosen the locking nut located against the hex bar.
3. Thread the cable end into the hex bar.
4. If threads are not sufficient for adjustment, disconnect the springs, move the cable bars to the next adjusting hole on the hex bar and reconnect the springs.
5. Retighten the locking nut against the hex bar. This adjusts both sets of brake shoes.
6. Test the brakes. Readjust if necessary.

* If so equipped.

SERVICE INSTRUCTIONS (CONTINUED) TIRES & MISCELLANEOUS

CHANGING SOLID TIRES

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

Front Tires

1. Remove the tire from the vehicle by removing the five 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.

Rear Tire

The rear tire is a special traction rubber compound press-on type tire.

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.

LATCHES AND HINGE MAINTENANCE

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

CABLES

Inspect the cables for wear every 500 hours.

PROBLEM	CAUSE	SOLUTION
Engine will not start or runs roughly after start.	Battery dead.	Recharge or replace battery.
All fuel types	Machine out of fuel.	Refuel
	Fuel filter plugged.	Clean or replace filter.
Gas / diesel	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 at back of this manual for maintenance and troubleshooting procedures.
<i>NOTE: On machines with LPG fuel, also check the following:</i>	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.

(CONTINUED)

PROBLEM	CAUSE	SOLUTION
Engine overheats.	Low coolant level.	Supply coolant.
	Fan blade installed incorrect	Reinstall (pusher type fan)
	Clogged radiator.	Flush radiator.
	Loose fan belt.	Tighten belt.
	Defective thermostat.	Replace thermostat.
<p>NOTE: If coolant loss has not occurred, check for malfunction of the temperature sending unit.</p>		
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.
	Tow valve in tow position	Move to drive position
	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 for the operation conditions; check pump.
	Hayes coupler failed	Replace

(CONTINUED)

PROBLEM	CAUSE	SOLUTION
PowerBoss® moves slowly or does not move (continued).	Other problems with the hydraulics system: pump failure, motor failure, relief valve leaking or stuck open. Tow Valve improperly set.	See Hydraulics System Problems in this section. Turn to correct position.
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: <ul style="list-style-type: none"> • Motor • Control Valve • Gear Pump • Relief Valve Brush switch not on Foot pedal not depressed	See Hydraulics System Problems in this section. Press to on position Press to forward position
Little Or No Vacuum	Leak or clog in hose from impeller Impeller failure.	Repair leaks; clear obstructions or replace hose. Check and repair.

(CONTINUED)

PROBLEM	CAUSE	SOLUTION
Scrubhead will not lower.	Fuse blown.	Replace fuse.
	Loose scrubhead switch wires.	Connect wires.
	Loose connection of plug at actuator.	Connect.
	Defective actuator.	Replace actuator.
	Defective scrubhead switch.	Replace switch.

(CONTINUED)

PROBLEM	CAUSE	SOLUTION
Brushes do not turn or turn very slowly.	Hydraulics system problem: <ul style="list-style-type: none"> • Motor • Control Valve • Gear Pump • Relief Valve 	See Hydraulics Systems Problems in this section.
Poor water pick-up	Recovery tank is full. Squeegee worn. Debris caught in squeegee or pick-up tube. Leak or clog in hose from impeller. Squeegee out of adjustment. Engine not operating at high speed. Impeller failure.	Empty the tank; if foaming badly, change detergent. Replace squeegee. Remove debris. Repair leak, clear obstruction or replace hose. Adjust squeegee. Check Throttle Switch Position Check and repair.

(CONTINUED)

PROBLEM	CAUSE	SOLUTION
Solution not being delivered.	<p>Solution tank is empty.</p> <p>Solution pump not on.</p> <p>Solution flow valve not functioning</p> <p>Delivery lines clogged.</p> <p>Fwd/Rev Pedal not depressed</p> <p>Solution valve out of lever adjustment.</p>	<p>Fill tank.</p> <p>Check Switch</p> <p>Check broom switch & pressure switches @ main pump</p> <p>Clear lines.</p> <p>Press pedal</p> <p>Adjust.</p>
Scrubber unit not cleaning the floor.	<p>Brushes worn.</p> <p>Need different type of brush or detergent.</p> <p>Debris caught in brush drive mechanism.</p> <p>Brushes out of adjustment.</p> <p>Brush motor failure.</p>	<p>Replace.</p> <p>Use manufacturer's recommended brushes / detergent.</p> <p>Clear obstruction.</p> <p>Adjust.</p> <p>See Hydraulics System Problems.</p>

(CONTINUED)

PROBLEM	CAUSE	SOLUTION
Squeegee will not lower.		
	Loose or defective squeegee switch (on console).	Reconnect wiring or replace switch.
	Loose wire(s) at foot pedal.	Connect.
	Foot pedal switches need adjustment.	Re-adjust cams.
Squeegee will not raise in reverse or by console switch.	Foot pedal switches need adjustment.	Re-adjust cams.
	Defective waterman valve	Check coil @ valve
	Lift springs worn out or missing.	Replace springs.
	Bad ground at valve.	Check ground.
	No power at valve.	Check fuse
<p>*Note*</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p>Power At The Waterman Valve = Squeegee In The Up Position</p> <p>No Power At Valve = Squeegee In Down Position</p> </div>		

