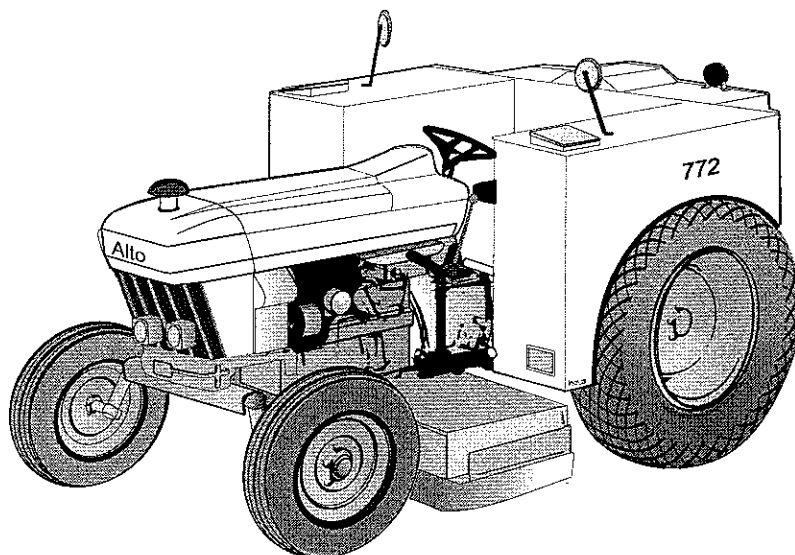




## AMERICAN-LINCOLN TECHNOLOGY

Operator's  
Manual



772  
Scrubmobile

Beginning with  
Serial No. 102569

### READ THIS BOOK!

This book has important information for the use and safe operation of this machine. Failure to read this book prior to operating or attempting any service or maintenance procedure to your machine could result in injury to you or to other personnel; damage to the machine or to other property could occur as well. You must have training in the operation of this machine before using it. If you or your operator (s) cannot read English, have this manual explained fully before attempting to operate this machine.

Si Ud. o sus operadores no pueden leer el Inglés, se hacen explicar este manual completamente antes de tratar el manejo o servicio de esta máquina.

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: Alto U.S., Inc., 1100 Haskins Road, Bowling Green, Ohio 43402



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## MACHINE SPECIFICATIONS

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<b>CLEANING PATH</b>	72 inches
<b>TRAVEL SPEED</b>	1.3 - 14 MPH
<b>TURNING RADIUS</b>	117 inches
<b> AISLE WIDTH FOR U-TURNS</b>	20 Feet
<b>DIMENSIONS</b>	
Length	138.50 inches
Width	93.3 inches
Height	66.5 Inches without Guard
<b>WEIGHT</b>	5800 lbs. Net

### FRAME

Main frame assembly utilizes Ford 3930 Series industrial tractor as base component. All heavy-duty steel construction.

### POWER SOURCE

Available in gasoline, liquid propane (LP) or diesel power 45 P.T.O.-HP, 3-cylinder, liquid cooled, Ford 201 cu. in. industrial engine, electric start, Engine air filter, 17.3 gal. Fuel tank, LP model includes a 33 lb. tank (ICC) and fittings, catalytic exhaust muffler to reduce emissions (Diesel model).

### TRANSMISSION

8-speed forward, 2-speed reverse, manual high-low gear shift with foot operated clutch.

### ELECTRICAL SYSTEM

12 volt, automotive type, with maintenance free battery.

### HYDRAULIC SYSTEM

Heavy-duty Ford Tractor gear pump provides power to individually mounted brush drive motors. 2500 PSI high pressure relief valve for squeegee and brush lift mechanisms.

### SOLUTION TANKS

Two (2) 100 gallon capacity each, steel construction, one on each side, crossover allows filling from either side, clean-out doors and oversize fill openings are standard.

### RECOVERY TANK

One (1) 210 gallon capacity, steel construction, equipped with vacuum shut-off float activated when tank reaches capacity. Clean-out doors and dump valves for easy draining.

### VACUUM SYSTEM

Power provided by a regenerative air turbine, V-belt driven from the tractor PTO to 5,000 RPM.

### SCRUBBING BRUSHES

Four (4) 18 inches diameter, disc type

Brushes are mounted to a 3/8" steel frame and are readily accessible. Hydraulic cylinder raises and lowers brush assembly off ground level for travel and storage. Scrub brush discs are gimbals mounted to follow irregular floor contours. One-piece or sectional brushes are available.

### OPTIONAL BRUSHES

- Bassine
- Straight wire
- Nylon
- Amerfil (.025)
- Amerfil (.040)
- Amerfil and wire (One-piece only)
- Amergrit
- Supergrit
- Soft Nylon
- Crimped wire scarifier (sectional only)

### SQUEEGEE ASSEMBLY

Two (2) overlapping, independently suspended double-bladed, gum rubber. Swivel caster allows adjustment up and down for optimum pick-up pressure. Provides maximum recovery from cracks and porous surfaces. Squeegees lift automatically when unit goes into reverse direction.

### STEERING

Hydrostatic power steering.

### BRAKES

Mechanical wet discs on individual rear wheels, separate parking brake control.

### CONTROLS

Key start ignition	Tachometer,
Alternator warning light	Recovery tank level warning light
Headlights	Horn button
Rear reflectors	Brush and squeegee raise/lower levers
Engine hour meter,	PTO lever
Brush drive control	Solution metering control.

### BEARINGS & LUBRICATION

All ball bearings on rotating shafts are lubricated for long life and sealed against dust and foreign material. Grease fittings are provided to allow for proper lubrication at all necessary points.

### TIRES

Front	(2) 7.50 - 18 pneumatic rubber
Rear	(2) 13.6 - 28 pneumatic rubber

### FILTERS

One (1) engine and one (1) hydraulic oil filter trap particles down to 10 microns in size.

## MACHINE SPECIFICATIONS

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### FORD 3930 TRACTOR SPECIFICATIONS

#### **CAPACITIES**

Fuel Tank	17.3 US gals.
Cooling System	11.2 US qt.
Power Steering System	2.3 US qt.
Engine Crankcase	
With Filter Change	7 US qt.
Without Filter Change	6 US qt.
Hydraulic Lift System (Rear Axle)	
With Ind. P.T.O.	12.0 US gal.
Transmission	
8 x 2	3.2 US gal.

#### **ENGINE**

Bore	4.4 in.
Stroke	4.4 in.
Displacement	201 cu. in.
Compression Ratio	
Diesel/Gasoline	16.3:1 / 7.75:1
Firing Order	1 - 2 - 3
Idle Speed(rpm)	600-850
Maximum Speed:	No Load (rpm)2175
Rated (rpm)	2000
Low Idle	600-850
Valve Clearance	
(Lash) Warm	
Engine	
Intake	0.014 in. - 0.016 in.
Exhaust	0.017 in. - 0.019 in.

#### **LUBRICANTS**

All Ford Tractor lubricants are specially blended from select base stocks and premium additives for long life and trouble-free service. The use of these lubrications is recommended as follows:

##### **Oils:**

Transmission/Rear Axle/hydraulic Sump	Ford M2C134-D/C
Power Steering Pump	Ford M2C134-D/C
Engine Crankcase	Ford M2C121-E
(see note below)	

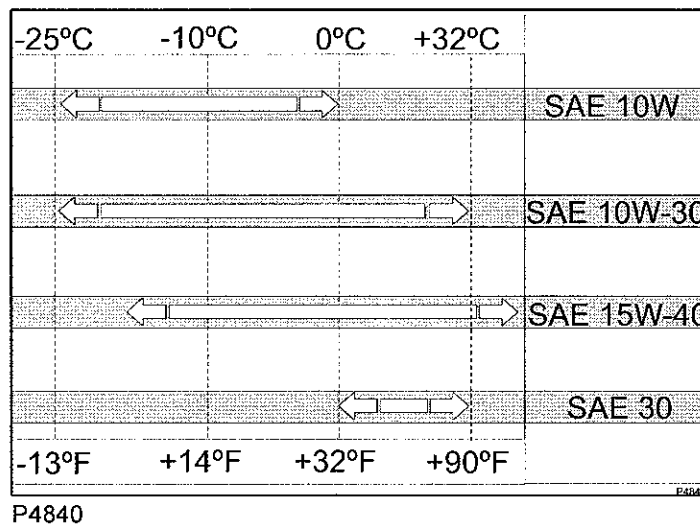
##### **Grease:**

Front Wheel Bearings and all Grease Fittings-M1C75-A/B or M1C137-B

#### **NOTE: Engine Crankcase Oils**

- 1) Viscosity grade selection for your climate:(see Figure 2)

## MACHINE SPECIFICATIONS



### OUTDOOR TEMPERATURES AND RANGES OF APPLICATION

In areas where prolonged periods of extreme temperatures are encountered, local lubricant practices are acceptable, such as the use of SAE 5W, SAE 40 or SAE 50 grades of oil. These oils must be of API CD or SF/CD Quality.

Engine crankcase oil drain intervals should be adjusted downward when diesel fuel sulfur content is above 0.5%. Consult your dealer for details of Engine Crankcase Oil Usage.

### COOLING SYSTEM

Type	Pressurized liquid, re-circulating bypass
Water Pump	
Type	Centrifugal
Drive	V-belt
Fan	
Diameter	16 in.
Fan belt deflection 1/4 to 1/2 in. with 25 lbs. force applied midway between alternator and crankshaft pulleys	
Thermostat:	
Starts to Open	180° F
Fully Open	203° F
Radiator Cap	10 psi

### ELECTRICAL SYSTEM

Alternator	12-volt
Output	55 amp. (STD)
Voltage Regulator	Integral
Battery	
Diesel Engine	107 amp. hour rating
Ground	negative
Starting Motor	positive engagement
Headlamp Sealed Beam Unit (Std. Fenders)	No. 4419
Headlamp (Opt. Flat Top Fenders)	
Dual Beam (inner) Lamps	No. 4460
Tail Lamp Bulb	No. 1155
Flasher Warning Lamp Bulb	No. 1156
Instruments and Warning Light Bulb	No. 1895



## MACHINE SPECIFICATIONS

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### IGNITION SYSTEM

Diesel	
Type	compression
Gasoline	
Type	spark
Method	coil and distributor
Distributor Point Gap-Breaker	0.022-0.025 in.
Dwell Angle	35-38
Timing (at 600-700 rpm with vacuum line disconnected)	5 Deg. BTDC
Spark Plugs	
Type	Autolite AG5
Gap	0.023-0.027 in.

### CLUTCH

w/Independent P.T.O.	13 in. single dry plate
Pedal Free Travel	1.1-1.6 in.

### BRAKES

Type	Mechanical, wet disc
Disc Diameter	8.0 in. O.D., 6.8 in. I.D.
No. Of Discs	3 Per Side

### STEERING

Type	Hydrostatic Power
Steering	
Turns Lock-to-Lock	3.4
Pump	
Type	gear

### FUEL SYSTEM

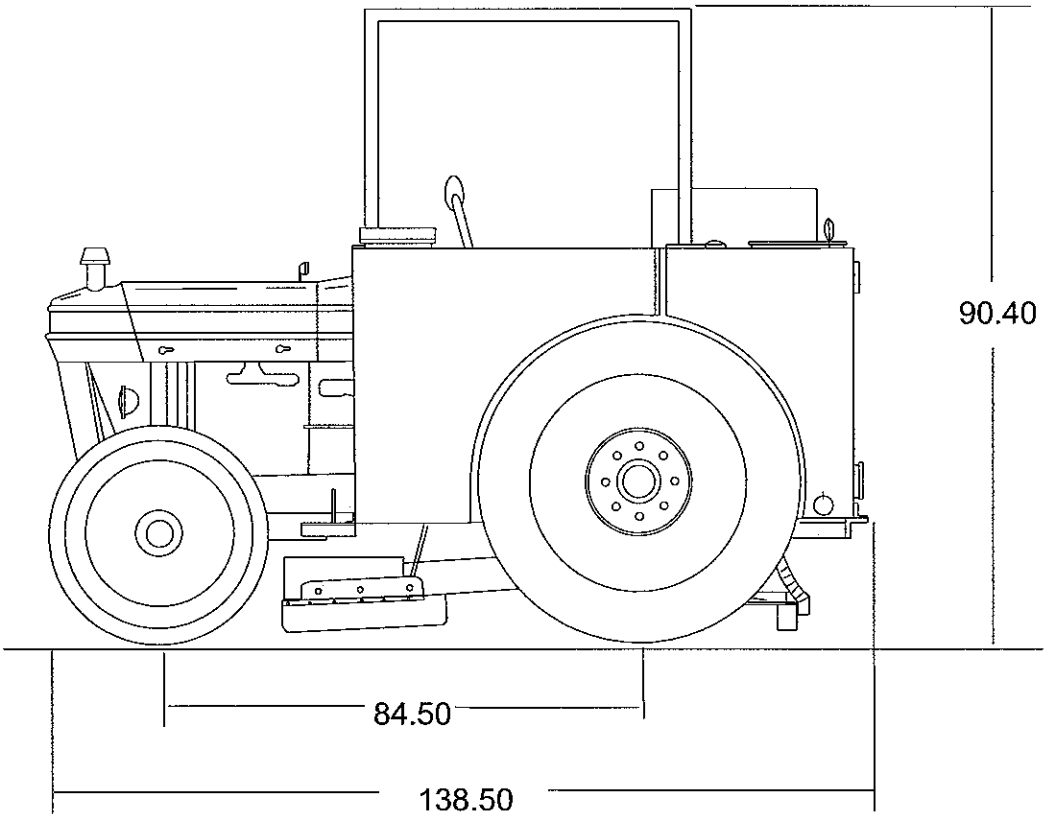
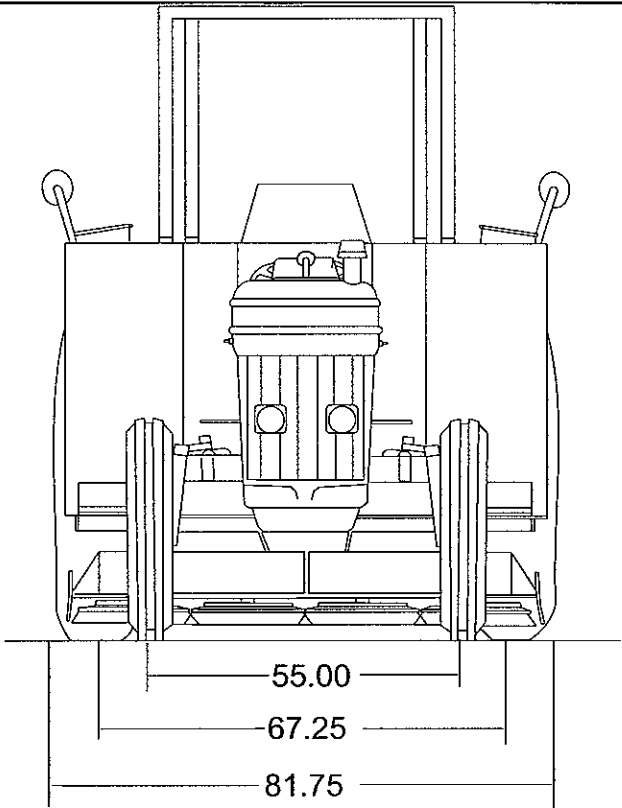
Carburetor	(Gasoline):
Type	Zenith
Injection Pump (Diesel)	
Type	Distributor
8 x 2 TRANSMISSION	

### ROAD SPEED IN MILES PER HOUR AND KILOMETERS PER HOUR

Gear	Engine Speed
	1450 RPM
1	1.2 MPH
2	1.51 MPH
3	2.65 MPH
4	3.60 MPH
5	4.31 MPH
6	5.38 MPH
7	4.46 MPH
8	12.85 MPH
R1	1.77 MPH
R2	6.20 MPH

Tire Size	13.6 x 28
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**MACHINE DIMENSIONS**



## **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.



### **WARNING**

Only enter and leave the machine from the right (curb) side using steps and handlebar provided.

Do not fill fuel tank with engine running. Do not smoke or use open flame near the fuel tank. Do not overfill LP tank. Make sure fuel container and machine are electrically connected when refueling.

Lead acid batteries emit a highly explosive hydrogen gas that can be ignited by electrical arcing or by smoking.

Provide adequate ventilation system to properly expel discharged gases. Check exhaust system regularly for leaks. Ensure that exhaust manifolds are secure and not warped.

Keep away from powerful vacuum fan suction at fan intake. Do not remove hose on fan intake housing while running.



### **CAUTION**

Avoid moving parts of the unit. Loose jackets, shirts or sleeves should not be permitted when working on machine because of the danger of becoming caught in moving parts. Make sure all nuts and bolts are secure. Keep shields and guards in position. If adjustments must be made while the unit is running, use extreme caution around hot manifolds, moving parts, V-belts, etc. Disconnect positive battery terminal before removing instrument panel.

Do not start machine unless you are in driver's seat, with foot on brake pedal, or hand brake engaged, and transmission in neutral position.

## **SAFETY DECALS**

THE FOLLOWING SAFETY DECALS ARE MOUNTED ON THE MACHINE. FIND AND NOTE THEIR LOCATION. REPLACE ALL SAFETY DECALS THAT ARE LOST OR ILLEGIBLE



### **CAUTION**

**FOR SAFETY, OBSERVE THE FOLLOWING WARNINGS. FAILURE TO COMPLY MAY CREATE A SERIOUS RISK OF INJURY TO YOURSELF AND OTHERS. THIS MACHINE SHOULD NOT BE USED IN HAZARDOUS LOCATIONS INCLUDING AREAS OF VOLATILE DUST OR VAPOR CONCENTRATIONS**

1. Operators must be trained, Qualified and Understand the Operator's Manual Before Starting.
2. Use caution when mounting and dismounting the machine particularly on wet surfaces.
3. Operate only from the designated operator's position. Keep inside the body of the machine. Keep hands and feet on the designated controls. Always operate in well Lighted areas.
4. Do not dump Hopper over an open pit or dock. Do not dump hopper when positioned on grade (Ramp). Machine must be level (Horizontal).
5. The operator must exhibit extreme caution when negotiating, turning and traveling across grades or ramps.
6. Start, stop, change directions, travel and brake smoothly. Slow down when turning. Avoid uneven surfaces and loose materials.
7. Watch out for obstructions, especially overhead.
8. Carry no passengers on machine.
9. Set parking brake when leaving the machine. Chock (block) the wheels if the machine is to be parked on a grade or ramp, or is to be worked on.
10. Never leave the operator's seat with the engine running.
11. Report damage or faulty operation immediately. Do not operate the machine until repairs have been



### **WARNING**

**NO GASOLINE, COMBUSTIBLE OR FLAMMABLE MATERIAL IN THIS TANK USE DIESEL FUEL ONLY.**



### **WARNING**

1. NEVER FILL FUEL TANK WHILE ENGINE IS RUNNING
2. TO AVOID STATIC DISCHARGE, BE SURE FUEL CONTAINER AND MACHINE ARE GROUNDED BEFORE POURING FUEL.

**DO NOT FILL - LIQUID PROPANE ONLY**



### **WARNING**

**ALWAYS SET PARKING BRAKE AND SHUT OFF ENGINE BEFORE LEAVING SEAT OF MACHINE.**



### **WARNING**

**DO NOT REMOVE RADIATOR CAP WHILE ENGINE IS HOT. RADIATOR CORE MUST BE KEPT CLEAN TO PREVENT OVERHEATING.**



### **WARNING**

**KEEP HANDS AND CLOTHING AWAY FROM ROTATING FAN AND BELTS TO PREVENT SERIOUS INJURY**



### **WARNING**

**START ENGINE ONLY FROM OPERATORS SEAT, IF SAFETY START SWITCH IS BY-PASSED, ENGINE CAN START WITH TRANSMISSION IN GEAR.**

**DO NOT CONNECT OR SHORT ACROSS TERMINALS ON STARTER SOLENOID.**

**ATTACH BOOSTER CABLES AS SHOWN ON BATTERY DECAL.**

**STARTING IN GEAR CAUSING RUNAWAY, CAN RESULT IN SERIOUS INJURY.**

## **SAFETY DECALS**

---



### **WARNING**

#### **BEFORE STARTING AND OPERATING:**

- KNOW THE OPERATION AND SAFETY INSTRUCTIONS IN THE OPERATORS MANUAL, AND ON THE TRACTOR.
- CLEAR THE AREA OF BYSTANDERS.
- LOCATE AND KNOW THE OPERATION OF ALL CONTROLS.
- FASTEN YOUR SEAT BELT.

**START ENGINE ONLY FROM OPERATORS SEAT WITH TRANSMISSION IN NEUTRAL, P.T.O.DISENGAGED AND HYDRAULIC CONTROLS IN LOWERED POSITION.**

**AVOID ACCIDENTAL CONTACT WITH THE GEARSHIFT LEVER WHILE THE ENGINE IS RUNNING. UNEXPECTED TRACTOR MOVEMENT CAN RESULT.**

**SLOW DOWN ON TURNS, ROUGH GROUND AND SLOPES TO AVOID UPSET.**

**DO NOT PERMIT ANYONE BUT THE OPERATOR TO RIDE ON THE TRACTOR. THERE IS NO SAFE PLACE FOR RIDERS.**

**LOCK BRAKES TOGETHER, USE WARNING LIGHT AND SMV EMBLEM WHILE DRIVING ON ROADS.**

**LOWER EQUIPMENT, PLACE GEAR SHIFT LEVERS IN NEUTRAL, STOP ENGINE AND APPLY PARKING BRAKE BEFORE LEAVING TRACTOR SEAT.**

**FAILURE TO FOLLOW ANY OF THE INSTRUCTIONS ABOVE CAN CAUSE SERIOUS INJURY TO THE OPERATOR OR OTHER PERSONS.**

Replacement Materials Are Available From Your Local FORD New Holland Dealer or From:  
FORD New Holland Service Publications - 500 Diller Ave. New Holland, Pa. 17557

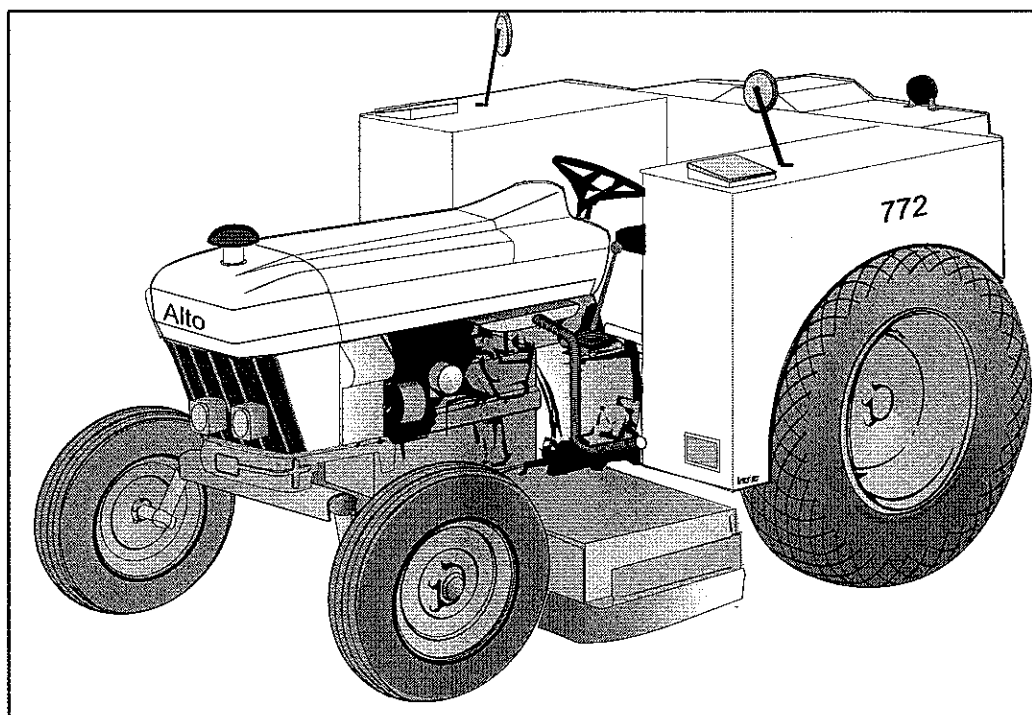


### **WARNING**

#### **TO JUMP START**

##### **(Negative Grounded Battery)**

1. SHEILD EYES.
2. CONNECT ONE END OF ONE CABLE TO POSITIVE [+] TERMINALS OF EACH BATTERY.
3. CONNECT ONE END OF OTHER CABLE TO NEGATIVE [-] TERMINAL OF GOOD BATTERY.
4. CONNECT OTHER END TO ENGINE BLOCK OF VEHICLE BEING STARTED. TO PREVENT DAMAGE TO OTHER ELECTRICAL COMPONENTS ON VEHICLE BEING STARTED, MAKE CERTAIN THAT ENGINE IS AT IDLE SPEED BEFORE DISCONNECTING JUMPER CABLES.



P4330

FIGURE 3

### MACHINE PREPARATION

YOUR AMER-CAN-LINCOLN 772 SCRUBMOBILE HAS BEEN SHIPPED COMPLETE, BUT DO NOT ATTEMPT TO OPERATE WITHOUT READING THE FOLLOWING INSTRUCTIONS.

1. Connect the squeegees.
2. Connect and tighten battery cables
3. Fill tank with appropriate fuel

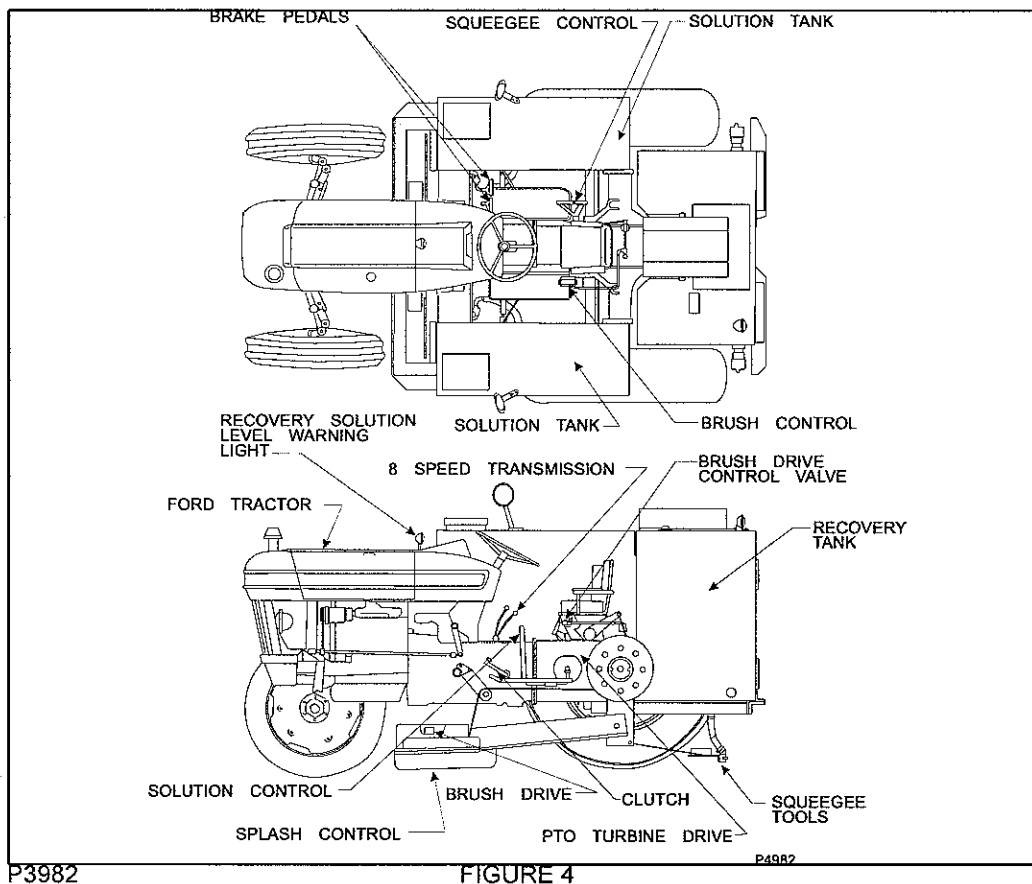


### WARNING

Never fill fuel tank while the engine is running. Always be sure the fuel dispenser and machine are electrically connected before fueling. 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 50 hours. See lubrication and maintenance section of the Ford tractor manual.
5. Check radiator coolant level. Permanent type antifreeze is added at the factory to provide protection to approximately -35°F. To retain this protection level, always add ½ part water to ½ part anti-freeze.
6. In addition to regular service operations listed, the following items should be checked every 10 hours or daily during the first 50 hours of operation.

- Transmission Oil Level
- Rear Axle Oil Level
- Rear Wheel Nuts for Tightness



### FORD 3930 TRACTOR POWER UNIT - Figure 4

The American-Lincoln H772 Scrubber utilizes a Ford Tractor Model 3930 as the power unit. The power unit provides hydraulic power for the brush drive, squeegee and brush position functions. The independent Power take off is used to drive the vacuum turbines.

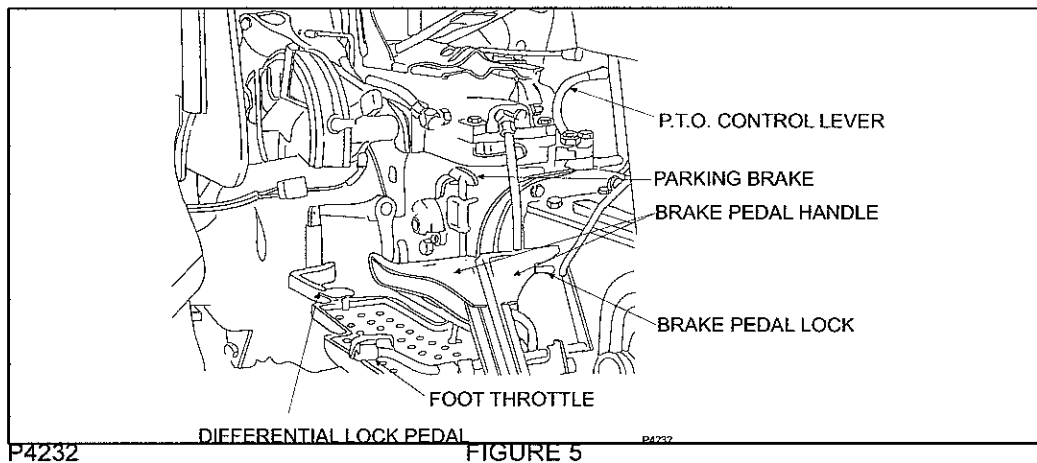
This manual includes some pertinent Ford Tractor Operator's Manual information for the 3930. Consult the Ford 3930 Operator's Manual for all other tractor related information. Parts for the 3930 power unit are available from your local Ford New Holland Dealer.

#### Standard Features:

- The Ford Tractor is equipped with an 8 x 2 speed mechanical foot clutch controlled transmission.
- The engine is governed at 1450-1500 RPM. Power take off is 435.
- Mechanical wet disc independently controlled brakes are provided for each rear wheel.
- Ford power steering is provided.
- Headlights and rear work light are provided.
- Differential lock for added traction (not used while scrubbing)

#### Tires:

Pneumatic Type	
Front 7.50	18 rim size
Rear 13.6	28 rim size



### **BRAKE CONTROLS - Figure 5**

The right brake pedal is used to brake the right rear wheel. The left pedal is used to brake the left rear wheel. Depress both pedals simultaneously to stop the tractor.

### **BRAKE PEDAL LOCK - Figure 5**

The brake pedal lock is used to lock the brake pedals together. Always lock the pedals together when the tractor is operated at road speeds.

### **PARKING BRAKE - Figure 5**

The parking brake handle is used to lock the brakes. Always apply the parking brake when the tractor is parked.

#### **To apply the brake:**

1. Lock the parking brakes together with the brake pedal lock.
2. Pull up on the parking brake handle and turn it  $\frac{1}{4}$  turn.
3. Depress both brake pedals.

#### **To release the parking brake:**

1. Turn the handle  $\frac{1}{4}$  turn so the tabs will enter the slot in the handle guide.
2. Depress the brake pedals to release the ratchet.
3. Release the brake pedals.

### **FOOT THROTTLE - Figure 5**

The foot throttle is used independently of the hand throttle to control the speed of the tractor. It is recommended that you use the foot throttle when driving on the highway.

### **IMPORTANT**

When it is necessary to use the foot throttle, set the hand throttle to the idle position (fully forward).

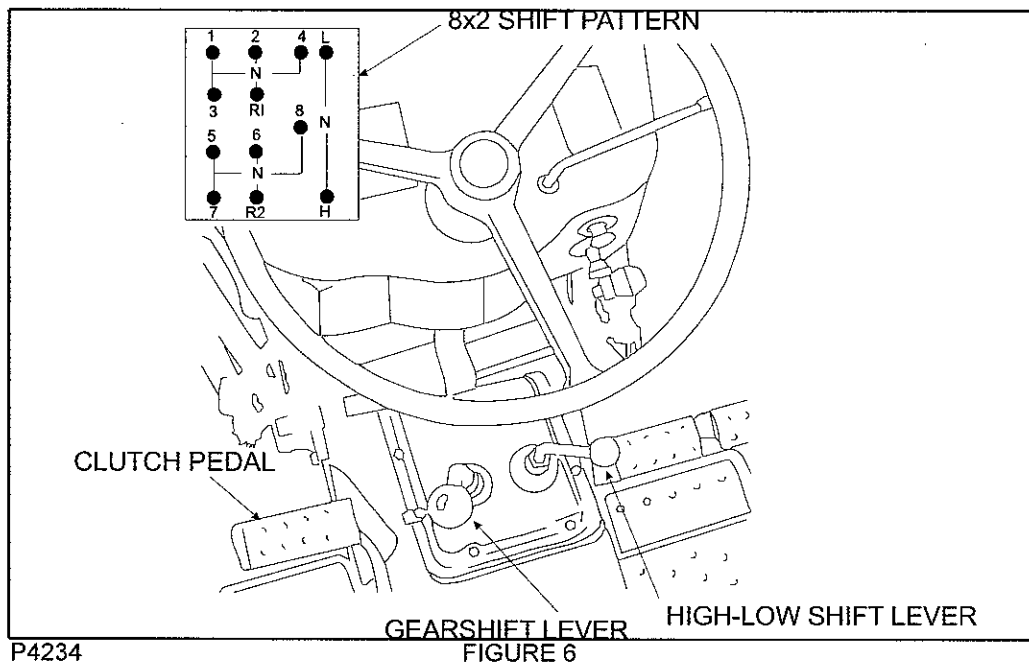
### **DIFFERENTIAL LOCK - Figure 5 (not used for scrubbing)**

The differential lock is used to lock the rear axle shafts together, providing additional traction in wet or loose soil.

### **INDEPENDENT P.T.O. CONTROL LEVER - Figure 5**

The P.T.O. is "independent", which means that it can be engaged or disengaged while the tractor is either moving or stopped. To engage, move lever forward. Moving the lever fully in reverse will disengage the P.T.O. and apply a P.T.O. brake. The brake will remain applied as long as the engine is running and the control lever is rearward. When the engine is shut off, the brake will release so that the shaft can be turned by hand when attaching equipment. On the H772 the P.T.O. is used to drive the vacuum turbine.





### 8x2 TRANSMISSION GEARSHIFT LEVERS - Figure 6

The 8-speed transmission levers are used to select the appropriate gear for driving the machine. The transmission gear shift lever is the longer of the two levers and is used to select one of four forward speeds. The High-Low shift lever is used to select either the High or Low range of forward and reverse gears. Placing the lever in the forward position selects the low range. Always depress the clutch pedal before moving either of the two levers.

A diagram of the shift pattern is provided directly below the Proof-Meter on the tractor.

See the chart on page 10 for gear and speed information.

### CLUTCH - Figure 6

The foot-operated clutch pedal is used to engage/disengage the engine from the transmission while changing gears and stopping. The pedal must be completely depressed, to stop forward travel of the tractor, or while shifting gears.

### BRUSH DRIVE & CONTROL HYDRAULICS

The transmission driven hydraulic pump, located in the differential housing, delivers 5.61 GPM at 1450 engine RPM. Relief valve pressure is 2500 psi.

The rear axle differential and axle housings are used as the hydraulic reservoir. System capacity is 12 gal.

Pump pressure drives the four scrubbing brushes at 180 RPM at loads to 100 lbs. A directional spool valve (see Figure 4) allows brush rotation in either direction.

The Ford Tractor hydraulic position control is used to raise and lower the squeegee independent of the brushes.

The four 18" diameter disc brushes are raised and lowered independently with a separate directional valve spool. A knob actuated lock-off valve is also provided to prevent leakdown when transporting long distances.

## MACHINE SYSTEMS & CONTROLS

### SOLUTION TANKS

The machine is equipped with two, .125" thick tanks saddle mounted and interconnected. They may be filled from either side of the machine.

Each tank has an inlet filter screen to prevent contaminants from entering the metering valves.

Liquid cleaning compounds are added to the solution water in the tanks.

### RECOVERY TANKS

The 210 gallon, .125" thick steel recovery tank is fitted with two pick up tubes and an air/water separation system. Tank is fitted with clean out doors and drain valves.

### P.T.O VACUUM TURBINE

One PTO belt driven turbine, at 5000 RPM, provides the air movement and water lift through the float manifold system. The control lever is located below the brush drive valves and behind the solution control. To engage the vacuum turbine move the lever forward.

### SOLUTION METERING SYSTEM

The scrubbing solution is metered from the solution tanks by the "L" shaped lever control located in the left side of the transmission housing above the clutch pedal (see Figure 4). Lift and position to start solution flow. The solution is gravity fed to the center of the 4 scrubbing disc brushes. The maximum flow is 5gpm.

With brushes down solution lowering the lever stops flow. Solution flow also stop when brushes are raised "full" up.

### SPLASH CONTROL SYSTEM

The splash control system (see Figure 4) consists of flexible adjustable skirts as part of the brush drive system. They provide containment of the shower from solution to a 72" path.

### SQUEEGEE CONTROL

The squeegee control levels (see Figure 4) which are located at the driver's right hand position, control the squeegee position. The draft control lever is locked in one position at the factory near setting "2". The other lever is used to raise and lower the squeegees. Always position lever full "up" or full "down".

With the squeegee in the full "down" position the squeegee will raise automatically when the manual transmission shift lever is moved to reverse gear position.

### BRUSH DRIVE CONTROL

The two spool valve assembly at the operator's left hand controls position and brush rotation. The handle nearest to the operator controls the rotation of the brushes. Push forward or pull back to detented positions. The other handle is pushed forward to lower the brushes to the floor and pull back to raise the brushes. Always lower the brushes completely.

### BRUSH DRIVE LOCK-UP

With brushes up for transporting or storage the small knob controlled valve behind the brush raise-lower handle can be closed by turning the knob clockwise until seated tightly.

### RECOVERY SOLUTION LEVER WARNING

The red lens lamp (see Figure 4) flashes when the float controlled limit switch on the top of the recovery tank is actuated by a water level 9" from the top of the tank. This indicates that the recovery tank needs to be emptied.

## TRACTOR CONTROLS & INSTRUMENTS

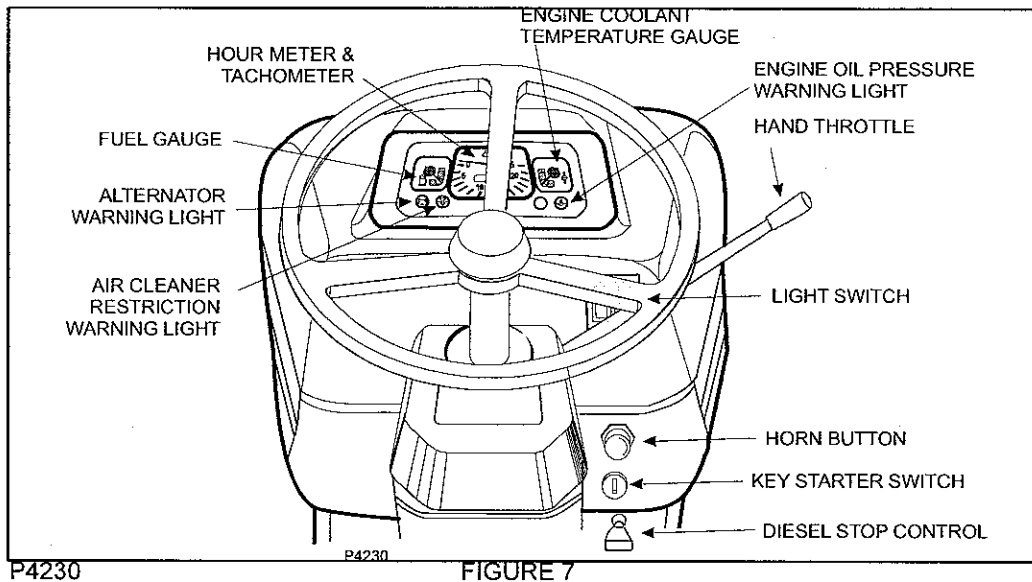


FIGURE 7

### LIGHT SWITCH - Figure 7

The light switch is a rocker ON/OFF switch. Depressing the rocker switch turns lights on or off.

### KEY STARTER SWITCH - Figure 7

The key starter switch actuates the starter motor and the thermostat.

### DIESEL ENGINE STOP CONTROL - Figure 7

Pull the stop control fully out to cut off the fuel supply to the injectors and stop the engine. The knob must be pushed fully in before restarting the engine.

### HAND THROTTLE - Figure 7

Pull the throttle down to increase engine rpm. Push the throttle up to decrease engine rpm.

### FUEL GAUGE - Figure 7

The needle indicated the amount of fuel remaining in the tank.

### TEMPERATURE GAUGE - Figure 7

The engine coolant temperature gauge indicates the temperature of the engine coolant. If the needle enters the red area of the gauge while the engine is running, stop the engine and investigate the cause.

### WARNING LIGHTS - Figure 7

When the key starter switch is turned "ON" the warning lights will come on. When the engine is running, the lights will go out as the engine rpm is increased. If they do not go out:

**Engine Oil Pressure Warning Light:** Stop the engine immediately and investigate the cause. This indicates oil pressure only. The operator must still check the crankcase from proper oil level.

**Alternator Warning Light:** It is an indication that the battery is not being charged. Investigate the cause as soon as possible, otherwise the battery will become discharged.

**Air Cleaner Restrict Warning Light:** Illuminates when the air cleaner requires service and the engine is running. If the light illuminates while the engine is running, stop the engine and service the air cleaner as described in the Ford Tractor maintenance section of this manual.

### HOUR METER - Figure 7

The hour meter indicated the time that the tractor has been operated, based on an average engine speed of 2055 rpm. Engine speeds below 2055 rpm accumulate hours at a slower rate than clock hours. Engine speed above 2055 rpm build up hours faster than clock hours. Use the hour meter as a guide to determine hourly service and maintenance intervals.

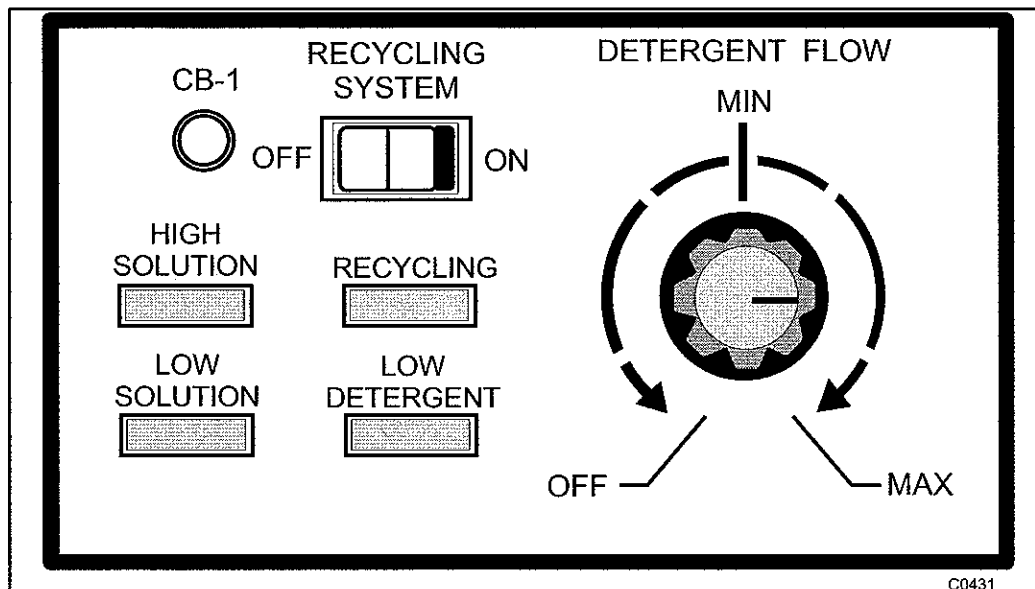
### TACHOMETER - Figure 7

The tachometer indicates the engine rpm. Scrubber is operated at the full throttle (1450-1500rpm).

### HORN BUTTON - Figure 7

The horn button is a momentary push button control located above the key switch.

## THE CAMEL RECYCLING SYSTEM CONTROL PANEL



C0431

FIGURE 8

C0431

### THE CAMEL RECYCLING SYSTEM ON/OFF SWITCH - Figure 8

The Camel ON/OFF switch is used to turn the Camel Recycling System on and off.

### SOLUTION HIGH WARNING LIGHT - Figure 8

The solution high warning light will illuminate if the solution tank is too full of solution from the recycling system.

### DETERGENT LOW WARNING LIGHT - Figure 8

The detergent low warning light will illuminate when the detergent tank is low, warning the operator to add detergent.

### DETERGENT FLOW KNOB - Figure 8

The detergent flow knob is a rotary control that regulates the detergent flow into the scrubbing solution. The operator may choose from any detergent setting for light to heavy cleaning applications. The detergent light will illuminate when the detergent tank is low, warning the operator to add detergent.

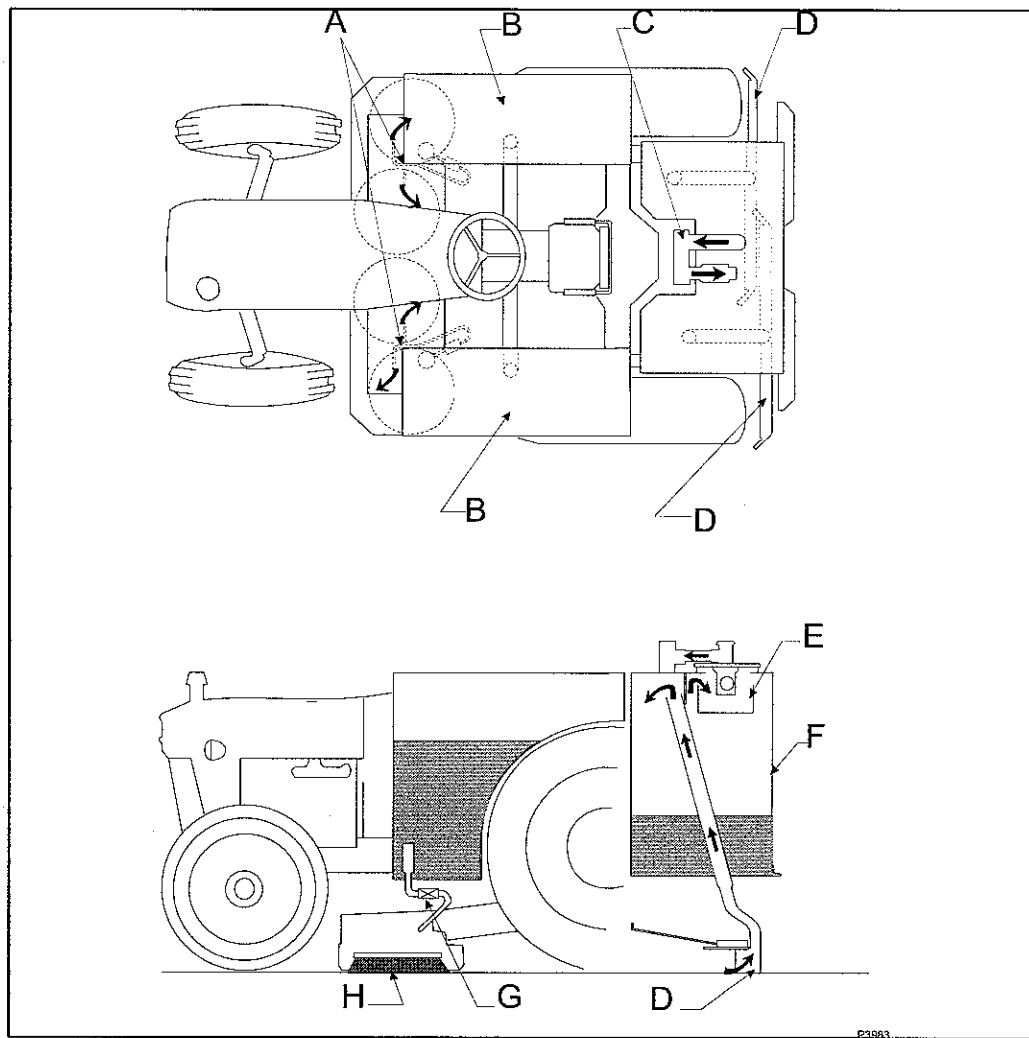
### LOW SOLUTION WARNING LIGHT - Figure 8

The low solution warning light will illuminate when the solution tanks are low on solution. When this occurs the recycling system switch should be turned on to begin recycling, which will fill the solution tanks.

### RECYCLING LIGHT - Figure 8

The recycling light illuminates to indicate that the recycling system is on.

## THE BASIC SCRUBBING SYSTEM



P3983

FIGURE 9

P3983

### BASIC SCRUBBING SYSTEM COMPONENTS

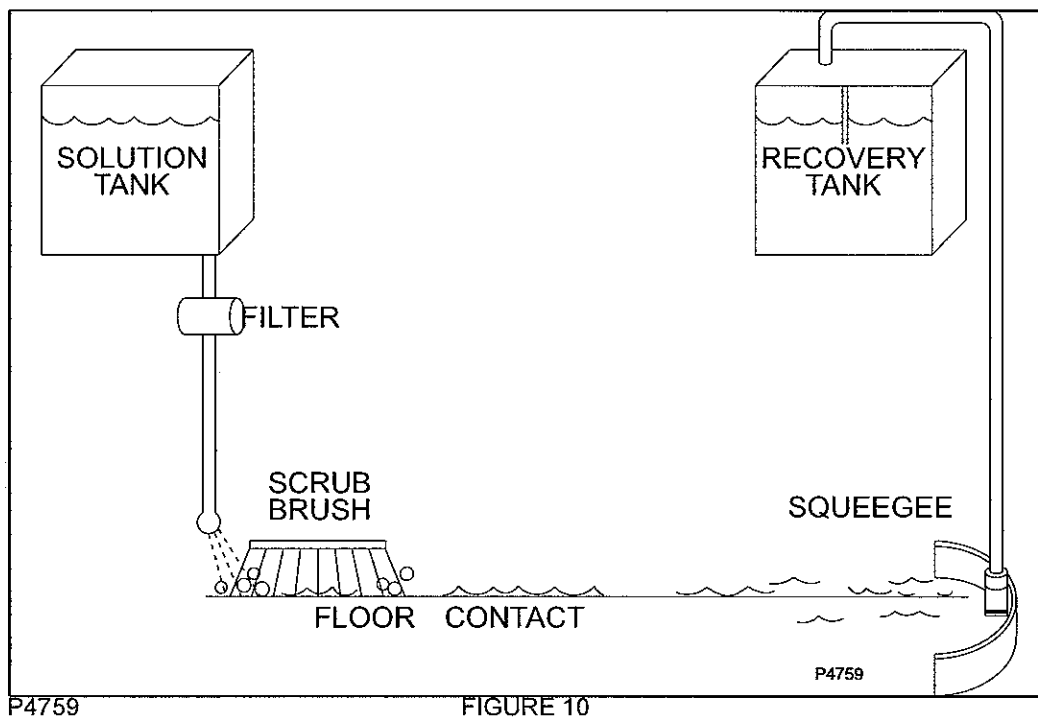
- |                        |                   |                    |
|------------------------|-------------------|--------------------|
| A. Solution Feed Tubes | D. Squeegee Tools | G. Metering Valves |
| B. Solution Tubes      | E. Float Cage     | H. Scrub Brushes   |
| C. Vacuum Tubes        | F. Recovery Tank  |                    |

There are two scrubbing systems available for the 772 scrubmobile:

- Standard Scrubbing System (non-recycling)
- Camel Scrubbing System (with recovery to solution recycling)

Both Scrubbing Systems share the same basic components as shown in Figure 9.

## THE STANDARD SCRUBBING SYSTEM

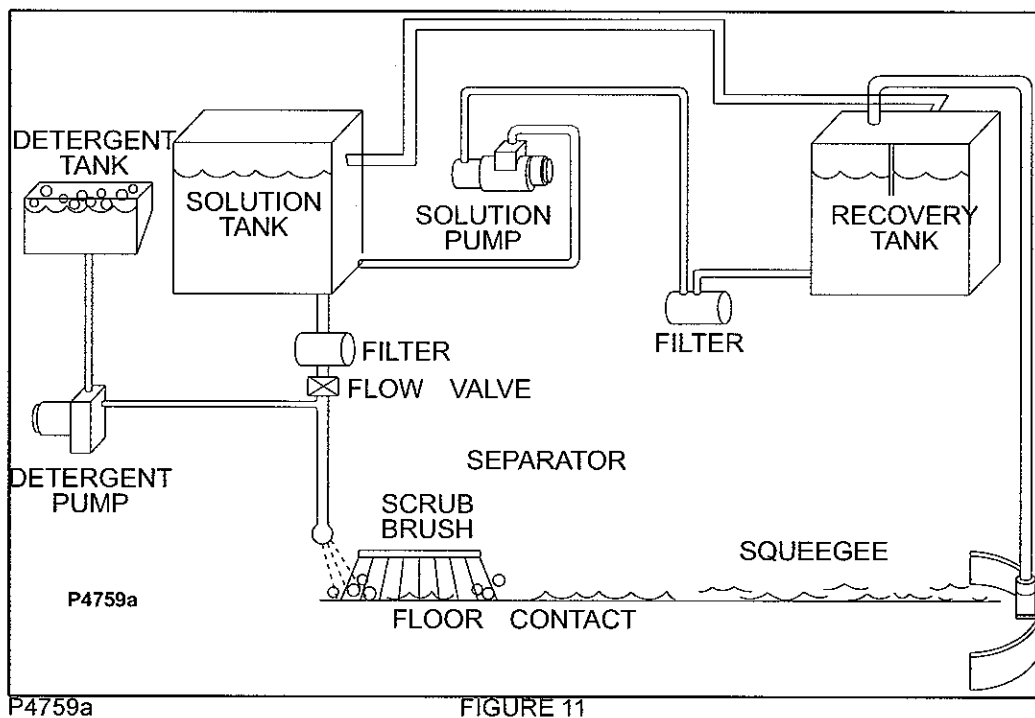


### HOW IT WORKS

During the scrubbing process (Figures 9 & 10), a solution of detergent and water from the solution tanks is fed to the solution lines where it is disbursed to the floor through the four scrubbing brushes that aggressively work to dislodge soilage.

As the machine moves forward, a high vacuum turbine system lifts dirty water and debris from floor surface, through the squeegee tools and a recovery tank air/water separation system. A float switch in the tank activates a flashing light on the control panel when the water level in the tank becomes too high. Debris and sludge settle to the bottom of the recovery tank.

## THE CAMEL SCRUBBING SYSTEM

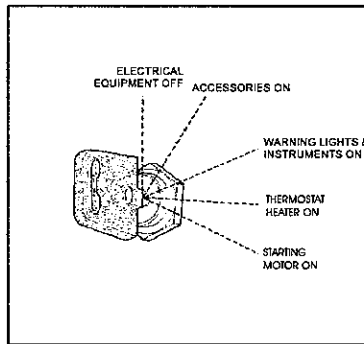


### HOW IT WORKS

During the scrubbing process (Figures (9 & 11), filtered water from the solution tank is fed to the solution lines where it combines with the detergent from the metering pumps. This mixture is then fed to the floor where four disc scrubbing brushes aggressively work to dislodge soilage.

After scrubbing, the used dirty solution is vacuumed from the floor and discharged into the containment chamber of the recovery tank. Once there a system of baffles helps to clarify the solution on its way to the pumping chamber of the recovery tank. At intervals, a system of sensors activates the recycling pump which sends filtered solution from the pumping chamber on its way to the centrifugal separator which aids in further clarifying of the solution for re-use. In the separator, solids are removed and purged into the containment chamber. The solids free solution is then fed up through the separator outlet and into the solution tank where it is ready to be mixed with fresh, metered detergent to be used again as scrubbing solution.

## OPERATING INSTRUCTIONS



P3850 FIGURE 13

### NOTE

A safety starter permits the starting motor to operate only when the transmission high-low shift lever is in neutral.



### CAUTION

Always shift both levers to neutral before starting the engine. Never attempt to start the engine while standing beside the tractor - Always sit in the seat.

### IMPORTANT

Do not crank the starting motor continuously for more than 30 seconds to avoid starting motor failure.

### PRE-START CHECKLIST

Before starting the machine perform the pre-start checklist:

- Check under the machine for leaks
- Check engine coolant level
- Check hydraulic fluid level
- Check fuel level gauge or LP tank gauge
- Check engine oil level
- Check brake and controls for proper operation
- Check engine air filter
- Open fuel shut off valve on fuel tanks.

### STARTING PROCEDURE GASOLINE/LP ENGINE

Follow these steps to start the Gasoline/LP Engine:

#### Warm Weather Starting:

1. Depress the clutch pedal and move the shift levers to the neutral position.
  2. Apply the parking brake.
  3. Place the hydraulic control lever(s) in the neutral position.
  4. Place the P.T.O. control lever in the disengaged position.
  5. Open the hand throttle slightly.
  6. Turn the key to its start position; when engine starts, release the key.
  7. Check to ensure that all the warning lights go out indicating all tractor systems are properly functioning.
- If the tractor fails to start, follow the instructions under "COLD WEATHER STARTING"

#### Cold Weather Starting (Gasoline Engine):

1. Depress the clutch pedal and move the shift levers to the neutral position.
2. Apply the parking brake.
3. Place the hydraulic control lever(s) in the neutral position.
4. Place the P.T.O. control lever in the disengaged position.
5. Open the hand throttle slightly.
6. Pull the choke all the way out.
7. Turn the key to its start position; when engine starts, release the key.
8. Push the choke all the way in.
9. Check to ensure that all the warning lights go out indicating all tractor systems are properly functioning.
10. Run the engine at 1000rpm for 30 to 60 seconds before driving the tractor.



## OPERATING INSTRUCTIONS

### STARTING PROCEDURE GASOLINE/LP ENGINE (cont.)

#### Cold Weather Starting (L/P Engines):

1. Depress the clutch pedal and move the shift levers to the neutral position.
2. Apply the parking brake.
3. Place the hydraulic control lever(s) in the neutral position.
4. Place the P.T.O. control lever in the disengaged position.
5. Open the hand throttle slightly and do not press the foot pedal.
6. Turn the key to its start position; when engine starts, release the key.
7. Check to ensure that all the warning lights go out indicating all tractor systems are properly functioning.
8. Run the engine at 1000 rpm for 30 to 60 seconds before driving the tractor.

#### If the engine fails to start, refer to the following instructions:

1. Momentarily depress the foot pedal to the floor.
2. Reposition the hand throttle to the fully closed position and start the engine.

### STARTING PROCEDURE FOR THE DIESEL ENGINE

Follow these steps to start the diesel engine.

#### Warm Weather Starting:

1. Depress the clutch pedal and move the shift levers to the neutral position.
  2. Apply the parking brake.
  3. Place the hydraulic control lever(s) in the neutral position.
  4. Place the P.T.O. control lever in the disengaged position.
  5. Open the hand throttle halfway.
  6. Turn the key to its start position; when engine starts, release the key.
  7. Return the hand throttle to the idle position.
  7. Check to ensure that all the warning lights go out indicating all tractor systems are properly functioning.
- If the engine fails to start, follow the instructions under "Cold Weather Starting".

#### Cold Weather Starting (Diesel Engines):

1. Depress the clutch pedal and move the shift levers to the neutral position.
2. Apply the parking brake.
3. Place the hydraulic control lever(s) in the neutral position.
4. Place the P.T.O. control lever in the disengaged position.
5. Open the hand throttle fully.
6. Turn the key to its start position; when engine starts, release the key.
7. After using the thermostart for 15 seconds turn the key start to the start position.
8. When the engine starts, return the throttle to the idle position and check to ensure all the warning lights have been extinguished and the gauge readings are normal.

If the engine fails to start, repeat the foregoing procedure. If the engine still fails to start, wait 5 minutes for battery to recover and repeat the procedure.

### COLD WEATHER STARTING AIDS



#### WARNING

Ether starting aids are available for cold weather starting. Do not use ether in conjunction with thermostart. Disconnect thermostart before using ether.

#### THERMOSTART:

The thermostart is available for all diesel tractors. The unit is effective in temperatures down to 0°F. If colder temperatures are encountered, a coolant immersion heater, described below, is recommended. The thermostart element is installed in the air intake manifold. It introduces and ignites fuel in the manifold before it enters the combustion chamber. The element is operated with the key starter switch. To start a cold engine with the thermostart, follow the instructions in the diesel engine cold weather starting procedures.

## OPERATING INSTRUCTIONS

### COOLANT IMMERSION HEATER (Accessory):

The coolant immersion heater consists of a heating element installed in the right side of the engine block. A detachable cord is provided for plugging into an electrical outlet. The heater provides for easier starting by warming the engine coolant and oil and is effective to -20°F.

#### To operate the Heater:

1. Plug in the heater to a suitable 115-Volt outlet and leave for two hours before carrying out the cold weather starting procedures.
2. Disconnect the heater from its power source and install the dust cover in the element.

The heater can be plugged in longer than two hours without damage but its effectiveness will not be increased. When the heater is not in use, install the dust plug in the element.

### STARTING THE TRACTOR WITH JUMPER CABLES:

Follow these instructions to start the engine with jumper cables.

If it is necessary to use jumper cables to start the engine, proceed with the following instructions. Connect one end of the jumper cable to the tractor battery positive (+) terminal and the other to the auxiliary battery positive (+) terminal. Connect one end of the other cable first to the auxiliary battery negative (-) terminal and the other end to the tractor starter negative (-) terminal. Follow the starting procedures after the jumper cables are connected.

Idle the engine and turn on all electrical equipment (lights, etc.), then disconnect the cables in reverse order of the connective procedure above. This will help protect the alternator from damage due to extreme load changes.

#### NOTE

Reversed battery polarity will damage the voltage regulator and alternator.



#### WARNING

Batteries contain sulfuric acid and produce explosive gases. Follow the instructions below to prevent personal injury.

- Wear eye and skin protection
- Keep sparks and flames away
- Always have adequate ventilation while charging or using the battery
- Follow the battery manufacturer's instruction which are shown on the battery

### STOPPING THE ENGINE:

Follow these steps to stop the engine.

1. Reduce the engine speed to idle, then:

#### Gasoline Engines:

2. Turn the key starter switch, Figure 13, to the "OFF" position.

#### Diesel Engines:

2. Turn the key starter switch, Figure 13, to the "OFF" position, then pull the diesel stop control out and hold until the engine stops.

#### NOTE

Failure to turn the key starter switch to the "OFF" position after the engine stops will result in the warning lights remaining on, causing the battery to discharge.

## OPERATING INSTRUCTIONS

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### TO OPERATE THE TRANSMISSION

Follow these steps to operate the transmission.

When the high-low shift lever is in the low range, 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, and (R1) gear ratios can be selected with the gearshift lever. When the high-low lever is in the high range, 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, and (R2) gear ratios can be selected.

### IMPORTANT

Avoid using the clutch pedal as a "footrest" (riding the clutch). Prolonged operation in this manner will cause premature failure of the clutch components.

To change from one gear ratio to another, or to change ranges:

1. Depress the clutch pedal completely.
2. Bring the tractor to a complete stop.
3. Shift to the desired gear and/or range. (Do not attempt to change gears while the tractor is in motion).



### WARNING

For your safety, always lock the brake pedals together when traveling at transport speeds. To lock the pedals together, slide the lock pin across to engage in the hole in the underside of the right hand pedal.

### TO DRIVE MACHINE (FOR TRANSPORT)

Follow these steps to drive (transport) the machine to the area to be cleaned.

1. Be sure the brushes and the squeegee are in the "up" position with all the other controls in the "OFF" position. Rotate the knob on the brush drive lock-up valve clockwise to hold the scrub deck in the "up" position.
2. Release the parking brake.
3. Transport may be done using either the foot throttle or the hand throttle. (For high speed transport, the foot throttle is recommended).
4. Depress the clutch, select the proper gear for desired transport speed with the transmission lever(s), slowly release the clutch pedal until the clutch is completely engaged.
5. To stop, depress the brakes, depress the clutch and reduce the throttle speed to idle.
6. Set the parking brake.

### TO OPERATE THE SCRUBBING EQUIPMENT

Follow these steps to begin the cleaning operation.

1. Fill the solution tanks.

**Standard machine:** Mix the detergent and water to the proper ratio for the cleaning task at hand. (Follow the detergent Mfr's recommended mixing ratio). Fill the tanks through the one or both of the fill doors on top of the solution tanks.

**Camel machine:** Fill the detergent tank with straight detergent. Fill the solution tanks with straight water. If there is no static water already on the area to be cleaned; the recovery tank can be filled also. This will provide additional "scrub" time. When filling the Camel recovery tanks, take care not to fill the center section of the tank. The left and right sides of the recovery tank can be filled to a maximum of 2/3 full. Do not fill the center section of the recovery tank.

2. Transport the machine to the area to be scrubbed.
3. Release the brush deck by turning the "brush deck lock-up valve" counterclockwise. Lower the brush deck by pushing the brush deck lift handle forward. The lever is located on the outbound side of the "brush deck control valve" assembly (see Figure 4).
4. Increase tractor engine speed to full governed speed: 1450-1500 rpm.
5. Lower the squeegees to the floor by positioning the quadrant lever to the pulled back position. (The squeegee will not lower until the transmission is placed in either 1<sup>st</sup> or 2<sup>nd</sup> gear).
6. Turn on the vacuum turbine by engaging the P.T.O. lever. Moving the lever to the forward position (see Figure 5) does this. Once the P.T.O. lever is engaged, the vac turbine will come on when the squeegees are lowered.
7. Check the squeegees for proper deflection of the squeegee rubber.

## OPERATING INSTRUCTIONS

### TO OPERATE THE SCUBBING EQUIPMENT (cont.)

Follow these steps to operate the scrubbing equipment.

1. Engage the solution flow

Standard Machine: Lift the solution control lever located near the operator's left foot (see Figure 4).

Camel Machine: Turn on the "Recycling System" switch and dial in the desired detergent flow (see Figure 8).

2. Engage brush rotation by moving the inboard lever on the brush control valve (see Figure 4). Placing the lever forward is for scrubbing while moving forward, and placing the lever backwards is for scrubbing while moving in reverse (see double scrubbing operation)
3. Begin scrubbing

#### NOTE

To avoid leaving solution on the floor, stop solution flow 20' before turning or stopping.

### TO OPERATE WHILE DOUBLE SCUBBING

Follow these instructions to operate while double scrubbing.

When heavy soil build-up is present, additional chemical solution time and extra scrubbing may be desirable.

#### NOTE

This procedure can only be used if safety conditions are controlled for wet flooring.

-Do not lower the squeegee, and scrub in forward direction.

-Reverse the brush rotation and scrub backward over the area just scrubbed.

-Reverse the brush rotation, lower the squeegees and scrub entire area again. This time the squeegees will remove all the dirty solution.

### TO END THE SCUBBING OPERATION

Follow these steps to stop the scrubbing operation.

Discontinue scrubbing whenever a "solution low", "detergent low", "high solution", or "high recovery" light is illuminated.

1. Shift transmission levers into neutral.
2. Reduce engine rpm to idle.
3. Apply parking brake.
4. Stop the solution flow

Standard & Camel Machine: Lift the "solution control lever" located near the operator's left foot (see Figure 4).

Camel Machine: Turn on the "Recycling System" switch and dial in desired detergent flow (see Figure 8).

5. Stop the brush rotation by placing the "brush rotation control" lever in the center position.
6. Raise the brush deck by pulling the "brush deck lift control" lever backwards.
7. Raise the squeegee tools by pushing the "quadrant lever" all the way forward and down.
8. Stop the vacuum turbine by pulling the P.T.O. lever all the way back.
9. Transport the machine to appropriate area for Post Operation cleaning and service.
10. Shut down engine.

### TO STOP THE ENGINE

Follow these steps to stop the engine.

1. Reduce the engine speed to idle, then:

#### Gasoline Engines:

2. Turn the key starter switch to the "OFF" position (see Figure 13).

#### Diesel Engines:

2. Turn the key starter switch to the "OFF" position (see Figure 13), then pull the diesel stop control out and hold until the engine stops.

## OPERATING INSTRUCTIONS

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### POST-OPERATION INSTRUCTIONS - ENGINE STOPPED

Perform these steps after the machine has been shut down.

- Close the LPG fuel valve as required.
- Check for string or wire tangled on scrub brushes.
- Check scrub brushes for wear or damage.
- Check squeegees for wear, damage, or adjustment.
- Drain and clean recovery tanks.
- Clean the recovery tank's screen and float.
- Check vacuum pipes and hoses for obstructions.
- Check the splash skirt for wear, damage, or adjustment.
- Check the outlet strainers in the solution tanks for contamination.
- Fill fuel tank
- Check for leaks

### TO CLEAN THE SOLUTION TANKS

Follow these instructions to clean the solution tanks after every scrubbing cycle.

Standard Machine:

- Inspect, remove, and clean the solution inlet filter on the bottom of the LH & RH tanks.
- Flush the sediment accumulations from the floor of the tanks.

Camel Machine:

- Inspect, remove, and clean the solution inlet filter on the bottom of the LH & RH tanks.
- Dirt and sludge build-up can be flushed out the pipe plugs located at the rear of the tanks.
- Disconnect and clean the crossover hoses periodically or as often as needed depending on service conditions.

### TO CLEAN THE RECOVERY TANK

Follow these instructions to clean the recovery tank after every scrubbing cycle.

Standard & Camel Machines:

- Position a corner of the machine near a floor drain.
- Standard Machine - open a drain valve.
- Camel Machine - Release the drain hose, lower it to the drain and open the hose end plug
- Open all clean out doors. Use a hose and squeegee to remove the dirt and sludge from to bottom of the tank.
- Remove the clean out caps located on top of the recovery tank. Inspect and flush the pickup tubes and squeegee hoses.

### TO OPERATE THE VACUUM WAND (Option)

The vacuum wand gives the machine the added flexibility of picking up spills not accessible by the machine. A 15' hose utilizes the machine vacuum system.



#### WARNING

Use the vacuum wand option only if the machine can be located on level surface

### TO OPERATE THE VACUUM WAND

1. Stop the engine and engage the machine parking brake



#### WARNING

Always engage the parking brake before operating the vacuum wand.

## OPERATING INSTRUCTIONS

### TO OPERATE VACUUM WAND (cont.)

2. Remove wand and hose assembly from mounting clips on top of the tanks.
3. Push hose end unto 1.50" fitting located on the left hand squeegee assembly.
4. Position the LH squeegee valve to connect the pick up hose to the vacuum wand hose by moving flat lever to the left to stop position.
5. Position the right hand squeegee valve lever to the left to close off the right hand pickup hose.
6. Start the engine.
7. Place throttle in the "full" rpm position.
8. When finished, shut off the engine.
9. Remove and store vacuum wand and hose.
10. Reposition squeegee hoses by moving both levers full right.

### IMPORTANT

The pickup hose assembly can also be used as a sumping system. When the pickup hose is submerged continuously the engine rpm must be reduced to 1000-rpm max. to prevent overload of the vacuum system drive belts.

### PUSHING OR TOWING

The machine may be pushed or towed with transmission shift levers in neutral at speeds appropriate for safety.

### OPERATION ON GRADES

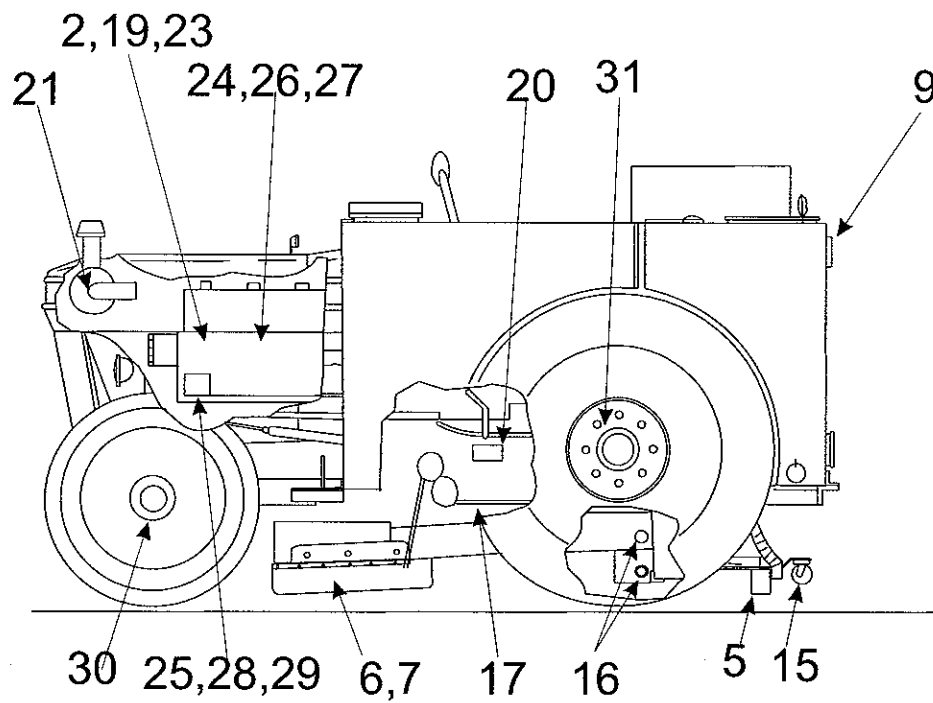
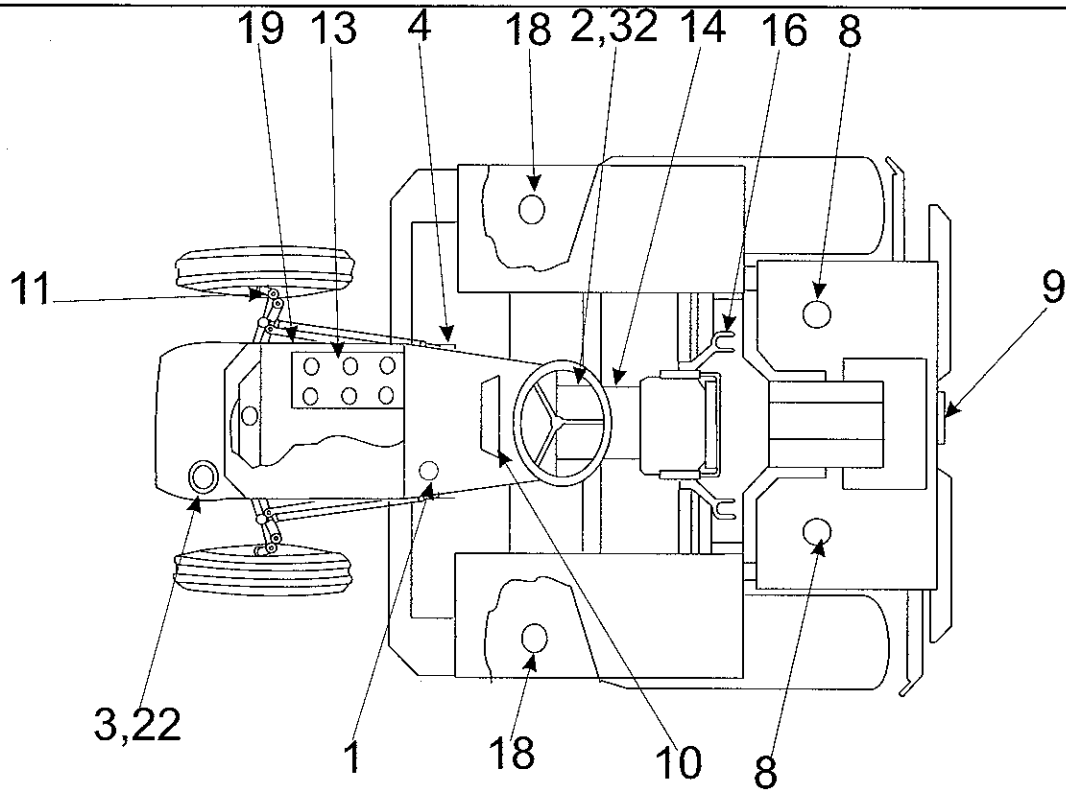
The machine may be operated on grades up to 12° if the surface provides adequate traction.



### WARNING

Always test wet surface traction part way up or part way down sloped area so that if slipping does occur, control can be regained before reaching the bottom of the slope.

# SERVICE CHART



## FIGURE 15

### SERVICE CHART FOR 772 SCRUBMOBILE GAS/LP/ AND DIESEL

For service assistance, consult your factory authorized American-Lincoln dealer. For best performance, replaced worn parts with genuine American-Lincoln parts.

#### EVERY 8 HOURS or DAILY operation check and clean/adjust if necessary:

1. Fuel level
2. Engine oil level
3. Radiator coolant level and radiator core
4. Water separator/Fuel filter Diesel
5. Power steering fluid oil level
6. Scrub brushes for wear or damage
7. All flaps for wear or damage
8. Recovery tank and pick up pipes
9. Vacuum manifold (through recovery tank access door)
10. Squeegees for wear or damage

#### (LUBRICATION AND MAINTENANCE)

##### EVERY 50 HOURS

11. Lubricate all grease fittings (see Ford 3930 tractor manual for reference)
  12. Check battery electrolyte level
  13. Check rear axle oil level
  14. Check and adjust clutch free play
  15. Check front and rear tires and lug nuts
- Perform recommended Ford Tractor maintenance (see tractor manual)

##### EVERY 100 HOURS

16. Lubricate squeegee casters
  17. Lubricate all moving joints (brush and squeegee lift)
  18. Lubricate head lift (chain and sprockets)
  19. Clean solution tank and filter screen
- Perform recommended Ford Tractor maintenance (see tractor manual)

##### EVERY 300 HOURS

20. Change engine oil and filter
  21. Change hydraulic system filter
  22. Clean engine air filter element
  23. Check transmission oil level
  24. Remove all spark plugs - clean or replace LPG/Gas
  25. Check distributor and points, service or replace LPG/Gas
  26. Check and adjust foot brakes
  27. Check and adjust belt tension
- Perform recommended Ford Tractor maintenance (see tractor manual)

##### EVERY 600 HOURS

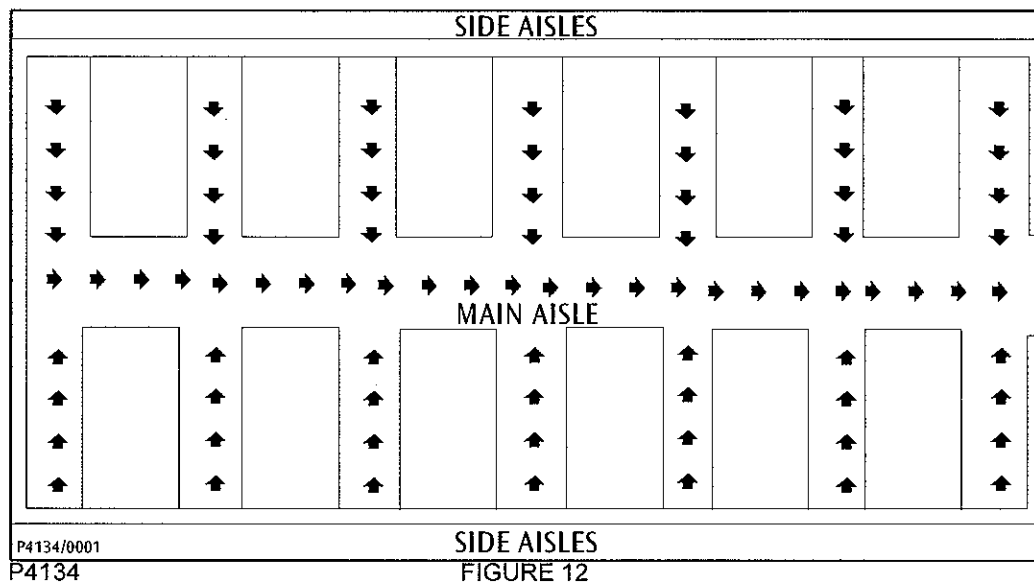
28. Change fuel filter/separator
  29. Lubricate front wheel bearings
  30. Replace engine air filter element
  31. Check, clean, and lube starter motor pinion gear
  32. Check and adjust valve tappet clearance.
- Perform recommended Ford Tractor maintenance (see tractor manual)

##### EVERY 1200 HOURS or EVERY YEAR

33. Change rear axle oil
34. Change transmission oil
35. Check, clean, and adjust fuel injectors
36. Change power steering oil and filter



## HELPFUL HINTS FOR CLEANING OPERATION



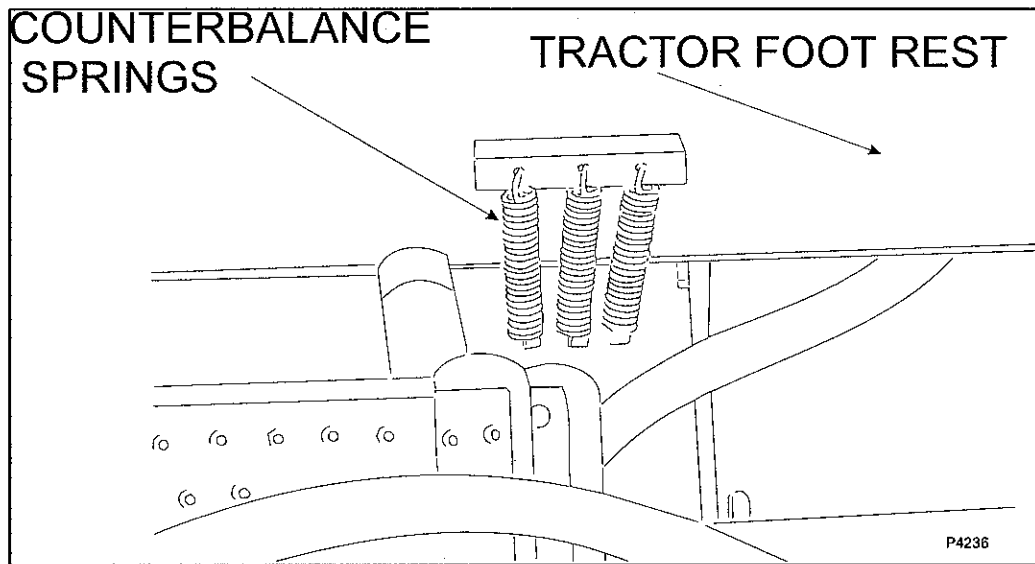
### WARNING

Do not turn the steering wheel sharply when the machine is in motion. The scrubber is very responsive to movement of the steering wheel. Do not make sudden turns.

## HELPFUL HINTS FOR CLEANING OPERATION

Follow these hints to get the best possible cleaning results:

- Scrub in straight paths, Do not bump posts. Do not scrape the sides of the machine
- Plan scrubbing in advance. Try to arrange long runs with minimum stopping and starting.
- Sweep heavily littered areas before scrubbing
- Allow a few inches of overlap on the scrub paths.
- Replace disc scrub brushes when bristles are worn down to  $\frac{1}{2}$ "
- Replace squeegee rubbers when all usable edges have become rounded with wear, impairing the wiping action



P4236

FIGURE 16

**EVERY 1200 HOURS or EVERY TWO YEARS**

37. Drain and flush radiator coolant system

**BRUSH LOAD AND BRUSH WEAR**

Factors affecting brush wear are type of bristle, bristle, area, and load on the bristles. See your authorized distributor for the type of brush and bristle most suitable.

Brush load may be adjusted by adding or removing counterbalance springs (see Figure 16). The counterbalance springs are located between the solution tanks and the tractor footrest (see Figure 16). The load will vary as follows:

No. Of Springs	Load Per Brush
0	100 lbs.
1 per side	80 lbs.
2 per side	60 lbs.
3 per side	40 lbs.

Adding springs will decrease scrub brush load. Shorter brush life can be expected as the scrub brush load is increased.

**SQUEEGEE TOOL FLOOR HEIGHT ADJUSTMENT**

The squeegee floor contact height for each squeegee tool may be varied by adjusting the threaded stem on the caster wheels at the rear side of the squeegee tool assemblies (see Figure 17). Loosen the locking plate (see Figure 17) and raise or lower the tool position by threading the caster stem up or down in the squeegee frame threaded bracket.

Proper adjustment will flare the rubber approximately 5/16" on a smooth floor. On a rough or irregular floor surface, more air leakage may occur at the squeegee pickup tool. If this occurs increased down pressure is required.

## SERVICE INSTRUCTIONS

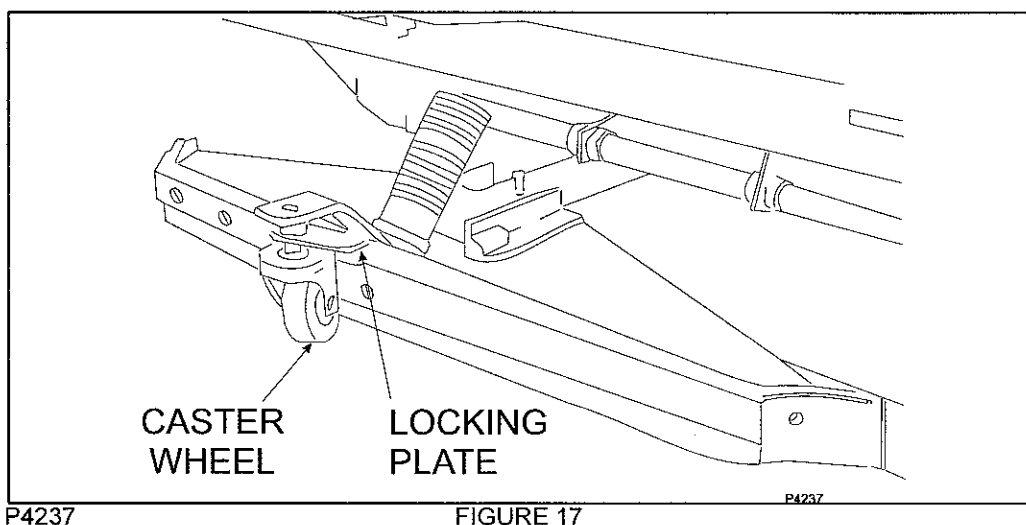


FIGURE 17

### SQUEEGEE TOOL LEVEL ADJUSTMENT

Individual level adjustment at each squeegee is possible to bring flared squeegee ends to proper floor contact.

Loosening one locked adjustment screw and tightening the other causes the entire tool assembly to tip on the pivot pin until the squeegee rubber is perpendicular (level) to the floor. Tighten the locking nuts after adjusting the screw.

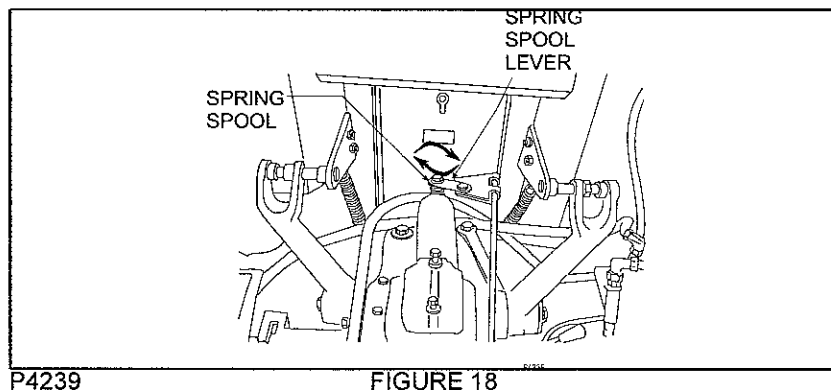


FIGURE 18

### AUTOMATIC SQUEEGEE LIFT ADJUSTMENT

With squeegee position control lever fully down, adjust Ford Tractor draft control linkage so that when the 4 speed shift lever is moved into reverse it actuates the valve that controls the squeegee lift.

#### Adjustment (see Figure 18):

To increase sensitivity to reverse gear position (squeegee not raising).

1. Remove spring spool lever from bracket. (Note position in bracket slot).
2. Rotate spring spool one turn counterclockwise (as viewed from rear of machine).
3. Replace spring spool lever. Position in bracket slot as before.

#### To decrease sensitivity (squeegee not lowering automatically)

1. Rotate spring spool clockwise one turn.

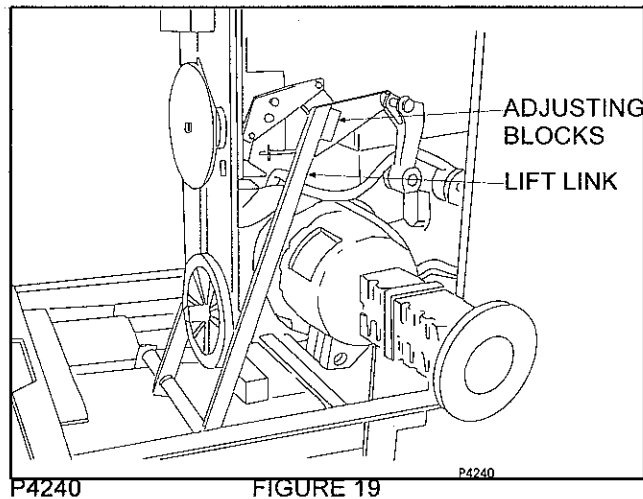


FIGURE 19

## SQUEEGEE LIFT HEIGHT ADJUSTMENT

The height of the squeegee tools in the full up position is adjusted so that the right side squeegee tool assembly clears the stop bracket by .25" to .50" (see Figure 19).

### To change the adjustment:

1. Place squeegee control lever in the full down position.
2. Loosen (2) two adjusting blocks (see Figure 19) clamped to squeegee lift arms.  
To increase lift move the block(s) in arm slots closer to the lift link(s) (see Figure 19).
3. Tighten screw. Raise squeegee full up and check clearance with stop bracket.

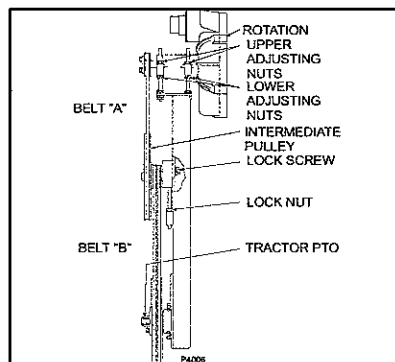


FIGURE 20

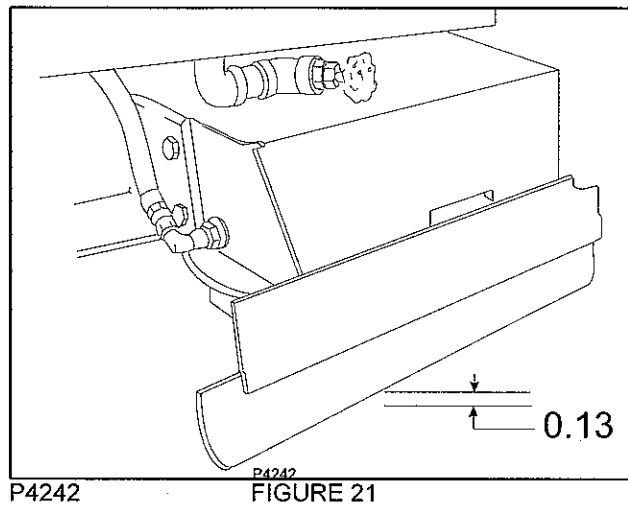
## TURBINE BELT ADJUSTMENT

Do not tighten belt excessively after initial break in. New belts may be set up tight since initial run it (1<sup>st</sup> hour) will "seat" the belt and give it the initial stretching under load required. Belt tension should be checked after initial run in and periodically thereafter.

### To adjust belt tension (see Figure 20):

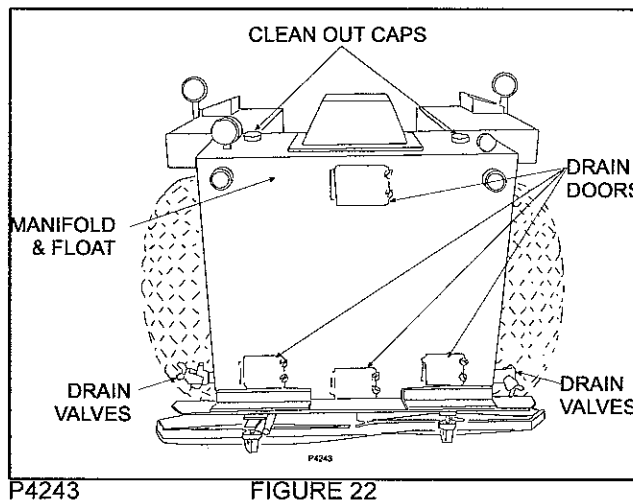
1. Remove turbine cover.
2. Loosen the lock screw one turn.
3. Loosen upper adjusting nut on Rotron stud mounting.
4. Tighten lower adjusting nuts equally (1¼ turns at a time) to increase tension in belt "A". Proper setting is ½" deflection of the belt with 25 lbs. of pressure at the midpoint between the two pulleys.
5. Check the tension of the "B" belts as above and adjust as necessary using the locknut provided
6. Secure intermediate pulley with lock screw.

## SERVICE INSTRUCTIONS



### SPLASH SKIRT ADJUSTMENT

Adjust the right and left side skirts with brush wear to maintain floor clearance as shown in Figure 21.



### SERVICING THE RECOVERY TANK

When tank is full (9" from top), the red flasher light is activated. At a height of 8" from the top the float, which is part of the manifold (see Figure 22), the vacuum air flow to the squeegees will shut off.

#### To drain:

Standard Scrubbing System: Position either rear corner of machine near a floor drain and open the drain valve (see Figure 22).

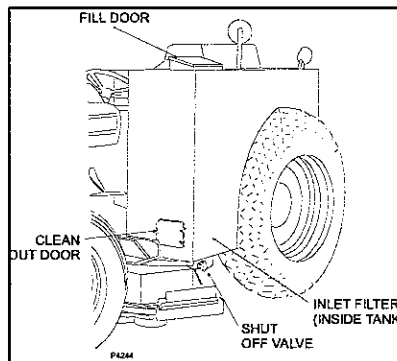
Camel Scrubbing System: Position either rear corner of the machine near a floor drain. Release the drain hose and lower it to the drain and open the hose end plug.

#### To clean:

To remove sludge after draining open all drain doors (see Figure 22), hose out tank interior to flush sludge into area near drain. The float and the float cage should be flushed clean. Remove clean out caps and flush pickup tubes in tank and squeegee hoses (see Figure 22)

#### NOTE

Accumulations of sludge greater than 2" will tend to clog the drain valves and the drain hose.



P4244 FIGURE 23

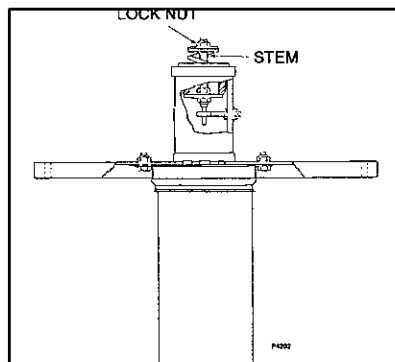
## SERVICING THE SOLUTION TANK

### Standard Machine:

- Periodically remove and clean out the solution inlet filter from the left hand & right hand side tanks.

### Camel Machine:

- Inspect, remove, and clean inlet filters on the bottom of the left hand and right hand tanks
- Sediment on the floor of each tank should be flushed periodically (use pipe plug on rear of tanks)
- The crossover hoses should be disconnected and flushed periodically.



P4202 FIGURE 24

## VACUUM RELIEF VALVE

The vacuum manifold inlet system is equipped with a factory adjusted relief valve that limits the vacuum produced by the air turbine to 90" to 95" of water.



### CAUTION

Continuous operation at vacuum pressures exceeding 95" of water will cause excessive heat in the turbine and will cause turbine failure.

The relief valve is located under the turbine cover and is part of the air inlet system to the turbine.

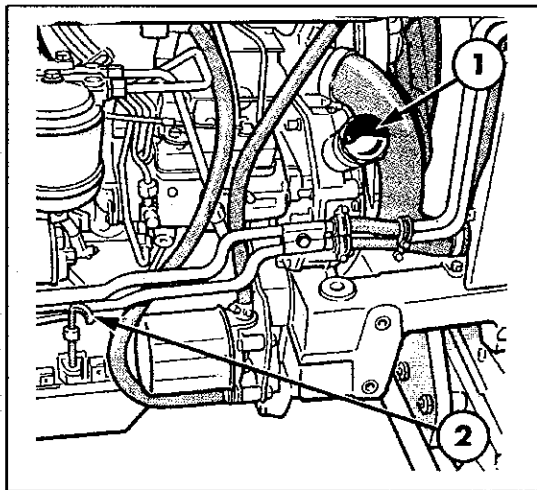
### To check the factory setting:

1. Remove the squeegee suction hoses from the recovery tank pickup hoses.
2. Cover one inlet pipe (must be airtight seal).
3. Run engine at governed rpm (1450).
4. Place vacuum gauge on other inlet pipe and check reading.

### To adjust the relief valve setting:

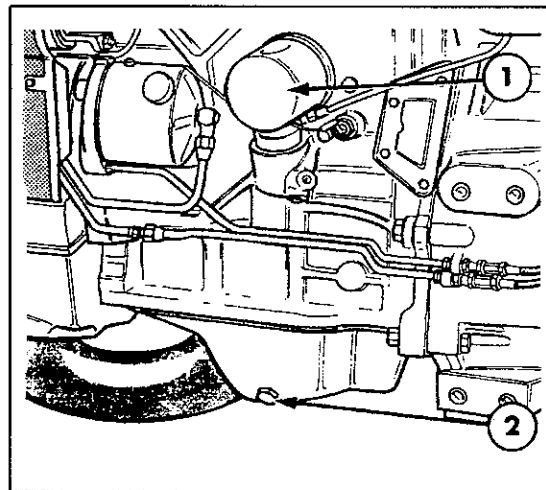
1. Hold the stem to keep it from turning.
2. Turn the lock nut clockwise to increase the setting.
3. Turn the lock nut counterclockwise to decrease the setting.

## SERVICE INSTRUCTIONS



P4245a1

FIGURE 25



P4245a2

FIGURE 26

### CHECKING ENGINE OIL LEVEL

Check the engine oil level daily or every 10 hours.

#### To check the engine oil level:

Before checking the oil level, stop the engine and wait a short time for the oil to drain back into the oil pan.

1. Check the oil by means of the dipstick (see Figure 25, Item 2)
2. If necessary, remove the filter plug (see Figure 25, Item 1) and top off with fresh oil to the upper mark on the dipstick. Do not overfill.

### CHANGING ENGINE OIL & FILTER

Change the engine oil and filter every 300 hours under normal operating conditions and every 200 hours under continuous full load conditions.

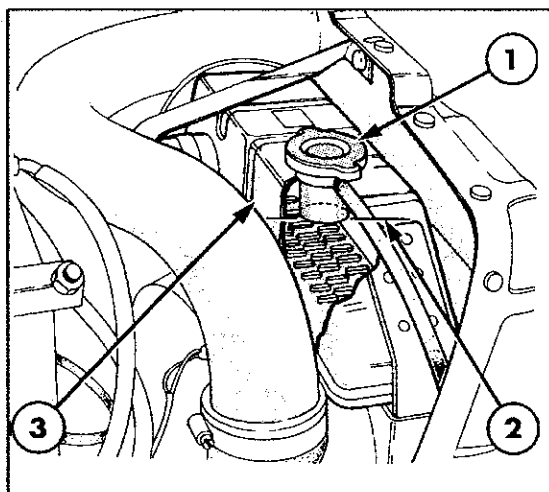
Oil and filter change interval adjustment based on diesel fuel sulfur content normal operation conditions.

% Sulfur Content	Change Interval (Hours)
0.5-1.0	150
1.1-1.3	75

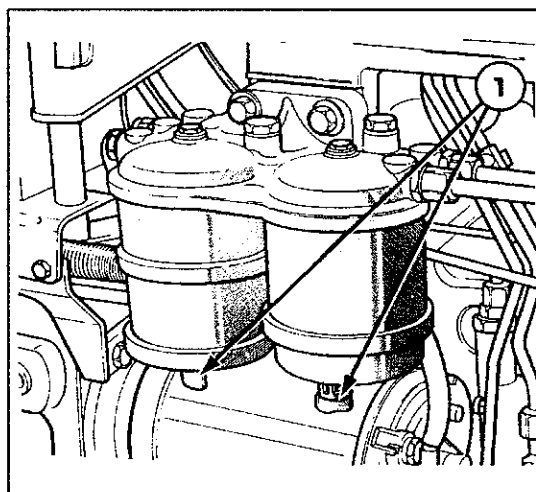
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#### To change the engine oil and filter:

1. With the engine off, but at normal operating temperature, remove the drain plug (see Figure 26, Item 2) and drain the oil. Install the plug after the oil has drained.
2. Remove and discard the filter (see Figure 26, Item 1).
3. Coat the gasket on a new filter with a film of oil. Screw the filter into place until the gasket contacts its mating surface, then turn the filter approximately  $\frac{3}{4}$  of a turn by hand. Do not over tighten.
4. Add new oil of the type specified (see Ford Tractor operator's manual, Section C for correct oil grade.)
5. Start the engine and check the filter for leaks.
6. Stop the engine and wait for a short time for the oil to drain into the oil pan and check oil level by means of the dipstick.
7. Add clean oil as necessary to raise the oil level to the upper mark on the dipstick.



P4245b1 FIGURE 27



P4245b2 FIGURE 28

## CHECKING THE ENGINE COOLING SYSTEM

Under some operating conditions there is a tendency for the coolant to boil and be expelled out of the radiator expansion chamber overflow tube (see Figure 27). Normally, this loss of coolant would be of little consequence, but repeated occurrences can lead to considerable loss of coolant and would be necessitate topping off the radiator.



### WARNING

If the engine has overheated, allow time for the engine to cool before attempting to open the radiator cap.



### WARNING

The cooling system operates under pressure. It is dangerous to remove the cap while the engine is warm. To open the radiator cap while the engine is warm, follow these instructions: use a thick rag and turn the cap to the first stop and wait for the pressure to escape, then carefully remove the cap.

## To check the radiator coolant level:

### With the engine cool:

1. Remove the filter cap (see Figure 27, Item 1)
2. Check that the coolant is level with the bottom of the filter tube (see Figure 27, Item 2)
3. If necessary, fill the radiator to the bottom of the filter tube

It is recommended that a solution of 50% water and 50% anti-freeze be premixed with 5% inhibitor and kept handy as a top off solution.

See the Ford 3930 operator's manual for more information on coolant capacity, anti-freeze specifications, clean water properties, and inhibitors.

## IMPORTANT

It is essential that a Ford New Holland approved cap is used. If replacement of the original cap becomes necessary, obtain a replacement for your Ford New Holland Dealer.

## CHECKING THE FUEL FILTER/SEDIMENT SEPARATOR

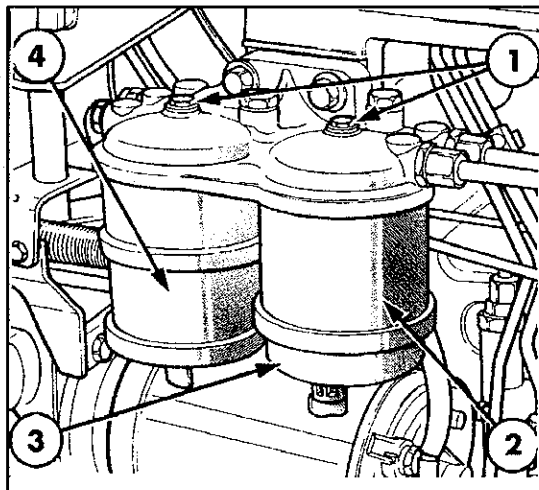
Check the fuel filter/sediment separator daily. Water and/or sediment in the glass bowl of sediment separator indicates the need to drain the bowl and replace the filter if needed (based on interval since the last filter change).

### To drain the sediment separator:

1. Turn the drain plugs counterclockwise (see Figure 28, Item 1) and allow the contaminated fuel to drain.
2. Close the drain plugs by turning clockwise. Check for leaks from the plugs after tightening.

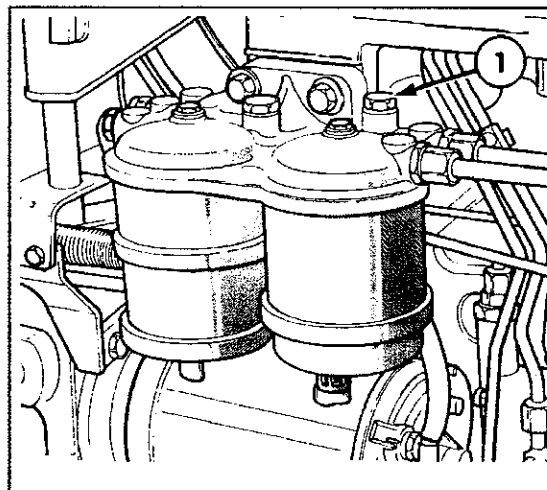


## SERVICE INSTRUCTIONS



P4245c1

FIGURE 29



P4245c2

FIGURE 30

### CHECKING THE FUEL FILTER/SEDIMENT SEPARATOR (cont.)

After draining the filter/separator, bleed the fuel injection system as outlined below.



#### WARNING

Do not use fuels or solvents in a confined area. Work in a well ventilated area.

#### To change the fuel filter:

1. Close the fuel tank shut off by turning in a clockwise direction.
2. Unscrew the central retaining bolts (see Figure 29, Item 1)
3. Remove the glass bowl (see Figure 29, Item 4)
4. Remove the filter element and filter bowl, discard element (see Figure 29, Items 2 & 3)
5. Using clean fuel, clean and rinse all removed parts
6. Install a new filter element and gaskets.
7. Reinstall the bowl
8. Open the shut off valve and bleed the fuel system

### BLEEDING THE FUEL SYSTEM (DIESEL ENGINES ONLY)

After changing the fuel filter or other fuel system components it may be necessary to bleed the fuel system to remove any air bubbles that may be present.



#### WARNING

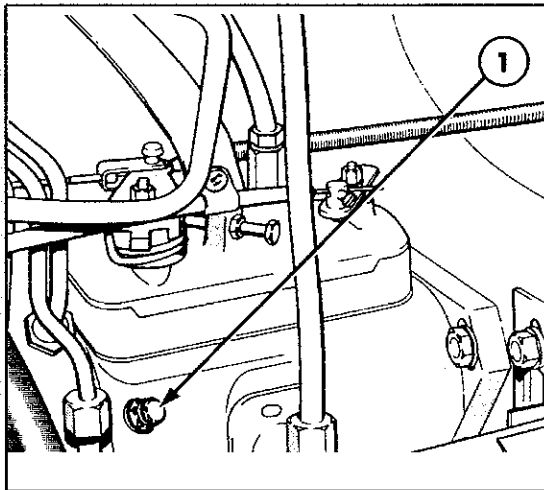
Diesel fuel or hydraulic fluid escaping under pressure can penetrate skin causing injury. Do not use your hand to find leaks. Use a piece of paper or cardboard as a tool to assist in finding leaks on a pressurized system.

#### To bleed the fuel system:

1. Loosen the filter bleed screw (see Figure 30, Item 1)
2. Observe the fuel as it escapes the bleed screw hole.
3. Once the fuel is free of air bubbles, retighten the filter bleed screw.

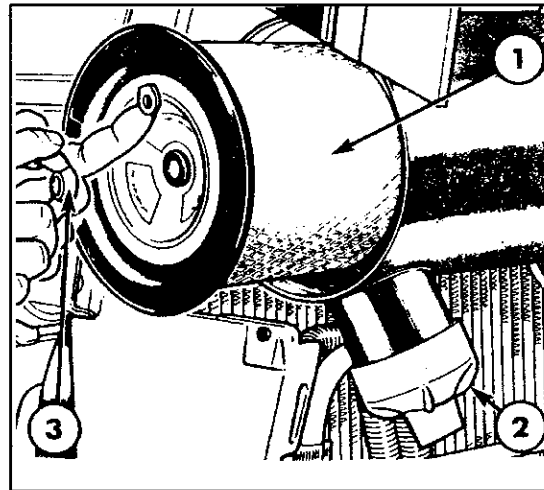
#### To bleed the injection pump:

1. Loosen the injection pump bleed screw (see Figure 31, Item )
2. Pull the engine stop control out.
3. Crank the engine until the fuel coming out of the bleed screw is free of air bubbles.
4. Tighten the bleed screw.



P4245d1

FIGURE 31



P4245d2

FIGURE 32

## SERVICEING THE AIR CLEANER

The air cleaner consists of an inner and an outer paper element and is located under the radiator cowl. Periodically squeeze the end of the rubber dust collector (see Figure 32, Item 2). Inspect and replace if necessary. Clean the air cleaner outer element (see Figure 32, Item 1) whenever the air restriction indicator light on the instrument panel illuminates while the engine is running. If there is dust inside the outer element it must be replaced.

### IMPORTANT

Clean the outer element only when the restriction indicator light illuminates while the engine is running. Unnecessary and too frequent cleaning exposes the elements to handling damage, which could allow dust and dirt to bypass the filtering process and cause engine wear.

### IMPORTANT

Compressed air, not to exceed 30 psi may be used for cleaning. Blow dust from the inside to the outside by inserting the nozzle inside the element. Blow loose particles from the outside by holding the nozzle at least 6" from the element.

### IMPORTANT

Do not use water hotter than the hand can stand to wash the element, as the element will be damaged. Never wash the element with fuel oil, gas, or solvent. Do not oil the element. Rinse the element with clean water from the inside to the outside to thoroughly loosen all foreign material. Shake excess water from the element and allow it to air dry.

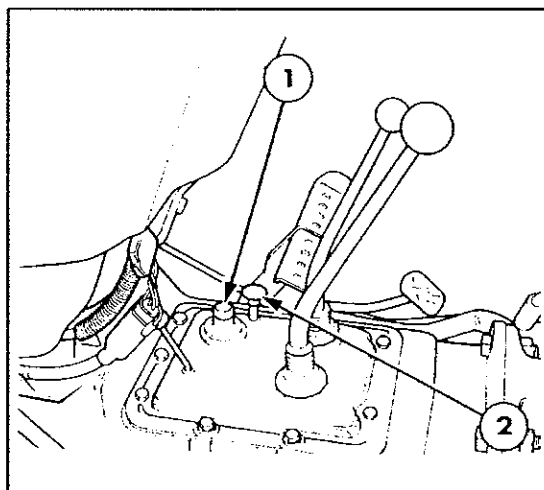
### IMPORTANT

Do not dry the element with compressed air, as the air will rupture a wet element.

### To clean the air filter:

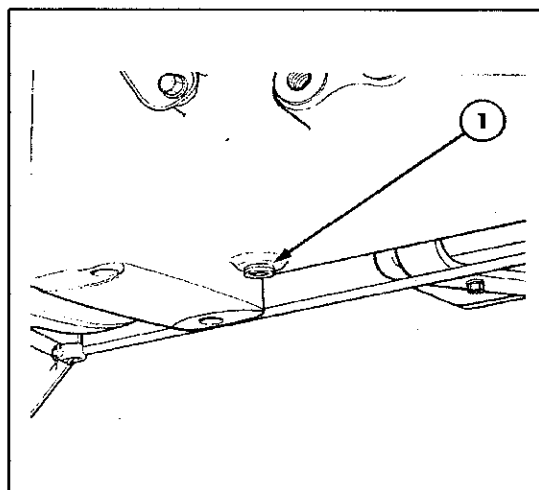
1. Remove the filter element as shown in Figure 32.
2. Check the rubber seal on the end of the element for adhesion. If it is loose, install a new element. A loose, damaged, or missing seal will allow dust to enter the engine, causing severe engine wear.
3. Clean the element by tapping it against the palm of your hand. Do not beat the element against the tire or a hard surface, as damage to the element will result.
4. Clean the inside of the canister with a damp, lint-free cloth, then reinstall the element.
5. Check and tighten all air induction before resuming operation.

## SERVICE INSTRUCTIONS



P4245e1

FIGURE 33



P4245e2

FIGURE 34

### To wash the element:

Wash the dry air cleaner element to remove exhaust smoke or film or after five cleanings.

1. Remove the filter element as shown in Figure 32.
2. Inspect the seal on the end of the element for damage. IF the gasket is damaged or missing, install a new element.
3. Agitate the element in warm water containing a small amount of non-sudsing detergent
4. Rinse the element with clean water from the inside to the outside to thoroughly loosen all foreign material.
5. Shake excess water from the element and allow to air dry.
6. After drying, check for damage by holding a light inside the element. If an even fine pattern of light is seen, the element is clean and undamaged. Any large spots of light indicate damage, which requires that the element be changed.
7. Wipe the canister free of dust, then install the element
8. Check and tighten all air induction connections before resuming operation.

### To change the air filter element:

Change the air cleaner element annually, whenever inspection shows the element to be damaged, or after ten cleanings, whichever occurs first.

### To change the air filter element:

1. Remove the filter element as shown in Figure 32.
2. Wipe the inside of the filter canister free of dust.
3. Install the new element.

### IMPORTANT

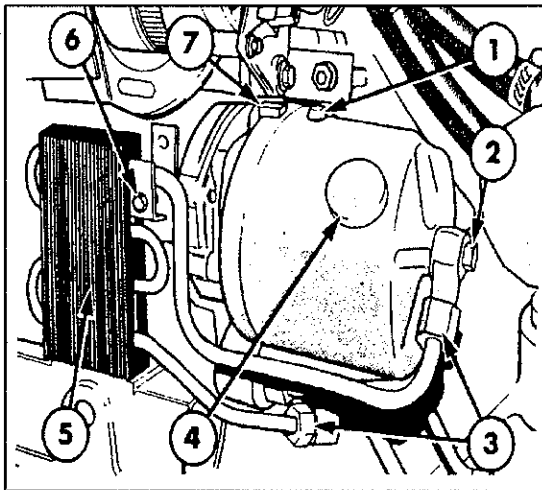
Do not remove or disturb the inner element. IF, after servicing or renewing the outer element, the air cleaner restriction warning light still does not extinguish when the engine is running then the inner element requires attention. Authorized Ford New Holland Dealer should only service the inner element.

## SERVICING THE TRANSMISSION

### To check the oil level:

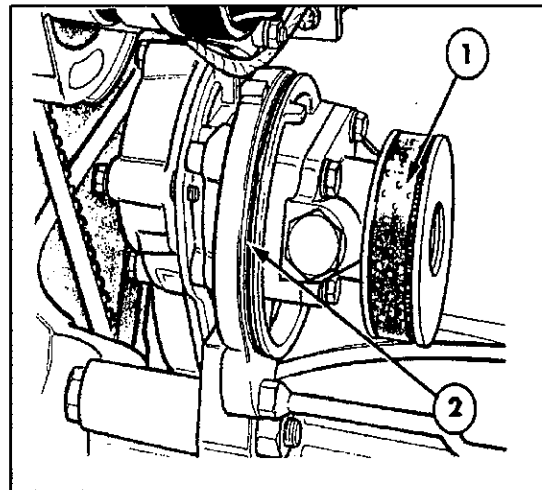
Check the transmission oil level every 300 hours.

1. With the tractor standing level and the engine turned off, check the oil level by removing the dipstick (see Figure 33, Item 2) from the right side of the transmission case.
2. If oil is low, remove the filter plug (see Figure 33, Item 1) and add new oil of the type specified to bring the oil up to level on the dipstick. (See Ford operator's manual for specific type oil to use.)



P4245f1

FIGURE 35



P4245f2

FIGURE 36

## To change the oil:

Change the transmission oil every 1200 hours.

1. With the transmission oil at normal operating temperature, drain and discard the oil by removing the transmission drain plug (see Figure 34, Item 1). Install the plug after the oil has drained.
2. Remove the filter plug (Figure 33, Item 1) and fill the transmission with new oil of the type specified. (See Ford operator's manual for specific type recommended.)

## SERVICING THE POWER STEERING HYDRAULICS

### To check the oil level:

Check the power steering fluid daily and top off as necessary.

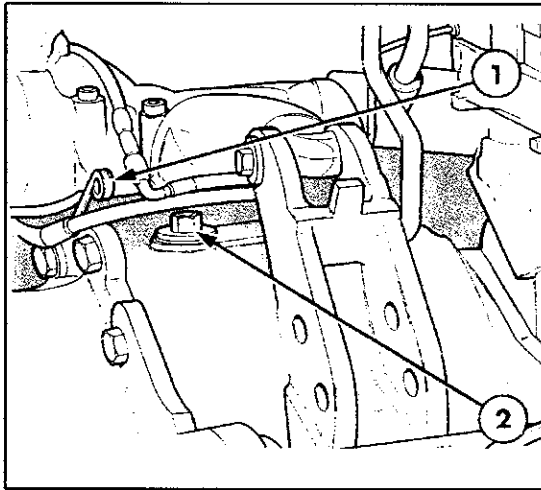
1. Unscrew the filter cap and check that the oil is level with the bottom of the filter neck (see Figure 35, Item 4). Top off as necessary.

### To change the power steering filter and oil:

Change the power steering oil and filter every year or 1200 hours.

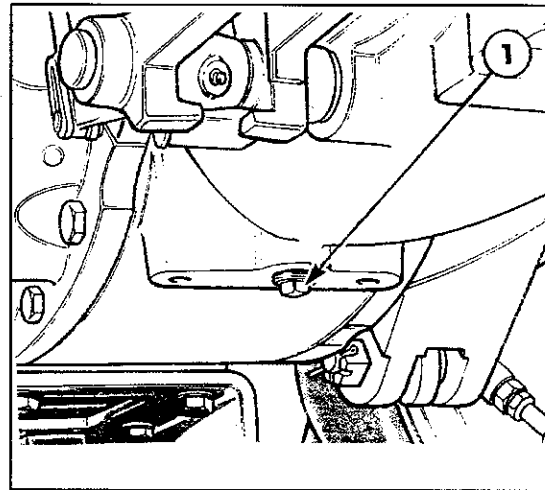
1. Disconnect the oil cooler pipes at the unions provided (see Figure 35, Item 3).
2. Remove the retaining bolt on the cooler and remove the cooler complete with piping (see Figure 35, Item 5).
3. Remove the central bolt (see Figure 35, Item 2) and ease the reservoir casing rearward. Catch the oil in a suitable container.
4. Remove and discard the filter and oil ring (see Figure 36, Items 1 & 2)
5. Clean the pump with a clean lint-free cloth.
6. Install new filter and seal.
7. Assemble the reservoir casing to the pump ensuring that the breather is in line with the projecting lug on the pump body (see Figure 35, Item 7).
8. Refit the oil cooler and pipework to the pump.
9. Fill the reservoir with new oil to the bottom of the filter neck. (See Ford operator's manual for specific type recommended.)
10. With the engine running, bleed the system by turning the steering wheel from stop to stop several times to allow the air in the system to escape.
11. Recheck the reservoir oil level and top off as necessary.

## SERVICE INSTRUCTIONS



P4245g1

FIGURE 37



P4245g2

FIGURE 38

### SERVICING THE HYDRAULIC LIFT SYSTEM (REAR AXLE)

#### To check the lift system oil level:

Check the hydraulic system (rear axle) oil every 50 hours.

1. With the tractor standing level, all the hydraulic rams in the extended position, check that the oil is level with the upper mark on the dipstick (see Figure 37, Item 1)
2. If it is low, remove the filter plug and add oil to bring the oil level up to the full mark on the dipstick (see Figure 37, Item 2).
3. Install the filter plug.

#### To change the lift system oil:

Change the hydraulic lift system (rear axle) oil every 1200 hours. With the tractor standing level, the hydraulic lift arms in the lowered positions and any external cylinders retracted,

1. Drain and discard the oil by removing the rear axle drain plug (see Figure 38, Item 1).
2. Install the plug after the oil has drained.
3. Remove the filter plug (see Figure 37, Item 2) and fill the rear axle with fresh oil of the type recommended.
4. Start the engine and fully raise the lift arms. Also extend any external hydraulic cylinders. Add oil as required until full.
5. Install the filter plug.

#### To change the hydraulic lift oil filter:

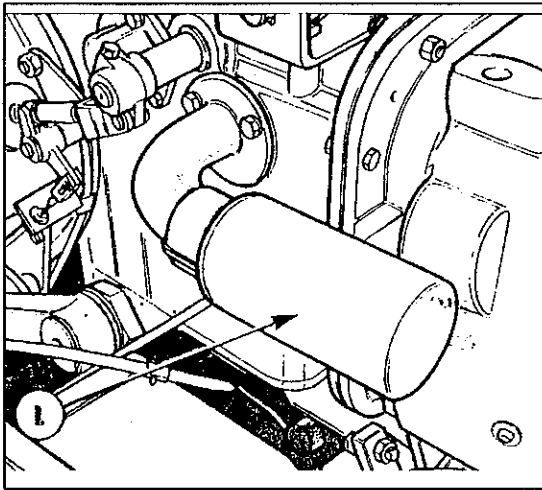
Change the hydraulic lift oil filter every 300 hours (see Figure 39, Item 1).

1. Remove and properly dispose the old filter.
2. Lightly oil the replacement filter seal and tighten by hand. Do not over tighten.

### LUBRICATION FITTINGS

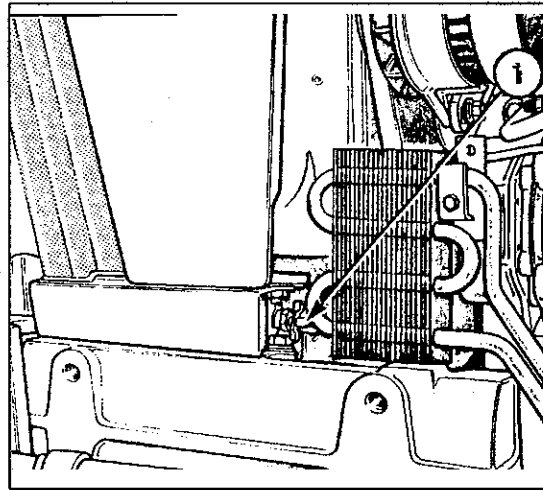
The following lubrication points require the application of good quality grease every 50 hours. In extremely dirty conditions, lubricate more often. See Ford 3930 operator's manual for additional information on lubrication requirements and specific type of grease to use.

- Front Wheel Hubs
- Front Wheel Spindles
- Brake and Clutch Pedal Pivots
- Power Steering Cylinder Pivots
- Hydraulic Lift Linkage



P4245h1

FIGURE 39



P4245h2

FIGURE 40

## To drain and flush the engine cooling system:

With the engine cool, drain and refill the cooling system as follows:

Drain the radiator and engine block based on type of coolant used as indicated below.

Plain water - drain, flush, and refill every 6 months, add rust inhibitor

Permanent Antifreeze (regular Ethylene Glycol) - change every 12 months

Long-Life (Ford) Antifreeze - change every 24 months.



## WARNING

The cooling system operates under pressure. It is dangerous to remove the radiator cap while the system is hot. Always cover the cap with a thick cloth and turn the cap slowly to the first stop. Allow all pressure to escape before removing the cap completely.

## IMPORTANT

Alcohol-type antifreeze is not recommended. Do not mix alcohol-type solution with permanent or long-life types of antifreeze.

## IMPORTANT

If plain water is used, be sure to add rust inhibitor to prevent corrosion of the water pump seal.

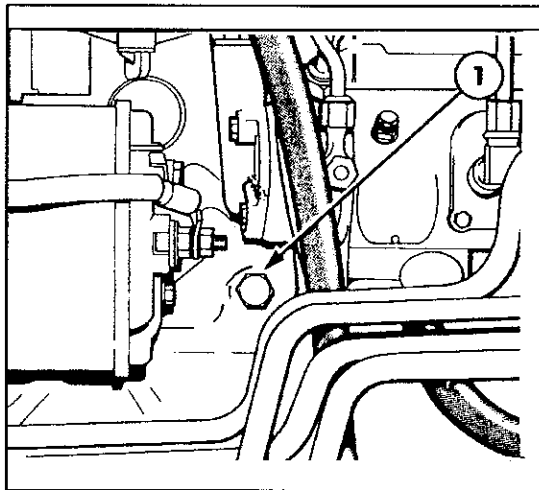
## To drain the system:

1. Remove the radiator cap and open the drain valve at the radiator (see Figure 40, item 1).
2. Open the drain valve at the engine block (see Figure 41, Item 1).
3. Allow the coolant to drain, then close the two drain valves and slowly refill the system.
4. Clean the radiator cap and seal. Install the cap.
5. Run the engine until normal operating temperature is reached, then stop the engine and check the coolant level.
6. Add coolant as necessary.

## IMPORTANT

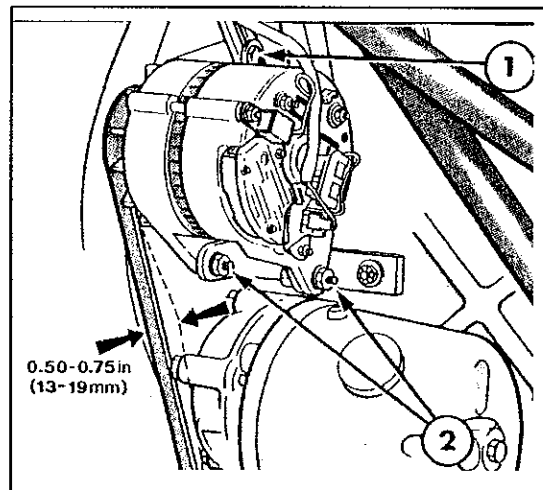
Do not run engine when the cooling system is empty. Do not add cold water or cold antifreeze solution if the engine is hot.

## SERVICE INSTRUCTIONS



P4245i1

FIGURE 41



P4245i2

FIGURE 42

### To adjust the fan belt:

Check the condition and tension of the fan belt every 300 hours. If the belt is frayed or cracked, install a new belt.



### WARNING

Never attempt to loosen or tighten the alternator mounting bolts when the engine is running.

### To adjust belt tension:

1. Loosen the alternator mounting bolts (see Figure 42, Items 1 & 2).
2. Pry the alternator away from the engine and tighten the mounting bolts.
3. Check belt deflection by applying 25 lbs. pressure on the fan belt between the alternator and crankshaft pulleys. An old belt should deflect about  $\frac{3}{4}$ ". A new belt about  $\frac{1}{2}$ ".

### To service the alternator:

The alternator (see Figure 42) is belt driven by the fan belt from the engine crankshaft pulley. It is important that belt slippage does not occur, otherwise the charging rate will be affected. Other than belt adjustment, the only maintenance required on the alternator is to periodically inspect the terminals and keep them clean and tight. Also occasionally clean the alternator cooling fan.

### IMPORTANT

Do not short the field terminal of the alternator to the ground.

Do not disconnect the voltage regulator while the alternator is running.

Do not remove the alternator without first disconnecting the negative battery cable.

When installing a battery make certain that positive cable is connected first and the negative cable is connected to the ground. Reverse polarity will destroy the rectifier diodes in the alternator.

When using jumper cables to start your tractor, always connect the positive terminals of both batteries to each other, and the negative terminals to each other.

### To service the voltage regulator:

The voltage regulator is mounted behind the battery. The unit is sealed and cannot be adjusted. If replacement is required, consult your Ford Tractor Dealer.

## SERVICE INSTRUCTIONS

### To service the battery:

Check the electrolyte level in the battery every 50 hours.



### CAUTION

When the alternator is charging, an explosive gas is produced inside the battery. Always check the electrolyte level with the engine stopped. DO not use an exposed flame and do not smoke when checking the battery.

### To check the battery electrolyte level:

1. Clean the top of the battery and remove the vent plugs.
2. Check the electrolyte level. A properly filled battery will have liquid up to the rings on the inside of the fill wells. In any case the electrolyte level should not be allowed a  $\frac{1}{4}$ " above the plates in the battery.
3. If the electrolyte level is low, add distilled water. The level is correct when the liquid just covers the ring in the filter wells, the top of the red shield, or  $\frac{1}{4}$ " above the plates, depending on the type of battery.
4. Install the vent plug after making sure the breathing holes are not blocked. At below freezing temperature, be sure to run the engine for a period of time, after adding water, so the battery will charge and prevent the water from freezing.

Keep the battery connections tight and free of corrosion. Use an ammonia or baking soda/water solution to wash the outside surface and terminals of the battery. Make sure the solution does not enter the battery. After cleaning, wash the battery with clear water. Protect the terminals from corrosion with a light application of petroleum jelly.

In freezing temperatures, the battery must be maintained in a good state of charge. When a battery is discharged or run down, the electrolyte is weak and may freeze, damaging the case. If it becomes necessary to add water (distilled), it should be done just before using the tractor so the charging will mix the water with the electrolyte and prevent the water from freezing.

### IMPORTANT

Keep distilled water in a clean, well covered, nonmetallic container.

When installing a battery, make certain the positive cable is connected first and the negative cable is connected to the ground. Reverse polarity will destroy the rectifier diodes in the alternator.

When using jumper cables to start your tractor, always connect the positive terminals of both batteries to each other, and the negative terminals to each other.

### TIRE SERVICE INSTRUCTIONS

Check tire pressure every 50 hours.

Tire inflation pressure:	
Front	40psi
Rear	25 psi

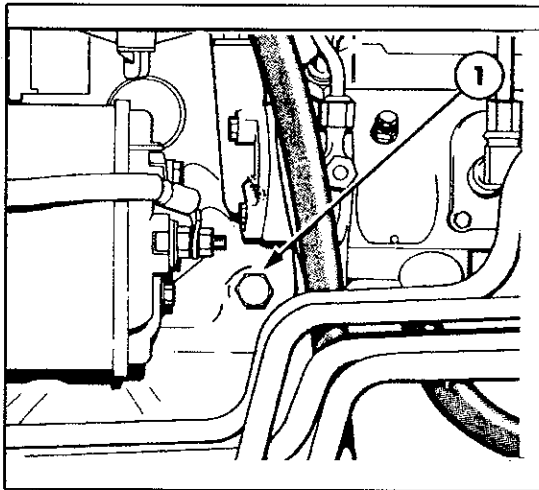
When checking the tire pressure, inspect the tire for damaged side walls and tread cut. Neglected damage will lead to early tire failure.

### To service the fuel injection pump:

Consult your Ford 3930 operator's manual to determine if repairs or adjustments are required. If replacement of the pump is necessary, consult the Ford 3930 operator's manual.

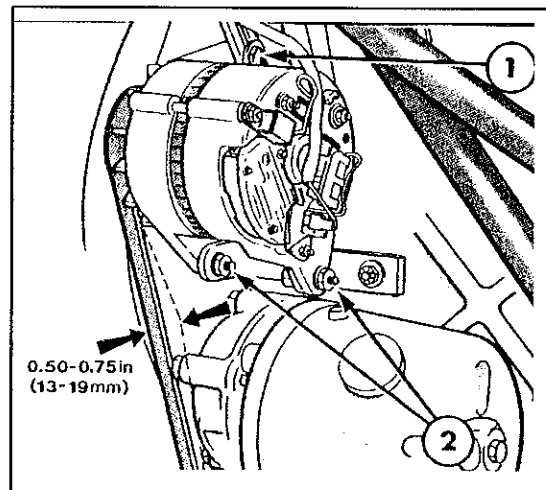


## SERVICE INSTRUCTIONS



P4245j1

FIGURE 43



P4245j2

FIGURE 44

### BRAKE ADJUSTMENT

If the brake pedal travel becomes excessive, or if the travel of one pedal is not equal to the other, adjust in the following manner:

1. Disconnect the brake return spring on the right pedal allowing the pedal to drop.
2. Push the pedal down to take up any slack in the linkage.
3. Loosen the lock nut (see Figure 43, Item 2) next to the pull rod nut (see Figure 43, Item 1) and turn the pull rod nut until the pedal is  $1\frac{1}{2}$ " to  $1\frac{3}{4}$ " below the left pedal.
4. Tighten the lock nut.
5. Disconnect the brake return spring on the left pedal allowing the pedal to drop.
6. Push the pedal down to take up any slack in the linkage.
7. Loosen the lock nut (see Figure 43, Item 2) next to the pull rod nut (see Figure 43, Item 1) and turn the pull rod nut until the left pedal is level with the right pedal.
8. Check for adjustment by engaging the brake pedal lock. The brake pedal lock should engage easily. If the pedals are aligned. This will give even braking action, which is particularly important at road speeds.
9. Tighten the lock nut and install both brake pedal return springs.
10. Road test the tractor to make sure the braking action of both rear wheels is equal.

### CLUTCH PEDAL ADJUSTMENT

To obtain maximum clutch life, it is essential that the clutch pedal free travel be checked every 50 hours to maintain free travel at  $1\frac{1}{4}$ ". Free travel is the distance the pedal can be moved before resistance is met. If the pedal free travel is excessive or insufficient, adjust as follow:

1. Loosen the clevis lock nut (see Figure 44, Item 1) and remove the cotter pin and clevis pin (see Figure 44, Item 3).
2. Turn the clevis to increase or decrease the effective length of the operating rod until the correct pedal free travel is obtained.
3. Install the clevis pin and secure with a new cotter pin and tighten the clevis lock nut.
4. Recheck the pedal free travel. Readjust if necessary.

## SERVICE INSTRUCTIONS

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### **To change the spark plugs:**

To maintain peak engine efficiency and performance, clean the spark plugs every 300 hours and install new plugs every 600 hours.

### **To remove the spark plugs:**

1. Gain access to the spark plugs by loosening the battery tray wing nut and swinging the battery out.
2. Remove the distributor-to-spark plug wire from the plugs.
3. Remove the high tension wires. Using a spark plug socket, remove the spark plugs and inspect for damaged insulators, fouling, and excessive electrode erosion. If serviceable, clean with sandblasting equipment.
4. Check the gap with a wire gauge. Adjust the gap to 0.023-0.027".
5. Install the plugs and tighten them to 26-30 lbs./ft.
6. Connect the wires and move the battery back into position.

### **TO CHANGE DISTRIBUTOR POINTS**

Replace distributor points every 600 hours. See your Ford 3930 operator's manual for detailed service instructions.

### **TO CHECK THE VALVE CLEARANCE (LASH)**

Correct valve clearance is important for good engine performance. Check and adjust the valves every 300 hours. See the Ford 3930 tractor operator's manual for instructions on setting valve clearance (Lash).

### **TO SERVICE THE FUEL INJECTORS**

The injectors should be checked/cleaned every 600 hours. New injectors are available from your Ford Tractor Dealer. Consult the Ford 3930 operator's manual for detailed service instructions.

### **TO ADJUST THE ENGINE SPEED ADJUSTMENT**

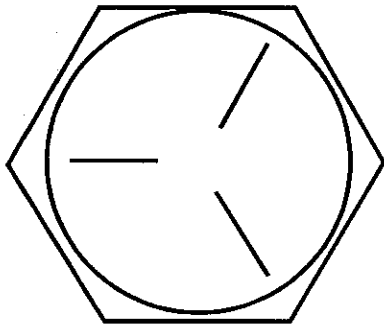
Engine speed is set at the factory at 1550-1600 maximum no load rpm. Low idle is set at the factory at 600-850 rpm. See your Ford 3930 operator's manual for adjustment instructions.

### **FRONT WHEEL BEARINGS**

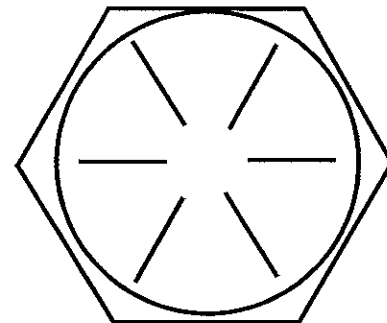
Front wheel bearings should be removed and packed every 600 hours. Refer to the Ford 3930 operator's manual for complete instructions on front wheel bearing service instructions.

## STANDARD HARDWARE TORQUE VALUES

### 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.										+

C2000/9905

## HYDRAULIC FITTING TORQUE CHART

### HYDRAULIC TAPERED O-RING FITTING TORQUE CHART

TUBE OD in.	THREAD SIZE	MINIMUM TORQUE	MAXIMUM TORQUE
0.25	0.44"-20	6 ft./lbs.	9 ft./lbs.
0.38	0.56"-18	13 ft./lbs.	20 ft./lbs.
0.50	0.75"-16	20 ft./lbs.	30 ft./lbs.
0.62	0.88"-14	25 ft./lbs.	40 ft./lbs.
0.75	1.12"-12	45 ft./lbs.	70 ft./lbs.
1.00	1.31"-12	60 ft./lbs.	90 ft./lbs.
<p style="text-align: center;"><b>NOTE</b> Do not use sealant on O-Ring threads.</p>			

### HYDRAULIC TAPERED PIPE FITTING (NPT) TORQUE CHART

SIZE	MINIMUM TORQUE	MAXIMUM TORQUE
1/4 NPT	10 ft./lbs.	30 ft./lbs.
1/2 NPT	25 ft./lbs.	50 ft./lbs.
3/4 NPT	50 ft./lbs.	100 ft./lbs.
<p style="text-align: center;"><b>NOTE</b> Ratings listed are when using teflon thread seal.</p>		

### HYDRAULIC TAPERED SEAT (37° FLARE) FITTING (JIC) TORQUE CHART

TUBE OD in.	THREAD SIZE	MAXIMUM TORQUE
0.25	0.44"-20	9 ft./lbs.
0.38	0.56"-18	20 ft./lbs.
0.50	0.75"-16	30 ft./lbs.
0.62	0.88"-14	40 ft./lbs.
0.75	1.12"-12	70 ft./lbs.
1.00	1.31"-12	90 ft./lbs.

# DECIMAL METRIC CONVERSION CHART

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

## TROUBLESHOOTING GUIDE - SCRUBBING SYSTEMS

### TROUBLESHOOTING - SCRUBBING SYSTEMS

<u>PROBLEM</u>	<u>PROBABLE CAUSE</u>	<u>REMEDY</u>
Poor scrubbing action	<ol style="list-style-type: none"> <li>1. Worn scrubbing brushes</li> <li>2. Incorrect method of operation</li> <li>3. Wrong cleaning agent or mixture</li> <li>4. Poor scrubbing distribution</li> <li>5. Low engine rpm</li> <li>6. Hydraulic system</li> <li>7. Hydraulic Drive</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect brushes. If brushes are worn to ½" or less, replace all 4 brushes</li> <li>2. Check scrubbing procedure, brush pressure, type of brush solution flow &amp; cleaning chemical used. For extreme conditions double scrubbing may be necessary.</li> <li>3. Use A-L recommended materials.</li> <li>4. Clean out distribution tube &amp; metering holes to brushes. Check feed hose &amp; clean if necessary. Check valve &amp; cable control system.</li> <li>5. Check rpm.</li> <li>6. See "hydraulic system" troubleshooting</li> <li>7. Check motors to see if worn or damaged.</li> </ol>
Poor solution pick up	<ol style="list-style-type: none"> <li>1. Clogged suction hoses or pick up tools</li> <li>2. Loose connections between suction hose &amp; squeegee or between manifold &amp; turbine inlet</li> <li>3. Vacuum turbine not operating</li> <li>4. Vacuum float shut off</li> <li>5. Power take off not engaged.</li> <li>6. Drain valve or drain door leakage or not properly closed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Disconnect suction hose from squeegee, flush squeegee &amp; hoses.</li> <li>2. Check all hose connections for looseness or damage.</li> <li>3. Check all air discharge at turbine muffler. Check for slipping or broken drive belt(s).</li> <li>4. Excessive solution recovery, drain tank. Excessive foam build up, change cleaning chemical mixture.</li> <li>5. Engage power take off</li> <li>6. Close, repair, or replace.</li> </ol>
Splash control	<ol style="list-style-type: none"> <li>1. Brush drive splash skirts - more than 1/8" from floor</li> <li>2. Splash skirts worn</li> <li>3. Too much solution being applied</li> </ol>	<ol style="list-style-type: none"> <li>1. Readjust to 1/8" clearance.</li> <li>2. Replace &amp; adjust</li> <li>3. Shut off solution flow 5' to 10' before making turns.</li> </ol>
Brush wear	<ol style="list-style-type: none"> <li>1. Lift chain(s) not adjusted properly.</li> <li>2. Brush housing sections binding with linkage</li> <li>3. One or more counterbalance spring missing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect for slack with brushes down. Adjust as necessary.</li> <li>2. Check and repair.</li> <li>3. Check and repair.</li> </ol>

## TROUBLESHOOTING GUIDE - HYDRAULIC SYSTEM

### TROUBLESHOOTING - HYDRAULIC SYSTEM

<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
Brushes not turning or turning slowly (196 rpm at 1450 engine rpm)	<ol style="list-style-type: none"><li>1. Faulty relief valve(s)</li><li>2. Worn drive motor</li><li>3. Worn valve spool</li><li>4. Worn gear pump</li><li>5. Low engine rpm</li><li>6. Low sump oil level</li><li>7. Clogged pump inlet filter</li></ol>	<ol style="list-style-type: none"><li>1. Check relief valve pressure, should be 2500 psi.</li><li>2. Repair or replace</li><li>3. Repair or replace</li><li>4. Repair or replace</li><li>5. Check rpm.</li><li>6. Check and fill</li><li>7. Replace</li></ol>
Brushes not lifting	<ol style="list-style-type: none"><li>1. Cylinder piston leakage</li><li>2. Valve spool leakage</li><li>3. Worn gear pump</li><li>4. Lock off valve closed.</li></ol>	<ol style="list-style-type: none"><li>1. Repair or replace</li><li>2. Repair or replace</li><li>3. Repair or replace</li><li>4. Open valve</li></ol>
Brushes not lowering	<ol style="list-style-type: none"><li>1. Lock off valve closed</li></ol>	<ol style="list-style-type: none"><li>1. Open valve</li></ol>

### SQUEEGEE CONTROL SYSTEM

<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
Failure to lift, control lever full up	<ol style="list-style-type: none"><li>1. Piston seals</li><li>2. O-ring seals</li><li>3. Relief valve in tractor</li><li>4. Internal linkage</li><li>5. Cross shaft seized</li></ol>	<ol style="list-style-type: none"><li>1. Repair or replace</li><li>2. Repair or replace</li><li>3. Repair or replace</li><li>4. Repair or replace</li><li>5. Repair or replace</li></ol>
Failure to lift with shift lever in reverse (control lever up)	<ol style="list-style-type: none"><li>1. Linkage adjustment</li></ol>	<ol style="list-style-type: none"><li>1. Readjust - see automatic squeegee lift adjustment in maintenance section.</li></ol>
Failure to lower with shift lever in forward gears (control lever down)	<ol style="list-style-type: none"><li>1. Linkage adjustment</li><li>2. Control valve stuck in lift position</li></ol>	<ol style="list-style-type: none"><li>1. Readjust automatic squeegee lift linkage</li><li>2. Repair or replace</li></ol>

## TROUBLESHOOTING GUIDE - POWER STEERING SYSTEM

### TROUBLESHOOTING - POWER STEERING SYSTEM

<u>PROBLEM</u>	<u>PROBABLE CAUSE</u>	<u>REMEDY</u>
No steering or excessive effort required to steer	<ol style="list-style-type: none"> <li>1. Incorrect oil level in reservoir</li> <li>2. Air in system</li> <li>3. Pump relief valve faulty</li> <li>4. Worn pump</li> <li>5. Leaking power cylinder</li> <li>6. Damaged or binding rock shaft</li> <li>7. Control valve worn or damaged</li> <li>8. Broken or damaged steering column flange and insulator assembly (hydrostatic steering)</li> <li>9. Damaged or worn metering element (hydrostatic steering)</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill with the correct grade and quantity of oil</li> <li>2. Check for loose connections or damaged tubing. Purge system of air.</li> <li>3. Check system pressure</li> <li>4. Inspect and repair</li> <li>5. Inspect and repair</li> <li>6. Inspect and repair</li> <li>7. Inspect and replace</li> <li>8. Inspect and replace</li> <li>9. Inspect and replace</li> </ol>
Steering wanders	<ol style="list-style-type: none"> <li>1. Excessive play in steering linkage ball joints</li> <li>2. Incorrect adjustment of rocker shaft free play</li> <li>3. Excessive play in worm and nut assembly</li> <li>4. Leaking power cylinder</li> <li>5. Control valve spool sticking or worn</li> <li>6. Weak or broken control valve return springs or torsion bar.</li> <li>7. Incorrect valve spool shimming adjustment (hydrostatic steering)</li> <li>8. Damaged or worn metering element (hydrostatic steering)</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect and replace</li> <li>2. Check and adjust</li> <li>3. Impact and replace</li> <li>4. Inspect and repair</li> <li>5. Inspect and replace</li> <li>6. Inspect and repair</li> <li>7. Check and adjust</li> <li>8. Inspect and replace</li> </ol>
Front wheels surge when steering	<ol style="list-style-type: none"> <li>1. Leaking power cylinder</li> <li>2. Control valve spool sticking</li> <li>3. Weak or broken control valve return springs or torsion bar.</li> <li>4. Damaged or worn metering element (hydrostatic steering)</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect and repair</li> <li>2. Inspect and repair</li> <li>3. Inspect and repair</li> <li>4. Inspect and replace</li> </ol>
Noisy pump	<ol style="list-style-type: none"> <li>1. Incorrect oil level in reservoir</li> <li>2. Air in system</li> <li>3. Water in oil</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill with the correct grade and quantity of oil.</li> <li>2. Check for loose connections or damaged tubing. Purge system of air.</li> <li>3. Drain and renew the oil</li> </ol>



## TROUBLESHOOTING GUIDE - GAS/DIESEL ENGINE SYSTEMS

### TROUBLESHOOTING - GAS/DIESEL ENGINE SYSTEMS

<b><u>PROBLEM</u></b>	<b><u>PROBABLE CAUSE</u></b>	<b><u>REMEDY</u></b>
Engine does not develop full power - Gas Engine	<ol style="list-style-type: none"><li>1. Clogged air cleaner</li><li>2. Improper governor linkage adjustment</li><li>3. Carburetor and choke out of adjustment</li><li>4. Low coil voltage</li><li>5. Improper breaker point dwell or gap</li><li>6. Faulty ignition timing</li><li>7. Improper valve lash adjustment</li><li>8. Worn or bent push rods</li><li>9. Burned, worn, or sticking valves</li><li>10. Improper valve timing</li><li>11. Blown or burned head gasket</li><li>12. Low cylinder compression</li></ol>	<ol style="list-style-type: none"><li>1. Clean or renew element</li><li>2. Check and reset</li><li>3. Check and reset</li><li>4. Check and replace coil if necessary</li><li>5. Check and reset</li><li>6. Check and reset</li><li>7. Check and reset</li><li>8. Check and replace</li><li>9. Check and replace</li><li>10. Check and reset</li><li>11. Check head flatness and fit new gasket</li><li>12. Replace piston rings or rebore/resleeve as necessary.</li></ol>
Engine does not develop full power - Diesel Engine	<ol style="list-style-type: none"><li>1. Clogged air cleaner</li><li>2. Fuel line obstructed</li><li>3. Faulty injectors</li><li>4. Low cylinder compression</li><li>5. Incorrect valve lash adjustments</li><li>6. Burnt, worn, or sticking valves</li><li>7. Blown head gasket</li><li>8. Incorrect fuel delivery</li></ol>	<ol style="list-style-type: none"><li>1. Clean or renew element</li><li>2. Clean</li><li>3. Clean and reset</li><li>4. Replace piston rings or rebore/resleeve as necessary.</li><li>5. Check and reset</li><li>6. Replace valves and/or guides</li><li>7. Check head flatness and fit new gaskets</li><li>8. Check injectors and pump</li></ol>

## TROUBLESHOOTING GUIDE - LP ENGINE SYSTEMS

### TROUBLESHOOTING - LP ENGINES

PROBLEM	PROBABLE CAUSE	REMEDY
NOTE: ALWAYS CHECK THROUGH LP FUEL SYSTEM IN ORDER OF NUMERICAL SEQUENCE.		
Will not start	Fuel tank (1)	<ol style="list-style-type: none"> <li>1. Check fuel tank type and fuel supply (vapor tank for vapor withdrawal system)</li> <li>2. Be sure tank hand valve is open (always open valve slowly). If hand valve is opened too fast, shut-off valve in tank will automatically shut off fuel supply. If this happens, close the hand valve and then reopen it slowly.</li> </ol>
	Fuel lines (2)	<ol style="list-style-type: none"> <li>1. Check hoses, connections, leaks, etc., using soap bubble test method.</li> <li>2. 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>3. Check fuel tank and lines for frosting up. To relieve frosting, open shut-off valve slowly (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>4. Check fuel filter. Remove and clean it if dirty filter is restricting fuel line. Check quick-disconnect fitting at LP tank: if LP tank is not properly sealed, no fuel will flow through the line. A broken fuel line or loose connection could cause the tank shut-off valve to close.</li> </ol>
	Ignition System (3)	<ol style="list-style-type: none"> <li>1. Remove and check spark plugs to be sure it is the correct type with proper gap.</li> <li>2. Check ignition points and condenser</li> <li>3. Check ignition coil.</li> <li>4. Check ignition switch</li> <li>5. Check wiring for loose connections or wire breakage. Check battery terminals for corrosion or loose ground cable. Check for possible shorts in wiring.</li> <li>6. Battery dead.</li> </ol>
	Carburetor (4)	<ol style="list-style-type: none"> <li>1. Always check carburetor for proper settings before tampering with regulator adjustment.</li> <li>2. Flooded carburetor - Shut off LP tank valve with ignition switch "on"; crank engine through a few times. If engine starts, then slowly open tank valve to provide fuel flow through line. If engine does not start, then choke engine and use standard starting procedure.</li> </ol>

## TROUBLESHOOTING GUIDE - LP ENGINE SYSTEMS

### TROUBLESHOOTING - LP ENGINES

PROBLEM	PROBABLE CAUSE	REMEDY
NOTE: ALWAYS CHECK THROUGH LP FUEL SYSTEM IN ORDER OF NUMERICAL SEQUENCE.		
	Regulator (5)	1. Be sure carburetor is properly adjusted before attempting to adjust regulator settings. 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 to regulator.
	Engine (6)	1. Under ordinary circumstances, an engine should start easily if the components previously mentioned have been checked through 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.
Runs unevenly & lacks power	Fuel Tank (1)	1. Out of fuel 2. Check fuel tank type and fuel supply (liquid tank for liquid withdrawal system)
	Fuel lines (2)	1. Broken fuel line or loose line connection could cause tank internal shut-off valve to close automatically and shut off the fuel supply.
	Ignition System (3)	
	Carburetor (4)	1. Restricted air cleaner 2. Clean or replace filter element
	Regulator (5)	
Stops during operation	Fuel Tank (1)	1. Tank valve not opened sufficiently 2. Check fuel tank type and fuel supply (liquid tank for liquid withdrawal system)
	Ignition System (2)	1. Check ignition for poor connections or weak or worn ignition parts.
	Carburetor (3)	1. Check carburetor setting 2. Check ignition system
	Regulator (4)	1. Could be improper setting. Allow too rich or too lean mixture to carburetor. Check and adjust only after checking carburetor adjustment.

## TROUBLESHOOTING GUIDE - GENERAL ENGINE SYSTEMS

### TROUBLESHOOTING - GENERAL ENGINE SYSTEMS

<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
Engine knocks	<ol style="list-style-type: none"> <li>1. Diluted or thin oil</li> <li>2. Insufficient oil supply</li> <li>3. Low oil pressure</li> <li>4. Excessive crankshaft end play</li> <li>5. Flywheel or ring gear run-out excessive</li> <li>6. Excessive connecting rod or main bearing clearance</li> <li>7. Bent or twisted connection rods</li> <li>8. Crankshaft journals out of round</li> <li>9. Excessive piston to cylinder bore cylinder</li> <li>10. Excessive piston ring clearance</li> <li>11. Broken rings</li> <li>12. Excessive piston pin clearance.</li> <li>13. Piston pin retainer</li> <li>14. Excessive camshaft end play</li> <li>15. Imperfections on timing gear teeth</li> <li>16. Excessive timing gear backlash</li> </ol>	<ol style="list-style-type: none"> <li>1. Drain and refill with specified oil and replace filter. Ascertain cause of dilution</li> <li>2. Check oil level and top up as necessary. Overhaul or replace pump as necessary. Check pump filter not clogged.</li> <li>3. Overhaul pump or relief valve as necessary.</li> <li>4. Install new thrust bearing liner.</li> <li>5. Skim flywheel or fit new ring gear</li> <li>6. Install new bearing inserts and/or regrind crankshaft</li> <li>7. Replace connecting rods</li> <li>8. Regrind crankshaft and fit undersize bearing inserts.</li> <li>9. Rebore/resleeve block and fit new pistons</li> <li>10. Fit new pistons and rings.</li> <li>11. Fit new rings. Check bore/pistons for damage</li> <li>12. Fit new piston pin and bush</li> <li>13. Install new retainer. Check loose or missing bore/pistons for damage.</li> <li>14. Install new thrust plate</li> <li>15. Renew timing gear</li> <li>16. Renew timing gear</li> </ol>
Low oil pressure	<ol style="list-style-type: none"> <li>1. Engine oil low</li> <li>2. Wrong grade of oil</li> <li>3. Blocked oil pump sump screen</li> <li>4. Oil pressure relief valve faulty</li> <li>5. Oil pump drive shaft worn</li> <li>6. Excessive oil pump rotor and assembly clearance</li> <li>7. Excessive main or connection rod bearing clearances</li> </ol>	<ol style="list-style-type: none"> <li>1. Top up, as necessary</li> <li>2. Drain and refill with correct grade of oil</li> <li>3. Clean pump screen</li> <li>4. Fit new relief valve</li> <li>5. Replace drive shaft</li> <li>6. Overhaul pump shaft</li> <li>7. Install new bearing inserts and/or re-grind crankshaft</li> </ol>
Engine tends to keep firing after fuel is shut off	<ol style="list-style-type: none"> <li>1. Air cleaner dirty or restricted</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean or renew element</li> </ol>
Excessive exhaust smoke	<ol style="list-style-type: none"> <li>1. Air cleaner dirty or restricted</li> <li>2. Excessive fuel delivery</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean</li> <li>2. Overhaul injection pump/injectors</li> </ol>

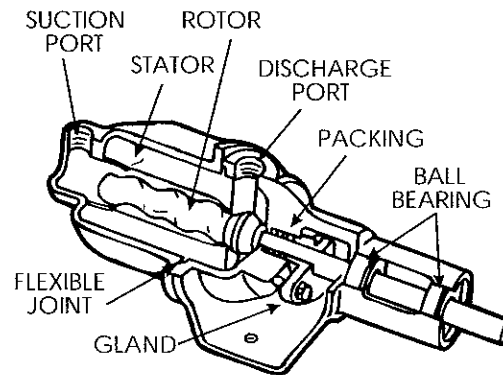
## TROUBLESHOOTING GUIDE - GENERAL ENGINE SYSTEMS

### TROUBLESHOOTING - GENERAL ENGINE SYSTEMS

<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
Excessive oil consumption	<ol style="list-style-type: none"> <li>1. Engine oil level too high</li> <li>2. External oil leaks from engine</li> <li>3. Worn valves, valve guides or seals</li> <li>4. Head gasket not sealing</li> <li>5. Oil loss past the pistons and rings</li> <li>6. Oil cooler leak (if fitted)</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce oil level</li> <li>2. Renew gaskets/seals, where necessary. Check mating surfaces for damage or distortion.</li> <li>3. Replace</li> <li>4. Renew gasket. Check head for damage or distortion</li> <li>5. Renew rings and/or rebore/resleeve block as necessary</li> <li>6. Repair/replace oil cooler assembly</li> </ol>
Engine overheats	<ol style="list-style-type: none"> <li>1. Hose connection leaking or collapsed</li> <li>2. Radiator cap defective or not sealing</li> <li>3. Radiator leakage</li> <li>4. Improper fan belt adjustment</li> <li>5. Radiator fins restricted</li> <li>6. Faulty thermostat</li> <li>7. Internal engine leakage</li> <li>8. Water pump faulty</li> <li>9. Exhaust gas leakage into cooling system</li> <li>10. Coolant aeration</li> <li>11. Cylinder head gasket improperly installed</li> <li>12. Hot spot due to rust and scale or clogged water jackets.</li> <li>13. Obstruction to radiator air flow</li> <li>14. Extended engine idling for long periods</li> <li>15. Oil cooler tube blocked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten hose connection. Replace hose if damaged</li> <li>2. Replace radiator cap</li> <li>3. Repair/replace radiator</li> <li>4. Readjust fan belt</li> <li>5. Clean with compressed air</li> <li>6. Renew thermostat</li> <li>7. Check for source of leakage. Renew part.</li> <li>8. Overhaul water pump</li> <li>9. Renew cylinder head gasket. Check head for damage or distortion</li> <li>10. Tighten all connections and check coolant level is correct. Ensure head gasket has not blown</li> <li>11. Renew cylinder head gasket</li> <li>12. Reverse flush entire cooling system</li> <li>13. Remove the obstruction</li> <li>14. Do not allow engine to idle</li> <li>15. Clean</li> </ol>
Oil pressure warning light fails to operate	<ol style="list-style-type: none"> <li>1. Bulb burnt out</li> <li>2. Warning light pressure switch faulty</li> <li>3. Warning light circuit faulty</li> </ol>	<ol style="list-style-type: none"> <li>1. Renew bulb</li> <li>2. Renew pressure switch</li> <li>3. Check and renew wiring</li> </ol>
Water temp. gauge fails to reach normal operating temperature	<ol style="list-style-type: none"> <li>1. Faulty temperature sender switch</li> <li>2. Incorrect or faulty thermostat</li> <li>3. Faulty water temperature gauge</li> </ol>	<ol style="list-style-type: none"> <li>1. Renew sender switch</li> <li>2. Renew thermostat</li> <li>3. Renew temperature gauge</li> </ol>

## TROUBLESHOOTING GUIDE - CAMEL RECYCLING PUMP

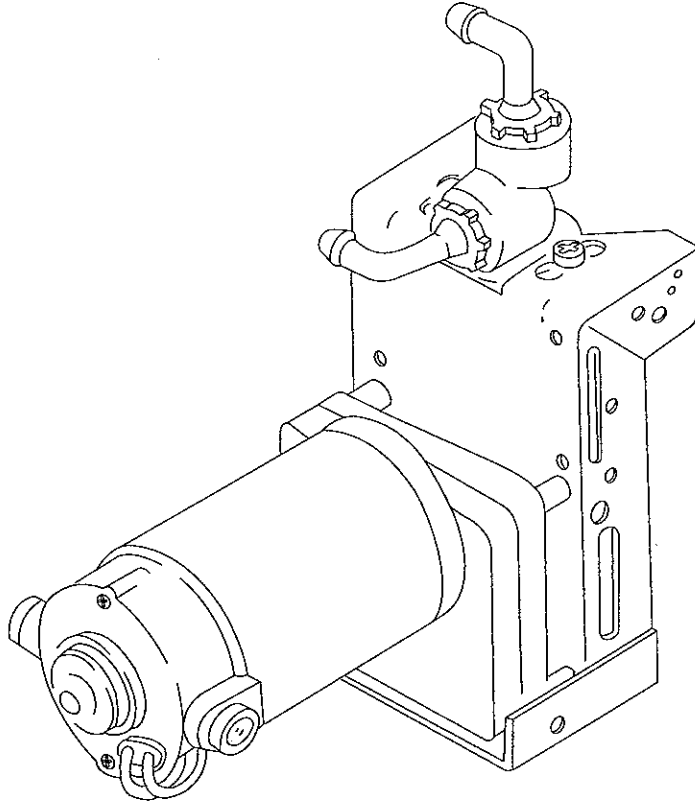
### TROUBLESHOOTING CHART - CAMEL RECYCLING PUMP



<b>PROBLEM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
Failure to pump	<ol style="list-style-type: none"> <li>1. Coupling slip</li> <li>2. Stator torn</li> <li>3. Wrong rotation</li> <li>4. Threads in rotor or on shaft stripped</li> <li>5. Excessive suction lift or vacuum</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten set screw on coupling</li> <li>2. Possible excessive pressure. Replace stator, check pressure at discharge port. Maximum pressure is 40 psi</li> <li>3. Check for clockwise rotation when facing shaft</li> <li>4. Replace part, check for proper rotation</li> <li>5. Check for obstructions inside intake line</li> </ol>
Pump Overhauls	<ol style="list-style-type: none"> <li>1. Excessive discharge pressure</li> <li>2. Bearings worn</li> <li>3. Broken flexible joints</li> <li>4. Insufficient mounting</li> </ol>	<ol style="list-style-type: none"> <li>1. Check discharge pressure. Maximum pressure is 40 psi. Check for obstructions at discharge port.</li> <li>2. Replace parts, check alignment and pressure at discharge ports (40 psi)</li> <li>3. Replace part, check pressure at discharge port</li> <li>4. Check mounting to be sure pump is securely mounted to base</li> </ol>
Shaft leakage	<ol style="list-style-type: none"> <li>1. Leakage at startup</li> <li>2. Persistent leakage</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust packing</li> <li>2. Packing rings and/or shaft keys may be worn. Inspect and replace if necessary</li> </ol>
Pump will not prime	<ol style="list-style-type: none"> <li>1. Air leak in suction side</li> </ol>	<ol style="list-style-type: none"> <li>1. Check all pipe connections at suction side</li> </ol>
Noise during operation	<ol style="list-style-type: none"> <li>1. Starved suction</li> <li>2. Bearings worn</li> <li>3. Broken flex joint</li> <li>4. Insufficient mounting</li> </ol>	<ol style="list-style-type: none"> <li>1. Check fluid supply for obstructions in supply line</li> <li>2. Replace parts as required. Check alignment and pressure at discharge port (maximum pressure of 40 psi)</li> <li>3. Replace part and check pressure at discharge port</li> <li>4. Check mounting to be sure pump is securely mounted</li> </ol>

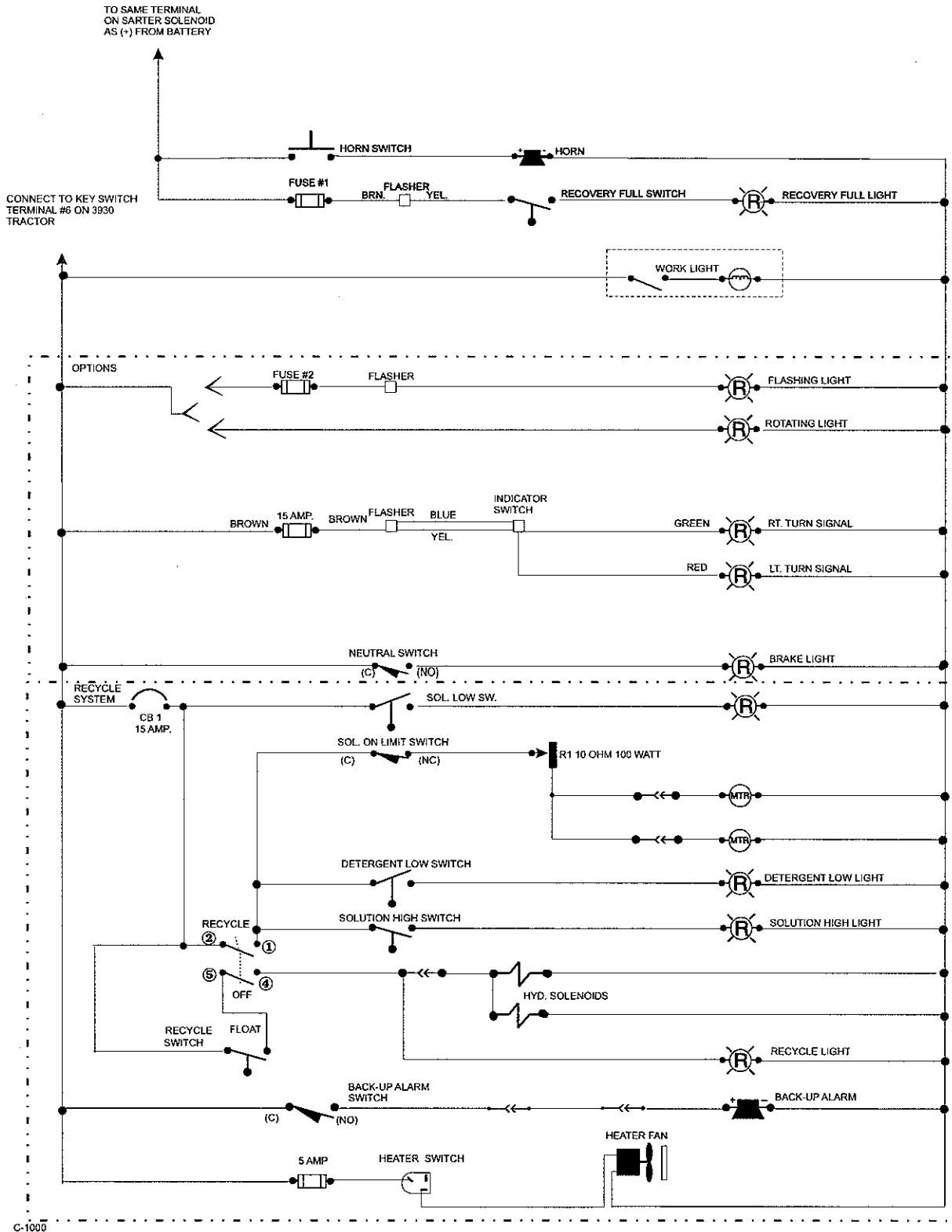
## TROUBLESHOOTING GUIDE - CAMEL DETERGENT PUMP

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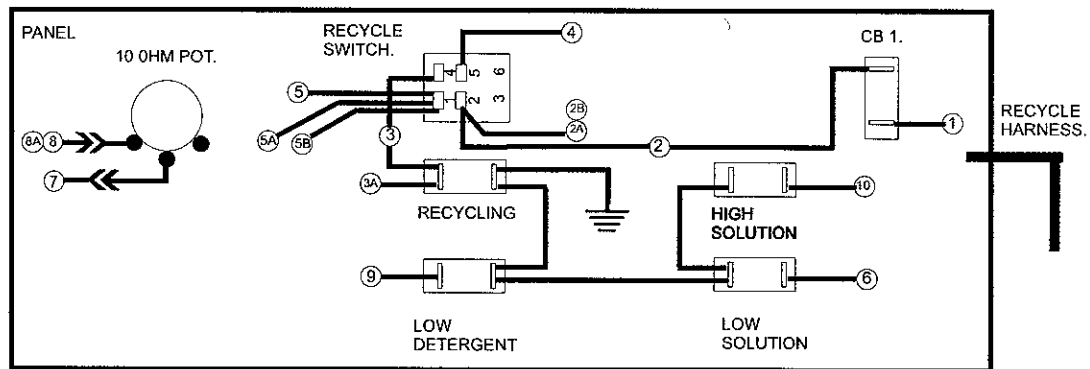
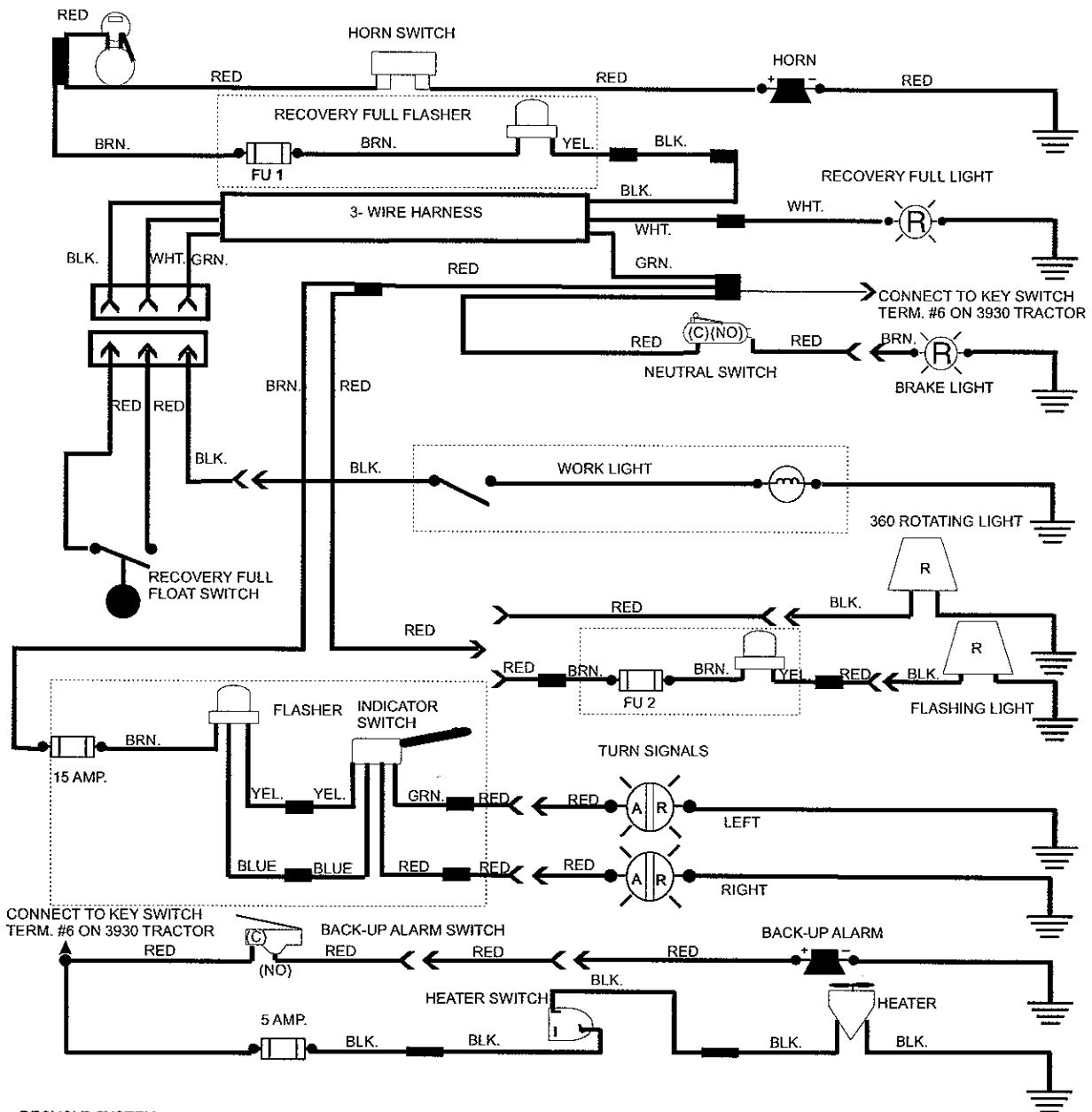


Motor fails to operate (engine running)
1. Poor electrical connection 2. Defective motor
Motor operates, but pump output is low or stopped
1. Restricted or blocked detergent lines 2. Excessive torque on tubing connectors (5.5 to 6.5 in/lbs. Max) 3. Poppet valves dirty 4. Air leak at intake side 5. Defective wiring or motor

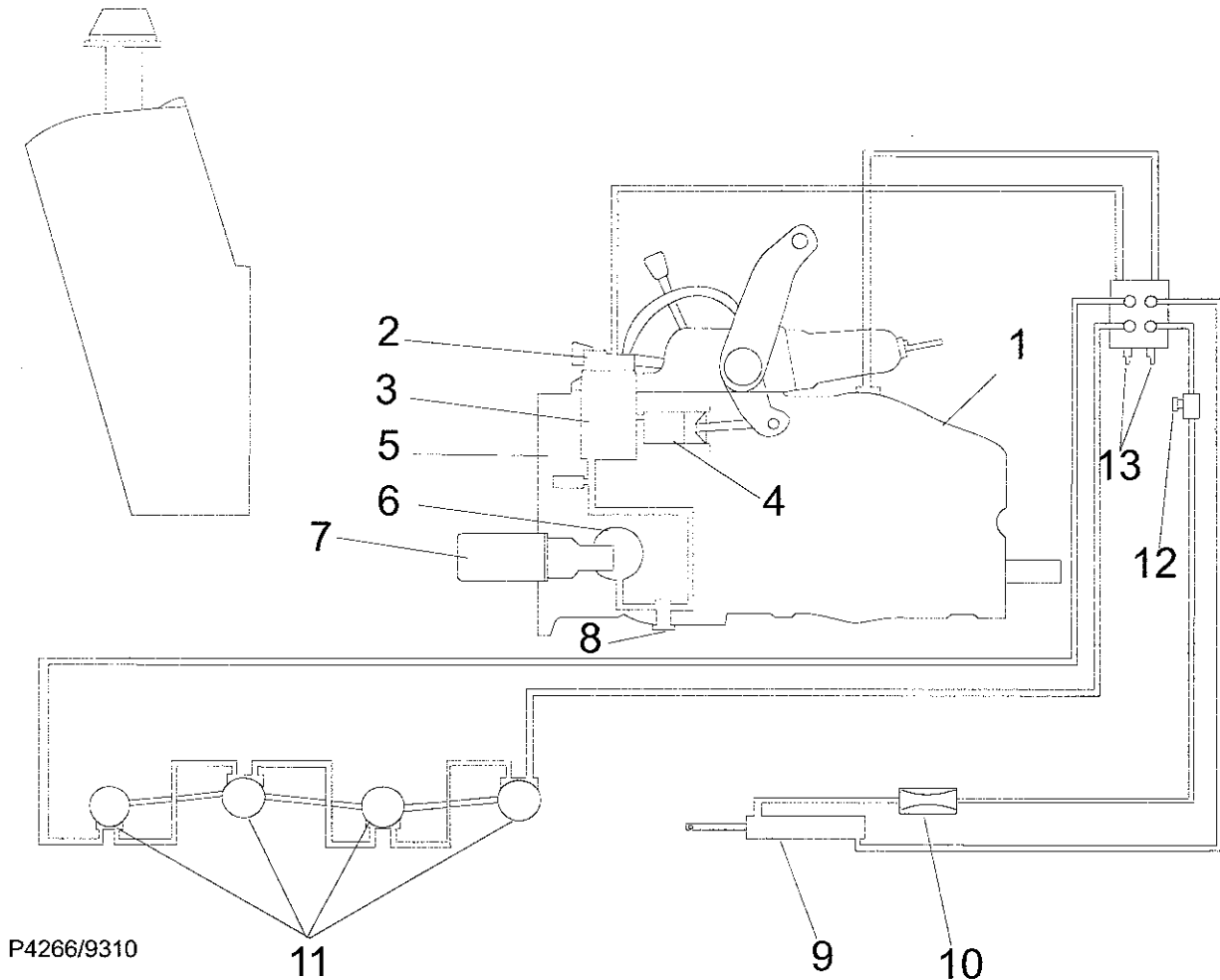
# ELECTRICAL SCHEMATIC DIAGRAM







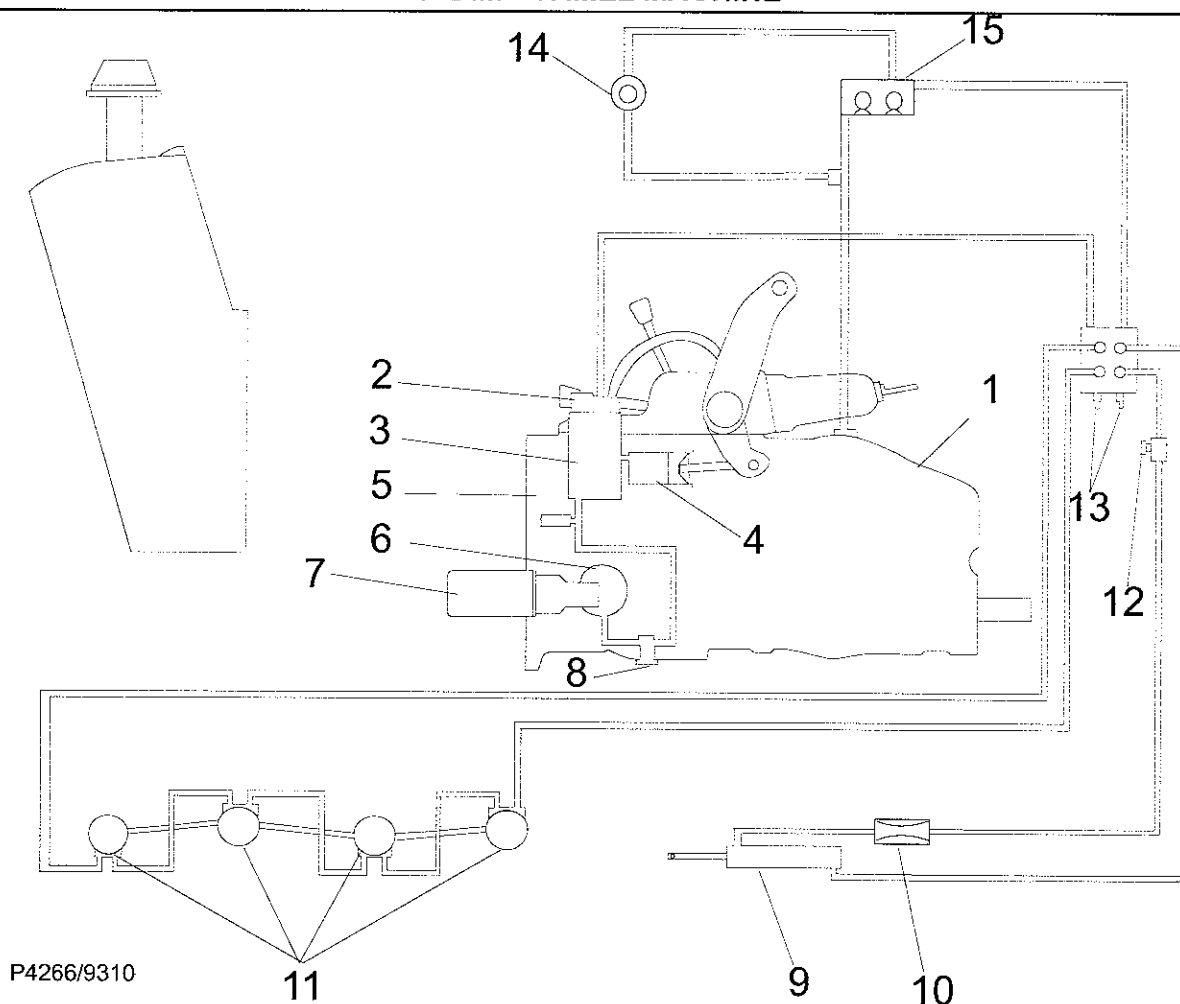
## HYDRAULIC SCHEMATIC DIAGRAM - STANDARD MACHINE



### HYDRAULIC SCHEMATIC

1. Rear Axle Oil Sump
2. Priority Valve
3. Quadrant Control Valve
4. Squeegee Lift Arm Cylinder
5. Flow Control Valve
6. Gear Pump
7. Micronic Inlet Filter
8. Relief Valve (2500 psi)
9. Brush Lift Cylinder
10. Flow Restrictor
11. Brush Drive Motor
12. Brush Lift Lock-off Valve
13. 2 Spool Control Valve (2500 psi Relief)

## HYDRAULIC SCHEMATIC DIAGRAM - CAMEL MACHINE



### HYDRAULIC SCHEMATIC

1. Rear Axle Oil Sump
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11. Brush Drive Motor
12. Brush Lift Lock-off Valve
13. 2 Spool Control Valve (2500 psi Relief)
14. Recycling Pump Recycling Motor
15. Motor Control Valve

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## HARDWARE ABBREVIATIONS

### ABBREVIATIONS - SCREWS

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ADJ	= Adjusting Screw
ADJ.SP	= Adjusting Plunger Screw
BHM	= Binding Head Machine Screw
BHS	= Button Head Socket Screw
CAPT.SL	= Captivated Slotted Screw
CAPT.WG	= Captivated Wing Screw
FHM	= Flat Head Machine Screw
FIL.HM	= Filister Head Machine Screw
HHC	= Hexagon Head Cap Screw
HHM	= Hexagon Head Machine Screw
HIHD	= 1/2 High Head Screw
HSHC	= Hexagonal Socket Head Cap Screw
HSFHC	= Hexagonal Socket Flat Head Cap Screw
KNH	= Knurled Head Screw
MHHC	= Metric Hexagon Head Cap Screw
PHM	= Pan Head Machine Screw
RHD	= Round Head Drive Screw
RHM	= Round Head Machine Screw
RHW	= Round Head Wood Screw
SHC	= Shiny Crown Cap Screw
SHTB	= Shoulder Thumb Screw
SQ	= Square Head Screw
TB	= Thumb Screw
THM	= Truss Head Machine Screw
WELD	= Weld Stud
WG	= Wing Screw

### ABBREVIATIONS - SETSCREWS

HS	= Hexagonal Socket Setscrew
S	= Slotted Setscrew
SH	= Square Head Setscrew
-KCP	= Knurled Cup Point Setscrew
-CP	= Cup Point Setscrew
-OP	= Oval Point Setscrew
-FDP	= Full Dog Point Setscrew
-HDP	= Half Dog Point Setscrew
-FP	= Flat Point Setscrew
-COP	= Cone Point Setscrew

## ORDERING PARTS

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

<b>MODEL NO.</b>  	<b>SERIAL NO.</b>  
<b>Manufactured By</b>  <b>American Lincoln Technology®</b> Bowling Green, Ohio	

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

### MACHINE CATALOG NUMBER

510-009	72" Gasoline Powered H-772G
510-010	72" LP Powered H-772LP
510-011	72" Diesel Powered H-772D

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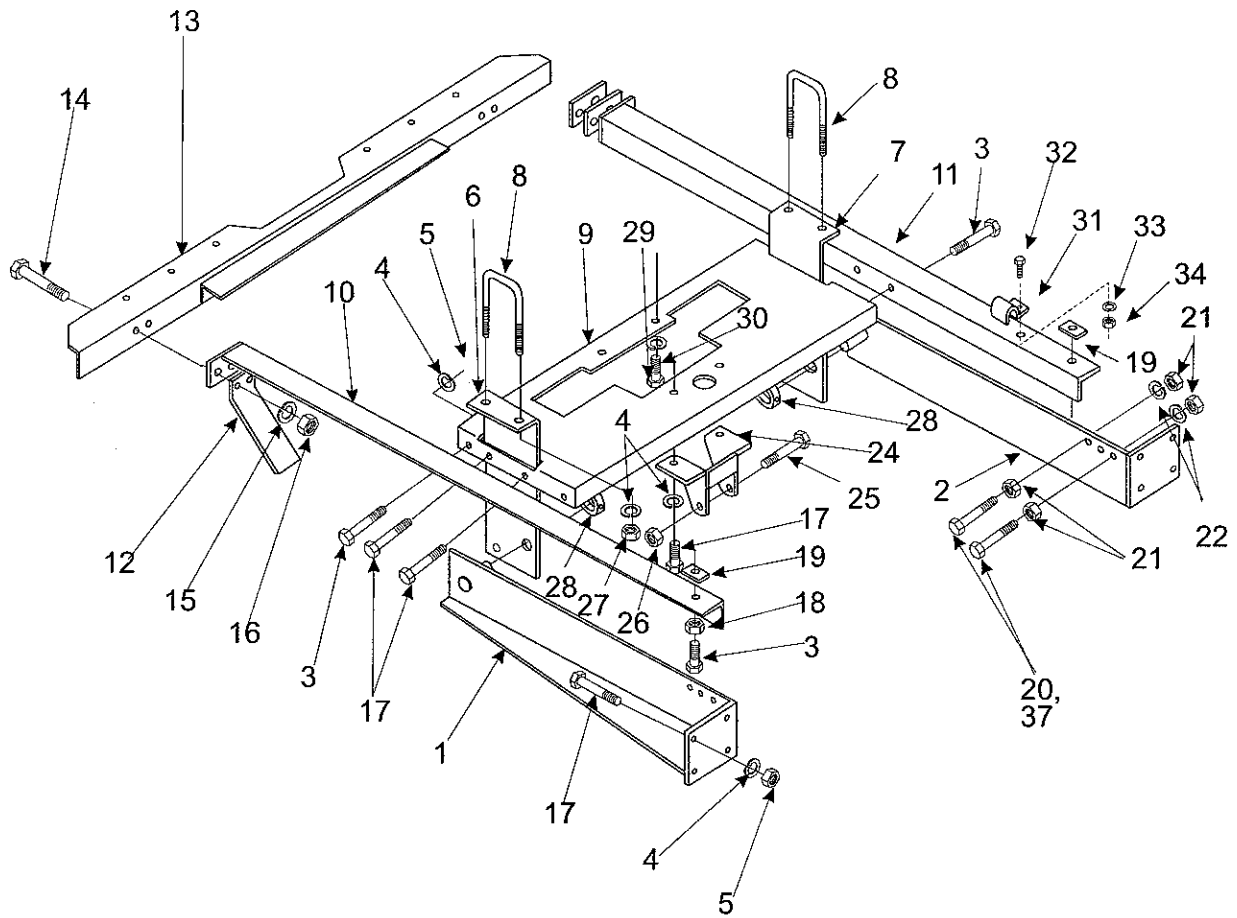
## FRAME BRACKETS & BUMPER - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-42-05039	Link, Right Hand	1
2	7-42-05038	Link, Left Hand	1
3	2-00-02620	Screw, 5/8 - 11 x 1.500 HHC	6
4	2-00-02313	Lock Washer, Helical Spring 5/8 Med	24
5	2-00-00615	Nut, Hex 5/8 - 11 x .937 x .547	20
6	7-08-00459	Bracket, Frame Right Hand	1
7	7-08-00460	Bracket, Frame Left Hand	1
8	7-23-03095	U-Bolt, 5/8 - 18 x 5.000 x 7.000	1
9	7-27-07121	Frame, Crossmember	2
10	7-27-07178	Frame, Right Hand	1
11	7-27-07177	Frame, Left Hand	1
12	7-08-00858	Bracket, Stop	1
13	7-08-07001	Bumper	1
14	2-00-00241	Screw, 1/2 - 13 x 1 3/4 Hex. Hd.	4
15	2-00-02312	Lock Washer, Helical Spring 1/2 Med	4
16	2-00-00596	Nut, Hex 1/2 - 13 x .750 x .437	4
17	2-00-02623	Screw, 5/8 - 11 x 2.750 HHC	14
18	2-00-01672	Nut, Hex Jam 5/8 - 11 x .937 x .375	2
19	8-89-05522	Plate	2
20	2-00-02603	Screw, 3/8 - 16 x 3.500 HHC	4
21	2-00-02360	Nut, Hex 3/8 - 16 x .562 x .328	8
22	2-00-02310	Lock Washer, Helical Spring 3/8 Med	4
23			
24	7-08-00461	Bracket, Cylinder	1
25	2-00-02619	Screw, 1/2 - 20 x 4.500 HHC	1
26	2-00-00640	Nut, Hex Fiber Insert 1/2 - 20	1
27	2-00-00590	Nut, Hex 5/8 - 18 x .937 x .546	4
28	7-15-01032	Setscrew Collar, 2.250 x 1.500 x .750	2
29	2-00-03850	Screw, 3/4-10 x 1.50 HHC	2
30	2-00-00522	Washer - 3/4 Lock	2
31	2-00-04288	Clamp - 1.00 I.D.	2
32	2-00-00205	Screw 1/4 - 20 x 1.00 HHC	4
33	2-00-00518	Washer lock 1/4 I.D.	4
34	2-00-00594	Nut 1/4-20 Hex Cap	2
35	7-58-05268	Plate - Cylinder Stop	2
36	2-00-03702	Washer, Flat - 1/4 I.D.	2
*37	2-00-04699	Screw, 3/8-16 x 2 3/4 Hex. Hd.	2

Use 2-00-04699 for Camel Machines Only

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## FRAME BRACKETS & BUMPER - EXPLODED VIEW





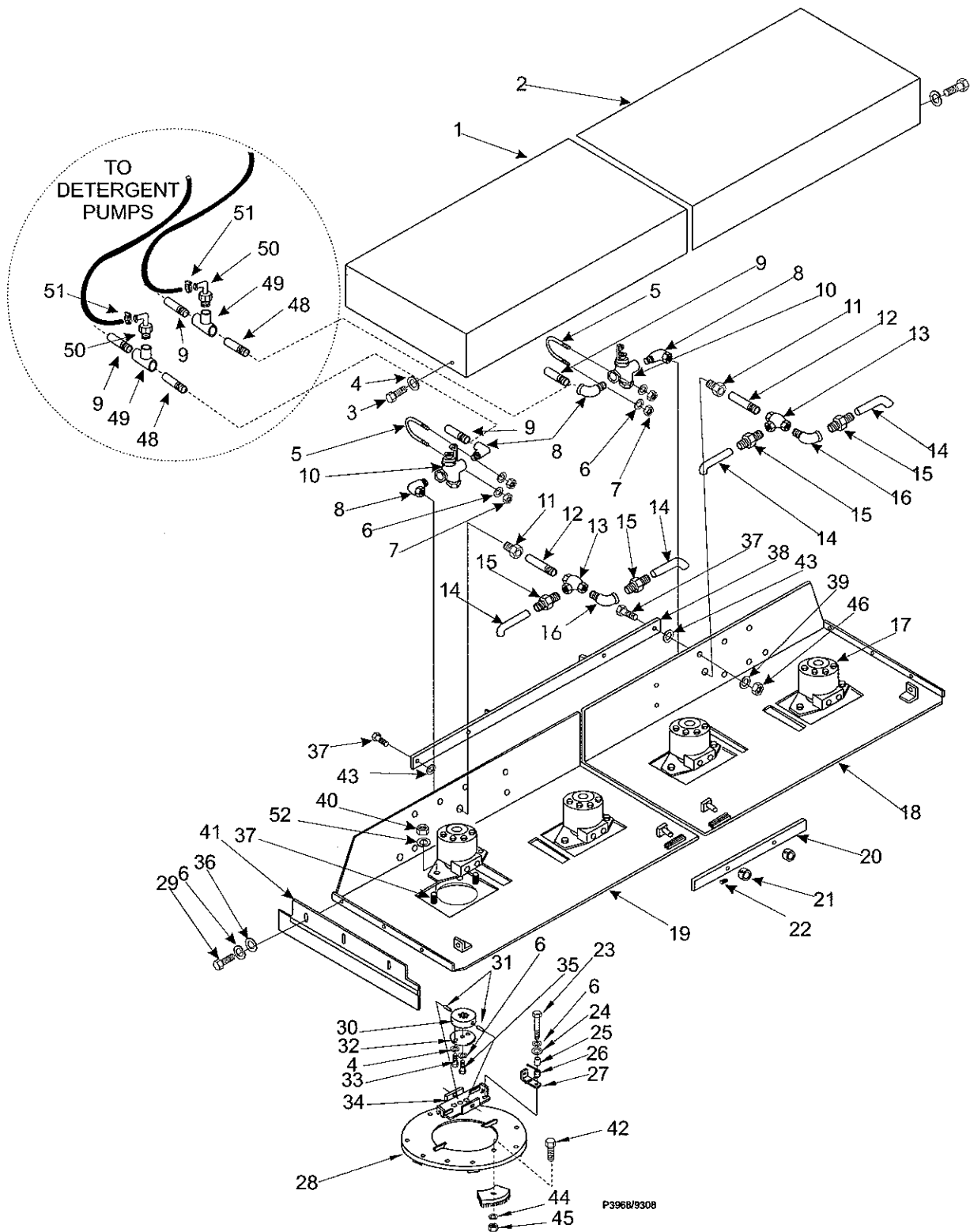
## DRIVE BRUSH - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-16-07209	Cover, Brush Drive (R.H.)	1
2	7-16-07208	Cover, Brush Drive (L.H.)	1
3	2-00-00224	Screw, 5/16 - 18 x .500 HHC	2
4	2-00-00530	Lock Washer, Helical Spring 5/16 Med	14
5	7-23-03049	U-Bolt, 1/4 - 20 x 2.375 x 1 3/16	2
6	2-00-00518	Lock Washer, Helical Spring 1/4 Med	18
7	2-00-00589	Nut, Hex Jam 1/4 - 20 x .437 x .156	8
8	2-95-04268	Street Elbow, 90E 3/4 NPT	4
9	2-00-03585	Pipe Nipple, 3/4 NPT x 2.000 (Thd one end)	2
10	7-88-00018	Valve, Solution Feed	2
11	2-95-02541	Pipe Reducer Bushing, 3/4 NPT to 1/2 NPT	2
12	7-56-04028	Pipe Nipple, 1/2 NPT x 7.250	2
13	2-95-02537	Pipe Tee, 1/2 NPT	2
14	7-87-02084	Tubing	4
15	2-95-01547	Connector, 1/2 x 1/2	4
16	2-95-02534	Street Elbow, 90E 1/2 NPT	2
17	0782-135	Motor, Brush Drive	4
18	7-27-07088	Frame, Brush Drive (L.H.)	1
19	7-27-07087	Frame, Brush Drive (R.H.)	1
20	7-05-07145	Bar, Tie	1
21	8-15-01002	Setscrew Collar, 1.125 x .625 x .500	2
22	2-00-00266	Setscrew, 5/16 - 18 x .250 HS-KCP	2
23	2-00-02587	Screw, 1/4 - 20 x 1.250 HHC	8
24	2-00-04054	Flat Washer, .875 x .265 x .062	8
25	7-09-01062	Spacer, .500 x .257 .812	8
26	7-76-00089	Spring, Latch	8
27	7-41-00007	Latch, Brush	8
28	7-58-05182	Plate, Brush Mounting	4
29	2-00-00219	Screw, 1/4 - 20 x .500 HHC	6
30	7-33-09013	Hub, Drive	4
31	2-00-04663	Pin - 1/2 Dia. x 1.75 Roll	8
32	7-58-05181	Plate, Brush Disc Hub	4
33	2-00-00244	Screw, 1/4 - 20 x 1.000 HHC (Heat Treat)	8
34	7-03-04070	Arm, Brush Drive	4
35	2-00-00208	Screw, 5/6-18 x 1.000 HHC	4
36	2-00-00462	Flat Washer, .562 x .250 x .031	6
37	2-00-00241	Screw, 1/2 - 13 x 1.750 HHC	10
38	7-05-07144	Bar, Brush	1
39	2-00-00531	Lock Washer, Helical Spring 1/2 X.Heavy	2
40	2-00-00596	Nut, Hex 1/2 - 13 x .750 x .437	8
41	7-25-08001	Flap (R.H.) Shown	1
	7-25-08002	Flap (L.H.) Not Shown	1
42	2-00-02706	Screw - 1/4-20 x 1.00 HHM	24
43	2-00-00405	Flat Washer	2
44	2-00-00518	Lockwasher - 1/4 Hel.	24
45	2-00-00594	Nut - 1/4-20 Hex	24
46	2-00-02352	Nut - Hex 1/2-13	2
47	0720-069	Assy Drive Brush	4
*48	2-95-02518	3/4 NPT x 1 3/8 Close Nipple	2
*49	2-00-04675	3/4 NPT Tee	2
*50	2-00-04655	90° Elbow 3/4 NPT to Barb	2
*51	7-13-07084	Hose Clamp	2
52	2-00-02312	Washer - 1/2 I.D. Hel. Med.	8

\*Used on Camel Machines Only

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# DRIVE BRUSH - EXPLODED VIEW

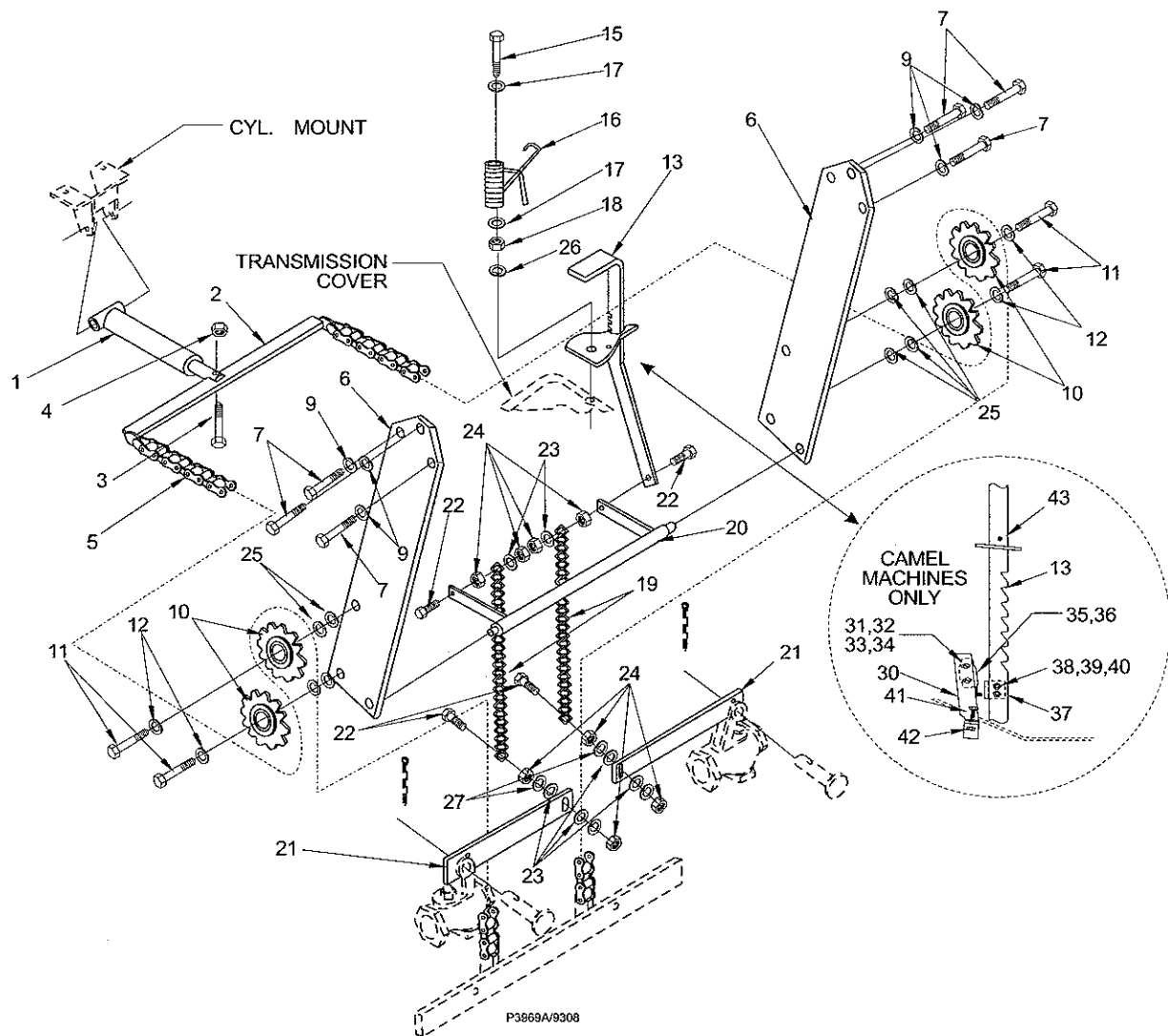


## BRUSH LIFT & SOLUTION CONTROL - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-17-05009	Cylinder, Hydraulic	1
2	7-05-07158	Bar, Brush Lift Cylinder	1
3	2-00-02692	Screw, 1/2 - 20 x 1.75 HHC	1
4	2-00-00640	Nut, Hex Fiber Insert 1/2 - 20	1
5	7-13-05056	Chain, Brush Lift	2
6	7-31-07013	Hanger, Brush Lift	2
7	2-00-00238	Screw, 7/16 - 14 x 1.250 HHC	3
8			
9	2-00-01879	Lock Washer, Helical Spring 7/16 Heavy	6
10	8-76-05055	Sprocket, Idler	4
11	2-00-02692	Screw, 1/2 - 20 x 1.750 HHC	4
12	2-00-02312	Lock Washer, Helical Spring 1/2 Med	4
13	7-31-06047	Handle, Solution Control	1
14	7-08-00247-1	Bracket, Solution Positioning	1
15	2-00-00235	Screw, 3/8 - 16 x 1.750 HHC	1
16	7-76-00089	Spring	1
17	2-00-00402	Flat Washer, .750 x .390 x .093	2
18	2-00-02360	Nut, Hex 3/8 - 16 x .562 x .328	1
19	7-13-05053	Chain, Lever	2
20	7-17-00010	Crank, Solution Control	1
21	7-41-05064	Lever	2
22	2-00-00207	Screw, 5/16 - 18 x 1.250 HHC	4
23	2-00-00409	Flat Washer, .687 x .343 x .062	4
24	2-00-02341	Nut, Hex Hvy. Jam 5/16 - 18 x .562 x .203	8
25	2-00-00405	Washer Flat .063 X .531 X .094	8
26	2-00-02310	Washer Lock 3/8 H.S.	1
27	2-00-02306	Washer Lock 5/16 Int'l Tooth	5
28			
29			
30	7-08-00760	Bracket Sol. Limit Sw. Mtg.	1
31	2-00-05060	Screw 6-32 x 1.25 RHM	2
32	2-00-00455	#6 Flatwasher	2
33	2-00-01499	#6 Lockwasher	2
34	2-00-00624	Nut #6-32 MS	2
35	7-82-00009	Switch	Ref.
36	7-35-00013	Insulator	1
37	7-08-00761	Bracket Sw. Contact	1
38	2-00-00049	Screw 10-24 x .50 HHC	2
39	2-00-00512	#10 Lockwasher Int.	2
40	2-00-00460	# 10 Flatwasher	2
41	2-00-00220	Screw 1/4-20 x .62 HHC	1
42	2-00-00641	Nut Hex 1/4-20 Fibre-Lock	1
43	2-00-01475	Roll Pin	1

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# BRUSH LIFT & SOLUTION CONTROL - EXPLODED VIEW

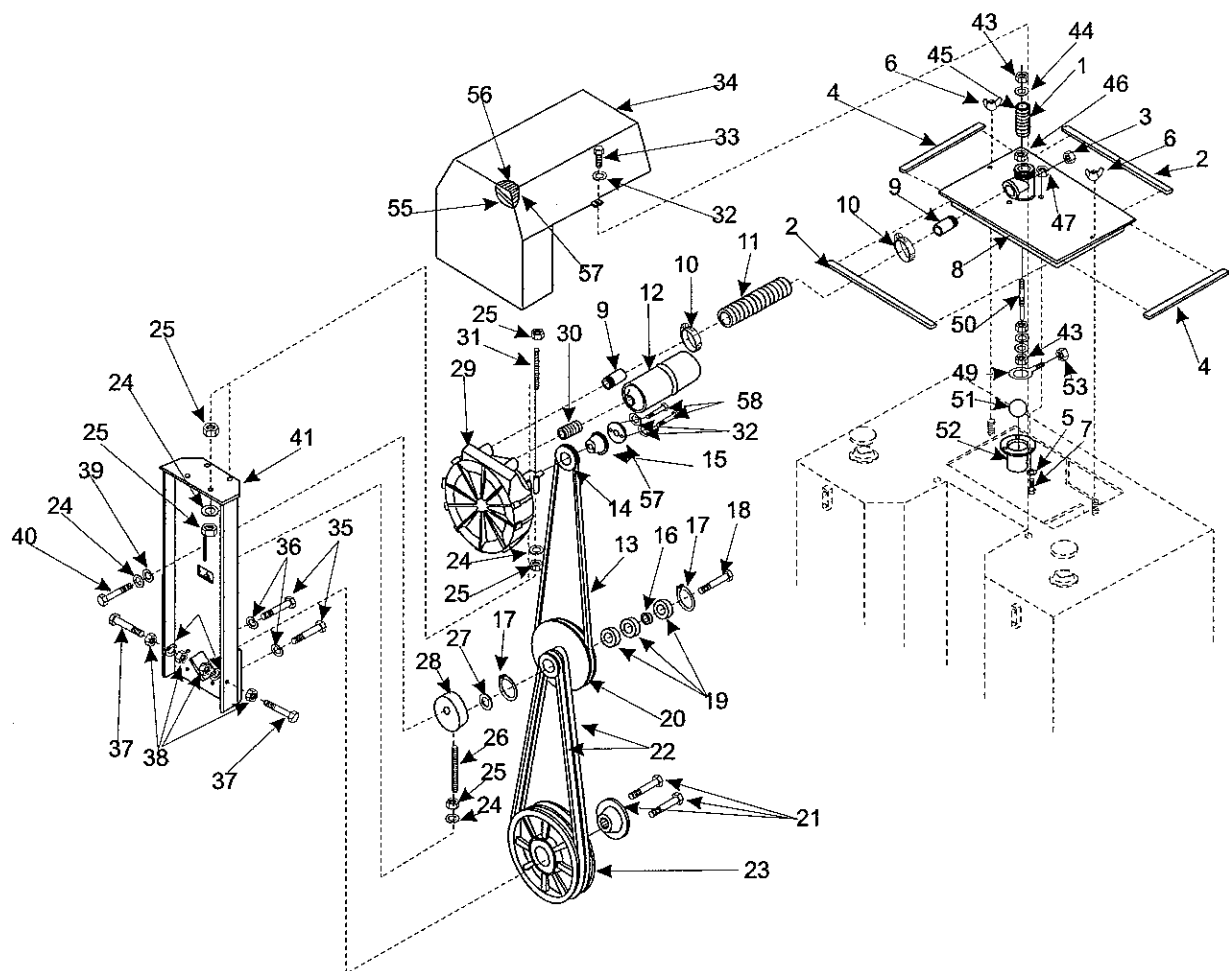


## TURBINE - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	2-00-02310	3/8 Lockwasher	1
2	7-29-00082	Gasket - Manifold Long	2
3	2-00-01246	Nut, Hex Fiber Insert #10 - 24	1
4	7-29-00081	Gasket - Manifold Short	2
5	2-00-03702	Flat Washer	3
6	2-00-00672	Wing Nut, 1/4 - 20	2
7	2-00-00251	Screw, 1/4 - 20 x .500 HHC	3
8	7-16-07263	Turbine Inlet Cover	1
9	2-95-02554	Pipe Nipple, 2 NPT x 3 NPT (Thd. End)	2
10	2-00-02216	Hose Clamp, 1.562 - 2.500	2
11	7-33-02168	Hose Inlet	1
12	7-49-00035	Rotron Muffler	1
13	2-00-04814	V-Belt, 58.500 x .500 x .343	1
14	7-60-00135	Turbine Pulley	1
15	7-09-01116	Bushing, Flanged Split 2.00 x 1.000	1
16	2-00-01114	Bushing, Turbine Pulley	1
17	2-00-01471	Ring, Snap	2
18	7-23-03096	Screw, 5/8 - 18 x 3.250 (Special)	1
19	2-95-01654	Bearing	3
20	7-60-00134	Intermediate Drive Pulley	1
21	7-08-00474	Bushing, Pulley 4.13 x 2.875 x 2.500	1
22	2-00-04815	V-Belt, 68.000 x .500 x .343	2
23	7-60-00136	Pulley, 2 Groove (P.T.O.)	1
24	2-00-02312	Lock Washer, Helical Spring 1/2 Med	10
25	2-00-00596	Nut, Hex 1/2 - 13 x .750 x .437	17
26	7-80-05063	Screw, 1/2-13 UNF-2A Pulley Adjust	1
27	2-00-00408	Flat Washer, 1.312 x .656 x .093	1
28	7-33-09026	Pulley Adjust Block	1
29	0790-045	Suction Turbine	1
30			
31	7-80-05062	Screw, Turbine Adjust	4
32	2-00-00518	Lock Washer, Helical Spring 1/4 Med	4
33	2-00-00251	Screw, 1/4 - 20 x .500 HHC	2
34	7-16-07259	Rotron Blower Cover	1
35	2-00-02620	Screw, 5/8 - 11 x 1.500 HHC	4
36	2-00-02313	Lock Washer, Helical Spring 5/8 Med	4
37	2-00-00225	Screw, 5/16 - 18 x 1.500 HHC	2
38	2-00-00585	Nut, Hex 5/16 - 18 x .500 x .265	4
39	2-00-00405	Flat Washer, 1.062 x .531 x .093	1
40	2-00-00240	Screw, 1/2 - 13 x 1.250 HHC	1
41	7-27-07125	Frame, Turbine Mount	1
42	2-00-00530	Lock Washer, Helical Spring 5/16 Med	2
43	2-95-04182	Nut, Hex Fiber Insert 3/8 - 16	2
44	7-11-00032	Cap, Spring	1
45	7-76-00052-1	Spring	1
46	2-00-00593	Nut, Hex 3/8-16 THD	1
47	2-00-00641	Nut, Hex Fiber Insert 1/4 - 20	3
48	2-95-04689	Flat Washer, 2.000 x .406 x .162	1
49	2-00-04817	Eye Bolt, #10 - 24 x .320 x 2.000	1
50	7-66-00141	Rod - Valve Stem	1
51	7-26-04010	Float - (White)	1
	7-26-04009	Float (Black - Optional)	1
52	7-10-04006	Cage - Float	1
53	2-00-00605	Nut, Hex MS #10 - 24 x .375 x .125	1
54	7-34-09013	Insulation	1
55	7-34-09014	Insulation	2
56	7-34-09012	Insulation	1
57	7-65-00030	Bushing, Key Retainer	1
58	2-00-01490	Screw 1/4- 20 x .875	2

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# **TURBINE - EXPLODED VIEW**



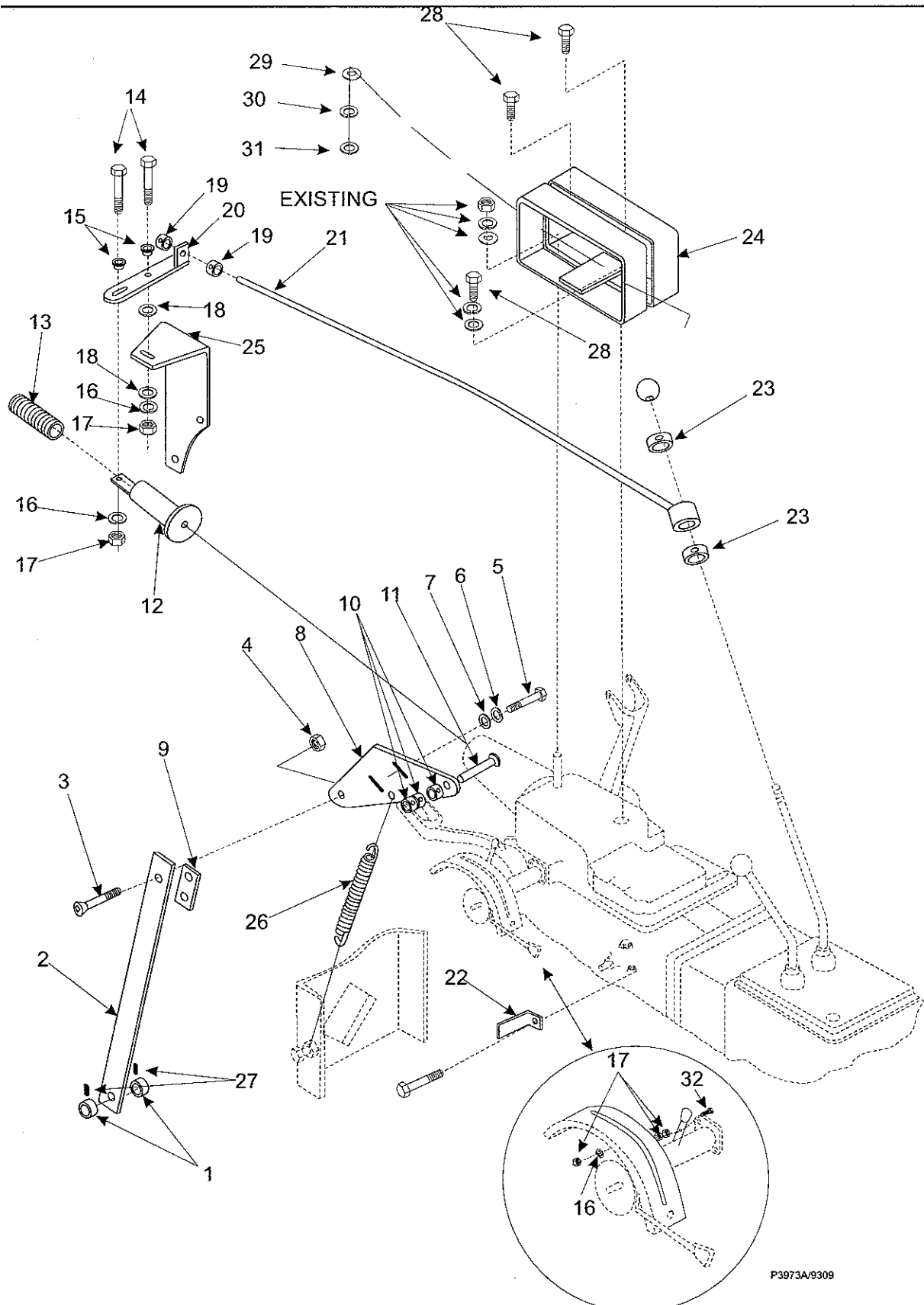
## SQUEEGEE LIFT - PARTS LIST

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<u>KEY NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	7-15-01014	Setscrew Collar, 1.625 x 1.000 x .750	4
2	7-42-05080	Link	2
3	2-00-03057	Screw, 1/2 - 20 x 1.250 HSFHC	2
4	2-00-02354	Nut, Hex Hvy. Jam 1/2-20 x .875 x .296	2
5	2-00-00233	Screw, 3/8 - 16 x .750 HHC	4
6	2-00-02310	Lock Washer, Helical Spring 3/8 Med	4
7	2-00-00402	Flat Washer, 3/8	4
8	7-03-04095	Arm, Squeegee Lift	2
9	7-78-05010	Stop, Squeegee Adjustment	2
10	8-15-01003	Setscrew Collar, 1.250 x .750 x .562	6
11	8-55-08084	Pin	2
12	7-72-03025	Sleeve, Spring	1
13	7-76-00019	Spring	1
14	2-00-00207	Screw, 5/16 - 18 x 1.250 HHC	2
15	7-09-01057	Bushing	2
16	2-00-00530	Lock Washer, Helical Spring 5/16 Med	3
17	2-00-00585	Nut, Hex 5/16 - 18 x .500 x .265	5
18	2-00-00409	Flat Washer, 5/16	2
19	8-15-01016	Setscrew Collar, 1.000 x .500 x .437	2
20	7-41-05081	Lever, Spring Spool	1
21	7-42-05081	Link, Trans. Shift	1
22	7-78-05011	Stop, Flow Control	1
23	8-15-01002	Setscrew Collar, 1.125 x .625 x .500	2
24	7-08-02013	Bracket, Seat Mtg.	1
25	7-08-00458	Bracket	1
26	8-76-00041	Spring	2
27	2-95-01931	Setscrew - 5/16 - 18	4
28	2-00-00238	Screw, 7/16 - 14 x 1.25 HHC	3
29	2-00-03979	Washer, Flat	4
30	2-00-02311	Washer, Lock	2
31	2-00-00620	Nut, 7/16 - 14 Hex	2
32	2-00-00225	Screw, 5/16 - 18 x 1.500	1
33	7-31-06072	Handle Grip	1

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# SQUEEGEE LIFT - EXPLODED VIEW



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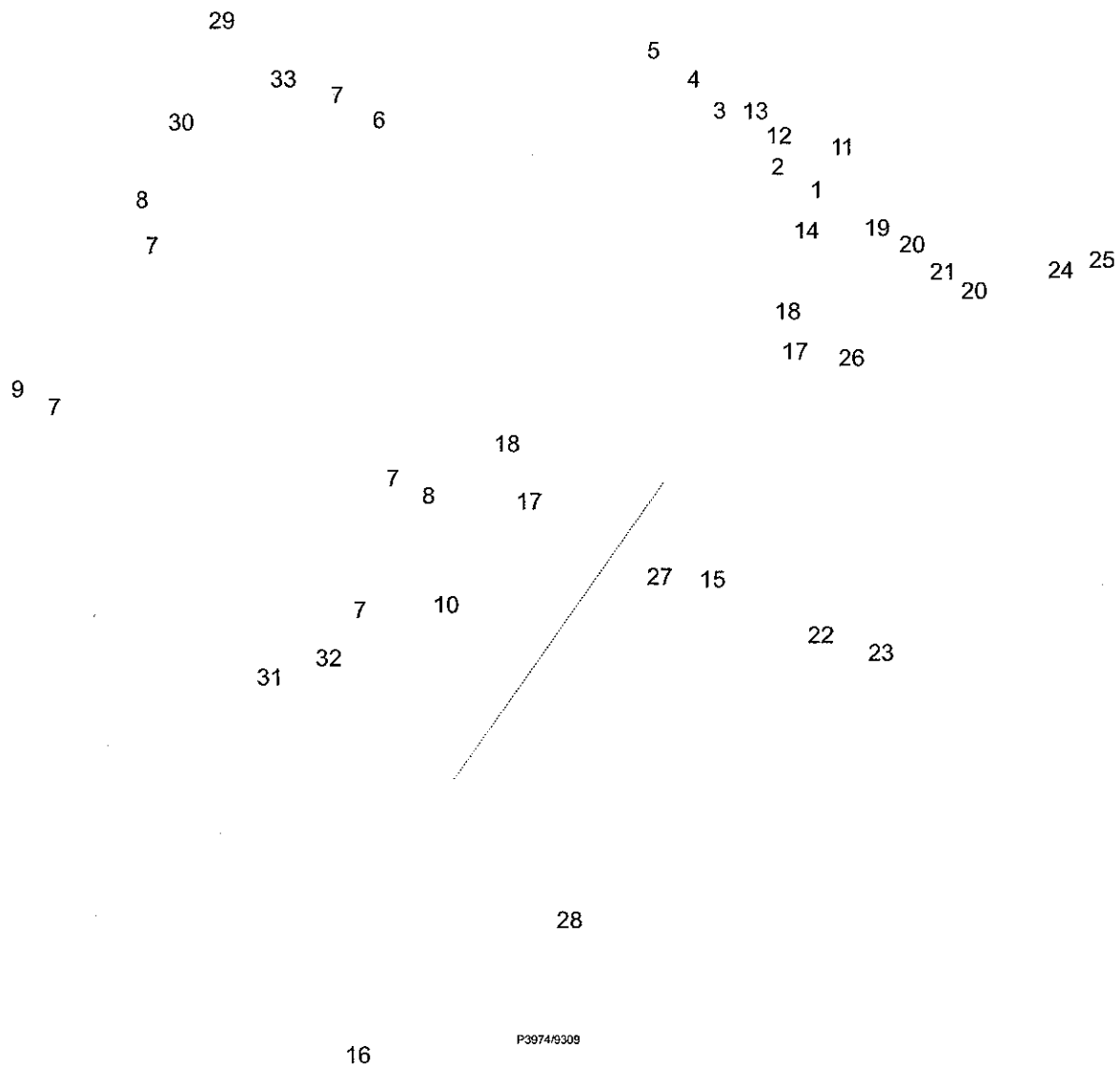


## SQUEEGEE TOOL - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-05-07005	Bar, Inner	2
2	7-77-00035	Squeegee, Inner	2
3	7-86-08009	Tool	2
4	7-77-00036	Squeegee, Outer	2
5	7-05-07115	Bar, Outer	4
6	2-00-03702	Flat Washer	2
7	2-00-00498	Lock Washer, 1/4 Ext	40
8	2-00-02899	Screw, 1/4 - 20 x .750 RHM	36
9	2-00-02907	Screw, 1/4 - 20 x 1.250 RHM	4
10	2-00-00606	Nut, Hex 1/4 - 20 x .437 x .218	4
11	2-00-00530	Lock Washer, 5/16	2
12	2-00-00585	Nut, Hex 5/16 - 18 x .500 x .265	2
13	2-00-00207	Screw, 5/16 - 18 x 1.250 HHC	2
14	7-55-08060	Pin, