POWERBOSS®

SWEEPER/SCRUBBER

TSS/90 HC ,TSS/90, ISS/90 HC, ISS/90, CSS/90 HC, CSS/90
TSS/82, ISS/82, CSS/82
TSS/80, ISS/80, CSS/80

OPERATION, MAINTENANCE & TROUBLESHOOTING

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AAR POWERBOSS, INC.
ANDERSON & TAYLOR STREETS / P.O. BOX 1227
ABERDEEN, NORTH CAROLINA 28315 U.S.A.
(910) 944-2167 / FAX: (910) 944-7409

NOVEMBER '94

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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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(LIMITED) PRODUCT WARRANTY
(NORTH AMERICA ONLY)

AAR PowerBoss warrants that the **PowerBoss** machine will be free from defects in material and workmanship for a period of **24 months or 2,000 operating hours on rider units, 12 months or 500 operating hours on walk-behind units from date of installation**, whichever comes first. Written notice of any claimed defect must be given to AAR 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 AAR's election, any part or parts deemed defective after examination by AAR or an Authorized Service Representative. Any **PowerBoss** machine or any of its parts returned by customer to AAR or an Authorized Service Representative via prepaid transportation and which is found to be defective, will be repaired or replaced and returned to customer via prepaid surface transportation within the Continental U.S. On the other hand, should a part be found not defective, inspection and handling charges may be charged to the customer by AAR or an Authorized Service Representative.

For one hundred eighty (180) days from date of installation, AAR will provide repair labor, at no charge, solely through an Authorized Service Representative. Thereafter, labor will be charged.

This warranty does not extend to any **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 AAR's plant or the facility of Authorized Service Representative.

This warranty does not apply to routine wearable parts of the **PowerBoss** machine such as brushes, flaps, filters, seals, points, plugs, hoses or similar items. Moreover, this warranty does not extend to any **PowerBoss** machine or part replaced or repaired under this warranty.

Only replacement parts supplied by AAR are warranted for 30 days after installation.

The warranty for optional engines shall be limited to the warranty extended to AAR by the supplier.

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 OF AAR 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.

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

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

⚠ WARNING

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

⚠ CAUTION

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

ATTENTION !

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

NOTE

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 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 your machine appear on the next page.

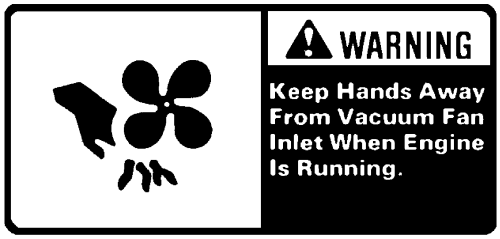
Part Number 301854

SAFETY DECALS

SOLUTION TANK

Part Number 301733

IMPELLER



Part Number 301729

IMPELLER

Part Number 301730

HIGH DUMP & LOW DUMP HOPPER

Part Number 301731

HIGH DUMP HOPPER

Part Number 301732

SHROUD OF RADIATOR

Part Number 301728

BASIC PowerBoss® SAFETY

PowerBoss® sweeper/scrubbers 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

1. 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

1. 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 OFF position.

2. 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.

3. When leaving the sweeper unattended:
   - Place the controls in OFF position.
   - Set the parking brake.
   - Shut off the engine.

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.
   - 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 getting under the hopper. Do not rely on the hydraulic cylinder to keep the hopper raised.
   - Lock and support the scrubhead assembly in raised position. Note: Later models with an electric scrubhead do not have a separate lock.

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 tank coupling.

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

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

⚠ CAUTION

1. 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 overhead objects, throwing the machine off-balance, and other hazards.

2. Travel slowly on grades.

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

4. Use special care when traveling on wet surfaces.

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

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

ATTENTION !

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

2. Never push or tow a machine faster than specified.

SPECIFICATIONS - 80, 82 MODELS

	TSS/80	ISS/80	CSS/80	TSS/82	ISS/82	CSS/82
BRAKES	MECHANICAL DRUM - FRONT WHEELS FOR ALL					
	AND DELUXE 82 MODELS HAVE HAND LEVER PARKING BRAKES					
DIMENSIONS						
LENGTH: IN. (MM)	114.56 (2910)	91 (2311)	91 (2311)	119 (3028)	95 (2413)	95 (2413)
WIDTH: IN.(MM)	54.12 (1375)	48 (1219)	48 (1219)	54.12 (1375)	48 (1219)	48 (1219)
HEIGHT: IN.(MM)	57 (1448)	57 (1448)	57 (1448)	57 (1448)	57 (1448)	57 (1448)
HEIGHT (W/OG):IN.(MM)	87 (2210)	87 (2210)	87 (2210)	87 (2210)	87 (2210)	87 (2210)
HEIGHT (W/CAB):IN(MM)	83.5 (2121)	83.5 (2121)	83.5 (2121)	83.5 (2121)	83.5 (2121)	83.5 (2121)
ENGINE						
GASOLINE: HP(KW)	53(39.5)	53(39.5)	53(39.5)	53(39.5)	53(39.5)	53(39.5)
LPG: HP(KW)	53(39.5)	53(39.5)	53(39.5)	53(39.5)	53(39.5)	53(39.5)
DIESEL: HP(KW)	32 (23.9)	32 (23.9)	32 (23.9)	32 (23.9)	32 (23.9)	32 (23.9)
FLUID CAPACITIES						
FUEL TANK: GAL(LTR)	8 (30.3)	8 (30.3)	8 (30.3)	8 (30.3)	8 (30.3)	8 (30.3)
RADIATOR: QT(LTR)	3 (2.8)	3 (2.8)	3 (2.8)	3 (2.8)	3 (2.8)	3 (2.8)
COOLANT SYSTEM: QT(LTR)	6 (5.7)	6 (5.7)	6 (5.7)	6 (5.7)	6 (5.7)	6 (5.7)
HYD FLUID RESERV:G(LTR)	6 (22.7)	6 (22.7)	6 (22.7)	6 (22.7)	6 (22.7)	6 (22.7)
FRAME	UNITIZED CONSTRUCTION, 3/16 INCH (4.8 MM) STEEL PLATE					
	(REINFORCED AT STRESS POINTS)					
HOPPER						
VOLUME:FT^3(M^3)	14 (.39)	6 (.17)	5 (.14)	14 (.39)	6 (.17)	5 (.14)
FILTERS & SHAKERS: FT^2(M^2)	100 (9.29)	50 (4.65)	NA	100 (9.29)	50 (4.65)	NA
WEIGHT LIMIT: LB(KG)	1000 (454)	300 (136)	NA	1000 (454)	300 (136)	NA
MANUAL LIFT OUT	NA	NA	STANDARD	NA	NA	STANDARD
LOW DUMP	OPTIONAL	STANDARD	NA	STD.(82LD)	STANDARD	NA
MULTI-LEVEL HIGH DUMP	OPTIONAL	NA	NA	STD.(82HD)	NA	NA
[60 IN (1524 MM) MAX. HT.)						
HYDRAULICS						
WHEEL MOTOR	CHAR-LYNN 4000 SERIES (15 IN3 /REV.) or DANFOSS					
BROOM & BRUSH MOTORS	CHAR-LYNN H-SERIES or DANFOSS					
PROPULSION PUMP	CESSNA VAR.DISP.PISTON (1.24 IN3/REV.)					
ACCESSORIES PUMP	CESSNA GEAR PUMP (.84 IN3)					
DIRECT.CONTROL VALVE	CESSNA					
SYSTEM FILTER	DONALDSON 10 MICRON					
HEAT EXCHANGER	RADIATOR-TYPE OIL COOLER					
RECOVERY TANK CAP:G(LTR)	65 (246)	65 (246)	68 (257)	65 (246)	65 (246)	65 (246)

SPECIFICATIONS - 80, 82 MODELS (CONT.)

	TSS/80	ISS/80	CSS/80	TSS/82	ISS/82	CSS/82
SCRUBBING						
MAIN SCR BRUSH DIA.:IN(MM)	14 (356)	14 (356)	14 (356)	14 (356)	14 (356)	14 (356)
SIDE SCR BRUSH DIA.:IN(MM)				14 (356)	14 (356)	14 (356)
SCRUB PATH:IN(MM)	42 (1067)	42 (1067)	42 (1067)	42 (1067)	42 (1067)	42 (1067)
SCRUB PATH (W/SIDE):IN(MM)	50 (1270)	50 (1270)	50 (1270)	50 (1270)	50 (1270)	50 (1270)
SCRUB COVER:$FT^2(M^2)$	67000(6224)	67000(6224)	67000(6224)	67000(6224)	67000(6224)	67000(6224)
[4 IN OVERLAP AT 4 MPH]						
SCRB COVER (W/SIDE):$FT^2(M^2)$	77500(7200)	77500(7200)	77500(7200)	77500(7200)	77500(7200)	77500(7200)
SOLUTION TANK: G(LTR)	68 (257)	68 (257)	68 (257)	68 (257)	68 (257)	68 (257)
SQUEEGEE: IN(MM)	44 (1118)	44 (1118)	44 (1118)	44 (1118)	44 (1118)	44 (1118)
STEERING	POWER STEERING STANDARD ON ALL					
SWEEPING						
MAIN BROOM DIA: IN(MM)	14 (356)	14 (356)	14 (356)	14 (356)	14 (356)	14 (356)
SIDE BROOM DIA:IN(MM)	24 (610)	24 (610)	24 (610)	24 (610)	24 (610)	24 (610)
SWEEP PATH (MAIN):IN(MM)	42 (1067)	42 (1067)	42 (1067)	42 (1067)	42 (1067)	42 (1067)
SWEEP PATH (W/SIDE):IN(MM)	54 (1372)	54 (1372)	54 (1372)	54 (1372)	54 (1372)	54 (1372)
SWEEP COVERAGE:$FT^2(M^2)$	118000(11036)	67000 (6224)	67000 (6224)	118000(11036)	118000(11036)	118000(11036)
SWP COVER (W/SIDE)::$FT^2(M^2)$	154000(14715)	77500(7200)	77500(7200)	154000(14715)	154000(14715)	154000(14715)
(W/SIDE BROOM) (AREA/HR)						
[6 IN OVERLAP AT 7.5 MPH]						
TIRE DIA:IN(MM)	16 (406)	16 (406)	16 (406)	16 (406)	16 (406)	16 (406)
TURN RADIUS (RH):IN(MM)						
TURN RADIUS (LH):IN(MM)	81 (2057)	81 (2057)	81 (2057)	81 (2057)	81 (2057)	81 (2057)
TURN RADIUS (U-TURN):IN (MM)						
VACUUM SYSTEM						
IMPELLER: IN(MM)	HSPD 9 (228)	HSPD 9 (228)	HSPD 9 (228)	HSPD 9 (228)	HSPD 9 (228)	HSPD 9 (228)