(CONTINUED)

PROBLEM	CAUSE	SOLUTION
Hydraulic control valve failure.	Misaligned control linkage. Foreign matter in spool bore. Valve seals leaking. O-rings leaking. Relief valve stuck open.	Align. Remove spool and clean bore. Replace seals. Replace O-rings. Clean or replace relief valve.
Hydraulic drive motor failure	Insufficient oil supply Motor leaking. Hayes pump coupler failed Key on motor shaft failed Drive hub failed Output shaft malfunction.	Replace seals. Replace Replace key Replace Replace output shaft and bearings.
Hydraulic gear pump failure.	Pump leaking. Hayes coupler failed Gears worn or scored. Relief valve stuck. Oil supply low.	Replace seals. Replace Rebuild pump or replace Clean or replace (at control valve). Check and fill.

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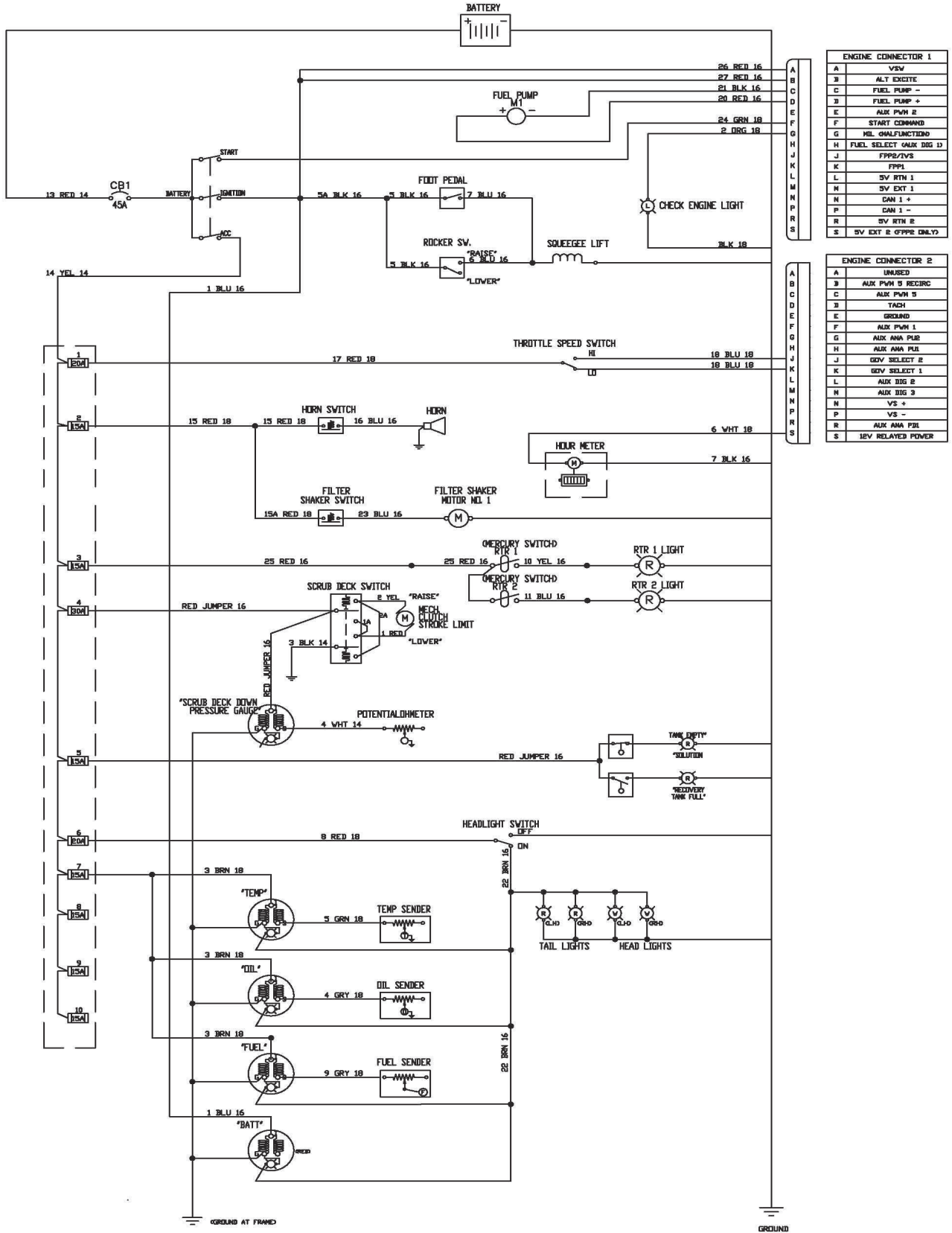
PROBLEM	CAUSE	SOLUTION
Hydraulic gear pump failure (Continued).	<p>Oil strainer clogged.</p> <p>Incorrect oil.</p> <p>Damage due to entry of air into hydraulic system.</p>	<p>Replace strainer (inside reservoir).</p> <p>Use recommended viscosity oil.</p> <p>Maintain correct hydraulic fluid level in reservoir. Keep suction hose fittings tight.</p>
Hydraulic variable displacement pump failure.	<p>Pump leaking.</p> <p>Relief valve(s) stuck.</p> <p>Hayes coupler failed</p> <p>Control linkage out of adjustment</p> <p>Charge pump gears worn or scored</p> <p>Cavitation Damage due to entry of air into hydraulic system.</p>	<p>Replace seals.</p> <p>Clean or replace relief valve(s) at the pump.</p> <p>Replace</p> <p>Check to see if linkage is binding or unfastened.</p> <p>Replace defective gears Or pump</p> <p>Maintain correct hydraulic fluid level in reservoir. Keep suction hose fittings tight.</p>

