



## Electronic Service Manuals

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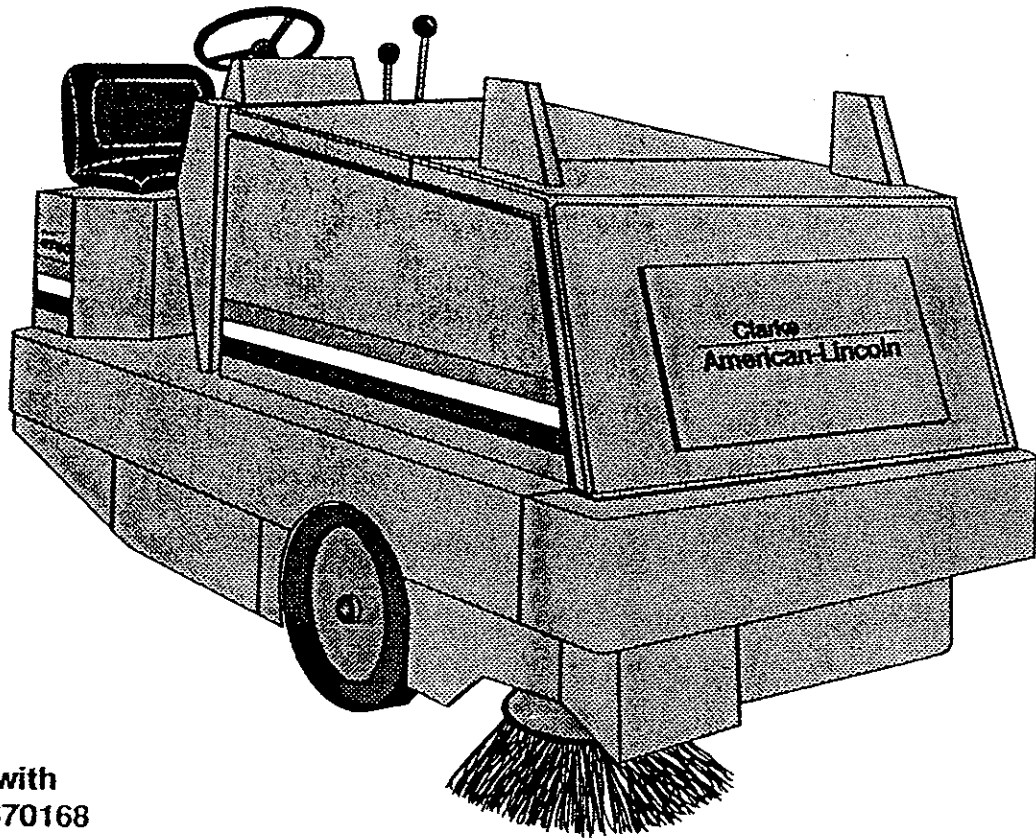
**Serving the Cleaning Industry Since 1922**

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# Clarke

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# American-Lincoln®



Beginning with  
Serial No. 670168

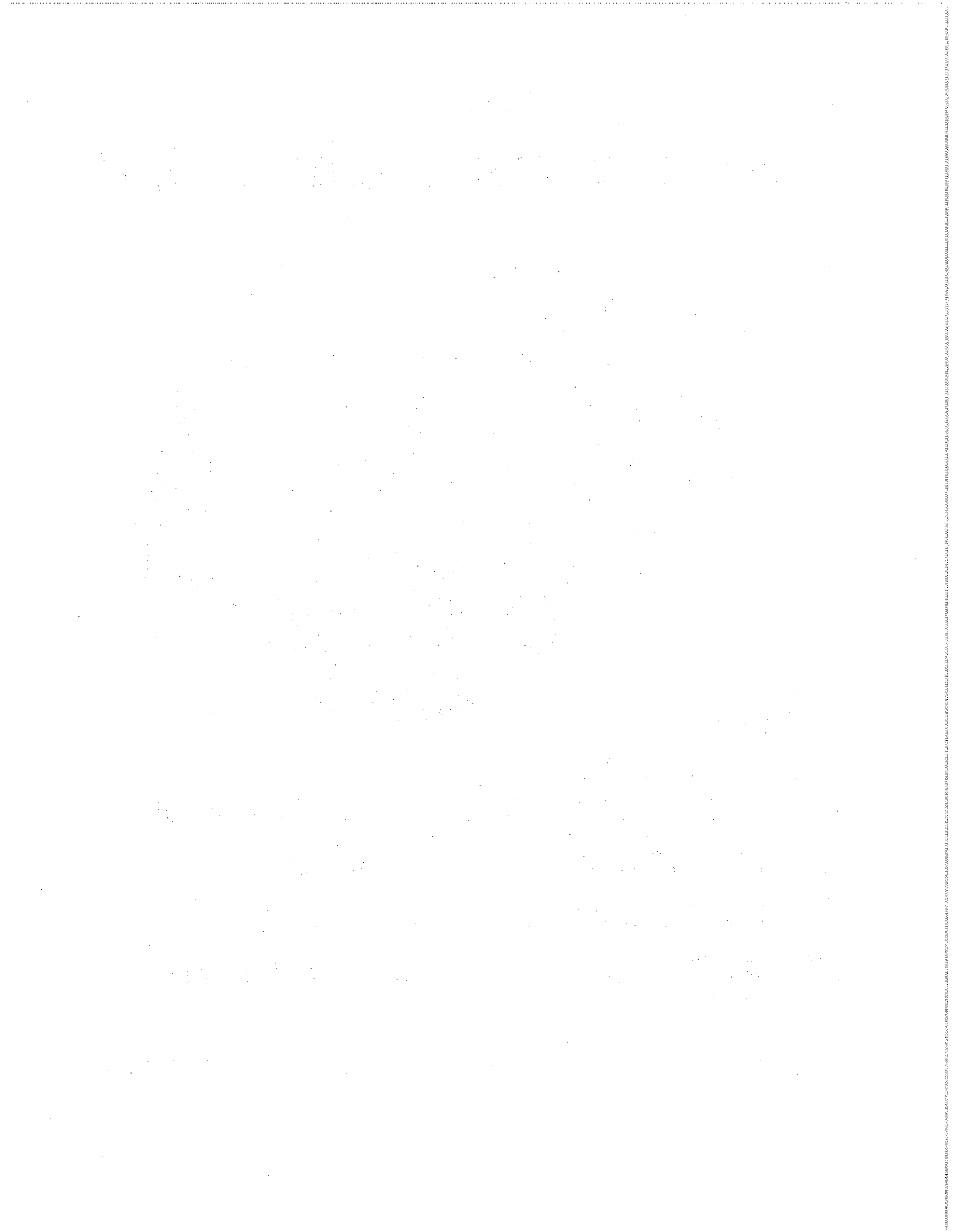
## READ THIS BOOK

This book has important information for the use and safe operation of this machine. Read and understand this book before starting the machine. Keep this book and tell all operators to read the book. If you do not follow the instructions, you can cause an injury, or damage equipment, furniture or buildings.

All directions given in this book are as seen from the operator's position at the rear of the machine.

For new books, write to:  
Clarke/American-Lincoln, 1100 Haskins Road  
Bowling Green, Ohio 43402

## Operator's Manual Instruction Book and Parts List for Model 6700 Sweeper / Scrubber



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## SPECIFICATIONS

### 6700 ENGINE-HYDRAULIC POWERED

#### DIMENSIONS

Length	94.5 inches (240.0 cm)
Width	46.0 inches (116.8 cm)
Height	49.5 inches (125.7 cm)
Wheelbase	50.8 inches (128.9 cm)
Height w/ Guard	84.0 inches (213.4 cm)

#### POWER UNIT

##### KUBOTA WG750-B GAS

Bore and Stroke	2.68" x 2.68" (68mm x 68mm)
Oil Capacity	3.9 Quarts (3.25 Liters)
Displacement	3 Cylinders - 45.2 Cu. In. (740 cc)
Fuel	Regular Unleaded Gasoline

##### KUBOTA D722-B DIESEL

Bore and Stroke	2.64" x 2.68" (67mm x 68mm)
Oil Capacity	3.4 Quarts (2.83 Liters)
Displacement	3 Cylinders - 43.9 Cu. In. (719 cc)
Fuel Oil	Minimum Cetane Number 40

#### DRIVES

Propelling	Hydrostatic Pump and Hydraulic Wheel Motor
Sweeping	(1) Hydraulic Motor
Scrubbing	(3) Hydraulic Motors
Vacuum (Wet)	(2) .75 HP Electric Turbines
Vacuum (Dust)	(1) Hydraulic Motor

#### INSTRUMENTS

Keyed Ignition  
Horn Button  
Hour Meter  
Full Recovery Tank Level Light  
Low Solution Tank Level Light  
Engine Warning Light Cluster - Oil, Water and Charge

#### CONTROLS

Single Foot Pedal Controls Forward, Neutral, Reverse and Dynamic Braking.  
Single Lever Controls Main Broom Lift and Automatically Activates Main Broom and Dust Control Motors.  
Single Lever Controls Scrub Deck Lift and Automatically Activates Scrub Brush Motors.  
Single Lever Controls Solution Flow.  
Single Switch Lowers/Raises Squeegee and Automatically Activates/Deactivates Wet Vacuum.  
Single Switch Controls Hopper Lift Cylinders.  
Single Switch Controls Side Broom.  
Single Switch Controls Dump Door.  
Single Button Switch Controls Dust Filter Shaker Motor.  
Steering - Standard Automotive Type Cam and Lever with 15" (38.1cm) Steering Wheel  
Brakes - Foot Operated Service and Hand Operated/Locked Parking - Disc Brakes

**6700 ENGINE-HYDRAULIC POWERED (Cont.)****SWEEPING SYSTEM**

Type	Direct Throw
Hopper	6 Cu. Ft. (.17 Cu. Meters) Capacity
Main Broom	Features One-Piece Disposable Plastic Core Broom
Length	40 inches (101.6 cm)
Diameter	11 inches (27.9 cm)
Bristle Length	3 inches (7.6 cm)

**SCRUBBING SYSTEM**

Brushes	(3) 14 Inch Diameter Gimble Mounted Disc Type
Squeegee	(1) 46 Inch Wide Contoured Rear Squeegee with (2) Side Squeegees

**TANKS**

Solution Tank	60 Gallon (227.1 Liters) Stainless Steel
Recovery Tank	60 Gallon (227.1 Liters) Plastic

**SYSTEM FLUID CAPACITIES**

Engine Cooling System	3.1 Quarts (2.9 Liters)
Fuel Tank	5.0 Gallons (18.9 Liters)
Hydraulic System	7.5 Gallons (28.4 Liters)

**GENERAL MACHINE PERFORMANCE**

Sweeping Path	40 Inches (101.6 cm)
Scrubbing Path	40 Inches (101.6 cm)
Travel Speed	0 - 4 MPH (0 - 6.4 KM/HR)
Right Hand Turning Radius	111 Inches (281.9 cm)
Left Hand Turning Radius	73 Inches (185.4 cm)

**WEIGHT**

6700 IC EVW	2550 LB. (1156.7 KG)
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# SPECIFICATIONS

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## 6700 BATTERY-HYDRAULIC POWERED

### DIMENSIONS

Length	94.5 inches (240.0 cm)
Width	46.0 inches (116.8 cm)
Height	49.5 inches (125.7 cm)
Wheelbase	50.8 inches (128.9 cm)
Height w/ Guard	84.0 inches (213.4 cm)

### BATTERY DATA

Battery Operated 36 Volt - 18 Cell - System with Available 510 or 800 Amp Hour Battery.

### DRIVES

Propelling	(1) 3.5 HP Electric Motor
Sweeping	(1) Hydraulic Motor
Scrubbing	(3) Hydraulic Motors
Vacuum (Wet)	(2) .75 HP Electric Turbines
Vacuum (Dust)	(1) Hydraulic Motor

### INSTRUMENTS

Keyed Ignition  
Horn Button  
Ho•Hour Meter  
Full Recovery Tank Level Light  
Low Solution Tank Level Light  
Battery Condition Meter

### CONTROLS

Single Foot Pedal Controls Forward, Neutral, Reverse and Dynamic Braking.  
Single Lever Controls Main Broom Lift and Automatically Activates Main Broom and Dust Control Motors.  
Single Lever Controls Scrub Deck Lift and Automatically Activates Scrub Brush Motors.  
Single Lever Controls Solution Flow.  
Single Switch Lowers/Raises Squeegee and Automatically Activates/Deactivates Wet Vacuum.  
Single Switch Controls Hopper Lift Cylinders.  
Single Switch Controls Side Broom.  
Single Switch Controls• Dump Door.  
Single Button Switch Controls Dust Filter Shaker Motor.  
Steering - Standard Automotive Type Cam and Lever with 15" (38.1 cm) Steering Wheel.  
Brakes - Foot Operated Service and Hand Operated/Locked Parking Disc Brakes

### SWEEPING SYSTEM

Type	Direct Throw
Hopper	6 Cu. Ft. (.14 Cu. Meters) Capacity
Main Broom	Features One-Piece Disposable Plastic Core Broom
Length	40 inches (101.6 cm)
Diameter	11 inches (27.9 cm)
Bristle Length	3 inches (7.6 cm)

### SCRUBBING SYSTEM

Brushes	(3) 14 Inch Diameter Gimble Mounted Disc Type
Squeegee	(1) 46 Inch Wide Contoured Rear Squeegee with (2) Side Squeegees

**6700 BATTERY-HYDRAULIC POWERED Cont.****TANKS**

Solution Tank	60 Gallon (227.1 Liters) Stainless Steel
Recovery Tank	60 Gallon (227.1 Liters) Plastic

**SYSTEM FLUID CAPACITIES**

Hydraulic System	5.5 Gallons(20.8 Liters)
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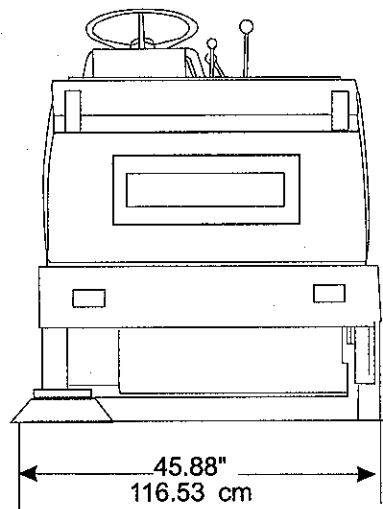
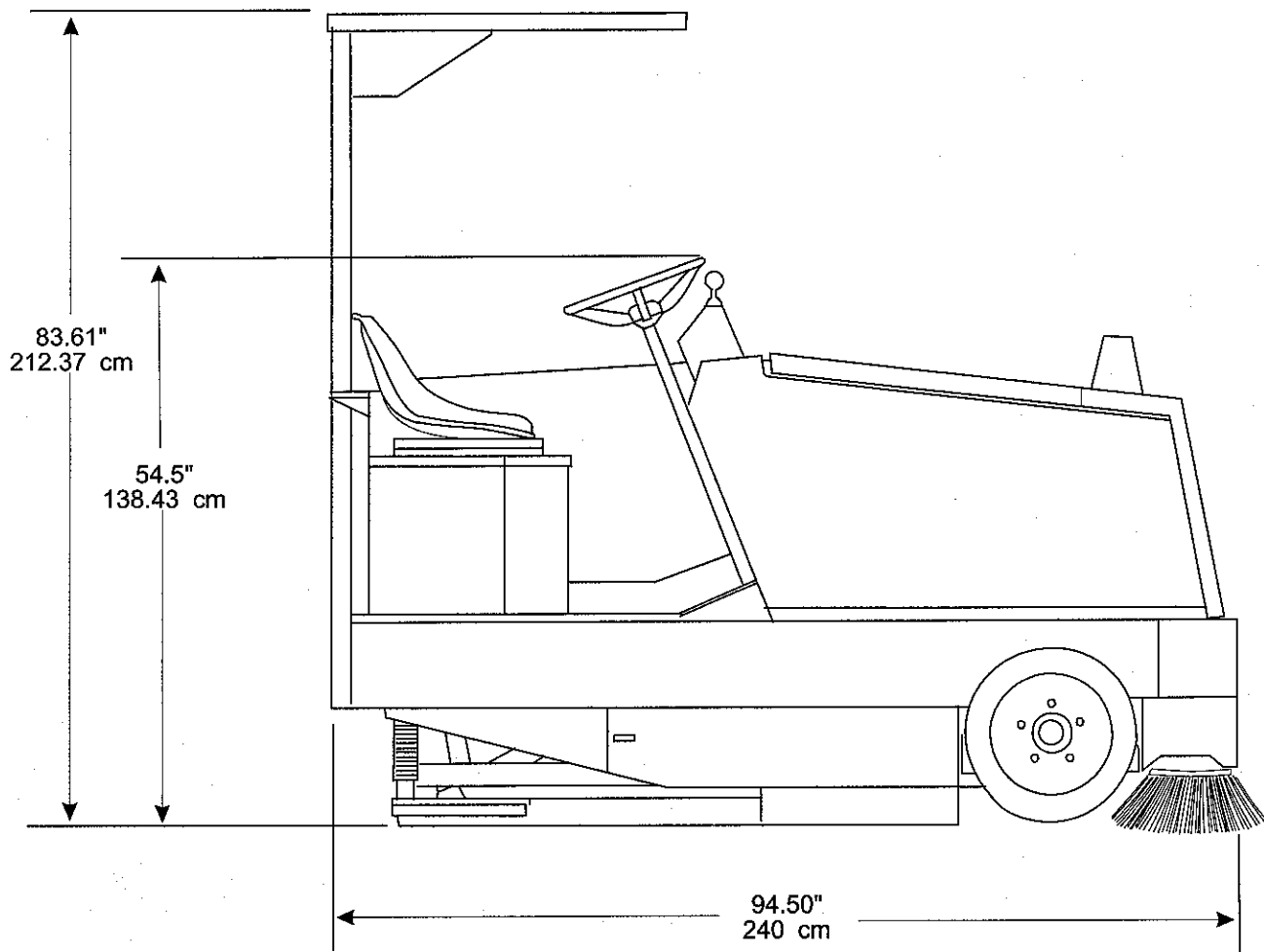
**GENERAL MACHINE PERFORMANCE**

Sweeping Path	40 Inches (101.6 cm)
Scrubbing Path	40 Inches (101.6 cm)
Travel Speed	0 - 4 MPH (0 - 6.4 KM/HR)
Right Hand Turning Radius	111 Inches (281.9 cm)
Left Hand Turning Radius	73 Inches (185.4 cm)

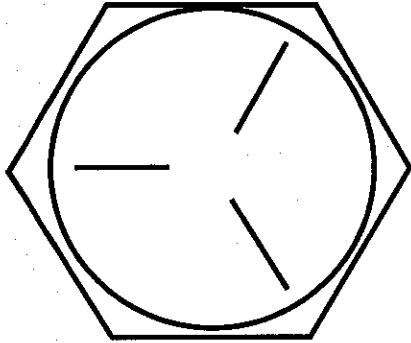
**WEIGHTS**

6700 BEH EVW w/o Battery	2150 LBS (975.2 KG)
6700 BEH EVW w/ 800 A.H. Battery	4350 LBS (1973.2 KG)

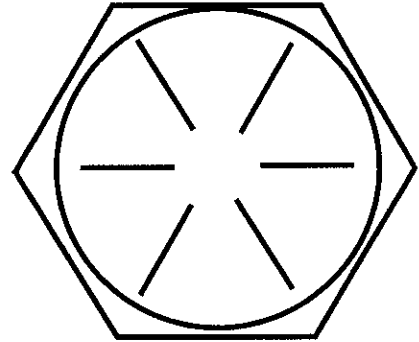
# MACHINE DIMENSIONS



## BOLT IDENTIFICATION



SAE - Grade 5



SAE - Grade 8

Screw Size	Grade 5 Plated		Grade 8 Plated		410H Stainless		Brass	Type F & T & BT		Type B, AB
	C	F	C	F	C	F		C	F	
*6	14	15	-	-	18	20	5	20	23	21
*8	27	28	-	-	33	35	9	37	41	34
*10	39	43	-	-	47	54	13	49	64	49
*1/4	86	108	130	151	114	132	32	120	156	120
5/16	15	17	22	24	19	22	6	-	-	-
3/8	28	31	40	44	34	39	10	-	-	-
7/16	44	49	63	70	55	62	16	-	-	-
1/2	68	76	95	108	85	95	-	-	-	-
9/16	98	110	138	155	-	-	-	-	-	-
5/8	135	153	191	216	-	-	-	-	-	-
3/4	239	267	338	378	-	-	-	-	-	-
7/8	387	-	545	-	-	-	-	-	-	-
1	579	-	818	-	-	-	-	-	-	-

C = Coarse Thread

F = Fine Thread

\* = Torque values for #6 through 1/4 are lb./in. All others are lb./ft.

**NOTE**

Decrease the torque by 20% when using thread lubricant  
The torque tolerance is  $\pm$  on torque values.

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C2000/9905

# DECIMAL METRIC CONVERSION TABLE

FRACTION	DECIMAL	MILLIMETER	FRACTION	DECIMAL	MILLIMETER
$\frac{1}{64}$	0.015625	0.3969	$\frac{33}{64}$	0.515625	13.0969
$\frac{1}{32}$	0.03125	0.7938	$\frac{17}{32}$	0.53125	13.4938
$\frac{3}{64}$	0.046875	1.1906	$\frac{35}{64}$	0.546875	13.8906
$\frac{1}{16}$	0.0625	1.5875	$\frac{9}{16}$	0.5625	14.2875
$\frac{5}{64}$	0.078125	1.9844	$\frac{37}{64}$	0.578125	14.6844
$\frac{3}{32}$	0.09375	2.3813	$\frac{19}{32}$	0.59375	15.0813
$\frac{7}{64}$	0.109375	2.7781	$\frac{39}{64}$	0.609375	15.4781
$\frac{1}{8}$	0.125	3.1750	$\frac{5}{8}$	0.625	15.8750
$\frac{9}{64}$	0.140625	3.5719	$\frac{41}{64}$	0.640625	16.2719
$\frac{5}{32}$	0.15625	3.9688	$\frac{21}{32}$	0.65625	16.6688
$\frac{11}{64}$	0.171875	4.3656	$\frac{43}{64}$	0.671875	17.0656
$\frac{3}{16}$	0.1875	4.7625	$\frac{11}{16}$	0.6875	17.4625
$\frac{13}{64}$	0.203125	5.1594	$\frac{45}{64}$	0.703125	17.8594
$\frac{7}{32}$	0.21875	5.5563	$\frac{23}{32}$	0.71875	18.2563
$\frac{15}{64}$	0.234375	5.9531	$\frac{47}{64}$	0.734375	18.6531
$\frac{1}{4}$	0.25	6.3500	$\frac{3}{4}$	0.75	19.0500
$\frac{17}{64}$	0.265625	6.7469	$\frac{49}{64}$	0.765625	19.4469
$\frac{9}{32}$	0.28125	7.1438	$\frac{25}{32}$	0.78125	19.8438
$\frac{19}{64}$	0.296875	7.5406	$\frac{51}{64}$	0.796875	20.2406
$\frac{5}{16}$	0.3125	7.9375	$\frac{13}{16}$	0.8125	20.6375
$\frac{21}{64}$	0.328125	8.3344	$\frac{53}{64}$	0.828125	21.0344
$\frac{11}{32}$	0.34375	8.7313	$\frac{27}{32}$	0.84375	21.4313
$\frac{23}{64}$	0.359375	9.1281	$\frac{55}{64}$	0.859375	21.8281
$\frac{3}{8}$	0.375	9.5250	$\frac{7}{8}$	0.875	22.2250
$\frac{25}{64}$	0.390625	9.9219	$\frac{57}{64}$	0.890625	22.6219
$\frac{13}{32}$	0.40625	10.3188	$\frac{29}{32}$	0.90625	23.0188
$\frac{27}{64}$	0.421875	10.7156	$\frac{59}{64}$	0.921875	23.4156
$\frac{7}{16}$	0.4375	11.1125	$\frac{15}{16}$	0.9375	23.8125
$\frac{29}{64}$	0.453125	11.5094	$\frac{61}{64}$	0.953125	24.2094
$\frac{15}{32}$	0.46875	11.9063	$\frac{31}{32}$	0.96875	24.6063
$\frac{31}{64}$	0.484375	12.3031	$\frac{63}{64}$	0.984375	25.0031
$\frac{1}{2}$	0.5	12.7000	1	1.0000	25.4000

C-2001/9907

## **SAFETY PRECAUTIONS**

THE FOLLOWING STATEMENTS ARE USED THROUGHOUT THIS MANUAL AS INDICATED IN THEIR DESCRIPTIONS:



### **DANGER**

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



### **WARNING**

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



### **CAUTION**

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

### **ATTENTION**

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

### **NOTE**

To give important information or to warn of unsafe practices which could result in equipment damage.

THE FOLLOWING INFORMATION SIGNALS POTENTIALLY DANGEROUS CONDITIONS TO THE OPERATOR OR EQUIPMENT. READ THIS MANUAL CAREFULLY. KNOW WHEN THESE CONDITIONS CAN EXIST. THEN, TAKE NECESSARY STEPS TO TRAIN MACHINE OPERATING PERSONNEL. FOR THE SAFE OPERATION OF THIS MACHINE, READ AND UNDERSTAND ALL WARNINGS, CAUTIONS AND NOTES.



### **WARNING**

You must have training in the operation of this machine before using it. **READ THE INSTRUCTION BOOK.**



### **WARNING**

Machines can ignite flammable materials and vapors. Do not use with or near flammables such as: gasoline, grain dust, solvents and thinners.



### **WARNING**

Heavy machinery. Improper use can cause personal injury.



### **WARNING**

Operate only when lids, doors, and access panels are securely closed.



### **WARNING**

Use care when reversing machine in confined area.



### **WARNING**

When servicing the machine disconnect the batteries first to prevent possible injury.



### **WARNING**

When working on the machine, empty hopper, remove batteries, clear area of people and obstructions, use additional people and proper procedures when lifting the machine.



### **WARNING**

Do not operate this machine unless it is completely assembled.



### **WARNING**

Do not use this machine as a step or furniture.



### **WARNING**

Stop and leave this machine on a level surface. When you stop the machine, put the power switch in the "OFF" position and Engage the Parking Brake.

## SAFETY PRECAUTIONS

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 **WARNING**

To prevent injury, and damage to the machine, do not lift the machine or move it to an edge of a stair or loading dock.

 **WARNING**

Lead acid batteries generate gases which can cause an explosion. Keep sparks and flames away from batteries. **NO SMOKING.** Charge batteries only in area with good ventilation.

 **WARNING**

Always wear eye protection and protective clothing when working near batteries. Remove all jewelry. Do not put tools or other metal objects across the battery terminals, or the tops of batteries.

 **WARNING**

Maintenance and repairs must be done by authorized personnel only. Tighten all fasteners. Keep adjustments according to the specifications given in the service manual for the machine. Keep the electrical parts of the machine dry. For storage, keep the machine in a building.

 **WARNING**

Make sure that all labels, decals, warnings, cautions and instructions are fastened to the machine. Get new labels and decals from American-Lincoln.

 **WARNING**

The Operator Must Exhibit Extreme Caution When Negotiating, Turning And Traveling Across Grades Or Ramps. Start, Stop, Change Direction, Travel And Brake Smoothly. Slow Down When Turning. Avoid Uneven Surfaces And Loose Materials. Watch Out For Obstructions, Especially Overhead.

 **WARNING**

Operate Only From The Designated Operators Position. Keep Inside The Body Of The Machine. Keep Hands And Feet On The Designated Controls. Always Operate In Well Lighted Areas.

 **WARNING**

Carry No Passengers On The Machine. Set the Wheel Lock When Leaving The Machine. Chock (block) The Wheels If The Machine Is To Be Parked On A Grade (ramp), Or Is To Be Worked On.

 **WARNING**

Never Leave The Operator's Seat With The Engine Running.

 **WARNING**

Report Damage Or Faulty Operation Immediately. Do Not Operate The Machine Until Repairs Have Been Completed. Maintenance And Repairs Must Be Done By Authorized Personnel Only.

 **WARNING**

To Maintain The Stability Of This Sweeper In Normal Operation, the Over- Head Guard, Counterweights, rear Bumper Guard, Or Any Similar Equipment, Installed by The Manufacturer As Original Equipment, Should Never Be Removed. If It Becomes Necessary To Remove Such Equipment For Repair Or Maintenance. This Equipment Must Be Reinstalled Before The Sweeper Is Placed Back In Operation.

 **WARNING**

Electrical Hazard. Shocks Can Cause Serious Personal Injury. Unplug The Battery Before Cleaning Or Servicing. To Avoid Possible Injury Or Property Damage. Read The Operators Manual Before Servicing The Machine. Maintenance And Repair Must Be Done By Authorized Personnel.

## UNPACKING AND PREPARING THE MACHINE FOR OPERATION

### NOTE

Your Model 6700 Sweeper-scrubber has Been Shipped Complete, But Do Not Attempt To Operate Without Reading The Following Instructions:

### GAS/DIESEL POWERED MACHINES

1. Uncrate the machine and carefully remove from skid to prevent damage.
2. Connect and tighten battery cables.
3. Fill tank with the appropriate fuel.



### WARNING

Never fill fuel Tank While The Engine Is Running. Always be sure Gasoline Container And Sweeper Are Electrically Connected Before Pouring Gas. This Can Be Easily Done By Providing An Insulated Wire (permanently attached to The Container) With Battery Clip On The Other End.

4. Check engine crankcase oil level. Although properly lubricated at factory, check before starting engine. No special break-in oil is used and recommended number of operating hours before the initial oil change is the same as normal. (See Maintenance Section)
5. Check radiator coolant level. Permanent type antifreeze is added at the factory to provide protection to approximately -35° F (-37° C). To retain this protection level, always add 1/2 part water to 1/2 part anti freeze.
6. Check oil level in the hydraulic reservoir located below the engine. The hydraulic reservoir Oil level is indicated on the dipstick located on the reservoir breather filler cap. Full is indicated by the upper line, add by the lower line. If oil is required, add HYDRAULIC FLUID ONLY, automatic transmission fluid FORD type "F" ATF.

### NOTE

After The First 35 Operating Hours, Service Must Be Performed On Your Engine To Insure Future High Performance And Trouble Free Operation. See Maintenance Section.

### BATTERY POWERED MACHINES

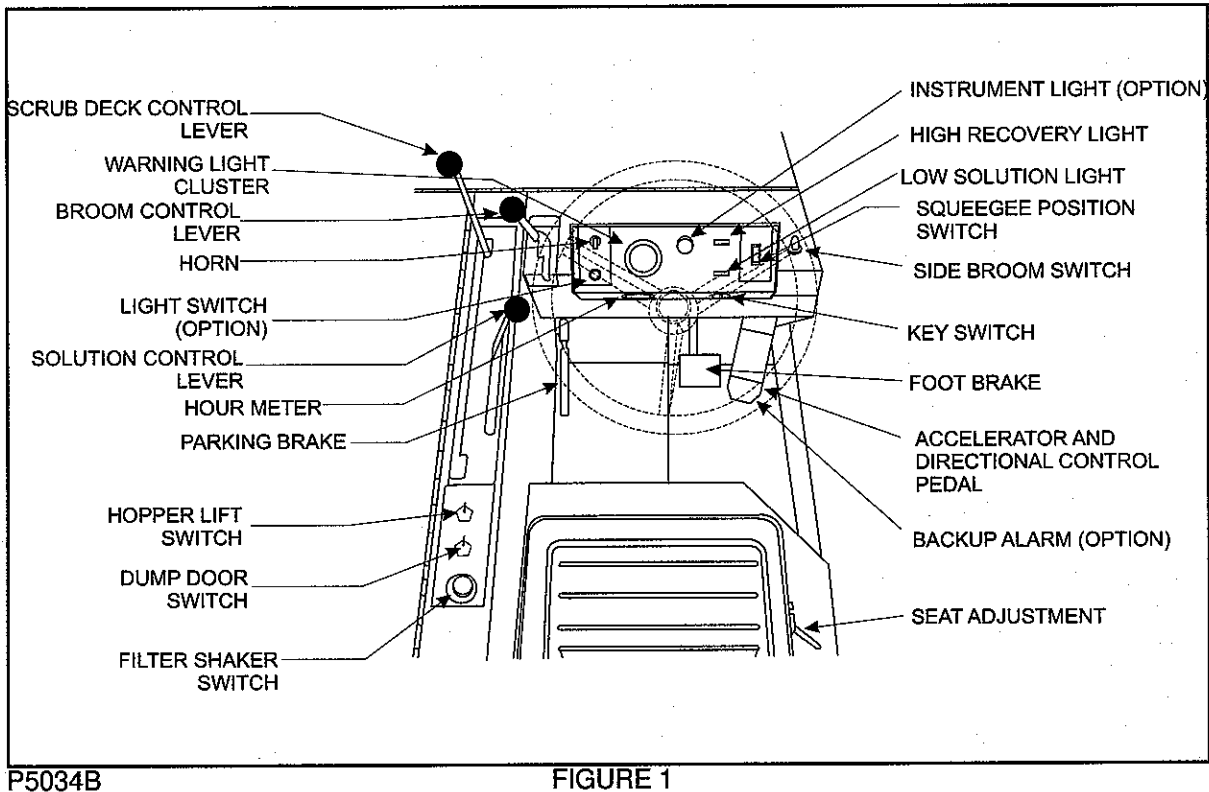
- Uncrate the machine and carefully remove from skid to prevent damage.
- The 6700 machines that are shipped without batteries, have the (+) positive drive motor lead disconnected.
- Open the seat compartment and connect the positive (+) motor lead to the top terminal post, that also has the wire "P" attached to it. Tighten the terminal nut.
- Install scrub brushes and brush retainer.
- Install batteries as follows (if not included):
  1. Turn the key to the "OFF" position.
  2. Raise the Solution Cover to the open position.
  3. Use a battery lifting device with a 2500 lb.(1150 KG) capacity hoist to lift the battery.
  4. Using the lifting device lower the 36 volt battery into the battery compartment directly in front of the driver's compartment.
  5. Plug the polarized connector from the battery into the 36 volt plug provided.



### WARNING

Hydrogen gas is formed during the charging operation and is explosive! Only charge batteries in a well ventilated area with the lid open. Avoid any open flame or electrical sparks. Pulling out the charger plug with the timer on will cause an arc and must be avoided.

## MACHINE CONTROLS



P5034B

FIGURE 1

### KEY SWITCH (See Figure 1)

(GAS/DIESEL POWERED MACHINES)

The key switch is located to the right of the steering column and below the low solution light on the instrument panel.

- The key turned to the center "OFF" position will shut off the engine.
- The key turned to the "ON" position, will activate all machine systems and is considered the run position. Rotate the key clockwise to the "START" position activates the engine starter. This position is a momentary position so once the engine starts, release the key to return it to the "ON" position. The key turned one position counterclockwise from the "OFF" position is considered the accessory position. This position will activate all machine system except those that are engine related.

### KEY SWITCH (See Figure 1)

(BATTERY POWERED MACHINES)

The key switch is located to the right of the steering column and below the low solution light on the instrument panel.

- Turn the key switch to the "ON" position, to activate all machine systems.
- Turn the key switch to the "OFF" position to turn off the sweeper.

### SEAT ADJUSTMENT (See Figure 1)

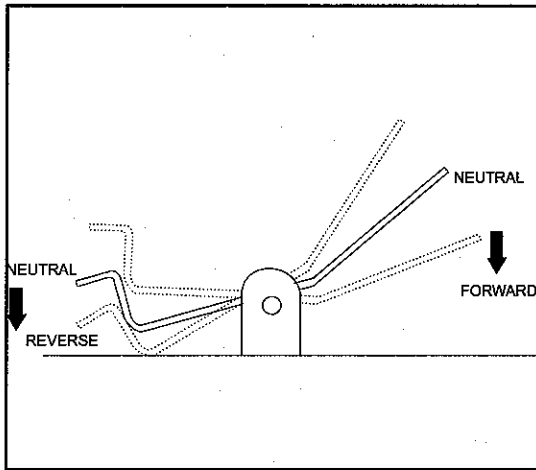
This lever is located on the right of the seat.

- The lever allows the seat to be adjusted forward or back when the lever is moved.

### HOUR METER (See Figure 1)

The hour meter is activated when the key switch is in the "ON" position. The hour meter indicates actual run time of the machine, this can be useful for determining service intervals.

- The meter indicates actual "run" time of the machine.



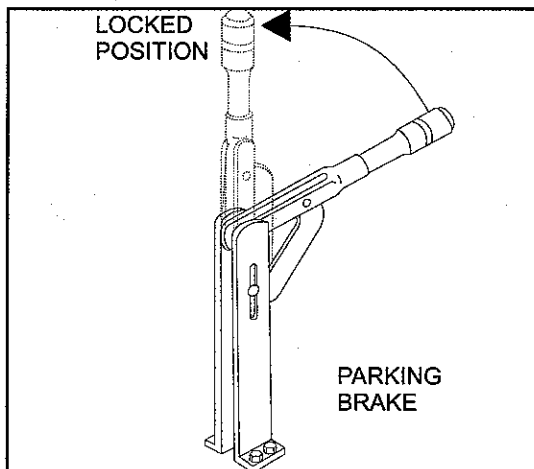
P4066

FIGURE 2

## ACCELERATOR and DIRECTIONAL CONTROL PEDAL (See Figure 2)

The accelerator and directional control pedal is located on the floor of the operator's area to the right of the parking brake pedal. The accelerator and directional control pedal controls the machine direction and travel speed. If the machine stops due to an electrical system overload in the power panel controller, place the forward/reverse pedal in neutral to reset the controller.

- Put foot pressure on the upper portion of the pedal marked "FORWARD". The machine will move forward. Increased pressure on the "FORWARD" portion of the pedal to increase the forward speed.
- Put pressure on the lower portion of the pedal marked "REVERSE". The machine will move in reverse. Increase pressure on the "REVERSE" portion of the pedal to increase the reverse speed.
- To stop the machine, put light foot pressure on the opposite end of the accelerator and directional control pedal. If the machine is moving forward, put light foot pressure on the "REVERSE" portion of the pedal. If the machine is moving in reverse, put light foot pressure on the "FORWARD" portion of the pedal.



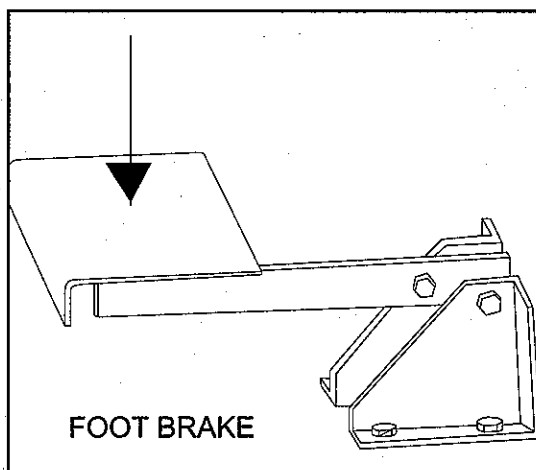
P4691

FIGURE 3

## PARKING BRAKE (See Figure 3)

The parking brake lever is located in the left side of the driver compartment floor.

- This lever when raised to the upright position will "lock" the foot brake pedal in the down position.



P4689

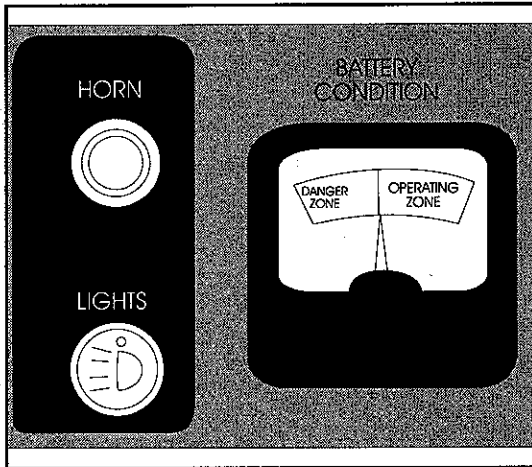
FIGURE 4

## FOOT BRAKE (See Figure 4)

The foot brake pedal is located to the right of the steering column on the floor of the driver compartment.

- The foot brake on front wheels is a mechanical system actuated by the brake pedal.

# MACHINE CONTROLS



P5038 FIGURE 5

## BATTERY CONDITION METER (See Figure 5)

(Battery Powered Machines)

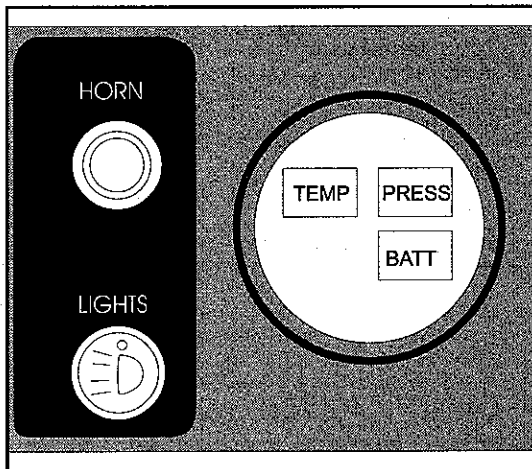
- The meter shows the condition of the battery, while the machine is running, under load.
- Batteries are charged when indicator is in the green zone.
- When indicator stays in the red zone, batteries must be charged.

## HORN BUTTON (See Figure 5)

- The horn can be activated by pushing the "HORN BUTTON".

## LIGHT SWITCH OPTION(See Figure 5)

- The light switch will activate any of the light options. The switch is active at all times.



P5038A FIGURE 6

## WARNING LIGHT CLUSTER (Gas and Diesel Only)

- The meter indicates with red warning lights when there is low oil pressure, high water coolant temperature and no charge to the battery.



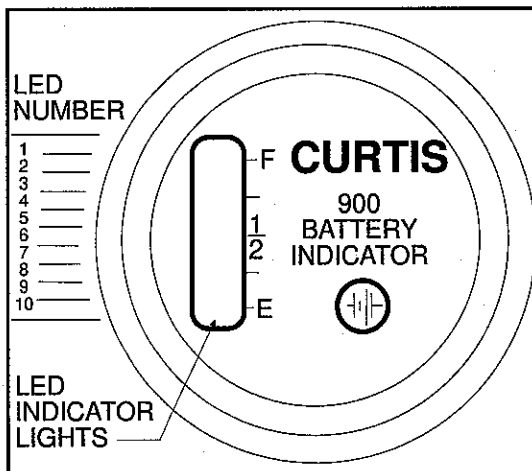
### WARNING

Should any of the warning lights illuminate, immediate service is required. Failure to correct the malfunction can result in permanent damage to the engine.

## BATTERY CONDITION METER & LOW BATTERY ALARM OPTION (Battery Powered Machines)

The indicator consists of ten LED lights with the number one at the top. When the batteries begin to discharge, the appropriate LED will be lit in descending order. The battery must be plugged in to activate the meter. The battery must be properly charged to activate the top LED. (See Figure 7)

- When the batteries are at 70% discharge number 9 LED will blink, when this occurs the operator must go to the recharging station.
- When the batteries reach 80% discharge LED numbers 9 and 10 will alternately blink and an alarm sounds. At this point, if it is ever reached, the machine must be towed to the recharging station, if the machine is run for any length of time damage will occur to the battery.



P4076 FIGURE 7

### NOTE

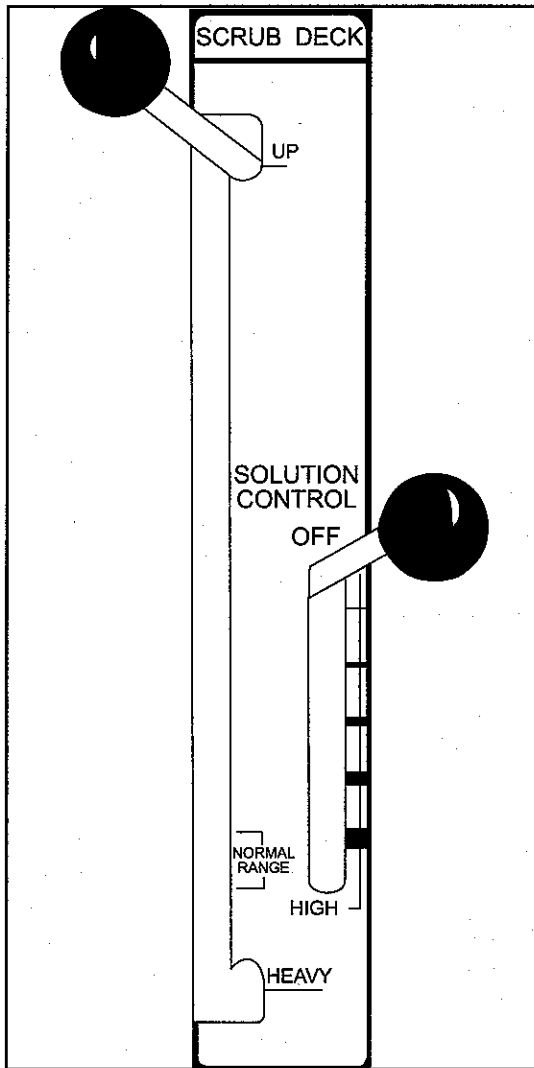
Continual Discharge Of The The Battery To 80% Will Shorten The Battery Life.

## MACHINE CONTROLS

### SCRUB DECK LEVER (See Fig. 8)

The Lever is Located On The Console To The Left Of The Steering Wheel In The "Scrub Deck" Section.

- Placing this lever in the position marked "Normal Range" will lower the Scrub Brush Deck and activate the three scrub brushes.
- Placing this lever in the "Up" position will stop the brushes from rotating and raise the scrub brush deck. The Lever in the "Heavy" position will allow more aggressive scrubbing pressure.



P5053

FIGURE 8

### SOLUTION CONTROL LEVER (See Figure 8)

The Lever is located on the console to the left of the steering wheel in the "Scrub Deck" section. The Solution Warning Light will illuminate when the solution tank is empty, marking the end of the scrubbing cycle.

- To apply solution to the scrubbing brushes, pull the solution control lever back until the desired setting is reached. The solution rate is continuously variable from off to approximately 3.00 gpm (11.35 lpm) At High.
- To Stop application of solution, push the lever until it stops at the "Off" position.

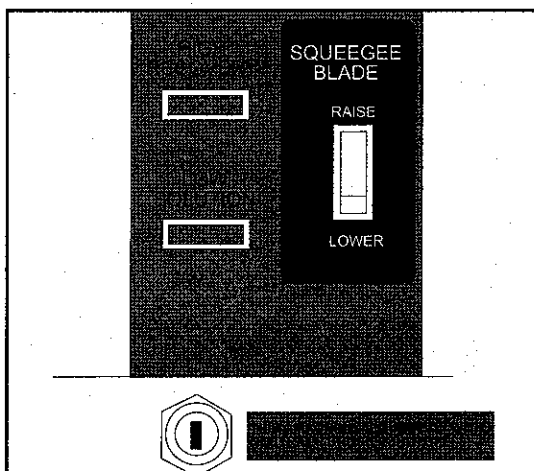
### NOTE

For Best Results, Discontinue Application Of Solution 10 Feet Before Making A 90° And 180° Turn Or Stopping The Machine.

### SQUEEGEE BLADE SWITCH (See Figure 9)

The Squeegee Blade Switch is located on the console to the right of the steering wheel in the "SQUEEGEE BLADE" section.

- This switch in the position marked "LOWER" will lower the squeegee and activate the squeegee vacuum.
- This switch in the "RAISE" position will stop the squeegee vacuum and raise the squeegee.
- The squeegee will lift up when the machine travels in reverse.



P5039

FIGURE 9

### HIGH RECOVERY WARNING LIGHT (See Figure 9)

The High Recovery Warning Light is located on the console to the right of the steering wheel beside the "SQUEEGEE BLADE" section.

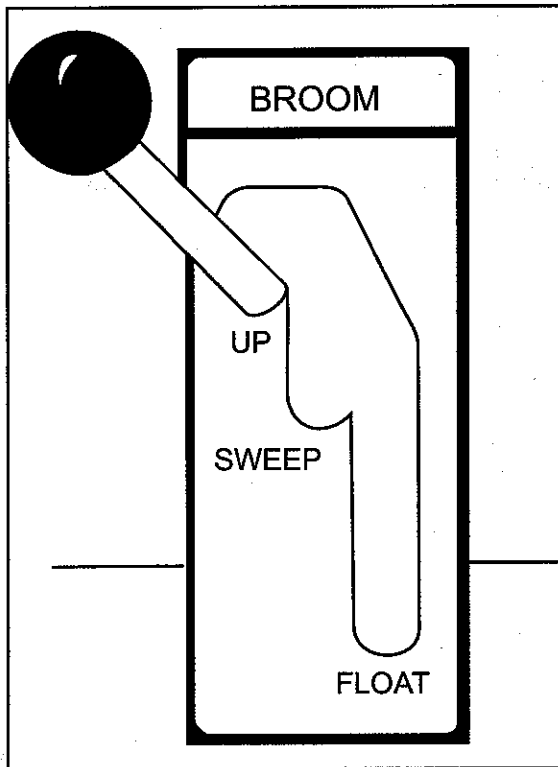
- The recovery warning light will illuminate and stay on approximately 5 minutes before the recovery tank is full, giving ample time to complete the scrubbing cycle before the mechanical float shuts off the vacuum to the recovery tank.

### LOW SOLUTION WARNING LIGHT (See Figure 9)

The Low Solution Warning Light is located on the console to the right of the steering wheel beside the "SQUEEGEE BLADE" section.

- The Solution Warning Light will illuminate when the solution tank is empty, marking the end of the scrubbing cycle.

## MACHINE CONTROLS



P5037

FIGURE 10

### MAIN BROOM LEVER (See Fig.10)

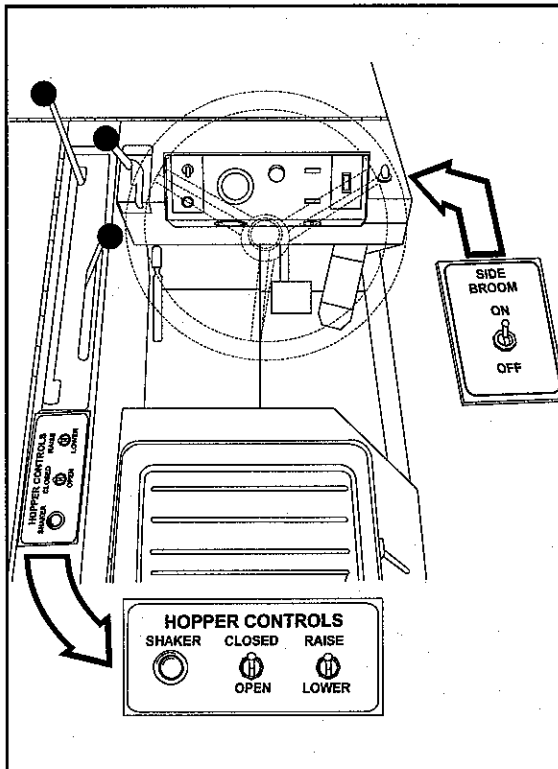
The main broom lift control is located to the left of the steering column.

- To lower the main broom, grasp the lever and push it up and to the right to clear the locking notch. Move the lever down to the first or second notch in the elongated slot. The first notch, "SWEEP," is for normal sweeping (1.5 to 2 inch [3.8 to 5 cm] broom pattern). The second notch, "FLOAT," is for heavy sweeping (3 to 4 inch [7.6 to 10 cm] broom pattern).
- To raise the main broom, push the lever up and slide into the locking notch in the "UP" position. You may operate the main broom in either the "SWEEP" or "FLOAT" position.
- The "SWEEP" position is used for normal sweeping and will result in increased broom life. The "FLOAT" position is used only when sweeping very uneven areas. The broom will start automatically when the broom lift control is set to SWEEP or FLOAT.

### SIDE BROOM SWITCH (See Figure 11)

The Side Broom Switch is located to the right of the instrument panel.

- This switch will raise and lower the side broom.
- The Side Broom will automatically start when lowered.



P5041b

FIGURE 11

### FILTER SHAKER SWITCH (See Figure 11)

The Filter Shaker Switch is Located on the Left side Console in the Operator Compartment.

- The Filter Shaker Control Switch is used during the sweeping cycle and the hopper dump cycle. Push the shaker control switch for 5-15 seconds to remove dirt from the dust control filter.

### HOPPER DUMP DOOR SWITCH (See Figure 11)

The hopper dump door switch is located on the left side console in the operator compartment.

- In the closed position the hopper dump door switch is used to hold debris in the hopper while in transit, or when raising the hopper to be dumped.
- In the open position the hopper dump door switch is used to open the hopper dump door while sweeping and to open the hopper once it has been raised for dumping.



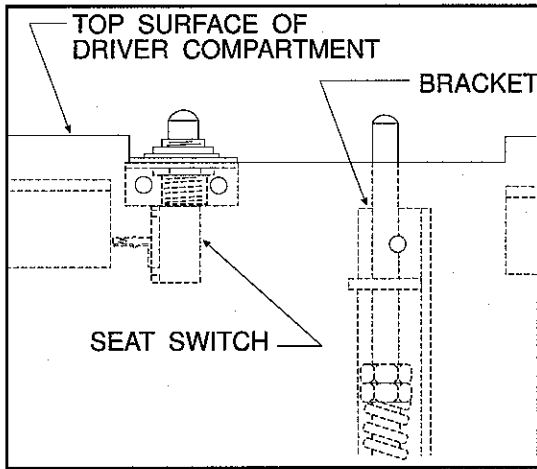
### WARNING

When the hopper is raised, the safety arm must be engaged before any work can be performed under or around the hopper. After the work is completed the safety arm must be disengaged and properly stowed.

### HOPPER RAISE AND LOWER SWITCH (See Figure 11)

The hopper raise and lower switch is located on the left side console in the operator compartment.

- In the raise position the hopper is raised for dumping.
- In the lower position the hopper is lowered after dumping.



P4370

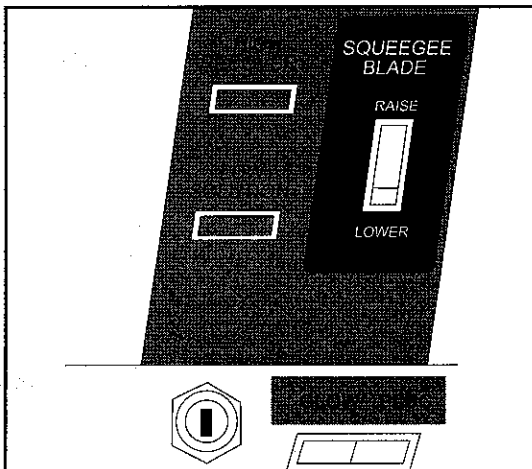
FIGURE 12

## SEAT SWITCH (See Figure 12)

(Battery Powered Machines Only)

This switch is located under the seat panel and disables the drive system when the operator's seat is not occupied.

- This switch is activated when the driver is seated. If the driver is not seated, the machine will not travel forward or in reverse.
- The controller for the machine is equipped with a re set feature. If the seat switch is momentarily inactive, the foot pedal must be put in the neutral position before travel can resume.



P5039A

FIGURE 13

## GLOW PLUG SWITCH (See Figure 13)

The glow plug is a momentary switch and is located on the dash panel next to the key switch.

To Use the glow plug switch to start the diesel engine.

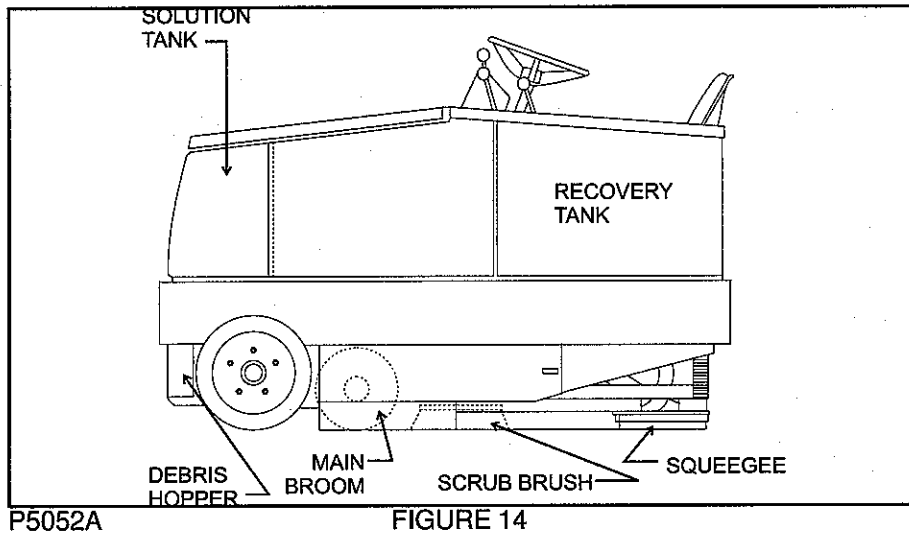
1. Push the glow plug switch and hold for 15 seconds prior to starting engine.
2. Turn key switch to start position.
3. Once engine has started and is running smoothly release the glow plug switch.



### WARNING

To prevent serious injury or property damage, Do not use ether or other starting aids when using the glow plugs to start the engine.

## OPERATING INSTRUCTIONS



### TO FILL SOLUTION TANK

Open the solution tank Access cover located at the top right of the machine. Fill tank with 60 gallons of water and the correct mixture of American-Lincoln #100 Industrial Cleaner for the job at hand. Make sure that the solution control lever is in the "Off" (forward) position.

### NOTE

Before Starting Machine, Perform The Pre-start Checks As Follows:

### PRE-START CHECK LIST

- Check brakes and controls for proper operation
- Set Parking Brake Before Starting Machine.
- Make sure all controls are in the "Off" position, Be sure accelerator and directional control pedal is in the neutral position.
- Clean Engine Air Filter Element.(Gas, Diesel Only)
- Check Engine Oil Level (Gas, Diesel Only)
- Check Radiator Coolant Level(Gas, Diesel Only)
- Check Hydraulic Fluid Level
- Check All Systems For Leaks



### WARNING

To Maintain The Stability Of This Sweeper In Normal Operation, the Over- Head Guard, Counterweights, rear Bumper Guard, Or Any Similar Equipment, Installed by The Manufacturer As Original Equipment, Should Never Be Removed. If It Becomes Necessary To Remove Such Equipment For Repair Or Maintenance. This Equipment Must Be Reinstalled Before The Sweeper Is Placed Back In Operation.



### WARNING

Report Damage Or Faulty Operation Immediately. Do Not Operate The Machine Until Repairs Have Been Completed. Maintenance And Repairs Must Be Done By Authorized Personnel Only.

## STARTING INSTRUCTIONS BATTERY POWERED MACHINES

- Turn key to "On" position.
- Check battery condition meter for sufficient charge in the batteries. (Must be checked with the machine running)

## GAS POWERED MACHINES

- Pull choke if engine is cold.
- Turn key to start position and hold until the engine starts.
- Push in choke when engine starts (If Used)

## DIESEL POWERED MACHINES

- If engine is cold push and hold glow plug switch for a maximum of 5 seconds
- Release glow plug switch.
- Turn key to start position and hold until the engine starts.

## POST START CHECK LIST (MOTOR RUNNING)

- Check broom pattern.
- Check squeegee deflection.



## WARNING

**Do Not Turn The Steering Wheel Sharply When The Machine Is In Motion. The Sweeper Is Very Responsive To Movement Of The Steering Wheel. Do Not Make Sudden Turns.**

## TO TRANSPORT MACHINE

- Be sure the sweeping broom, brushes and squeegee are in the "UP" or "RAISED" position with all other controls in the "OFF" position.
- Pull Throttle Control Full Out And Twist To Lock. (Gas, Diesel Only)
- Release parking brake.
- Push forward on the directional control pedal to place the machine in motion. Vary your foot pressure on the directional control pedal to obtain desired travel speed.
- To stop, allow directional control pedal to return to neutral (centered) position. (Pedal will automatically return to neutral when foot pressure is released).
- Set parking brake.

## TO BEGIN THE CLEANING OPERATION

MOVE THE CONTROL LEVERS INTO THE APPROPRIATE OPERATION POSITIONS.

### LOWER THE MAIN SWEEPING BROOM.

- Set The BROOM LEVER to SWEEP or FLOAT
- Sweep for the length of the machine.

### LOWER BRUSHES TO THE DESIRED POSITION.

- Set The SCRUB DECK LEVER to the NORMAL or HEAVY RANGE

### LOWER THE SQUEEGEE.

- Set The SQUEEGEE BLADE Switch To The LOWER POSITION.

### START APPLYING SOLUTION.

- Move SOLUTION CONTROL lever to desired range

## NOTE

**Discontinue The Cleaning Operation Whenever A Solution Or Recovery Warning light Is Illuminated.**

## OPERATING INSTRUCTIONS

---

### TO STOP THE CLEANING OPERATION

The solution light will illuminate when the solution tank is empty. At this time, discontinue the scrubbing cycle, put all controls in the forward position for transport and drive to the drain area.

- The recovery warning light will illuminate approximately 5 minutes before loss of vacuum to the recovery tank. This warning period should give ample time to complete the scrubbing cycle and transport or scrub to the drain area.

### NOTE

**AFTER STOPPING THE ENGINE, PERFORM THESE POST OPERATION CHECKS.**

#### POST OPERATION CHECK LIST

1. Clean debris hopper.
2. Check sweeping broom for wear or damage.
3. Check all flaps for wear, damage and adjustment.
4. Drain and clean recovery tank.
5. Clean recovery tank screen and float.
6. Check scrub brushes for wear or damage.
7. Check rear and side squeegees for wear, damage and adjustment.



### WARNING

**Check for overhead clearance before raising the hopper. Drive machine carefully when the hopper is raised.**

### TO EMPTY DEBRIS HOPPER

1. Transport or sweep and scrub to the dump site.
2. Close the hopper dump door by placing the hopper door switch to the CLOSED position.
3. Raise the hopper by placing the hopper switch to the RAISE position.
4. Move the machine forward over the dumpster if necessary.
5. Open the hopper dump door by placing the hopper door switch to the OPEN position.
6. Lower the hopper by placing the hopper switch to the LOWER position.



### WARNING

**When The Hopper Is Raised. The Safety Arm Must Be Engaged Before Any Work Can Be Performed Under Or Around The Hopper. After The Work Is Completed The Safety Arm must Be Disengaged And Properly Stowed.**

### TO CLEAN SOLUTION TANK

1. Park machine on a smooth level surface and set the parking brake.
2. Put the hopper in the dump position.
3. Engage the hopper safety arm.
4. Turn the drain plug and remove.
5. Drain And Flush all deposits from the tank.
6. Replace The Plug, put The Cover In Place And Close The Lid.
7. Disengage And Stow The Safety Arm
8. Return The Hopper To The Lower Position.

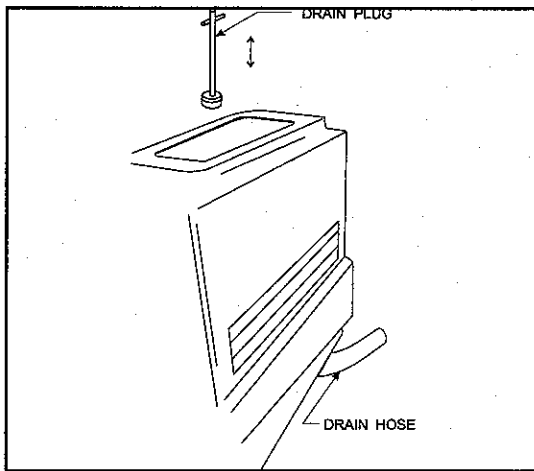


### WARNING

**Improper discharge of waste water may damage the environment and be illegal.**

The United States Environmental Protection Agency has established certain guidelines regarding discharge of waste water. Also, city and state regulations regarding this discharge may be in effect in your area.

Understand and follow the regulations in your area. Be aware of the environmental hazards of chemicals you dispose of.



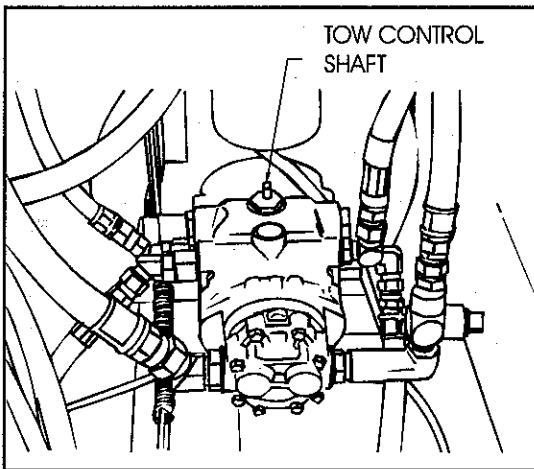
P5044

FIGURE 15

### TO DRAIN RECOVERY TANKS (See Figure 15)

A drain hose for the recovery tank is located underneath the rear of the machine.

1. To drain the tank, completely open the recovery cover and lid, lower the hose and place in a suitable drain.
2. Remove the drain plug. When the draining operation is completed, flush and clean recovery tank.
3. Place the drain hose on the holder.
4. Put the cover in place and close the lid.



P4183

FIGURE 16

### TOWING INSTRUCTIONS (See Figure 16)

(Gas and Diesel Only)

1. Locate tow control shaft extension as shown.
2. To open hydraulic circuit to wheel drive motor, turn shaft 90 Degrees so that the flats on the shaft are parallel to the front axle.
3. After towing, turn shaft 90 Degrees so that the flats on the shaft are parallel to the pump center line.

**SERVICE CHART (BATTERY)**

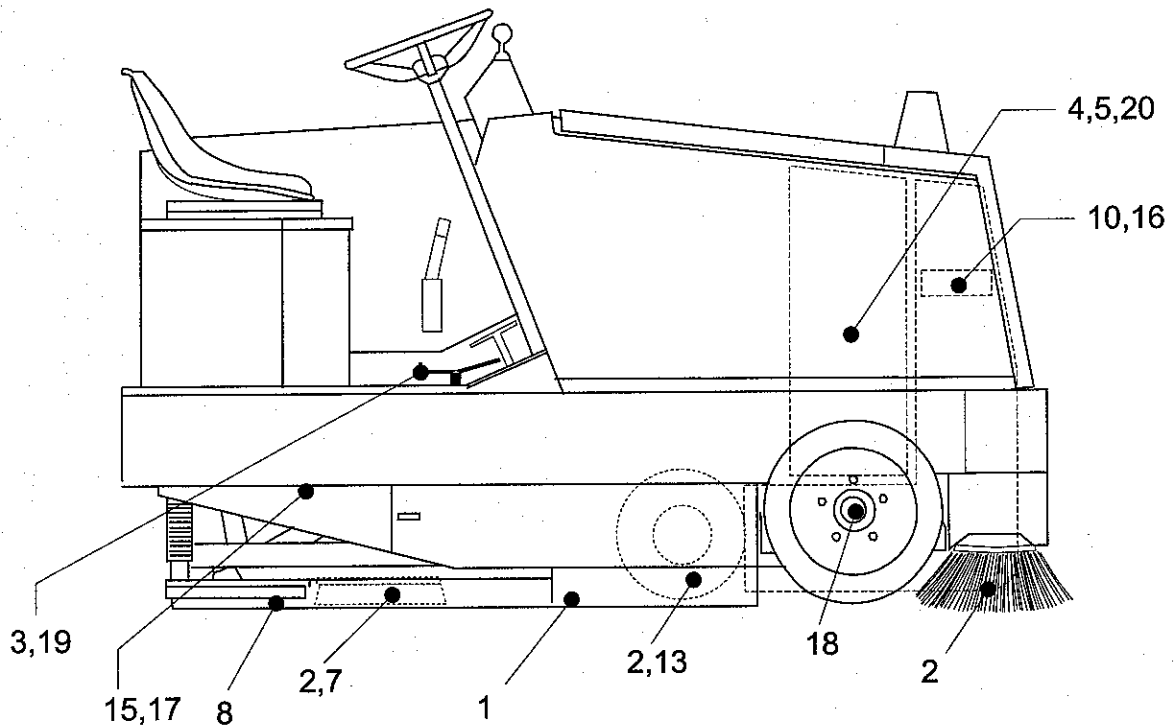
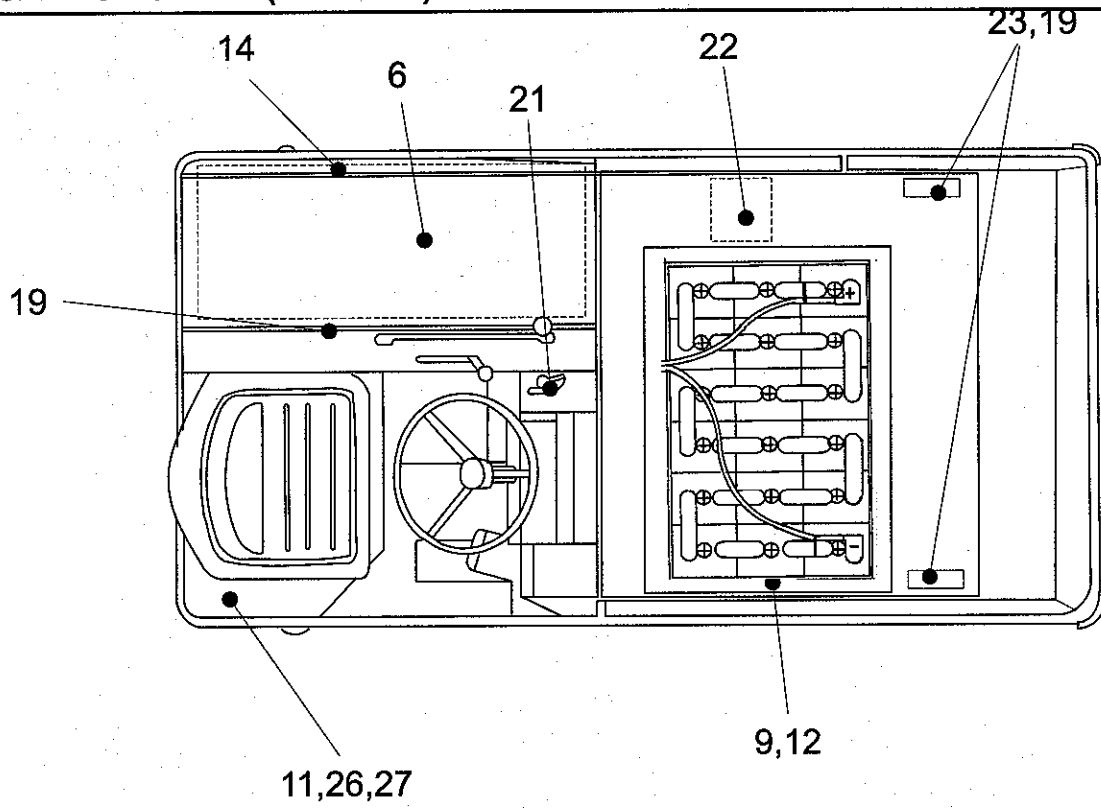


FIGURE 17

C195B

## SERVICE CHART (BATTERY)

For Service Assistance, Consult Your Local American-Lincoln Distributor.

For Best Performance, Replace Worn Parts With Genuine American-Lincoln Parts.

### EVERY 8 HOURS or DAILY

1. All Flaps For Wear Or Damage.
2. Sweeping Broom & Scrub Brushes For Wear Or Damage.
3. Brake Pedal And Parking Brake.
4. Solution Tank
5. Solution Filter Screen
6. Clean Recovery Tank.
7. Scrub Brushes For Wear Or Damage.
8. Rear And Side Squeegees For Wear Or Damage.
9. Check Battery Charge.
10. Inspect Panel Filter.
11. Check Hydraulic Fluid Level.

### 50 Hour (Weekly) Maintenance Check List

12. Check Battery Electrolyte Level.
13. Rotate Main Broom End For End.
14. Check Tension On All Belts.
15. Check Hydraulic Hoses For Cuts Or Signs Of Wear.
16. Clean Or Replace Panel Filter.

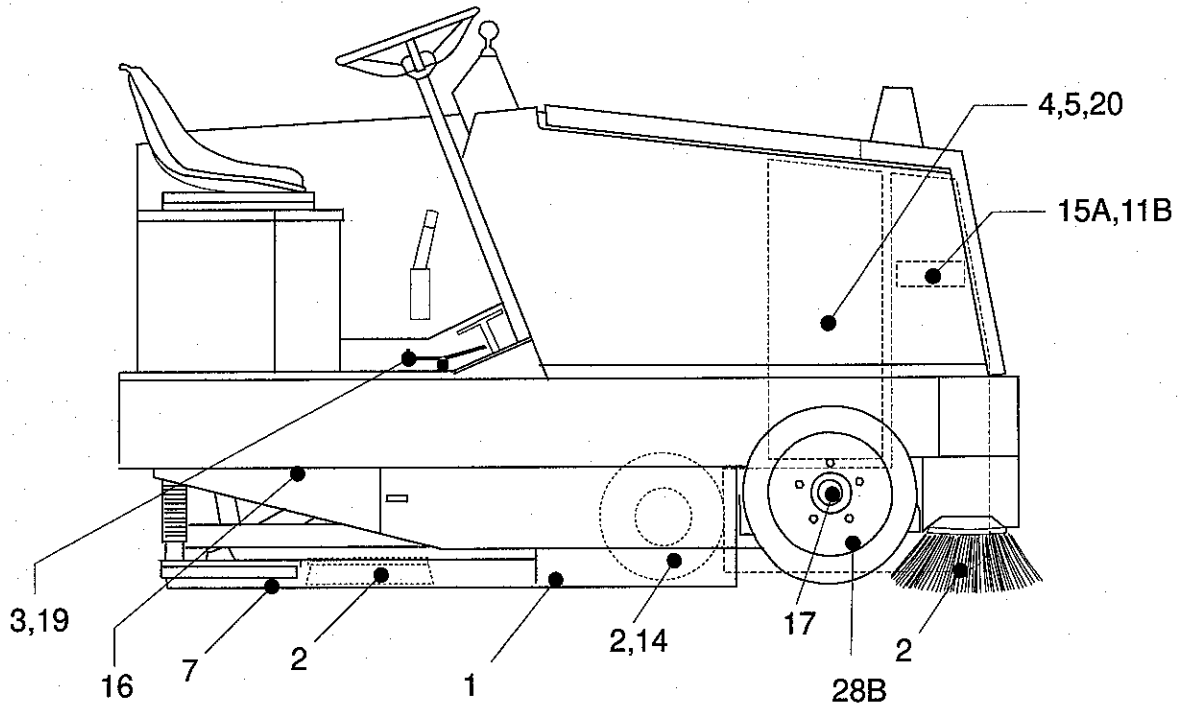
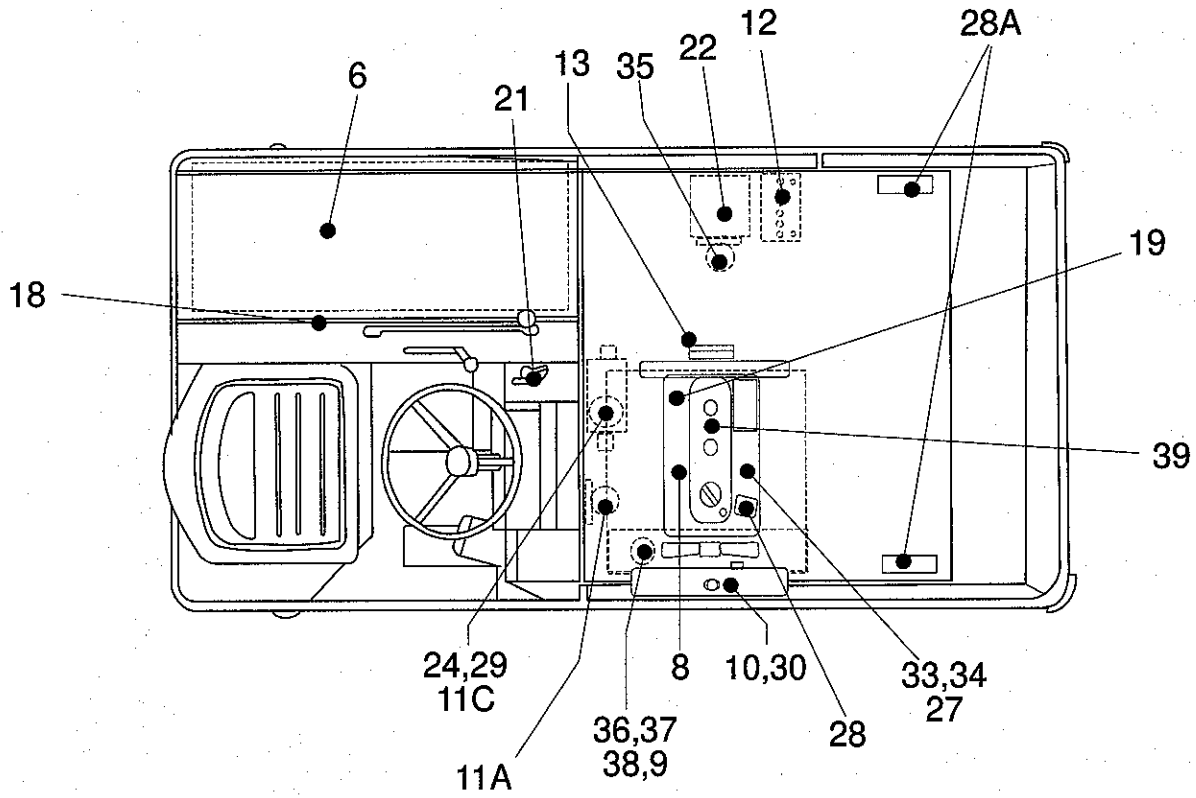
### 100 Hour Maintenance Check List

17. Grease Drive Wheel Swivel Bearings.
18. Lubricate Front Wheel Bearings.
19. Lubricate All Moving Joints.
20. Clean Solution Tank.
21. Grease Main Broom Lever.
22. Clean Vacuum Filter.
23. Lubricate Hopper Cylinder Bushings.
24. Check Brake Pads.

### 250 Hour Maintenance Check List

25. Replace Hydraulic Filter.
26. Clean Hydraulic Intake Strainer and Reservoir.
27. Change Hydraulic Fluid.

**SERVICE CHART (GAS & DIESEL)**



C195A

FIGURE 18

## SERVICE CHART (GAS & DIESEL)

For Service Assistance, Consult Your Local American-Lincoln Distributor.

For Best Performance, Replace Worn Parts With Genuine American-Lincoln Parts.

### EVERY 8 HOURS or DAILY

1. All flaps for wear or damage.
2. Sweeping broom & scrub brushes for wear or damage.
3. Brake pedal and parking brake.
4. Solution tank.
5. Solution filter screen.
6. Clean Recovery tank.
7. Rear and side squeegees for wear or damage.
8. Check engine oil level.
9. Check Hydraulic Fluid level.
10. Check coolant level and radiator core for blockage.
11. LP Check for LPG odor at connections.
- 11A. Check Water Separator.
- 11B. Inspect panel Filter.
- 11C. Inspect Engine Air Filter.

CHANGE ENGINE OIL AFTER FIRST 35 HOURS OF OPERATION

### 50 HOUR (WEEKLY) MAINTENANCE CHECK LIST

12. Check battery electrolyte level.
13. Check tension on all belts.
14. Rotate main broom end for end.
15. Check all hydraulic hoses for wear or cuts.

### 100 HOUR MAINTENANCE CHECK LIST

16. Grease drive wheel swivel bearings.
17. Lubricate front wheel bearings.
18. Lubricate all moving joints.
19. Lubricate the clamp ends of the Forward/Reverse cable with NAPA #765-1364 or equivalency-seize lubricant.
20. Clean solution tank.
21. Grease Main Broom lever
22. Clean vacuum filter
23. Check the battery electrolyte level.
24. Clean air filter element.
25. Check fuel hose.
26. Check radiator hoses and clamp bands.
27. Change of engine oil.
28. Replace oil filter cartridge.

### 250 HOUR MAINTENANCE CHECK LIST

29. Replace engine air filter element.
30. Flush radiator coolant system.
31. Remove spark plugs - clean or replace.
32. Check distributor and points - service or replace.
33. Clean and lubricate throttle and choke linkage.
34. Replace fuel filter.
35. Replace hydraulic filter.

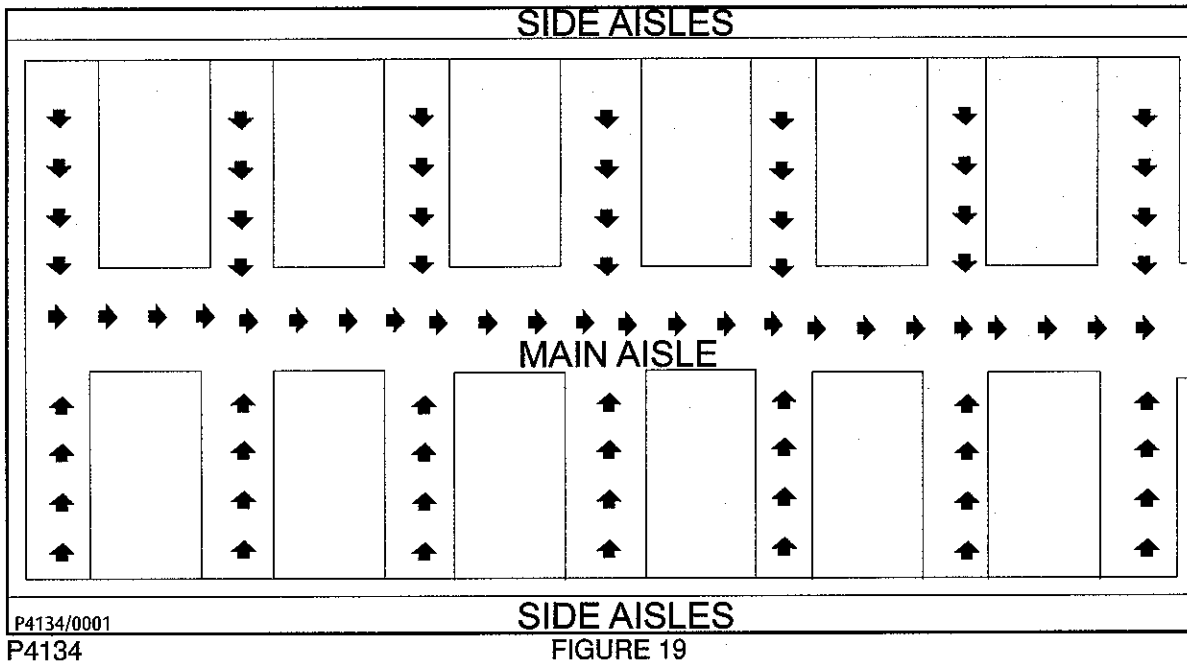
### 500 HOUR MAINTENANCE CHECK LIST

36. Clean Hydraulic reservoir.
37. Clean Hydraulic intake strainer.
38. Changed hydraulic fluid.

### 1 YEAR MAINTENANCE CHECK LIST

Check valve clearance.

## HELPFUL HINTS FOR CLEANING



### SWEEPING AND SCRUBBING THE AVERAGE FLOOR WITH LIGHT TO MEDIUM SOILAGE.

In this operation the cleaning is accomplished in one pass, with simultaneous solution feed, sweeping, scrubbing and dirty water pick up. The rate of solution feed and the speed of travel required will vary with floor condition. This knowledge will come with operator experience. The following hints will help to achieve the best possible results.

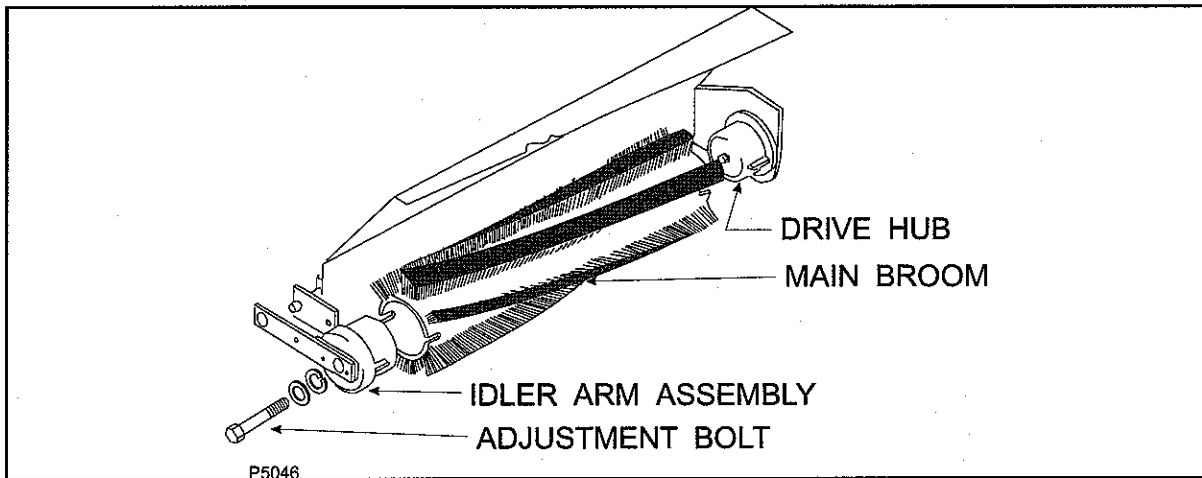
- Scrub in straight paths. Do not bump posts. Do not scrape the sides of the machine.
- When the machine is in motion, do not push the directional/speed control pedal all the way forward. This is the same as starting in "High" and will put a strain on the motor and drive system.
- Plan your sweeping and scrubbing in advance. Try to arrange long runs with minimum stopping and starting. Sweep debris from narrow aisles out into main aisle ahead of time. Do an entire floor, or section at one time.
- Pick up oversize debris before sweeping.
- Allow a few inches of overlap of sweep and scrub paths. This will eliminate leaving dirty patches.
- Periodically turn the sweeping broom end for end to prevent the bristles from "setting" in one direction.

#### NOTE

Replace sweeping broom when bristles are worn to 1 inch (2.54 cm.) length.

Replace disc brushes when bristles are reduced to 1/2 inch (1.27 cm.) in length.

Replace squeegee rubbers when all usable edges have become rounded with wear, impairing the wiping action.



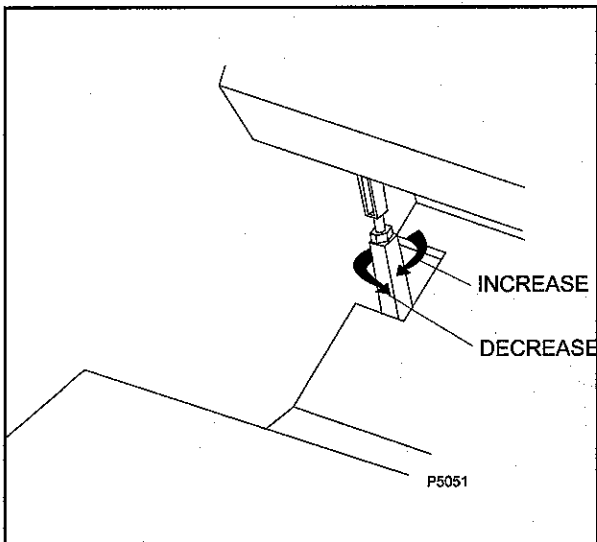
P5046

**FIGURE 20**

**HOW TO REPLACE THE MAIN BROOM (See Figure 20)**

Replace the main broom when the bristles are worn to 1 inch (2.5 cm) in length.

1. Open the right broom chamber door.
2. Remove the mounting bolt.
3. Remove the idler arm assembly.
4. Remove the main broom and discard.
5. Put a new main broom in the broom chamber.
6. Rotate the new broom to the right on the drive hub until it engages the drive hub broom tabs.
7. Put the idler arm assembly in place.
8. Put the mounting bolt in place and tighten.
9. Close the broom chamber door.
10. Turn the ignition key to the "ON" position.
11. Put the broom control lever to the "BROOM - SWEEP" position.
12. Let the broom sweep in place for two minutes.
13. Put the broom control lever to the "UP" position.
14. Back the machine off the test spot.
15. Inspect the area where the broom swept, for broom bristle contact with the floor. The area of broom bristle contact with the floor should be 1 to 2 inches ( 2.5 to 5 cm.) wide.
16. Follow the steps outlined in the sections on "HOW TO ADJUST FOR AN EVEN SWEEP PATTERN" and "HOW TO ADJUST THE BROOM HEIGHT."



P5051

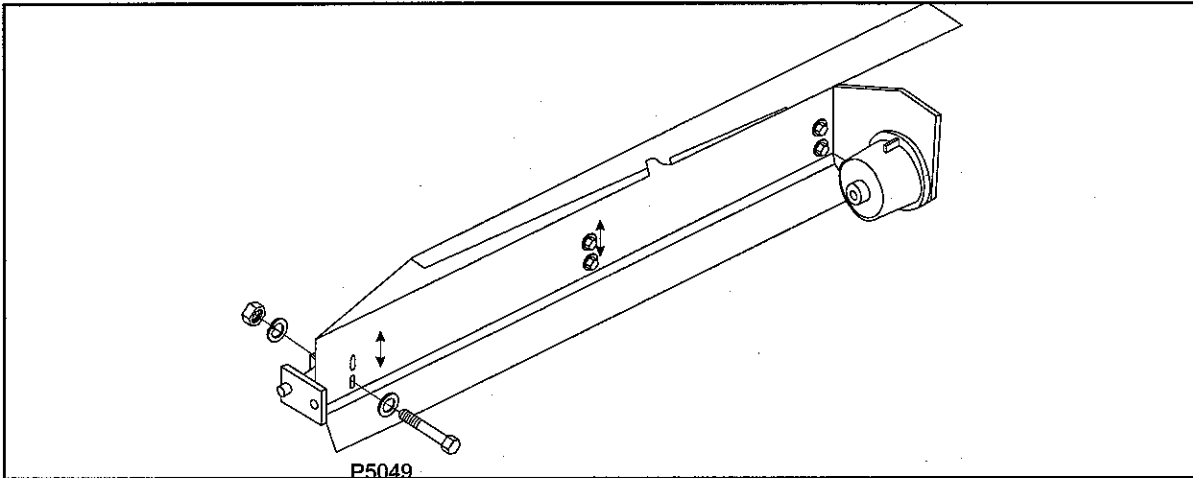
**FIGURE 21**

**HOW TO ADJUST THE MAIN BROOM HEIGHT (See Figure 21)**

As the main broom bristles wear, it is necessary to lower the broom so that the bristles will contact the floor.

1. Turn the main broom adjuster linkage, located in the corner of the driver compartment. Turning the linkage clockwise will increase the broom pattern and counter clockwise to decrease it. Turn the linkage one full turn at a time.
2. Turn the key switch to the "ON" position.
3. Put the broom control lever to the "SWEEP" position.
4. Let the main broom run for 2 minutes.
5. Put the broom control lever to the "UP" position.
6. Drive the machine forward, until the area swept by the main broom is behind the machine.
7. Turn the key switch to the "OFF" position and set parking brake.
8. Inspect the area swept by the main broom for an even pattern.

## SERVICE INSTRUCTIONS

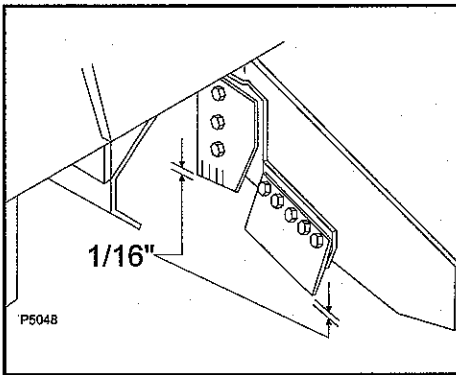


P5049

FIGURE 22

### HOW TO ADJUST FOR AN EVEN SWEEP PATTERN (See Figure 22)

1. Open the right broom door chamber.
2. Loosen the adjustment bolts that are located inside the broom chamber.
3. Loosen the sets of slots closest to the broom door and in the center of the broom chamber.
4. Move the end of the broom pivot shaft up and down until the area of the broom bristle contact with the floor appears even. The width of contact will be between one and two inches (2.5 to 5 cm).
5. Tighten the adjustment bolts.
6. Close the broom chamber door.
7. Turn the key switch to the "ON" position.
8. Place the "BROOM" control lever into the "UP" position.
9. Drive the machine forward until the area swept by the main broom is behind the machine.
10. Turn the key switch to the "OFF" position and set the parking brake.
11. Inspect the area swept by the main broom for an even sweep pattern.



P5048

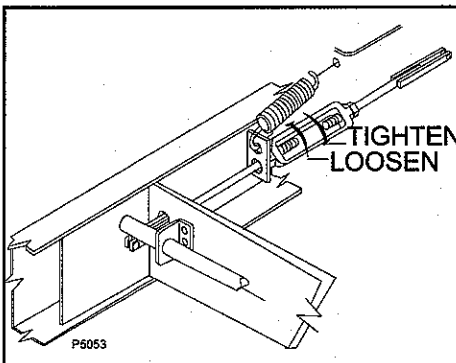
FIGURE 23

### TO CHECK THE FLAPS (See Figure 23)

The urethane and rubber flaps are susceptible to damage and should be inspected regularly and maintained in good condition. The side flaps are adjustable and should be maintained at approximately 1/16" (.15cm) above the floor.

### TO CLEAN THE DUST CONTROL FILTER ELEMENT

See Vacuum Assembly exploded view. Remove the four (4) wing nuts from the cover on the vacuum manifold. Remove the cover gasket and filter element. Rinse the filter in water and reassemble.



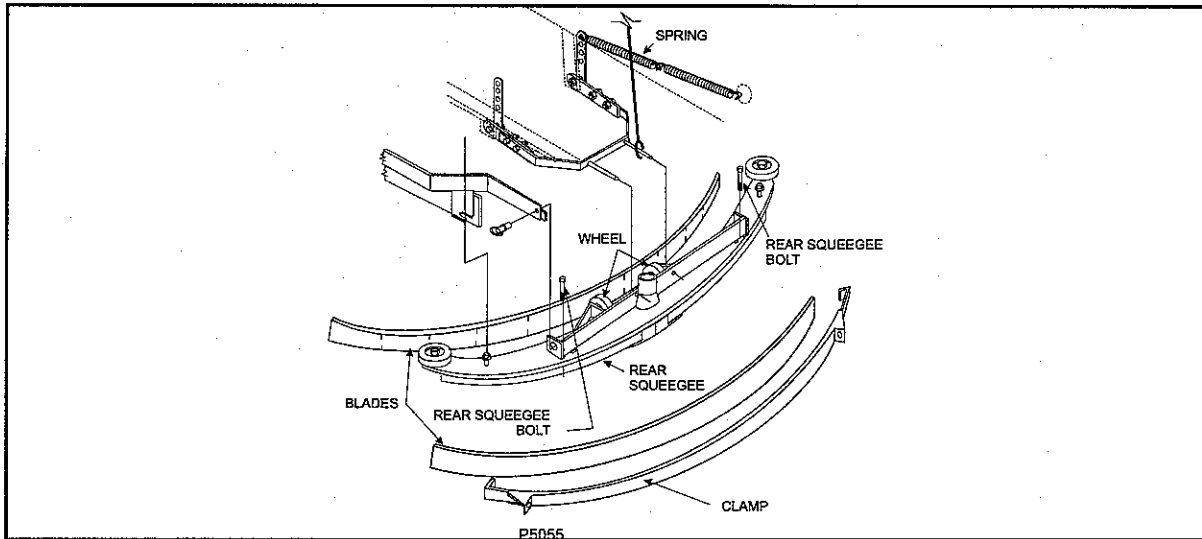
P5053

FIGURE 24

### BRAKE ADJUSTMENT

The brake adjustment turnbuckles are located along the machine frame toward the front of the machine.

1. Loosen the turnbuckle nut.
2. Looking towards the front of the machine, turn the turnbuckle clockwise to tighten the brake pads or turn it counterclockwise to loosen them.
3. Tighten the turnbuckle nut.



P5055

**FIGURE 25**

**NOTE**

**TORQUE REAR SQUEEGEE BOLT TO 15-20 FT. LBS. EXCESSIVE TIGHTENING CAN LEAD TO DAMAGE.**

**SQUEEGEE WHEEL ADJUSTMENT (See FIGURE 25)**

1. Set the hand parking brake.
2. Turn the key switch to the "ON" position.
3. Place the squeegee blade switch in the "LOWER" position.
4. Turn the key switch to the "OFF" position. This will turn the vacuum fans off.
5. Loosen the wheel mounting bolts.
6. Slide the wheels in their slots until they are at the 3/6" (.476 cm) above the floor.
7. Tighten the wheel mounting bolts.

**SQUEEGEE SPRING PRESSURE ADJUSTMENT (See FIGURE 25)**

1. Set the hand parking brake.
2. Turn the key switch to the "ON" position.
3. Place the squeegee blade switch in the "LOWER" position.
4. Turn the key switch to the "OFF" position.
5. Remove the rear squeegee assembly.
6. Raise the rear of the machine and place jack stands under the rear frame of the machine.
7. Disconnect the springs from the arms located above the scrub deck. The spring force increases when the springs are installed in the higher holes and decreases in the lower holes.

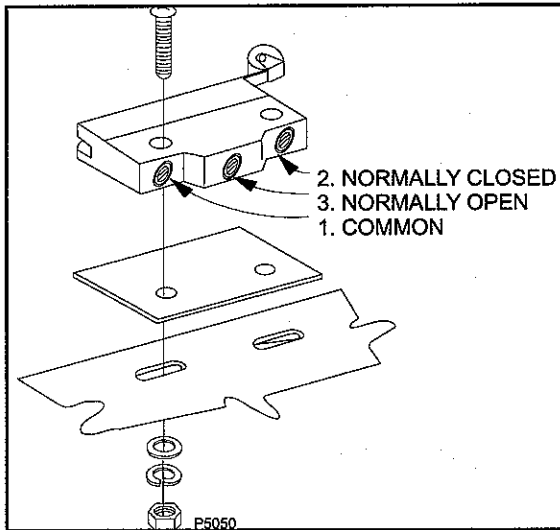
**SQUEEGEE BLADE REPLACEMENT (See FIGURE 25)**

1. Set the hand parking brake.
2. Turn the key switch to the "ON" position.
3. Place the squeegee blade switch in the "LOWER" position.
4. Turn the key switch to the "OFF" position.
5. Remove the rear squeegee assembly.
6. Loosen the strap clamp.
7. Remove the old blades.
8. Push the new blades in until they are against the top of the squeegee.
9. Retighten the strap clamp.

## SERVICE INSTRUCTIONS

### TO ADJUST THE MICRO SWITCHES

All microswitch mounting holes are slotted. Loosen the nuts to move the switch for adjustment. Move the switch to desired position then retighten the nuts while holding the switch in position.



P5050 FIGURE 26

### FOOT PEDAL SWITCHES

Adjust in slot until all switches are off when foot pedal is in neutral.

### SQUEEGEE LIMIT SWITCHES

If the actuator is making noise, move switches towards the actuator. If lift cable is too tight, lower upper switch.

### SCRUBBING SWITCH

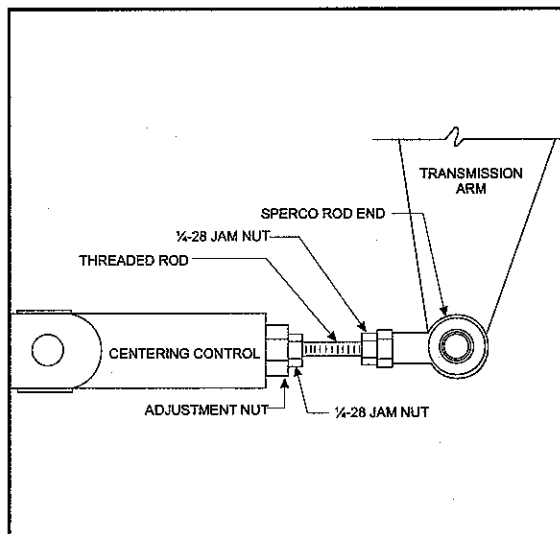
The switch is located on the frame and above scrub deck on the right side. To adjust the switch, loosen the switch or switch bracket with the scrub deck lever at mid point of its slot. The switch should come off the trip arm. When the lever is in the "UP" position, the switch will be active.

### BROOM SWITCH

The switch is located under the instrument panel. The switch will be active when the broom lever is in the "UP" position.

### NOTE

Adjustment directions given are as seen from the left hand side of the machine.



P5093 FIGURE 27

### FOOT PEDAL NEUTRAL ADJUSTMENT (See Fig.27)

1. Check for engine no load RPM@ 2800 RPM.
2. Raise rear of machine onto jack stands (two stands of 2000 lbs. capacity) so the rear wheel is off the ground.
3. Loosen the jam nut away from the adjustment nut.
4. If the rear drive wheel is turning forward, turn the adjustment nut clockwise. This will shorten the threaded shaft. If the rear drive wheel is turning in reverse, rotate the adjustment nut counter-clockwise, which will lengthen the threaded shaft.
5. Tighten the jam nut against the adjustment nut.
6. Test for operation of neutral with engine at full throttle. If the rear drive wheel turns, repeat adjustment Steps 2, 4 and 5.

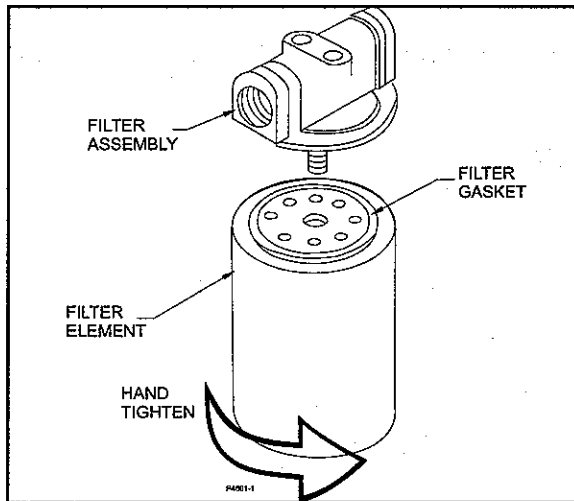
## HYDRAULICS

The hydraulic system provides power to various machine systems depending on the model you have. Use only FORD ATF Type "F" hydraulic fluid.

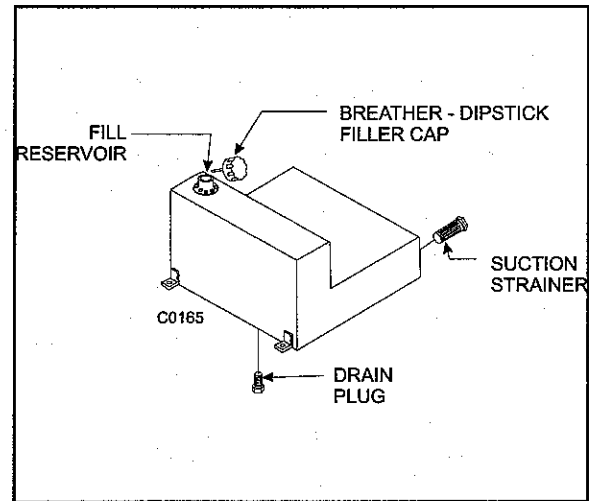
### TO FILL THE HYDRAULIC RESERVOIR

Check the hydraulic reservoir daily and fill as necessary. Use only FORDATF type "F".

1. Raise the cover over the engine compartment and remove the right side cover.
2. Remove the radiator overflow bottle from bracket.
3. Remove the hydraulic reservoir breather filler cap.
4. Remove any debris in the breather filler cap.
5. Fill the reservoir until the fluid level is to the upper line on the dipstick/filler cap. DO NOT OVERFILL.
6. Close the hydraulic reservoir breather filler cap.
7. Reinsert the overflow bottle back into the bracket.
8. Install the side cover and close engine cover.



P4601A FIGURE 28



C0165 FIGURE 29

### TO REPLACE THE RETURN FILTER ELEMENT (See Figure 29)

Replace the filter element after 250 hours of machine run time.

1. Locate and unscrew the filter element from the filter assembly and discard.
2. Moistenthe rubber gasket of the replacement filter with hydraulic fluid.
3. Install the filter element .
4. Turn the filter clockwise until it is hand tight.

### TO CLEAN THE HYDRAULIC SYSTEM (See Figure 30)

1. Set the parking brake.
2. Open the engine cover.
3. Put a container under the reservoir drain to catch the reservoir fluid.
4. Remove the drain plug. The reservoir fluid will drain.

### NOTE

**Do not use the drained fluid to refill the hydraulic reservoir. Dispose of the used fluid properly.**

### TO CLEAN THE HYDRAULIC SUCTION STRAINER (See Figure 30)

The suction strainer is located in the bottom of the hydraulic reservoir and can be removed from the outside of the reservoir once the fluid has been drained.

1. Turn the suction strainer counterclockwise by hand to remove the suction strainer from the reservoir.
2. Use compressed air on the inside of the strainer to remove impurities from the filter media. If compressed air is unavailable, use new FORD type "F" Automotive Transmission Fluid to flush the strainer.
3. Flush the interior of the hydraulic reservoir with clean fluid.
4. Put the cleaned strainer in the hydraulic reservoir.
5. Rotate the strainer clockwise into the bottom of the hydraulic reservoir. Stop rotating the strainer when it is hand tight.
6. Put the reservoir plug, removed in step six, back in the hydraulic tank drain and tighten.
7. Open the breather filler cap.
8. Fill the reservoir with new FORD type "F" automotive transmission fluid. The capacity of the tank is 6 gallons or 22.8 liters.
9. Close the breather filler cap.
10. Close the engine cover.

## SERVICE INSTRUCTIONS

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### LP GAS SYSTEM

The propane powered Model 6700 is identical to the "standard" gasoline powered 6700, except that its fuel system has been modified to operate on LP vapor fuel.

The LP fuel system consists of several components not found on the gasoline system. The LP fuel system also contains the associated mounting hardware and plumbing for the LP components. The major LP components are as follows:

- An LP carburetor
- A combination water heated vaporizer and regulator
- A combination LP fuel line filter and lock off valve
- LP fuel tank and fittings

These components are factory set, attempts at adjusting these components should only be made by authorized service personnel.

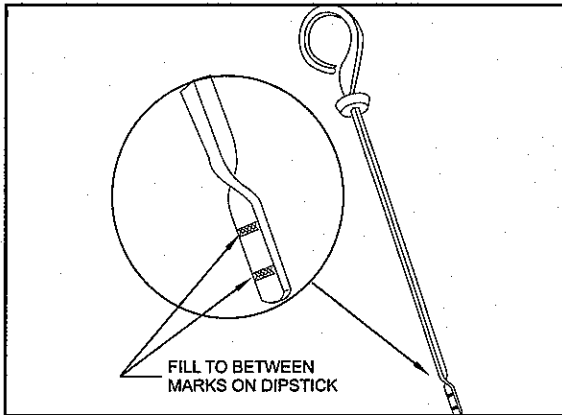
### LP GAS VAPORIZER-REGULATOR QUICK CHECK

Turn on the ignition switch and open the radiator cap. Check the coolant for bubbles. If bubbles are present, the vaporizer may have a leaking gasket or may have developed a pinhole leak, allowing the LP fuel to enter the cooling system.

### LP GAS FUEL TANK

The LP tank is located under the operator's seat.

Use only the proper size and type of LP tank. The 6700 LP powered sweeper uses 20 lb. horizontal liquid withdraw tank. The designation of the tank is DOT 4BW-240.



C0510 FIGURE 30

**DAILY CHECK POINTS**

To Check Engine Oil Level (See Figure 30)

1. Be sure the machine is parked on level ground.
2. To check the oil level, draw out the dipstick, wipe it clean and reinsert it. Draw it out again and check to see that the oil level lies between the two marks on the dipstick.
3. If the level is too low, add new oil to the specified level.
4. When using an oil of a different maker or viscosity from the previous one, remove all old oil. Never mix two different types of oil.

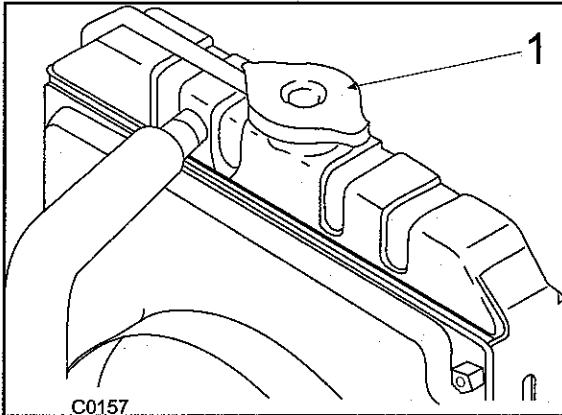
**NOTE**

Use the proper Engine Oil SAE according to the ambient temperatures.



**WARNING**

Do not open the radiator cap while engine is hot. Boiling coolant could be expelled from the radiator cap and will cause severe burns. Allow the engine to cool before opening the radiator cap.



C0157 FIGURE 31

**100 HOUR CHECK POINTS**

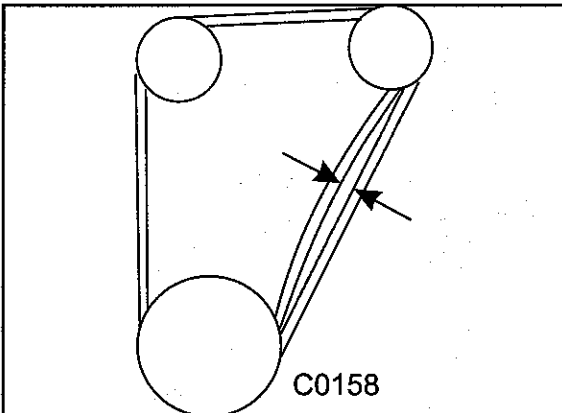
To Check the Coolant Level

1. Allow the engine to cool then remove the radiator cap (1) and check to see that the cooling water level is just below the port.
2. If low, add coolant solution of clean water and antifreeze.



**WARNING**

Be sure to close the radiator cap securely.

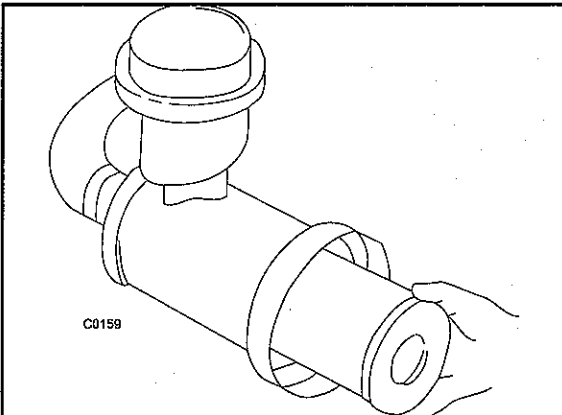


C0158 FIGURE 32

**Fan Belt Tension**

An improperly adjusted fan belt can cause overheating and insufficient battery charging. Check the fan belt tension every 100 hours of service.

1. Measure the deflection, depressing the belt half way between the fan drive pulley and the alternator pulley
2. If the measurement is not the specified value, loosen the bolts and the nuts and relocate the alternator to adjust.
3. The factory specification for fan belt tension is 0.273 to 0.351 inches (7 to 9 mm).



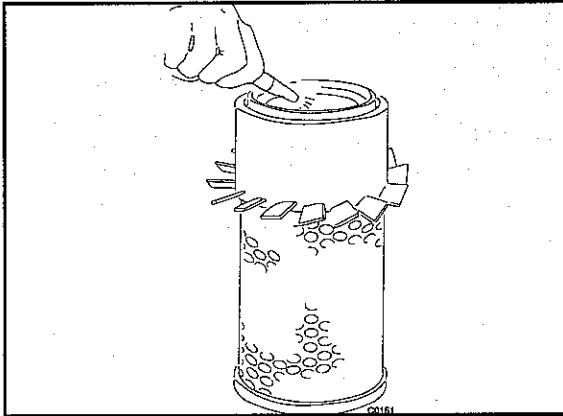
C0159 FIGURE 33

**To Clean the Air Filter Element**

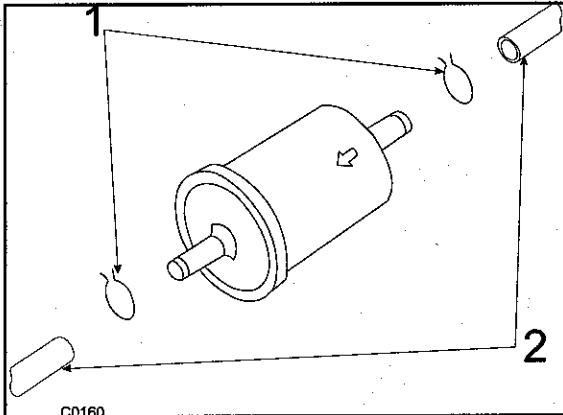
Use clean dry compressed air on the inside to clean the element. The air cleaner uses a dry element, never apply oil to the element. Do not disturb the filter element except for cleaning.

1. Release the dust cap clips to gain access to the filter element
2. Remove the filter element from the canister and use compressed air (not to exceed 100 psi) to blow dirt out of the filter media. The nozzle should be directed to the inside of the element.
3. If the element is stained with carbon or oil, replace the filter.
4. Replace the filter once a year. If the filter has been rinsed with water more than 6 times, replace the filter.

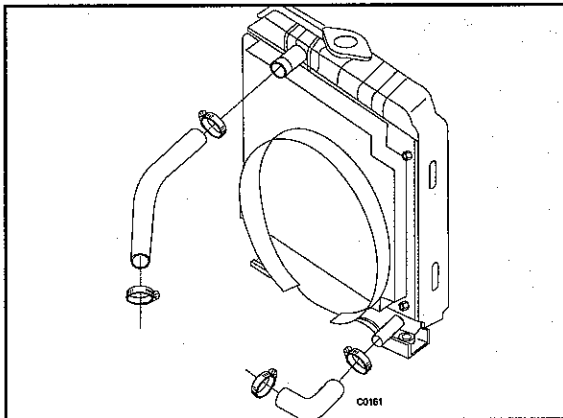
# SERVICE INSTRUCTIONS



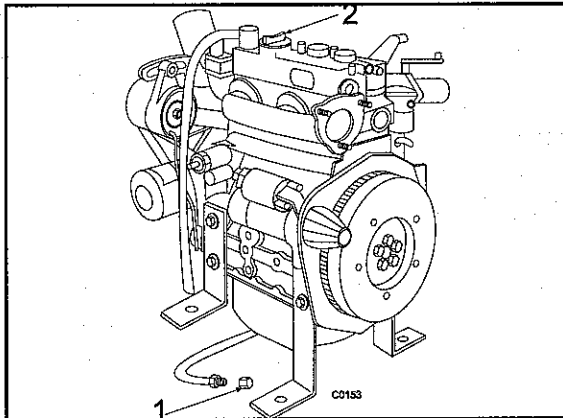
C0151 FIGURE 34



C0160 FIGURE 35



C0161 FIGURE 36



C0153 FIGURE 37

## WARNING

Stop the engine when attempting the check or changing of the fuel hose.

### Checking the Fuel Hose

Check the fuel hoses every 100 hours of operation. Since the fuel hose (2) is made of rubber, it ages regardless of the period of service. Change the fuel hose together with the clamp every two (2) years. If the fuel hose and clamp are found to be damaged or deteriorated earlier than two (2) years, change or remedy. After the fuel hose and the clamp have been changed, bleed the fuel system.

### 200 HOUR CHECK POINTS

#### Checking the Water Hose

Check to see if the water hoses are properly fixed every 200 hours of machine operation or every six months, whichever comes first. The water hose is made of rubber and tends to age. Due to this, it must be changed every two (2) years along with the clamp. If the clamp is loose, apply oil to the threads and retighten the clamp securely.

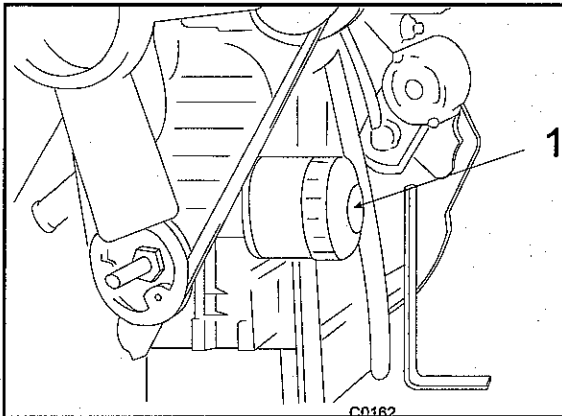
#### Changing Engine Oil

1. After warming up, stop the engine.
2. To change the used oil, position the drain hose to empty into a waste oil container, remove the oil drain cap (1) and drain off the oil completely.
3. Securely tighten the oil drain cap.
4. Fill (2) the new oil up to the upper notch on the dipstick.

## WARNING

The API classification of the engine oil should be SF class grade. Change the type of oil according to the ambient temperature of SAE viscosity grade.

Above 25°C (77°F)	SAE 30 or SAE 10W-30
0°C-25°C (32°F-77°F)	SAE 20 or SAE 10W-30
-12°C-0°C (10°F-32°F)	SAE 10W or SAE 10W-30
Below 12°C (10°F)	SAE 5W-30



C0162 FIGURE 38

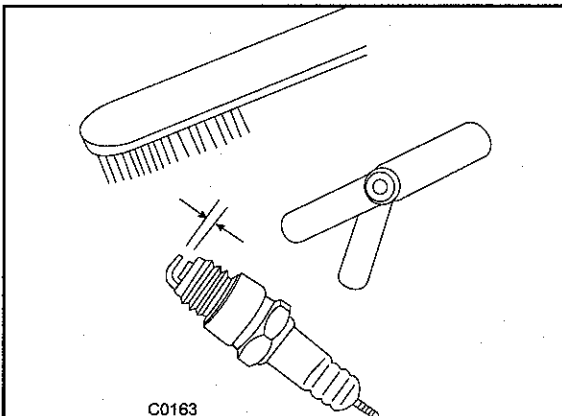
### To Change Engine Oil Filter (See Figure 38)

After the cartridge has been replaced. Check the oil level and add new oil to the specified level.

1. Remove the oil filter cartridge (Item1) with a filter wrench.
2. Apply engine oil to the rubber gasket on the new cartridge.
3. Screw the new cartridge in by hand.

#### NOTE

Overtightening may cause deformation of the rubber gasket.



C0163 FIGURE 39

### 400 HOUR CHECKPOINTS

#### To Check the Spark Plug Gap (See Figure 39)

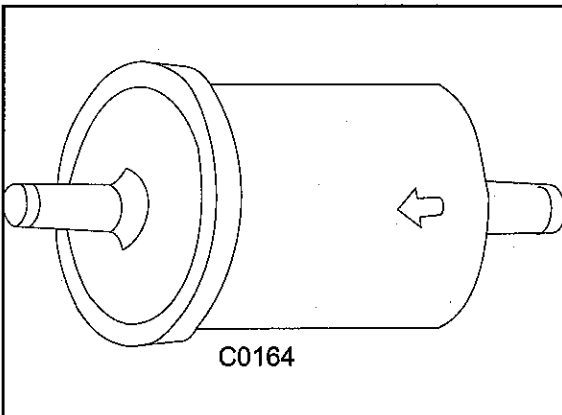
The spark plug gap should be checked after 400 hours of machine operation.

1. Remove carbon deposits with a wire brush.
2. Measure the clearance with a feeler gauge. The recommended spark plug gap is 0.039 to 0.043 inches (1.0 - 1.1 mm).
3. Set the gap if necessary

#### To Change the Fuel Filter (See Figure 40)

The fuel filter should be changed after 1 year of machine operation.

1. Stop the fuel from tank.
2. Replace the fuel filter with a new one (each year).



C0164 FIGURE 40



#### WARNING

Never remove the radiator cap until coolant water temperature is below its boiling point.

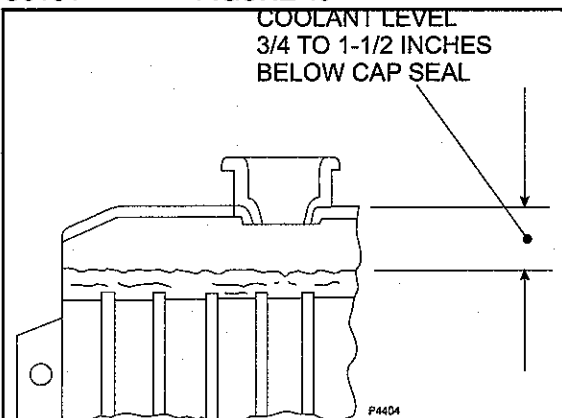
#### To Drain the Coolant

The coolant needs to be changed after 400 hours of machine operation.

1. Loosen the cap slightly to relieve any excess pressure before removing the cap completely.
2. Open the drain cock on the bottom of the radiator and drain cooling water into a suitable container.

#### NOTE

To prevent damage to the cooling system. Use a solution of 50% fresh, clean water and 50% Anti-Freeze to fill the radiator.

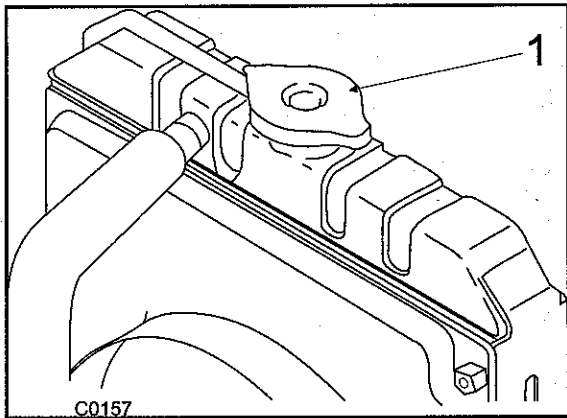


P4044 FIGURE 41

#### To Fill the Radiator

1. To drain the used coolant completely, open the radiator drain cock and remove the radiator cap.
2. The radiator should be filled with part antifreeze and part water at all times as recommended by the antifreeze manufacturer.
3. Fill the radiator so coolant level is between 3/4" and 1 1/2" below the cap seal.

## SERVICE INSTRUCTIONS



C0157 FIGURE 42

### To Clean the Water Jacket (Radiator Interior)

The cooling system should be cleaned on the following occasions:

- Every 400 service hours
- When adding antifreeze
- When changing from water containing antifreeze to pure water.

When cleaning the cooling system, Kubota Detergent No. 20 is recommended to effectively wash away rust build-up.

## TORQUE REQUIREMENTS

### STANDARD METRIC TORQUE VALUES

When tightening torques are not specified, tighten the bolts and nuts according to the table below.

GRADE		No-Grade or 4T			7T			9T		
		SS41, S20C			S43C, S48C			SCR435, SCM435		
Nom. Dia.	Unit	N.m	kgf.m	ft-lbs	N.m	kgf.m	ft-lbs	N.m	kgf.m	ft-lbs
M6 (6mm, 0.24 in.)		7.85	0.80	5.79	9.81	1.00	7.23	12.26	1.25	9.04
		to 9.32	to 0.95	to 6.87	to 11.28	to 1.15	to 8.32	to 14.22	to 1.45	to 10.49
M8 (8mm, 0.31 in.)		17.7	1.8	13.0	23.5	2.4	17.4	29.4	3.9	21.7
		to 20.6	to 2.1	to 15.2	to 27.5	to 2.8	to 20.3	to 34.3	to 3.5	to 25.3
M10 (10mm, 0.39 in.)		39.2	4.0	28.9	48.1	4.9	35.4	60.8	6.2	44.8
		to 45.1	to 4.6	to 33.3	to 55.9	to 5.7	to 41.2	to 70.6	to 7.2	to 52.1
M12 (12mm, 0.47 in.)		62.8	6.4	46.3	77.5	7.9	57.1	103.0	10.5	75.9
		to 72.6	to 7.4	to 53.5	to 90.2	to 9.2	to 66.5	to 117.7	to 12.0	to 86.8

### ENGINE TORQUE VALUES

Screws, bolts and nuts must be tightened to the specified torque using a torque wrench. Several screws, bolts, and nuts such as those used on the cylinder head must be tightened in proper sequence and at the proper torque.

ITEM	Size & Pitch	N.m	kgf.m	ft-lbs
*Head Cover Cap Nuts	M6 x 1.0	3.9 to 5.9	0.4 to 0.6	2.9 to 4.3
*Head Bolts	M8 x 1.25	37.2 to 42.1	3.8 to 4.3	28.9 to 32.5
*Bearing Case Bolts 1	M6 x 1.0	12.7 to 15.7	1.3 to 1.6	9.4 to 11.6
*Bearing Case Bolts 2	M7 x 1.0	26.5 to 30.4	2.7 to 3.1	19.6 to 22.5
*Flywheel Bolts	M10 x 1.25	53.9 to 58.8	5.5 to 6.0	39.8 to 43.4
*Connecting Rod Bolts	M6 x 0.75	26.5 to 30.4	2.7 to 3.1	10.8 to 13.7
*Rocker Arm Bracket Bolts	M6 x 1.0	9.81 to 11.28	1.00 to 1.15	7.23 to 8.32
*Idle Gear Shaft Bolts	M6 x 1.0	9.81 to 11.28	1.00 to 1.15	7.23 to 8.32
Spark Plugs	M14 x 1.25	19.6 to 24.5	2.0 to 2.5	14.5 to 18.1
Drain Plugs	M12 x 1.25	32.4 to 37.3	3.3 to 3.8	23.9 to 27.5
Oil Switch Taper Bolt	PT 1/8	14.7 to 19.6	1.5 to 2.0	10.8 to 14.5
*Crankshaft Bolt	M12 x 1.5	98.1 to 107.9	10.0 to 11.0	72.3 to 79.6

For "\*" marked bolts and nuts in the table, apply engine oil to their threads and seats before tightening.

Screw and bolt material grades are shown by numbers punched on the screw and bolt heads.

C-2005

## HYDRAULIC TORQUE REQUIREMENTS

### HYDRAULIC TORQUE REQUIREMENTS

Refer to the following chart for torque values on all hydraulic hoses and fittings.

Nominal SAE Dash Size	O-Ring Face Seal End		SAE O-Ring Boss End	
	Thread Size Inch	Swivel Nut Torque	Thread Size Inch	Str. Fitting or Locknut Torque
		LB-FT		LB-FT
-3	*	*	3/8-24	8-10
-4	9/16-18	10-12	7-16-20	14-16
-5	*	*	1/2-20	18-20
-6	11/16-16	18-20	9/16-18	24-25
-8	13/16-16	32-35	3/4-16	50-60
-10	1-14	46-50	7/8-14	72-80
-12	1 3/16-12	65-70	1 1/16-12	125-135
-14	1 3/16-12	65-70	1 3/16-12	160-180
-16	1 7/16-12	92-100	1 5/16-12	200-220
-20	1 11/16-12	125-140	1 5/8-12	210-280
-24	2-12	150-165	1 7/8-12	270-360

\* O-Ring face seal type end not defined for this tube size.

**NOTE**

**Parts must be lightly oiled with hydraulic fluid.**

C-2002

## TROUBLESHOOTING - BATTERY MACHINES

<u>PROBLEM</u>	<u>PROBABLE CAUSE</u>	<u>REMEDY</u>
Poor sweeping Sweeper/ Scrubber	<ol style="list-style-type: none"> <li>1. Broom jammed.</li> <li>2. Hopper full</li> <li>3. Broom does not turn</li> <li>4. Hopper not installed correctly</li> <li>5. Poor broom pattern</li> <li>6. Flaps worn</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove obstruction</li> <li>2. Empty hopper</li> <li>3. Adjust or replace broom belts. Reset circuit breakers. Adjust broom micro switches. Repair loose wire connections.</li> <li>4. Reinstall</li> <li>5. Adjust sweep pattern</li> <li>6. Repair or replace</li> </ol>
Poor water pickup at squeegee	<ol style="list-style-type: none"> <li>1. Recovery tank full</li> <li>2. Side or rear squeegees are worn or damaged.</li> <li>3. Clogged suction hose or pickup tool</li> <li>4. Loose connections between suction hose &amp; squeegee</li> <li>5. Vacuum motors not running</li> <li>6. Plugged filter</li> <li>7. Vacuum float cage clogged</li> <li>8. Vacuum float shut off</li> <li>9. Air leaks in suction hose &amp; connection</li> <li>10. Air leaks at recovery tank cover and/or manifold hose</li> <li>11. Drain hose or drain plug leaking or not closed properly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Empty tank.</li> <li>2. Examine squeegee rubber blade for cuts or worn spots.</li> <li>3. Disconnect suction hose from squeegee. Flush squeegee &amp; hoses thoroughly.</li> <li>4. Check all hose connections for looseness or damage.</li> <li>5. Reset circuit breaker or repair loose connection</li> <li>6. Clean filter element in vac manifold</li> <li>7. Clean perforated metal thoroughly.</li> <li>8. Excessive solution in recovery tank. Excessive foam buildup, change cleaning chemical. Use A-L materials.</li> <li>9. Repair or replace hose connections.</li> <li>10. Repair or replace seal or hose.</li> <li>11. Close, repair or replace drain plug in recovery tank.</li> </ol>
Water spills from sides of scrubber	<ol style="list-style-type: none"> <li>1. Side squeegee blades, poor floor contact</li> <li>2. Squeegee blades worn or damaged.</li> <li>3. Too much solution being applied before making turns.</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust blades for proper contact.</li> <li>2. Replace &amp; adjust</li> <li>3. Shut off solution flow 5' to 10' before making turns.</li> </ol>
Machine does not move	<ol style="list-style-type: none"> <li>1. Circuit breaker #11 is tripped</li> <li>2. Battery unplugged</li> <li>3. Foot pedal switches out of adjustment</li> <li>4. Seat switch out of adjustment</li> <li>5. Fuse blown</li> </ol>	<ol style="list-style-type: none"> <li>1. Breaker will reset automatically in approximately one (1) minute.</li> <li>2. Plug in battery</li> <li>3. Adjust or replace</li> <li>4. Adjust</li> <li>5. Replace</li> </ol>
Machine moves slowly or erratically	<ol style="list-style-type: none"> <li>1. Battery charge low</li> <li>2. Brakes dragging.</li> <li>3. Foot pedal switches out of adjustment</li> <li>4. Seat switch out of adjustment</li> <li>5. Overload of drive circuit</li> <li>6. Control Pot. out of adjustment</li> </ol>	<ol style="list-style-type: none"> <li>1. Charge</li> <li>2. Adjust</li> <li>3. Adjust or replace</li> <li>4. Adjust</li> <li>5. Remove obstruction. Put drive pedal in neutral</li> <li>6. Adjust</li> </ol>
Squeegee actuator makes noise while up or down	<ol style="list-style-type: none"> <li>1. Limit switches out of adjustment</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust</li> </ol>
Squeegee drags on floor while up	<ol style="list-style-type: none"> <li>1. Up limit switch out of adjustment</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust</li> </ol>
Squeegee leaves wet spots	<ol style="list-style-type: none"> <li>1. Lift cable too tight</li> <li>2. Wheels out of adjustment</li> <li>3. Incorrect spring pressure</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust</li> <li>2. Adjust</li> <li>3. Adjust</li> </ol>
Squeegee makes excessive noise	<ol style="list-style-type: none"> <li>1. Blades worn or damaged</li> <li>2. Incorrect spring pressure</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> <li>2. Adjust</li> </ol>
Poor scrubbing	<ol style="list-style-type: none"> <li>1. Worn scrubbing brushes</li> <li>2. Incorrect method of operation</li> <li>3. Wrong clean agent or mixture.</li> <li>4. Poor solution distribution</li> <li>5. Brushes don't turn</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect brushes. If they are worn to 1/2" (1.3 cm) or less, replace all 3 brushes.</li> <li>2. Check scrubbing procedures, brush pressure, type of brush, solution flow, &amp; cleaning chemical used. For extreme conditions, double scrubbing necessary.</li> <li>3. Use A-L recommended materials</li> <li>4. Clean out distribution tube &amp; metering hoses to brushes. Check feed hose and clean if necessary. Check valve &amp; cable control system.</li> <li>5. Check fuse or wire connections. Switch out of adjustment</li> </ol>

## TROUBLESHOOTING - GAS & DIESEL MACHINES

PROBLEM	PROBABLE CAUSE	REMEDY
Poor sweeping Sweeper/ Scrubber	<ol style="list-style-type: none"> <li>1. Broom jammed.</li> <li>2. Hopper full</li> <li>3. Broom does not turn</li>   <li>4. Hopper not installed correctly</li> <li>5. Poor broom pattern</li> <li>6. Flaps worn</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove obstruction</li> <li>2. Empty hopper</li> <li>3. Adjust or replace broom belts. Reset circuit breakers. Adjust broom micro switches. Repair loose wire connections.</li> <li>4. Reinstall</li> <li>5. Adjust sweep pattern</li> <li>6. Repair or replace</li> </ol>
Poor water pickup at squeegee	<ol style="list-style-type: none"> <li>1. Recovery tank full</li> <li>2. Side or rear squeegees are worn or damaged.</li> <li>3. Clogged suction hose or pickup tool</li>   <li>4. Loose connections between suction hose &amp; squeegee</li> <li>5. Vacuum motors not running</li>   <li>6. Plugged filter</li> <li>7. Vacuum float cage clogged</li> <li>8. Vacuum float shut off</li>   <li>9. Air leaks in suction hose &amp; connection</li> <li>10. Air leaks at recovery tank cover and/or manifold hose</li> <li>11. Drain hose or drain plug leaking or not closed properly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Empty tank.</li> <li>2. Examine squeegee rubber blade for cuts or worn spots.</li> <li>3. Disconnect suction hose from squeegee. Flush squeegee &amp; hoses thoroughly.</li> <li>4. Check all hose connections for looseness or damage.</li> <li>5. Reset circuit breaker or repair loose connection</li> <li>6. Clean filter element in vac manifold</li> <li>7. Clean perforated metal thoroughly.</li> <li>8. Excessive solution in recovery tank. Excessive foam buildup, change cleaning chemical. Use A-L materials.</li> <li>9. Repair or replace hose connections.</li> <li>10. Repair or replace seal or hose.</li> <li>11. Close, repair or replace drain plug in recovery tank.</li> </ol>
Water spills from sides of scrubber	<ol style="list-style-type: none"> <li>1. Side squeegee blades, poor floor contact</li> <li>2. Squeegee blades worn or damaged.</li> <li>3. Too much solution being applied before making turns.</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust blades for proper contact.</li> <li>2. Replace &amp; adjust</li> <li>3. Shut off solution flow 5' to 10' before making turns.</li> </ol>
Squeegee actuator makes noise while up or down	<ol style="list-style-type: none"> <li>1. Limit switches out of adjustment</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust</li> </ol>
Squeegee drags on floor while up	<ol style="list-style-type: none"> <li>1. Up limit switch out of adjustment</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust</li> </ol>
Squeegee leaves wet spots	<ol style="list-style-type: none"> <li>1. Lift cable too tight</li> <li>2. Wheels out of adjustment</li> <li>3. Incorrect spring pressure</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust</li> <li>2. Adjust</li> <li>3. Adjust</li> </ol>
Squeegee makes excessive noise	<ol style="list-style-type: none"> <li>1. Blades worn or damaged</li> <li>2. Incorrect spring pressure</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace</li> <li>2. Adjust</li> </ol>
Poor scrubbing	<ol style="list-style-type: none"> <li>1. Worn scrubbing brushes</li>   <li>2. Incorrect method of operation</li>   <li>3. Wrong clean agent or mixture.</li> <li>4. Poor solution distribution</li>   <li>5. Brushes don't turn</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect brushes. If they are worn to 1/2" (1.3 cm) or less, replace all 3 brushes.</li> <li>2. Check scrubbing procedures, brush pressure, type of brush, solution flow, &amp; cleaning chemical used. For extreme conditions, double scrubbing necessary.</li> <li>3. Use A-L recommended materials</li> <li>4. Clean out distribution tube &amp; metering hoses to brushes. Check feed hose and clean if necessary. Check valve &amp; cable control system.</li> <li>5. Check fuse or wire connections. Switch out of adjustment</li> </ol>
Engine runs, but machine will not move on level ground	<ol style="list-style-type: none"> <li>1. Foot pedal and/or linkage jammed</li> <li>2. Front wheels jammed &amp; brakes locked</li> <li>3. Hydraulic pump trouble</li> <li>4. Rear wheel hydraulic motor broken, broken shaft key, broken shaft, etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check pedal linkage</li> <li>2. Check wheels and brakes</li> <li>3. Check &amp; repair. See CESSNA section</li> <li>4. Check &amp; repair</li> </ol>
Machine moves slowly	<ol style="list-style-type: none"> <li>1. Low hydraulic oil level</li> <li>2. Brake dragging</li> <li>3. Hydraulic oil temperature too high</li> <li>4. Worn hydraulic pump or drive wheel motor</li> </ol>	<ol style="list-style-type: none"> <li>1. Add oil to reservoir</li> <li>2. Check brakes</li> <li>3. Check oil level, add Sae 5 ATF if required</li> <li>4. See CESSNA troubleshooting section</li> </ol>
Hydraulic pump making excessive noise	<ol style="list-style-type: none"> <li>1. Clogged inlet strainer or suction line</li>   <li>2. Air bubbles in hydraulic fluid</li>   <li>3. Worn or damaged hydraulic pump</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean inlet strainer. Check inlet line. Drain &amp; flush reservoir if oil is dirty and refill with SAE 5ATF.</li> <li>2. Check for low hydraulic fluid level, leaking fittings or hoses.</li> <li>3. See CESSNA troubleshooting section</li> </ol>

## TROUBLESHOOTING - LIQUID PROPANE GAS

### NOTE

ALWAYS CHECK THROUGH THE LP FUEL SYSTEM IN ORDER OF NUMERICAL SEQUENCE

	<b>WILL NOT START</b>	<b>RUNS UNEVENLY AND LACKS POWER</b>	<b>STOPS DURING OPERATION</b>
<b>(1) FUEL TANK</b>	<ul style="list-style-type: none"> <li>-Check fuel tank type and fuel supply (vapor tank for vapor withdrawal system.)</li> <li>-Be sure tank hand valve is open (always open valve slowly). If hand valve is opened too fast, shutoff valve in tank will automatically shut off fuel supply. If this happens, close the hand valve and then reopen it slowly.</li> </ul>	<ul style="list-style-type: none"> <li>-Out of fuel</li> <li>-Check fuel tank type &amp; fuel supply (liquid tank for liquid withdrawal system.)</li> </ul>	<ul style="list-style-type: none"> <li>-Tank valve not opened sufficiently.</li> <li>-Check fuel tank type &amp; fuel supply (liquid tank for liquid withdrawal system.)</li> </ul>
<b>(2) FUEL LINE</b>	<ul style="list-style-type: none"> <li>-Check hoses, connections, leaks, etc., Using soap bubble test method.</li> <li>-When changing LP fuel tanks, always be sure fuel is getting into carburetor. Crank engine briefly and push primer button until vapor fumes are smelled or are visible at carburetor, or around air filter.</li> <li>-Check fuel tanks and lines for frosting up. To relieve frosting, open shutoff valve slowly (approx. ¼ open.) Start engine and idle until warm. Then open tank valve completely before loading the engine. If frost forms on connection fittings, check for fuel leakage, kinked lines, or restriction at frost points.</li> <li>-Check fuel filter. Remove and clean it if dirty filter is restricting fuel line. Check quick disconnect fitting at LP tank; if LP tank valve isn't properly seated, no fuel will flow through the line. A broken fuel line or loose connection could cause the tank shutoff valve to close.</li> </ul>	<ul style="list-style-type: none"> <li>-Broken fuel line or loose fuel line connection could cause tank internal shut off valve will close automatically and shut off fuel supply</li> </ul>	
<b>(3) IGNITION SYSTEM</b>	<ul style="list-style-type: none"> <li>-Remove and check spark plug to be sure it is the correct type with proper gap.</li> <li>-Check ignition points and condenser</li> <li>-Check ignition coil</li> <li>-Check ignition switch</li> <li>-Check wiring for loose connections or wire breakage</li> <li>-Check battery terminals for corrosion or loose ground cables</li> <li>-Check for possible shorts in wiring</li> <li>-Battery dead</li> <li>-No current to filter-fuel lock solenoid valve or possible defective solenoid</li> </ul>	<ul style="list-style-type: none"> <li>Check electrical system for loose connections or intermittent shorts.</li> <li>Check spark &amp; electrical system for malfunction of condenser, points, etc.</li> <li>Check for broken wires or defective relay. Relay can be checked by bypassing relay &amp; directly energizing the solenoid valve in filter fuel lock.</li> </ul>	<ul style="list-style-type: none"> <li>Check ignition for poor connections or weak or worn ignition parts.</li> </ul>

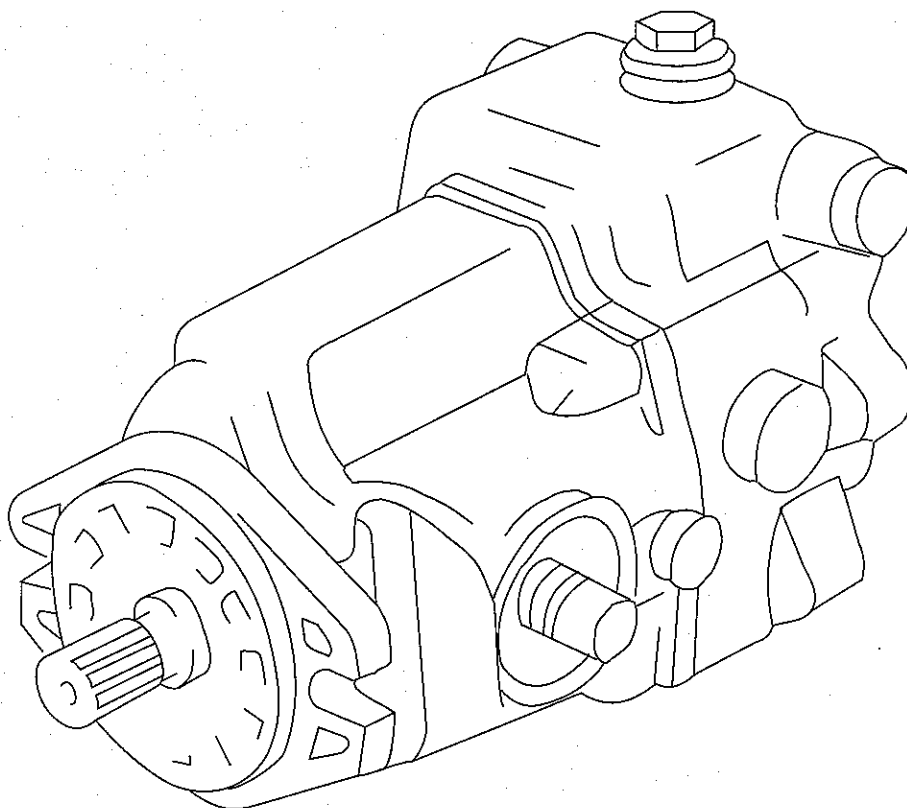
## TROUBLESHOOTING - LIQUID PROPANE GAS

### NOTE

ALWAYS CHECK THROUGH THE LP FUEL SYSTEM IN ORDER OF NUMERICAL SEQUENCE

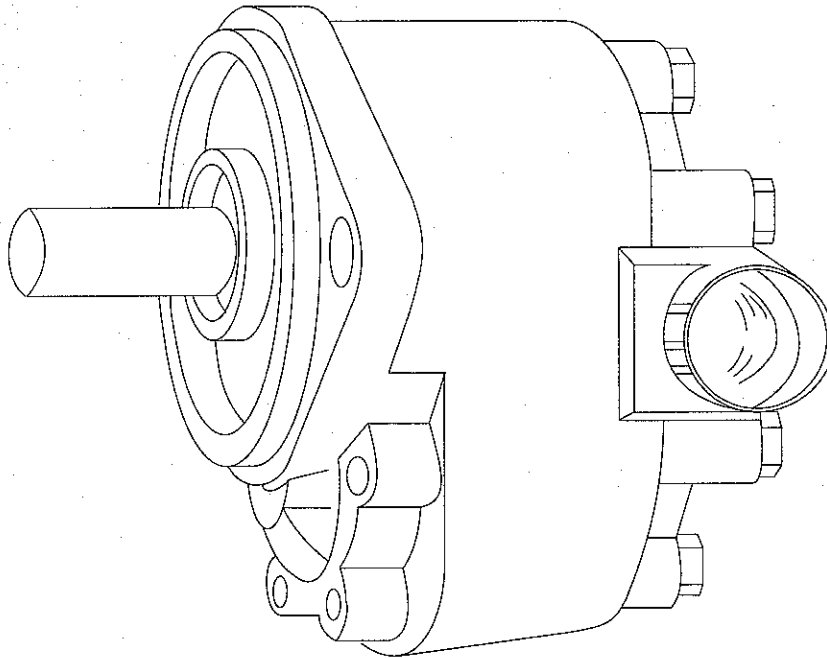
	<b>WILL NOT START</b>	<b>RUNS UNEVENLY AND LACKS POWER</b>	<b>STOPS DURING OPERATION</b>
(4) CARBURETOR	<ul style="list-style-type: none"> <li>-Always check carburetor for proper settings before tampering with regulator adjustment.</li> <li>-Flooded carburetor-Shut off LP tank valve with ignition switch "ON"; crank engine through a few times. If the engine starts, then slowly open tank valve to provide fuel flow through line. If engine does not start before opening fuel tank valve, then choke engine &amp; use standard starting procedure</li> </ul>	<ul style="list-style-type: none"> <li>-Restricted air cleaner</li> <li>-Clean and replace filter element</li> </ul>	<ul style="list-style-type: none"> <li>-Check carburetor setting</li> <li>-Check ignition system</li> </ul>
(5) REGULATOR	<ul style="list-style-type: none"> <li>-Be sure carburetor is properly adjusted before attempting to adjust regulator setting.</li> <li>-Check vaporizer regulator. Be sure it is functioning properly. In troubleshooting, be sure all of the previous five check points have been checked thoroughly before making any adjustment.</li> </ul>	<ul style="list-style-type: none"> <li>-Only after checking the carburetor setting should the regulator be checked (too rich, too lean). Could very definitely affect operation if carburetor adjustment is correct</li> </ul>	<ul style="list-style-type: none"> <li>-Could be improper setting. Allow too rich or too lean mixture to carburetor. Check and adjust only after checking carburetor adjustment.</li> </ul>
(6) ENGINE	<ul style="list-style-type: none"> <li>-Under ordinary circumstances an engine, should start easily if the components previously mentioned have been checked thoroughly and properly adjusted. On an older engine, if proper adjustment on other components are correct, it is possible that major repairs may be required to the basic engine</li> </ul>		

## TROUBLESHOOTING - CESSNA PUMPS



<b><u>PROBLEM</u></b>	<b><u>PROBABLE CAUSE</u></b>	<b><u>REMEDY</u></b>
1. System will not operate either direction	<ul style="list-style-type: none"> <li>A1. Oil supply low</li> <li>B. Oil filter clogged</li> <li>C. Oil too heavy</li> <li>D. Control linkage misadjusted</li> <li>E. Low charge pressure</li> <li>F. Drive coupling broken</li> <li>G. High pressure relief valve stuck open or damaged seat</li> </ul>	<ul style="list-style-type: none"> <li>A. Check oil level, fill</li> <li>B. Replace filter element</li> <li>C. Use proper viscosity</li> <li>D. Check to see if control linkage is binding or unfastened</li> <li>E. See below: F &amp; G. Pressure should be 60-100 PSI</li> <li>F. Inspect coupling for sheared spline, key or broken chain</li> <li>G. Remove relief valve, clean or replace. Inspect relief valve seat</li> </ul>
2. System noisy	<ul style="list-style-type: none"> <li>A. Air in system</li> <li>B. Loose suction line</li> <li>C. Clogged suction filter</li> <li>D. Internal pump or motor damage</li> </ul>	<ul style="list-style-type: none"> <li>A. Low oil level in reservoir</li> <li>B. Tighten fittings</li> <li>C. Replace filter element</li> <li>D. Disassemble, inspect, &amp; repair</li> </ul>
3. Sluggish response to acceleration or deceleration	<ul style="list-style-type: none"> <li>A. Air in system</li> <li>B. Low charge pressure</li> <li>C. Internal pump or motor wear or damage</li> <li>D. Relief valve dirty or damaged</li> </ul>	<ul style="list-style-type: none"> <li>A. See step 1-A, 1-B, 1-C, 2-B</li> <li>B. See step 1-F, 1-G</li> <li>C. Disassemble, inspect, &amp; repair</li> <li>D. Remove, clean, or replace</li> </ul>

## TROUBLESHOOTING - CESSNA PUMPS



<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
1. Noisy pump caused by cavitation	<ul style="list-style-type: none"> <li>A. Oil too heavy</li> <li>B. Oil filter plugged</li> <li>C. Suction line plugged</li> </ul>	<ul style="list-style-type: none"> <li>A. Change to proper viscosity</li> <li>B. Clean filters</li> <li>C. Check and clean suction strainer</li> </ul>
2. Oil heating	<ul style="list-style-type: none"> <li>A. Oil supply low</li> <li>B. Contaminated oil</li> <li>C. Setting or relief valve too high or too low</li> <li>D. Oil in system too light</li> </ul>	<ul style="list-style-type: none"> <li>A. Fill reservoir</li> <li>B. Drain reservoir &amp; refill with clean oil</li> <li>C. Set to correct pressure</li> <li>D. Drain reservoir &amp; refill with proper viscosity oil</li> </ul>
3. Shaft seal leakage	<ul style="list-style-type: none"> <li>A. Worn shaft seal</li> <li>B. Worn shaft in seal area</li> <li>C. Broken bearing seal or back-up gasket</li> <li>D. Bushings out of position</li> <li>E. Excessive internal wear</li> </ul>	<ul style="list-style-type: none"> <li>A. Replace shaft seal</li> <li>B. Replace drive shaft</li> <li>C. If replacing the shaft seal does not stop leakage the pump should be replaced</li> <li>D. Disassemble pump and replace pump and replace front plate</li> <li>E. Disassemble pump and inspect parts &amp; replace as needed.</li> </ul>
4. Foaming oil	<ul style="list-style-type: none"> <li>A. Low oil level</li> <li>B. Air leaking into suction line</li> <li>C. Wrong kind of oil</li> </ul>	<ul style="list-style-type: none"> <li>A. Fill reservoir</li> <li>B. Tighten fittings</li> <li>C. Drain and fill reservoir with non-foaming oil</li> </ul>

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**B-SIZE - P5010A**

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**B-SIZE - P5011A**

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**B-SIZE - C0167B**

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**B-SIZE - C0168C**

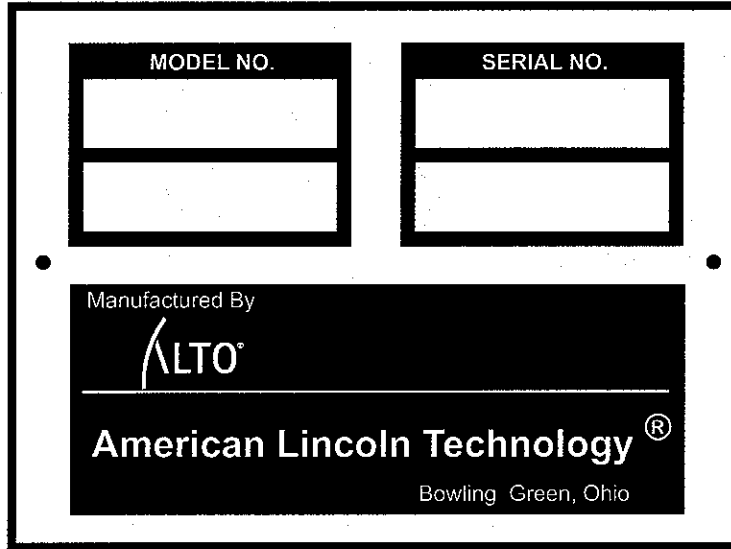
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**B-SIZE - C0167A**

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**B-SIZE - C168B**

Parts may be ordered from American-Lincoln authorized distributors. Inspect the Alto U.S. serial plate to avoid delays in filling you orders:



1. Use the model number, catalog number, and serial number when ordering.
2. Give the part number, description, and quantity of parts needed.
3. Give shipping instructions for either freight, UPS, or parcel post.

Parts and supplies listed in this manual can be ordered from the following address:

<b>Alto U.S., Inc. American Lincoln Technologies</b>	<b>Alto U.S., Inc. Distributor</b>
<b>1100 Haskins Road Bowling Green, Ohio 43402 (800) 331-7692</b>	

**MACHINE CATALOG NUMBER**

- |         |   |
|---------|---|
| 505-301 | Model 6700 Gas Powered Sweeper/Scrubber     |
| 505-302 | Model 6700 Diesel Powered Sweeper/Scrubber  |
| 505-303 | Model 6700 Battery Powered Sweeper/Scrubber |