SPECIFICATIONS - 90 MODELS

	TSS/90 HC	TSS/90	ISS/90 HC	ISS/90	CSS/90 HC	CSS/90
BRAKES	MECHANICAL DRUM - FRONT WHEELS FOR ALL					
	AND DELUXE 82 MODELS HAVE HAND LEVER PARKING BRAKES					
DIMENSIONS						
LENGTH: IN. (MM)	119.37 (3032)	115.37 (2930)	95 (2413)	91 (2311)	95 (2413)	91 (2311)
WIDTH: IN.(MM)	60.12 (1527)	60.12 (1527)	54 (1372)	54 (1372)	54 (1372)	54 (1372)
HEIGHT: IN.(MM)	58 (1473)	57 (1448)	58 (1473)	57 (1448)	58 (1473)	57 (1448)
HEIGHT (W/OG):IN.(MM)	87 (2210)	87 (2210)	87 (2210)	87 (2210)	87 (2210)	87 (2210)
HEIGHT (W/CAB):IN(MM)	83.5 (2121)	83.5 (2121)	83.5 (2121)	83.5 (2121)	83.5 (2121)	83.5 (2121)
ENGINE						
GASOLINE: HP(KW)	53(39.5)	53(39.5)	53(39.5)	53(39.5)	53(39.5)	53(39.5)
LPG: HP(KW)	53(39.5)	53(39.5)	53(39.5)	53(39.5)	53(39.5)	53(39.5)
DIESEL: HP(KW)	46 (34.3)	46 (34.3)	46 (34.3)	46 (34.3)	46 (34.3)	46 (34.3)
FLUID CAPACITIES						
FUEL TANK: GAL(LTR)	8 (30.3)	8 (30.3)	8 (30.3)	8 (30.3)	8 (30.3)	8 (30.3)
RADIATOR: QT(LTR)	3 (2.8)	3 (2.8)	3 (2.8)	3 (2.8)	3 (2.8)	3 (2.8)
COOLANT SYSTEM: QT(LTR)	6 (5.7)	6 (5.7)	6 (5.7)	6 (5.7)	6 (5.7)	6 (5.7)
HYD FLUID RESERV:G(LTR)	6 (22.7)	6 (22.7)	6 (22.7)	6 (22.7)	6 (22.7)	6 (22.7)
FRAME	UNITIZED CONSTRUCTION, 3/16 INCH (4.8 MM) STEEL PLATE					
	(REINFORCED AT STRESS POINTS)					
HOPPER						
VOLUME:FT^3(M^3)	16 (.45)	16 (.45)	7 (.2)	7 (.2)	6 (.17)	6 (.17)
FILTERS & SHAKERS: FT^2(M^2)	120 (11.15)	120 (11.15)	50 (4.65)	50 (4.65)	NA	NA
WEIGHT LIMIT: LB(KG)	1200 (544)	1200 (544)	400 (181)	400 (181)	X	X
MANUAL LIFT OUT	NA	NA	NA	NA	STANDARD	STANDARD
LOW DUMP	OPTIONAL	OPTIONAL	STANDARD	STANDARD	NA	NA
MULTI-LEVEL HIGH DUMP	STANDARD	STANDARD	NA	NA	NA	NA
HYDRAULICS						
WHEEL MOTOR	CHAR-LYNN 4000 SERIES (15 IN3 /REV.) or DANFOSS					
BROOM & BRUSH MOTORS	CHAR-LYNN H-SERIES or DANFOSS					
PROPULSION PUMP	CESSNA VAR.DISP.PISTON (1.24 IN3/REV.)					
ACCESSORIES PUMP	CESSNA GEAR PUMP (.84 IN3)					
DIRECT.CONTROL VALVE	CESSNA					
SYSTEM FILTER	DONALDSON 10 MICRON					
HEAT EXCHANGER	RADIATOR-TYPE OIL COOLER					
RECOVERY TANK CAP:G(LTR)	100 (378.5)	60 (227)	100 (378.5)	60 (227)	100 (378.5)	65 (246)

SPECIFICATIONS - 90 MODELS (CONT.)

	TSS/90 HC	TSS/90	ISS/90 HC	ISS/90	CSS/90 HC	CSS/90
SCRUBBING						
MAIN SCR BRUSH DIA.:IN(MM)	16 (406)	16 (406)	16 (406)	16 (406)	16 (406)	16 (406)
SIDE SCR BRUSH DIA.:IN(MM)						
SCRUB PATH:IN(MM)	48 (1219)	48 (1219)	48 (1219)	48 (1219)	48 (1219)	48 (1219)
SCRUB PATH (W/SIDE):IN(MM)	56 (1422)	56 (1422)	56 (1422)	56 (1422)	56 (1422)	56 (1422)
SCRUB COVER:FT^2(M^2)	77500(7200)	77500(7200)	77500(7200)	77500(7200)	77500(7200)	77500(7200)
SCRB COVER (W/SIDE):FT^2(M^2)	91500 (8500)	91500 (8500)	91500 (8500)	91500 (8500)	91500 (8500)	91500 (8500)
[4 IN OVERLAP AT 4 MPH]						
SOLUTION TANK: G(LTR)	100 (378.5)	65 (246)	100 (378.5)	65 (246)	100 (378.5)	65 (246)
SQUEEGEE: IN(MM)	50 (1270)	50 (1270)	50 (1270)	50 (1270)	50 (1270)	50 (1270)
STEERING	POWER STEERING STANDARD ON ALL					
SWEEPING						
MAIN BROOM DIA: IN(MM)	14 (356)	14 (356)	14 (356)	14 (356)	14 (356)	14 (356)
SIDE BROOM DIA:IN(MM)	24 (610)	24 (610)	24 (610)	24 (610)	24 (610)	24 (610)
SWEEP PATH (MAIN):IN(MM)	48 (1219)	48 (1219)	48 (1219)	48 (1219)	48 (1219)	48 (1219)
SWEEP PATH (W/SIDE):IN(MM)	60 (1524)	60 (1524)	60 (1524)	60 (1524)	60 (1524)	60 (1524)
SWEEP COVERAGE:FT^2(M^2)	138600(12876)	138600(12876)	77500(7200)	77500(7200)	77500(7200)	77500(7200)
SWP COVER (W/SIDE)::FT^2(M^2)	178000(16536)	178000(16536)	95000(8825)	95000(8825)	95000(8825)	95000(8825)
(W/SIDE BROOM) (AREA/HR)						
[6 IN OVERLAP AT 7.5 MPH]						
TIRE DIA:IN(MM)	16 (406)	16 (406)	16 (406)	16 (406)	16 (406)	16 (406)
TURN RADIUS (RH):IN(MM)						
TURN RADIUS (LH):IN(MM)	85.75 (2178)	82 (2083)	85.75 (2178)	82 (2083)	85.75 (2178)	82 (2083)
TURN RADIUS (U-TURN):IN (MM)						
VACUUM SYSTEM						
IMPELLER: IN(MM)	HSPD 9 (228)	HSPD 9 (228)	HSPD 9 (228)	HSPD 9 (228)	HSPD 9 (228)	HSPD 9 (228)

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(IN ENGLISH VERSION)

OPERATION CONTROLS

IGNITION SWITCH The four position keyswitch is used to turn the machine's power on and off.

STARTER To start gasoline powered machines, turn the key to ON position and press START button. When engine starts, release button. To stop engine, turn key to OFF.

HORN The horn is activated by pressing the horn button located on the right side of the instrument panel.

FUEL LEVEL GAUGE The fuel gauge indicates the amount of fuel remaining in the tank.

AMMETER The ammeter indicates the charging current which is being sent to the battery by the alternator. It also indicates a discharge of current being used by the sweeper/scrubber when the alternator is not charging.

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

ENGINE CHOKE KNOB The choke knob on gasoline-powered machines is connected to a cable which controls the engine choke.

- Pull the knob out for aid in cold-starting the engine.
- Push the knob in after the engine starts.

STOP CABLE (DIESEL) When the stop cable knob is pulled out, the fuel pump is disconnected. The stop cable knob should be pulled out only after turning off the key switch, to prevent running down the battery.

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 engine coolant. Temperatures above 210° F indicate an overheating engine.

OPERATION CONTROLS *(Continued)*

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 opera tion to ensure proper broom speed and dust control (RUN on sweeper/scrubbers and NORMAL on sweepers.

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 foot pedal into neutral.
- For emergency stops move foot pedal past neutral into opposite position. ***(Use for emergency stops only! Constant use of this braking method may result in damage to drive components.)***

⚠ CAUTION

The sweeper/scrubber is equipped with a speed limiter, a stop under the pedal which can be raised to reduce maximum speed.

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

SWEEPING CONTROLS

BROOM CONTROL The broom and brush control lever activates the brooms and scrub brushes. (Side Broom OFF position activates main broom only.)

NOTE The main broom and side broom as well as the brushes 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 deactivated 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 LOWER on the handle slot.

NOTE

- For extremely uneven floors, position the handle at FLOAT position on the handle slot. **Note:** Extensive use of FLOAT position reduces broom life.
- When not sweeping, position and lock handle at 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 at LOWER in the handle slot.

SCRUBBING CONTROLS

FILLING THE SOLUTION TANK

To fill the solution tank follow these steps:

1. Make sure the air control knob is pushed in (on TSS and ISS models).
2. Park the machine on a level area and lock the parking brake.
3. Make sure the solution delivery valve is closed.
4. Open the top door of the machine. Note: On 82 models unscrew the smallest (6 inch) cap located on the top of the solution tank. Fill the tank with cleaning water solution.
5. When the tank is full, close the door (or replace the cap).

⚠ CAUTION

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

MAIN SCRUB BRUSHES

To operate the main scrub brushes follow these steps:

1. Lower the scrubheads to the floor with the scrubhead switch. Obtain the correct pressure for the floor conditions by noting pressure shown on the scrubhead position gauge. The scrubheads are raised with the same switch.

NOTE

For normal scrubbing, the main broom and side broom remain in the raised position.

NOTE

To sweep simultaneously, lower the brooms at this time. Even though the brooms and brushes are both rotating, each is lowered independently.

2. Activate the scrub brushes by putting the broom and brush control lever in the SIDE BROOM OFF position. Stop the brushes by returning the lever to the center OFF position.

3. Lower the squeegee and lock it in the down position with the squeegee switch. The squeegee can also be raised with the same switch.

4. Start the flow of solution to the floor. To dispense solution push the solution delivery lever forward. To stop the flow of solution pull the lever back to the OFF position. The amount of solution dispensed increases as the lever is moved forward, increasing the flow rate to up to 3 gallons per minute.

SCRUBBING CONTROLS *(Continued)*

5. Drive forward slowly.

⚠ CAUTION ***Use care when driving on wet surfaces.***

⚠ CAUTION ***Always travel slowly on grades.***

DOUBLE SCRUBBING

For double scrubbing proceed as follows:

1. Follow the procedures on the previous page for scrubbing *without* lowering the squeegee to the floor.
2. Make multiple passes over the same area of floor as conditions dictate.
3. Lower and lock the squeegee in the down position with the squeegee switch for the final pass. The squeegee can be raised with the same switch.

DRAINING THE RECOVERY TANK

Follow these steps to drain the recovery tank:

1. Park the machine on a level surface with the left rear of machine beside the drain site.
2. Engage the parking brake.
3. Turn off the machine.
4. Open the left scrubhead access door.
5. Remove the flexible drain hose from its storage hook. Pull out the drain hose for maximum reach.
6. Place the drain hose at the floor drain opening, grate or on the ground.
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.

SCRUBBING CONTROLS *(Continued)*

CLEANING THE RECOVERY TANK

To clean the recovery tank proceed as follows:

NOTE

The recovery tank should be cleaned after every shift.

1. Engage the parking brake.
2. Shut off the machine.
3. Remove the two access doors at the rear of the unit. Note: On 82 models remove the two large screw-on caps located at the bottom rear of the tanks.
4. Remove the drain hose and position it over the floor drain opening.
5. Loosen and remove the drain plug.
6. Spray the tank with clean water, flushing all sludge out the access ports.
7. Remove the ball and float. Rinse and reinstall.
8. Drain the tank completely and reinstall the plug.
9. Reposition the hose in the storage area beneath the floor pan.

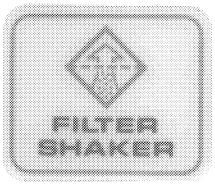
SQUEEGEE WAND

This attachment allows the operator to vacuum up 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 hose.
3. Connect the squeegee wand to the adapter.
4. Set the engine at high idle and vacuum.

DEBRIS HOPPER CONTROLS

HOPPER FILTER SHAKER BUTTON



(On the Left Side of the Instrument Panel)

This button is used to activate the filter shakers prior to dumping or as needed during sweeping operation. It is located on the left hand side of the instrument panel.

To shake 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 RAISE position for an extended period of time.

HIGH DUMP MODELS

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

NOTE

Note: Levers are spring loaded to a center off position.

- To raise the hopper, pull back Lever 1 to the RAISE position and hold until the hopper raises to the proper height for the dumpster or container.
- To empty debris, pull back Lever 2 to the DUMP position to rotate the hopper forward and empty the debris.
- To rotate the hopper back, push Lever 2 forward to the RETURN position until the hopper rotates and stops.
- To lower the hopper, push Lever 1 forward 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 neutral position.

2. Make sure the throttle is in idle position.

3. **Gasoline-powered:** Turn ignition switch to START position; then release. If the engine is cold, pull out the choke knob and repeat procedure. When engine is running smoothly, push choke knob in.
   Diesel: Push in the engine stop knob. Turn the ignition switch to the first position; then press glow plug switch for approximately 15-20 seconds. Turn the ignition switch to the START position and release.

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

4. Allow the engine to warm up approximately two minutes.

SLOWING AND STOPPING

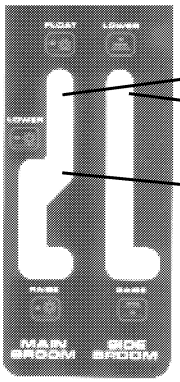
1. Allow the directional control pedal to move into neutral. The machine will slow and coast to a stop.

OPERATING ON GRADES

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

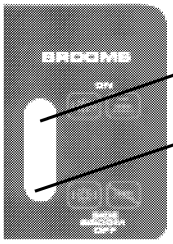
SWEEPING

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 at 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.

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

EMPTYING THE HOPPER

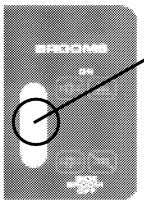
High Dump Models

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.

NOTE

Broom control lever must be in center OFF position.



3. Reduce the engine speed.
4. Pull back Lever 1 to 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 debris into the container.

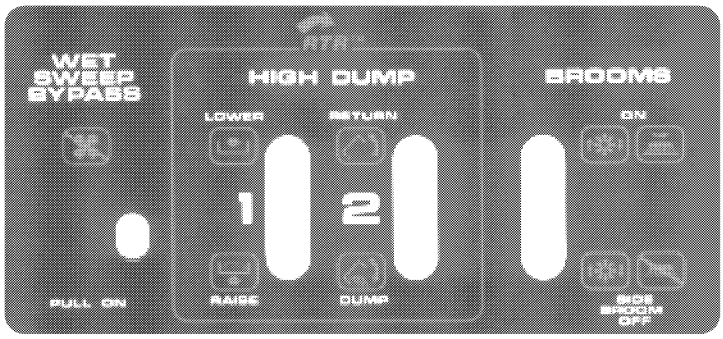
⚠ CAUTION

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

6. At this point, shake filters for 20 - 30 seconds. Pull back Lever 2 to DUMP position to rotate the hopper forward and empty the debris.

7. After hopper empties, push Lever 2 forward to RETURN position until the hopper rotates and stops.
8. Slowly back machine away from dumpster approximately 5 feet.
9. Push Lever 1 forward to the LOWER position until the hopper stops.

Controls That Are Located On The Lintel (the control panel in front of the steering wheel)

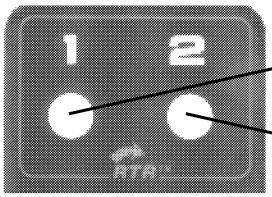


USING THE ROTARY TRASH RELOCATOR (RTR™)

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



(On the Console)

- 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 to the RAISE position and hold until Light 1 illuminates, then release.

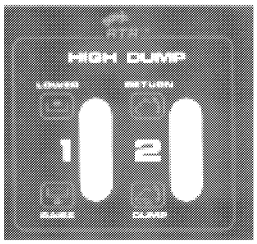
⚠ WARNING

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

4. Pull back Lever 2 to DUMP position and hold until Light 2 illuminates, then release.

NOTE

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



(On the Lintel)

5. Push Lever 2 forward to RETURN position until the hopper rotates back and stops.
6. Push Lever 1 forward to the LOWER position until the hopper returns to the normal operating position.
7. Move the throttle back to RUN and resume sweeping.

LOW DUMP MODEL

1. Push the throttle to the IDLE position.

NOTE

Broom control lever must be in center OFF position.
Never attempt to dump debris off a dock or mezzanine. Dump onto ground surface only.

2. Pull back the lever marked DUMP from its center OFF position until the hopper raises and locks in dump position. Debris will empty onto floor.
3. With the hopper in the raised position, press the filter shaker button for 20 to 30 seconds to shake the dust from the hopper filter(s).
4. Use the directional control pedal to slowly back the machine a distance of about five feet (15.24 cm).

⚠ CAUTION

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

⚠ WARNING

Never place your hands or other body parts under a raised or partially raised hopper unless the safety arm is in place.

5. Use the directional control pedal to stop the machine, then release the DUMP lever to return it to its center OFF position.
6. Pull the throttle back to RUN and resume sweeping.

MANUAL LIFT-OUT MODELS (CSS)

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. Move the hopper back and dump it out.
4. Replace hopper.

NOTE

If the debris in the hopper is too heavy, the hopper can be rotated and partially dumped to make it lighter.

Vacuum Attachment

To operate the vacuum, open the hopper lid, close the vacuum door (at the front of the dust filter housing) and attach the vacuum hose. With the parking brake locked, move the throttle to the RUN position. The vacuum is now ready for use.

Blower

The blower blows debris from hard-to-reach areas into the path of the sweeper. To operate, take the wand and pull the blower control knob.

TRANSPORTING THE MACHINE

Loading

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 behind both front wheels and in the rear center of the frame.

NOTE

Attach the tie downs to the frame only.

ATTENTION !

1993 and later models are equipped with a tow valve located on the top of the propulsion pump. To operate the tow valve:

1. Turn the flat-sided shaft, at the top of the pump, 90°.
2. Before operating the machine, return the valve to its original position.

Pushing

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

ATTENTION !

Do not tow or push the machine a distance of more than .5 miles or faster than one mile per hour. 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.

INTRODUCTION

Regular maintenance on your sweeper/scrubber 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 machine 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

FREQUENCY (IN HOURS)					SERVICE (BY MAINTENANCE AREA)
DAILY	50	100	200	500	
					ENGINE
		X			Pressure wash engine
					For additional maintenance requirements, refer to the engine manual furnished with this manual.
					AIR INTAKE AND EXHAUST SYSTEMS
X					Empty rubber dust cup of air filter element.
		X			Clean air filter. ***NOTE:*** *Clean more often in dusty conditions.*
			X		Replace air filter.
					ELECTRICAL SYSTEM
		X			Check electrolyte level in battery cells and fill as needed.
			X		Clean battery top.
					COOLANT SYSTEM
X					Check coolant level and fill as needed.
	X				Inspect radiator fins and clean as needed.
		X			Blow out radiator fins.

PLANNED MAINTENANCE CHART

FREQUENCY (IN HOURS)					SERVICE (BY MAINTENANCE AREA)
DAILY	50	100	200	500	
					HYDRAULIC SYSTEM
X					Check hydraulic reservoir gauge and fill as needed.
				X	Replace breather cap filter element.
				X	Replace hydraulic fluid and filter.
X					Check functioning of directional control pedal and adjust as needed.
				X	Clean hydraulic fluid strainer in reservoir.
	X				Inspect hydraulic oil cooler fins & clean as needed (if so equipped).
		X			Blow out hydraulic oil cooler fins with compressed air (if so equipped).
					SWEEPING COMPONENTS
X					Inspect brooms for wear and remove strings and debris from bristles and drive assembly.
	X				Inspect broom skirts for wear and adjust or replace as needed.
	X				Rotate main broom end-to-end.
	X				Perform main broom adjustment test and adjust as needed.
X					Inspect the side broom for wear and adjust as needed.
					Replace main and side brooms as needed. *Main Broom - Bristles are 1" in length.* *Side Broom - Bristles are 3" in length.*

PLANNED MAINTENANCE CHART

FREQUENCY (IN HOURS)					SERVICE
DAILY	50	100	200	500	(BY MAINTENANCE AREA)
					HOPPER
X					Check hopper filters and clean or replace as needed.
	X				Check hopper clearance from floor and adjust as needed.
X					Inspect the hopper flaps for wear or damage and replace as needed.
		X			Inspect hopper side and frame seals for wear or damage. Adjust or replace as needed.
				X	Lubricate the pillow blocks supporting the dump mechanism.
					STEERING
				X	Lubricate steering cylinder rod ends.
				X	Lubricate steering fork assembly.
	X				Check for leaks.
					PARKING BRAKE
			X		Check for proper functioning and adjust as needed.
					TANKS
X					Check squeegee tool and vacuum hose for clogs.

PLANNED MAINTENANCE CHART

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

ENGINE

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

- Air Intake and Exhaust Systems
- 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 AND EXHAUST SYSTEMS
SERVICE INSTRUCTIONS