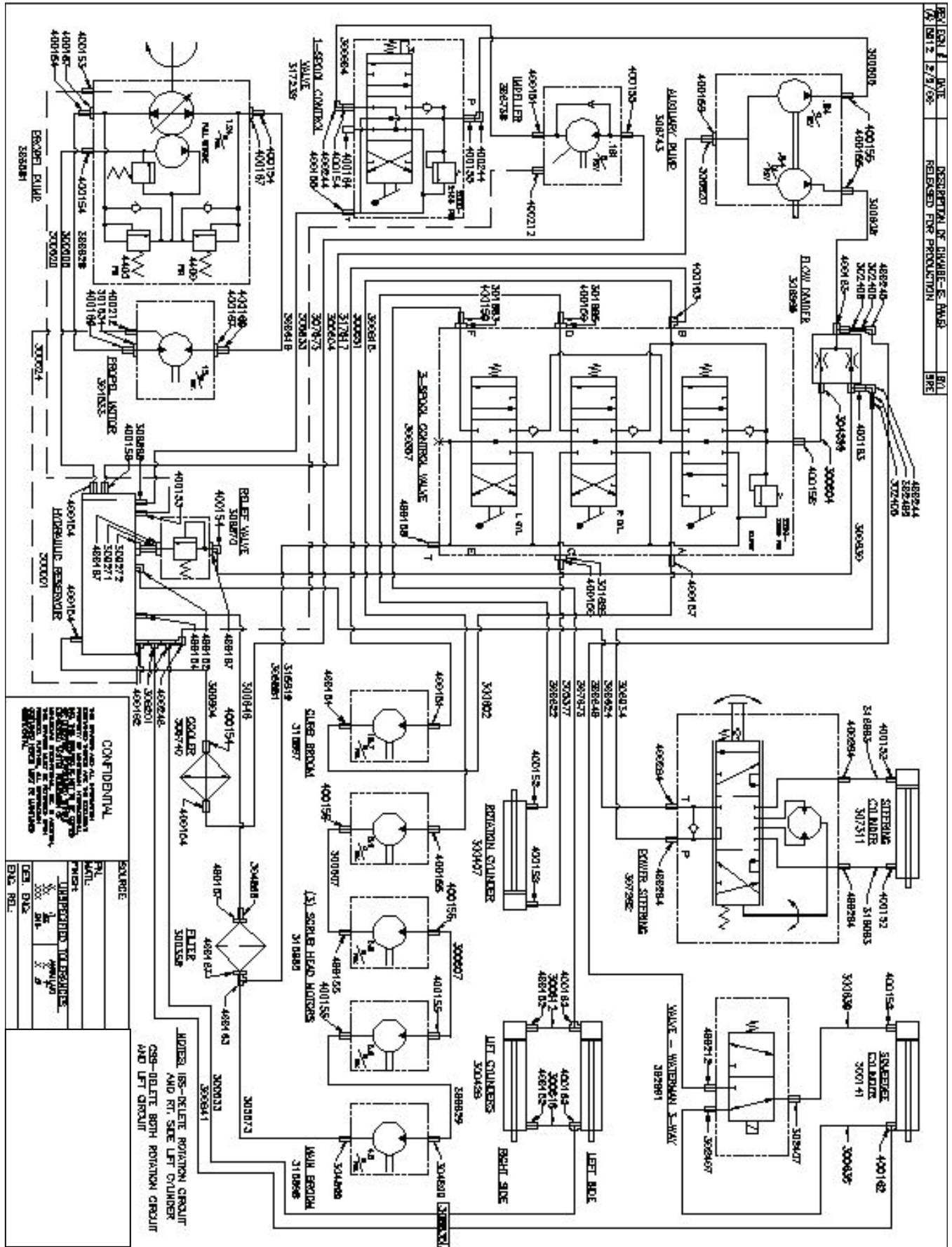
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PROBLEM	CAUSE	SOLUTION
Hydraulic system noisy.	<p>Air in system.</p> <p>Relief valve dirty or damaged.</p> <p>Loose suction line.</p> <p>Clogged section filter or pump inlet line.</p> <p>Internal pump or motor damage</p>	<p>Check fluid level in reservoir; check for loose connections or leaks.</p> <p>Clean or replace.</p> <p>Tighten fittings.</p> <p>Replace filter, clear line; change fluid in reservoir if dirty and flush system.</p> <p>Inspect and repair.</p>

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