AIR FILTER REMOVAL

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

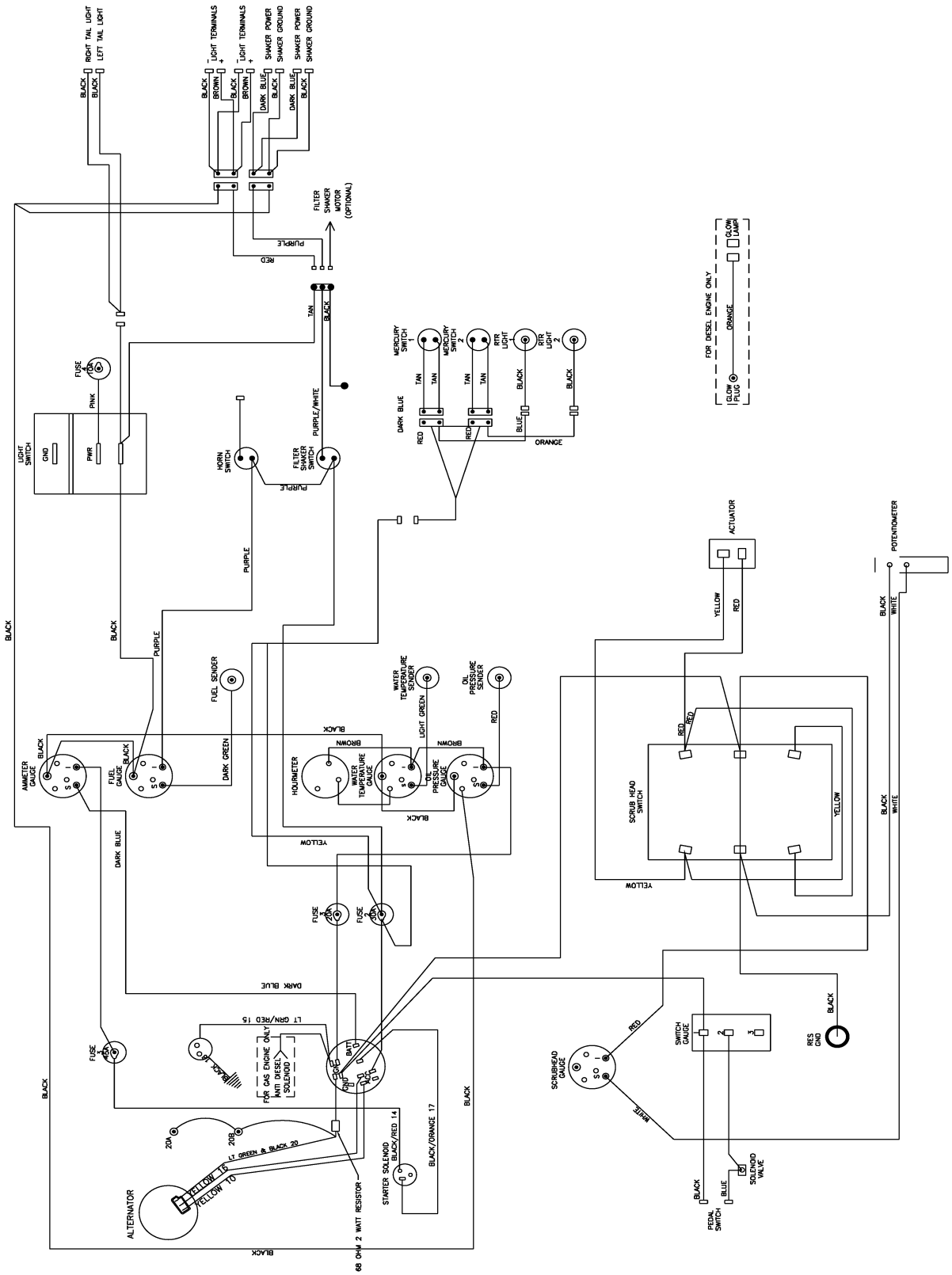
AIR FILTER INSPECTION

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

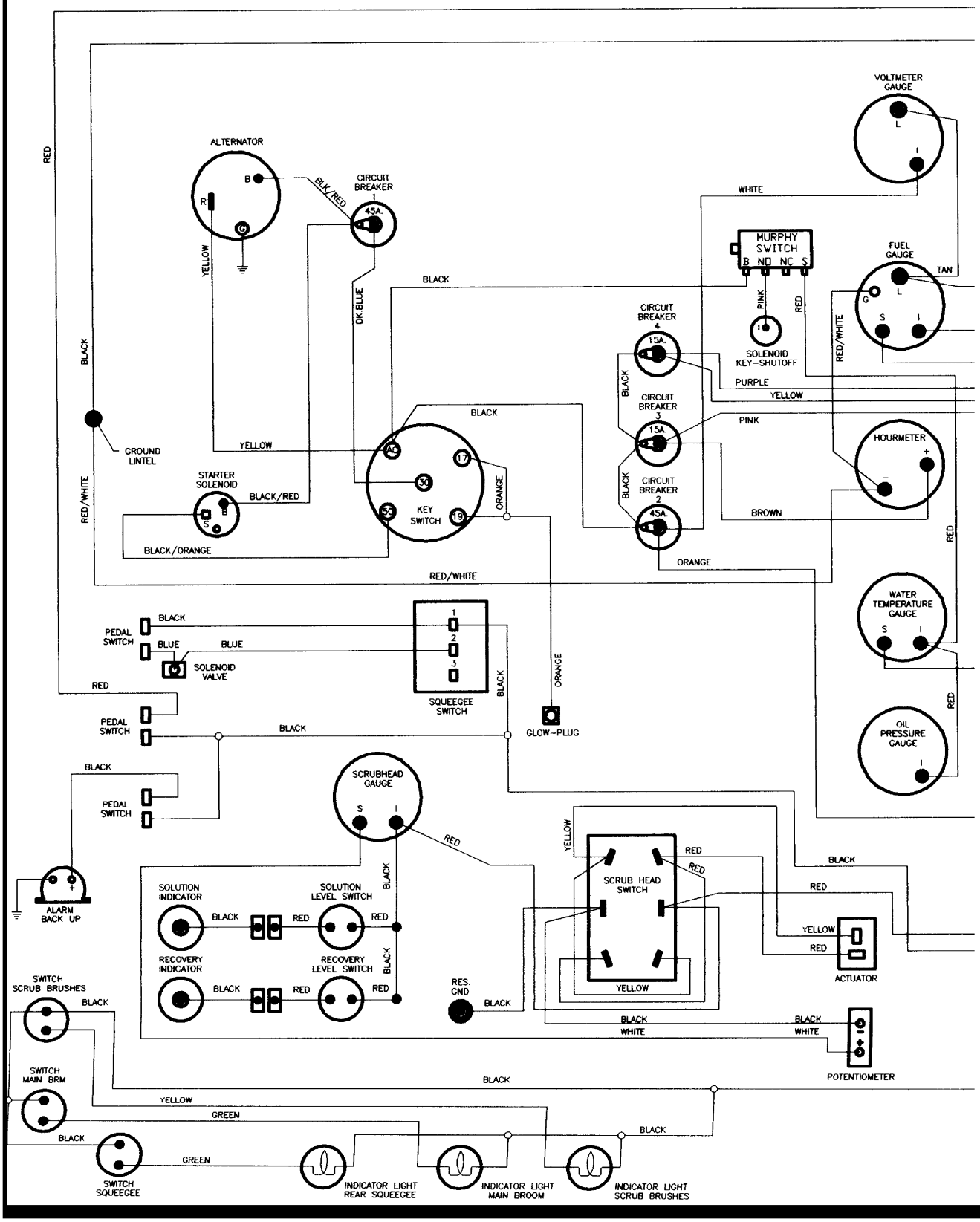
AIR FILTER INSTALLATION

1. Wipe out the air cleaner housing with a damp cloth. Be sure all dirt is removed.
2. Install the cleaned replacement filter 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.
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.
7. Check the condition of intake hoses and clamps.
8. Close the engine cover.

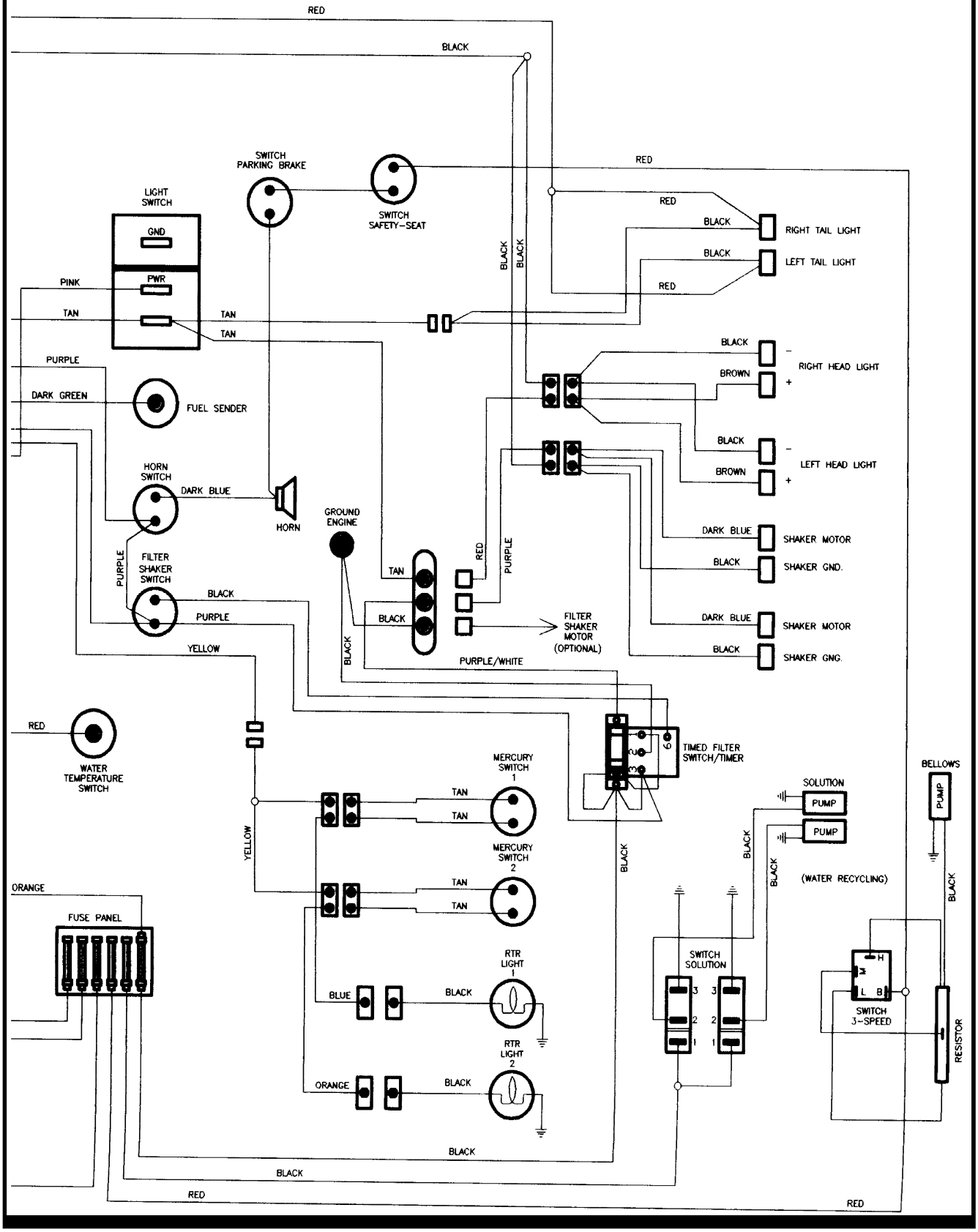
ELECTRICAL SCHEMATIC - FORD 1.3L GASOLINE



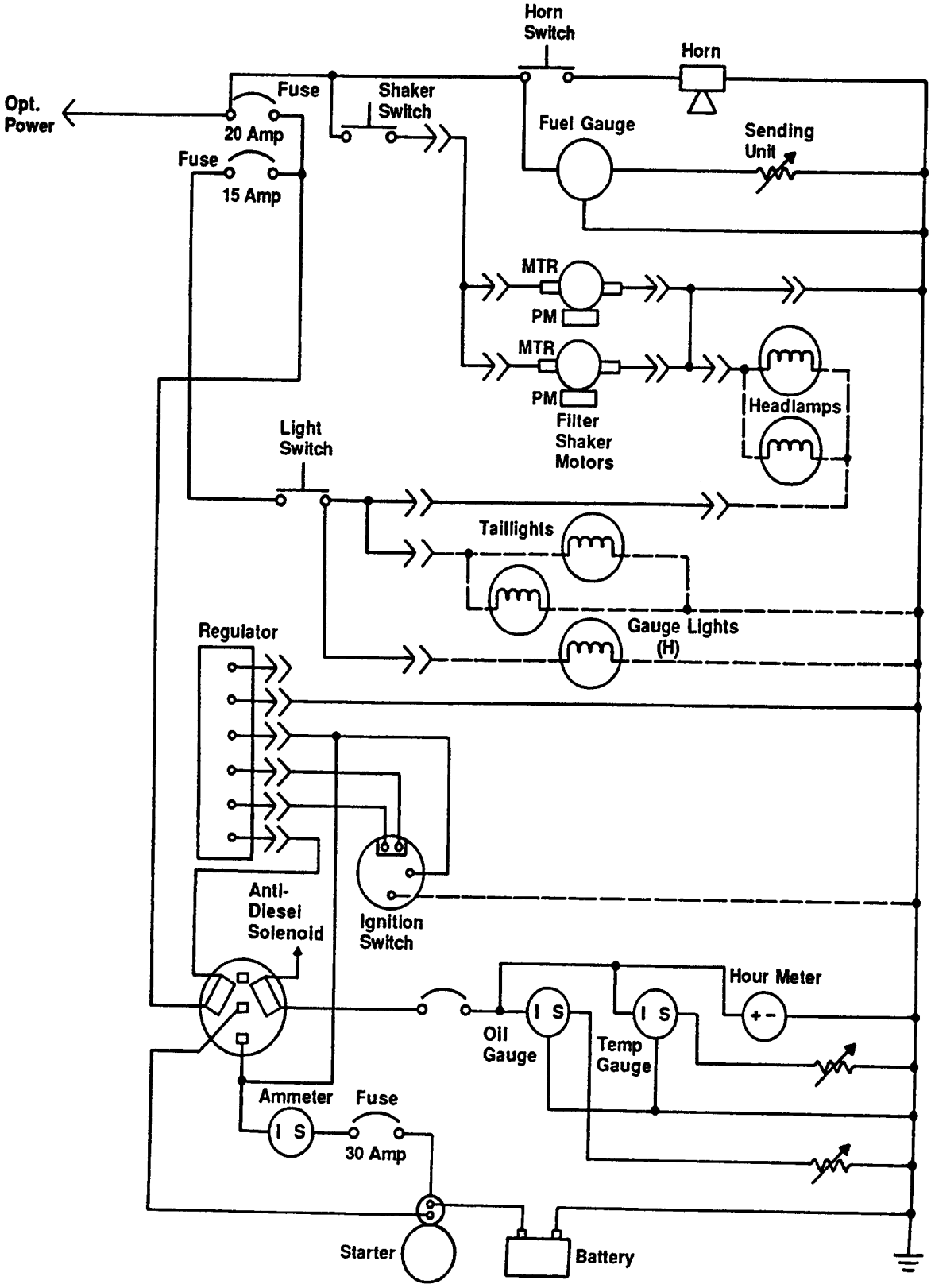
ELECTRICAL SCHEMATIC - PERKINS 104-19 DIESEL



ELECTRICAL SCHEMATIC - PERKINS 104-19 DIESEL



ELECTRICAL SCHEMATIC - KUBOTA DIESEL



ELECTRICAL SYSTEMS

SERVICE INSTRUCTIONS

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 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.)

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

FUEL SYSTEM

⚠ 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 machine 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 machine.**
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 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.**

CHECKING THE LPG FUEL FILTER LOCK

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

COOLANT SYSTEM
SERVICE INSTRUCTIONS

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, 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.

Radiator Capacity: 3 qts., US (2.84 liters)

Total System Capacity: 6 qts., US (5.68 liters)

LUBRICATION

Gasoline and LPG 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

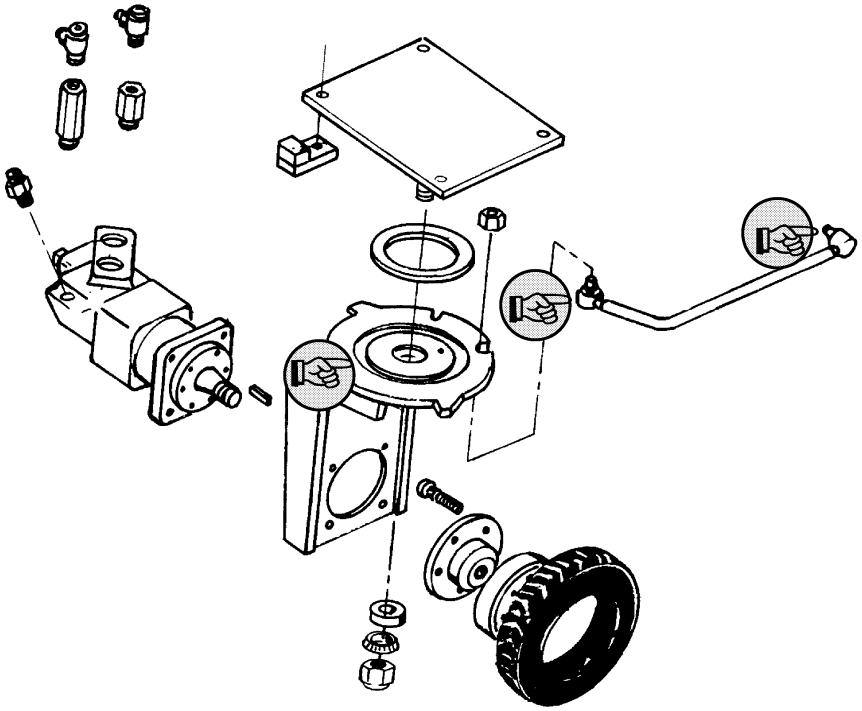
NOTE: *The engine oil pan is equipped with a drain hose.*

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

LUBRICATION POINTS

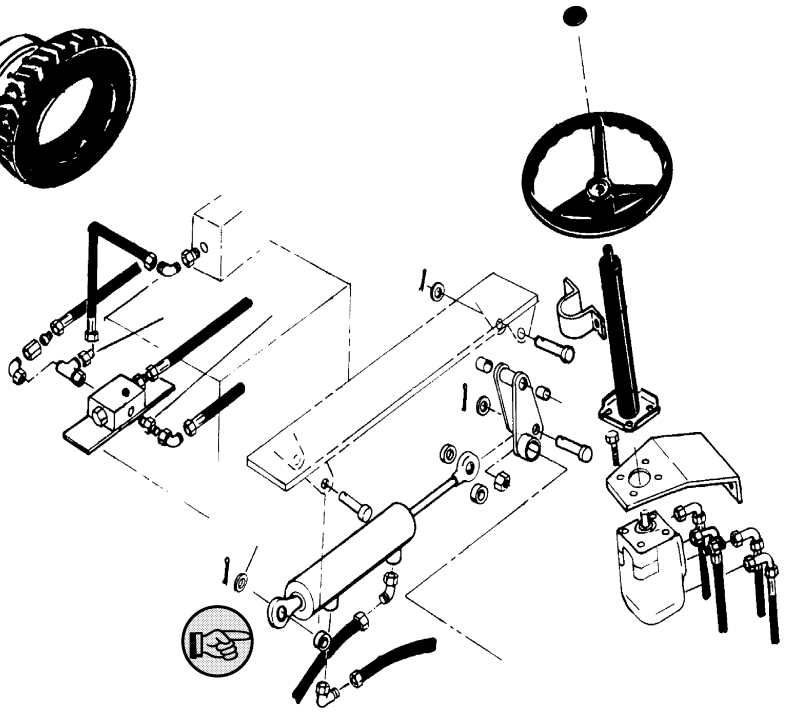
Lubrication	Type of Lubrication	Frequency (In Hours)
Steering Cylinder (2 fittings)	Grease	500
Steering Fork Assembly	Grease	500
Pillow Block Supporting Dump Mechanism (2 fittings)	Lithium Grease	500
Hood Latches & Hinges	Oil	500

Steering Fork & Drive Tire



indicates location of grease fitting

Power Steering



HYDRAULICS SYSTEM
SERVICE INSTRUCTIONS

FILLING THE FLUID RESERVOIR

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

1. When the machine is cool and the hopper is in the lowered position, observe the sight glass in the side of the fluid reservoir. Fluid level should be approximately 2/3 to the top of the sight glass.

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

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

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, then replace and retighten the drain plug.
5. Remove the filler/breather cap located on top of the reservoir and fill the reservoir with approved hydraulic fluid.

NOTE: Six (6) gallons (US) (22.71 liters) of fluid required.

6. Check the sight glass to ensure the proper two-thirds level is achieved.
7. Install a new filler/breather cap assembly.
8. Check the drain plug for leakage.

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.
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 overtighten.

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 low dump models remove the hopper . On high dump models, raise and engage safety arm.

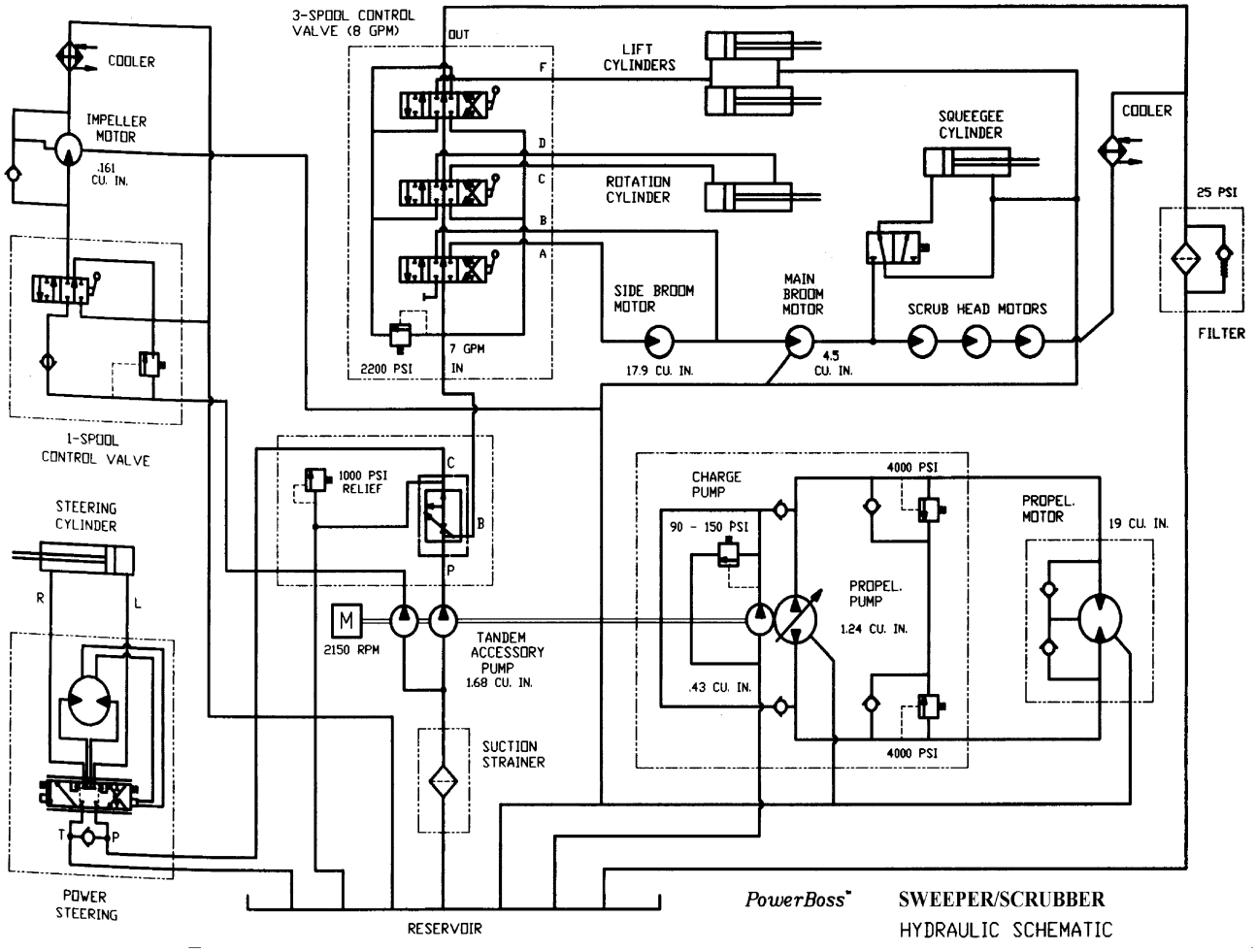
1. Turn off the engine, engage the parking brake, and chock both wheels.
2. Jack the rear of the machine so that the rear tire just clears the floor. Use two jack stands to support the machine. **DO NOT USE A JACK ALONE TO HOLD THE MACHINE !!**
3. Locate the forward/reverse adjustment bracket mounted beneath the pump on the pump mounting plate.
4. Slightly loosen the bolt on the center of the bracket.
5. Now 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 throttle. Push the directional control pedal forward and backward to be sure pump stays in neutral. Check wheel again and adjust as needed until the wheel remains motionless.
9. Retighten all the locking nuts and the bolts.
10. Turn the engine off and lower the machine to the floor.

ADJUSTING MACHINE SPEED

To limit the speed of the machine, simply reposition the speed limiter, a bolt underneath the directional control pedal which can be moved in or out. Be sure that the directional control pedal contacts the speed limiter bolt before the pump control arm hits the pump stop.

HYDRAULIC SCHEMATIC



Note: The hydraulic schematic shown is for the TSS High Dump model. For use on ISS models, disregard the "rotation cylinder" circuit. For use on CSS models, disregard "lift cylinder" and "rotation cylinder" circuit.

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IN ENGLISH EDITION

SWEEP COMPONENTS
SERVICE INSTRUCTIONS

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 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 and hex bolts and nuts. To remove the flaps, remove nuts, bolts, and retainer bar. To adjust flaps, loosen nuts and bolts, slide flap up or down as needed. Retighten nuts and bolts.

MAIN BROOM ADJUSTMENT TEST

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

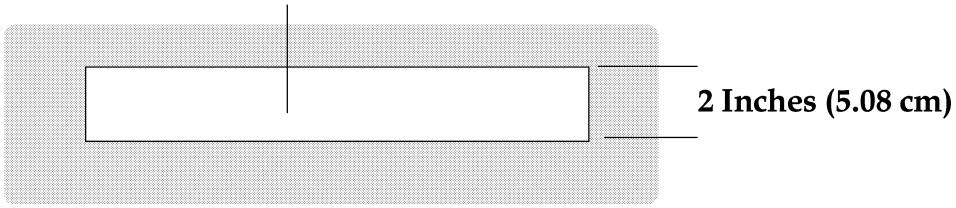
1. Drive the machine onto the test surface with the main broom in the RAISED position.
2. Set the parking brake and position the main broom handle in NORMAL position.
3. Push the broom control lever to ON position to activate the broom motor and open throttle to full RPM.
4. Allow about 45 seconds for 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 Test Pattern



MAIN BROOM HEIGHT ADJUSTMENT

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

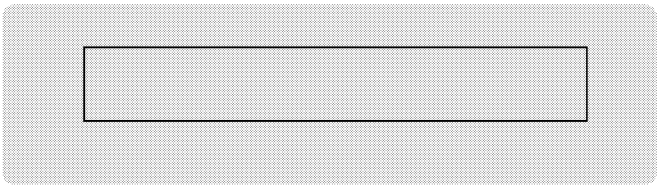
NOTE: The adjustment knob is located in the engine compartment on the broom control handle pivot.

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

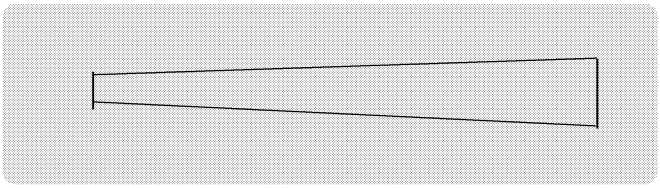
MAIN BROOM TAPER ADJUSTMENT

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.*

Correct Taper Pattern



Incorrect Taper Pattern



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 locking 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.

SIDE BROOM ANGLE ADJUSTMENT

The angle adjustment is controlled with 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 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. 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 fully 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.

MAIN BROOM REPLACEMENT (Bristles worn to length of 1 inch)

1. Turn the engine off and lock the parking brake.
2. Push the main broom control lever to the NORMAL position.
3. Open the left broom chamber door (the door opposite the driver's seat).
4. Using a 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 REPLACEMENT (Bristles worn to length of 3 inches; 7.62 cm)

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 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 three drive pins are properly engaged.

SCRUB & WATER PICK-UP COMPONENTS
SERVICE INSTRUCTIONS

⚠ WARNING

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 scrub brush features a quick release mechanism which enables the operator to remove the brush in seconds.

NOTE: *Brushes should be replaced when bristles are less than 1/2" (12.7 mm) long.*

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

SCRUBHEAD GAUGE ADJUSTMENT

1. Raise the scrubheads to the full "UP" position.
2. Locate the linkage attached to the frame above the scrubheads.
3. Loosen 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 set screw.

   NOTE: *A nonfunctional gauge does not prevent the scrubhead from being used.*

CHECKING & ADJUSTING THE MAIN SQUEEGEE FLARE

1. Park the machine on a flat surface. Lower squeegee.
2. Turn the machine off and engage the parking brake.
3. Open the rear lower access doors.
4. Remove the pull pins and remove the side squeegees.
5. Lower the squeegee.
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.
8. Locate the squeegee arms on each side of the machine.
9. Loosen the bolt which attaches the upper squeegee arm to the squeegee mount plate on each side.
10. Locate and loosen both nuts on each squeegee adjustment link and back them away from the gussets. The rear squeegee is now free to be aligned with the floor.
11. Check the squeegee rubber to make sure the squeegee makes contact with the floor all the way around. It should stand straight on the floor with ***no flare***.
12. At each squeegee mount, turn the two nuts on the adjusting link until they both make contact with the mount plate on each side.
13. Tighten the nuts on each mount plate. Then tighten the bolt on top of each of the two upper squeegee arms.
14. With the squeegee straight up on the floor (no flare), adjust the caster until it clears the floor by 1/2" (12.7 mm).
15. Use a 1/2" (12.7 mm) shim spacer of metal or wood as a feeler gauge for this procedure.
16. Tighten the nut on the caster and move the shim.
17. With the squeegee in the down position, drive the machine forward approximately two feet (.61 meters). Examine the flare in the squeegee rubber to see that it is uniform around the entire parabola. If not, go through Steps 7 to 15.

TURNING OR REPLACING THE MAIN SQUEEGEE RUBBER

The primary rubber 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, 4. Opposite Upper Edge. Removal and replacement instructions follow. This procedure can be performed with the squeegee tool on or off machine.

NOTE: *Removal and replacement of the main squeegee elements is easier if the squeegee frame is removed from the machine.*

1. Remove the hand knobs from the rear of the squeegee frame.
2. Remove the metal strap, the two back-up strips, and the outer squeegee rubber.
3. Turn the side ends of the squeegee rubber 180°, or turn the rubber upside down, to expose an unused edge. Reposition the rubber 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 so that the center slot is on the center stud.
7. Install the center knob and tighten it.
8. Place the remainder of the strap and knobs on the studs, working from the center out to the edge.

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 parking brake and chock wheels.
2. Place the broom control lever in the SIDE BROOM OFF position.
3. Put the squeegee switch in the down position and turn the ignition switch off. (This will hold the squeegee in the down position.)
4. Disconnect the vacuum hose from the squeegee.
5. Disconnect the quick-release ball joint from the squeegee.

6. Return the broom control lever to the OFF position.
7. Locate the squeegee frame supports on each side of the squeegee and remove the hand knobs (one on each side).
8. Lift the supports up off the pins on the squeegee frames and slide the squeegee tool toward the rear of the machine.
9. Go to the back of the machine and pull the squeegee straight back and out.

MAIN SQUEEGEE TOOL INSTALLATION

1. At the back of the machine, push the squeegee forward under the machine.
2. Lift the supports up onto the pins on the squeegee frames.
3. On each side of the squeegee attach the hand knobs (one on each side) to the squeegee frame supports.
4. Put the squeegee switch in the down position and turn the ignition switch off. (This will hold the squeegee in the down position.)
5. Connect the quick-release ball joint to the squeegee.
6. Connect the vacuum hose to the squeegee.

INNER SQUEEGEE REPLACEMENT

The inner squeegee is a component of the rear squeegee. When the squeegee is down, locked, and the rear squeegee rubber is flared, the inner squeegee has become too worn to make proper contact with the floor.

1. Remove the main squeegee tool (see removal instructions).
2. Remove 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 dry bearings located on the scrubhead lift assembly as necessary.

HOPPERS
SERVICE INSTRUCTIONS

HIGH DUMP HOPPER REMOVAL AND REPLACEMENT

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

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

TO REPLACE:

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 1/3 of way up.
2. Engage lift arm rotation plates with three mounting bolts on each side of the hopper.
3. Start the machine and lift hopper.
4. Drive the truck away from the hopper dolly or cart.
5. Lower hopper.
6. Engage wire connections at right side of hopper.

FILTER REMOVAL:

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

FILTER CLEANING

The dust control filters are permanent - type paper element filters. They 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 sides 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 & isolators.
4. Hook the wire harness to the filter shaker motor.
5. Close the hopper cover and secure the latches.

LOW DUMP HOPPER REMOVAL AND REPLACEMENT

The hopper must be removed on low dump models for service and maintenance. A low dump hopper dolly is needed for this procedure.

1. Park the machine on a level surface and engage the parking brake.
2. Adjust the throttle to just above idle.
3. Raise the hopper to full dump height and lock it into the raised position.
4. Turn the engine off.
5. Insert the hook on top of the dolly into the opening between the bottom of the sweeper/scrubber's bumper and the hopper. Position it near the center of the bumper.

   Note: The dolly should stay attached in this position when released.
6. Return the dump lever to its center OFF position to lower the hopper.
7. Push down on the dump arms until the ends of the dump arms are lower than the hopper lift brackets.
8. Disconnect the wire connection at rear of hopper.
9. Grab bumper and pull the hopper straight out away from machine.

REPLACEMENT

1. Make sure the ends of the dump arms are lower than hopper lift brackets.
2. Roll the hopper between lift arms.
3. Be sure the hopper stop bars are positioned immediately above the dump arm flanges located at the rear of the dump arms.
4. Align the hopper lift brackets with the hook openings located at the front of the lift arms.
5. Start the engine and lift the dump arms slowly. When lift arms engage hopper lift brackets, lift the hopper all the way up.
6. Pull dump lever back to lock hopper in the raised position. Remove dolly.
7. Lower hopper.

HOPPER FLOOR CLEARANCE & DUMP ADJUSTMENTS

In order to perform properly, the hopper (on both low and high dump models) must maintain a distance of 3-1/2" (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.

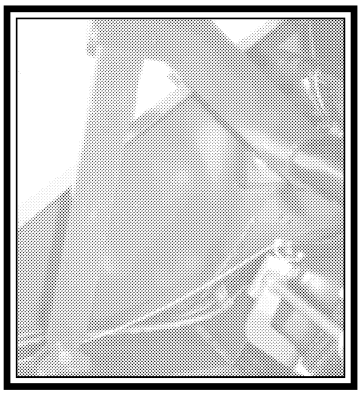
ADJUSTING MAXIMUM HOPPER DUMP (HIGH DUMP) ANGLE

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

⚠ CAUTION

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

SAFETY ARM ENGAGED



2. Adjust the lift arm stop bolts located on top of the wheel wells as low as possible while still allowing the side broom assembly to clear the lift arms when the hopper is in 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.

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.*

ADJUSTING MAXIMUM HOPPER DUMP (HIGH DUMP) ANGLE (CONT.)

4. After the 3-1/2" (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) -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 lowered 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. Next, raise the hopper and rotate fully.
6. Turn the engine off.

⚠ CAUTION

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

7. Adjust the stops on the hopper mounts on each side of hopper so that clearance between the lift arms and the cut outs in bumper is 1/4" (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 cylinder extended length to match hopper rotation stops.
10. Tighten the set screw.
11. Rotate the hopper back, remove the safety arm, and lower the hopper.

HOPPER VACUUM GASKET MOUNT ADJUSTMENT

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

⚠ CAUTION

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

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

ADJUSTING MAXIMUM HOPPER DUMP (LOW DUMP) ANGLE

1. With the hopper lowered, with correct floor clearance, note the amount of unpainted cylinder that does not return into the cylinder bodies.
2. If more than 1/8" (3.18 mm) of unpainted cylinder rod is exposed on both cylinders, then the hopper dump angle can be increased by the following:
3. Start the engine, raise the hopper and lock the lever in full RAISE position.
4. Turn off the engine.
5. Loosen the set screw on each of the cylinder clevises and adjust each side alternately. With a tapered punch, rotate the cylinder rod to thread it out of the clevis a distance equal to the length of exposed rod on the cylinder observed when the hopper was down.
6. Tighten the set screws.
7. Lower the hopper.
8. Check to see that both of the cylinders reach their extended positions at the same time. If not, screw in the clevis on the longer cylinder to match the other's extended length.

HOPPER FLAP REPLACEMENT

Flaps located at the entrance lip of the hopper, 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 (high dump) or remove the hopper (low dump).

⚠ CAUTION *Do not rely upon hydraulic cylinders to keep hopper raised for maintenance. Always engage the safety arm before getting under 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.

HOPPER / 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 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 1/8" (3.18 mm).

If the bottom of a side seal measures 1/2" (12.7 mm) or more above the floor, readjust it or replace it by removing the bolts on the inside of the frame 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 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.

⚠ CAUTION

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

ADJUSTING THE PARKING BRAKE CABLE LENGTH (OPTIONAL HAND BRAKE)

1. Park the machine on a level surface and chock wheels.
2. Place parking brake lever in "OFF" position.
3. Turn knurled handle counter-clockwise as far as possible.
4. Raise hopper and engage safety arm.
5. Locate the cable clevis ends for the parking brake cables.
6. Disconnect clevis ends from bar.
7. Loosen jam nuts at the base of the clevis.
8. Turn clevis clockwise three or four complete turns.
9. Tighten jam nuts and re-install clevis ends onto bar.
10. Adjust knurled handle on 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 as far into the hex bar as possible.
4. If threads are not sufficient for adjustment, move the cable bars to the next adjusting hole on the hex bar.
5. Retighten the locking nut against the hex bar. This adjusts both sets of brake shoes.
6. Test brakes. Readjust if necessary.

TIRES

SERVICE INSTRUCTIONS

CHANGING SOLID TIRES

NOTE: *The procedures which follow apply to solid tires only.*

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

MISCELLANEOUS ADJUSTMENTS

- 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 hinges should be inspected after every 500 hours of use. Retighten and oil if necessary.
- Inspect cables for wear every 500 hours.

BASIC MACHINE OPERATING PROBLEMS

PROBLEM	CAUSE	SOLUTION
Engine will not start or runs roughly after start.	Battery discharged.	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.
	Fuel line connection loose.	Tighten connection.
	Dirty air filter.	Clean or replace air filter. (See Maintenance Section.)
	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.
NOTE: *On machines with LPG Fuel, also check the following:*	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 frosting up.	Open shut-off valve slowly to 1/4 open, start.
	Defective vacuum lock-off.	Replace or repair.
Engine overheats.	Low coolant level.	Supply coolant.
	Clogged radiator.	Flush radiator.
	Loose fan belt.	Tighten belt.
	Defective thermostat.	Replace thermostat.

NOTE: If coolant loss has not occurred, check for malfunction of the temperature sending unit.

BASIC MACHINE OPERATING PROBLEMS (CONT.)

PROBLEM	CAUSE	SOLUTION
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.
	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.
	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.
PowerBoss® creeps in neutral.	Directional control pedal return spring is out of adjustment.	Perform the adjustment procedure.

SWEEPING PROBLEMS

PROBLEM	CAUSE	SOLUTION
Brushes do not turn or turn very slowly.	Hydraulic system problem: - motor - control valve - gear pump - relief valve	See Hydraulics System Problems in this section.
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.
Loss of dust control.	Debris in hose or impeller inlet.	Clean.
	Broom skirts or seals 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 at hopper.	Visually check and adjust, if necessary.
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.

SWEEPING PROBLEMS (CONT.)

PROBLEM	CAUSE	SOLUTION
Sweeper unit leaving debris. (Cont. from previous page)	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: - control valve - gear pump - lift cylinder - relief valve	See Hydraulics Systems Problems in this section.
	Hopper arms binding.	Lubricate or adjust arm linkage.
Hopper does not rotate or rotates too slowly.	Hopper load too heavy.	Dump more frequently.
	Hydraulics system problem: - control valve - gear pump - lift cylinder - relief valve	See Hydraulics System Problems in this section.

SCRUBBING PROBLEMS

PROBLEM	CAUSE	SOLUTION
Scrubhead will not lower.	Fuse blown.	Replace.
	Loose scrubhead switch wires.	Connect wires.
	Loose connection of plug at actuator.	Connect.
	Defective actuator.	Replace.
	Defective scrubhead switch.	Replace.
Scrubhead motors will not turn.	Loose or defective microswitch at actuator bellcrank.	Replace or tighten.
	Defective contactor.	Replace.
	Fuse blown.	Replace.
	Loose plug at scrubhead motor. (Check all.)	Re-seat plug.
Side Scrub Option will not shift.	Loose or defective switch on console.	Reconnect wiring or replace.
	Loose or defective actuator (under floor pan).	Reconnect wiring or replace.
Side Scrub Option will not lower.	Loose or defective switch on console.	Reconnect wiring or replace.
	Loose or defective actuator (under machine).	Reconnect wiring or replace.
	Fuse blown.	Replace.

SCRUBBING PROBLEMS (CONT.)

PROBLEM	CAUSE	SOLUTION
Poor water pick-up.	Recovery tank full.	Empty tank; if foaming badly, change detergent.
	Squeegee worn.	Replace.
	Debris caught in squeegee or pick-up tube.	Remove debris.
	Leak or clog in hose from impeller.	Repair leak, clear obstruction, or replace hose.
	Squeegee out of adjustment.	Adjust.
	Engine not operating at governed speed.	Readjust governor.
	Impeller belts worn or slipping.	Replace, tighten, or clean grease off belts .
	Impeller failure.	Check and repair.
Detergent solution not being delivered.	Solution tank empty.	Fill tank.
	Solution tank outlet screen clogged.	Clean screen.
	Delivery lines clogged.	Clear lines.
	Solution valve out of adjustment.	Adjust.
Scrubber unit not cleaning the floor.	Brushes worn.	Replace.
	Need different type of brush or detergent.	Use manufacturer's recommended brushes / detergent.
	Debris caught in brush drive mechanism.	Clear obstruction.
	Brushes out of adjustment.	Adjust.
	Brush motor failure.	See Hydraulics System Problems.

SQUEEGEE PROBLEMS

PROBLEM	CAUSE	SOLUTION
Squeegee will not lower.	Fuse blown.	Replace.
	Loose or defective squeegee switch (on console).	Reconnect wiring or replace.
	Loose wire(s) at foot pedal.	Connect.
	Foot pedal switches need adjustment.	Re-adjust cams.
	Loose or defective switches beneath squeegee actuator.	Reconnect wiring or replace.
	Loose or defective control box contactors.	Reconnect wiring or replace.
Squeegee will not raise in reverse.	Foot pedal switches need adjustment.	Re-adjust cams.
	Loose or defective switches beneath squeegee actuator.	Reconnect wiring or replace.

Hydraulics System Problems

PROBLEM	CAUSE	SOLUTION
Hopper lift cylinder failure.	Line to cylinder leaking.	Tighten fittings or replace hose.
	Piston seals leaking.	Replace seals.
	Bent piston rod.	Replace rod.
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.
Hydraulic gear pump failure.	Pump leaking.	Replace seals.
	Gears worn or scored.	Rebuild 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.

HYDRAULICS SYSTEM PROBLEMS (CONT.)

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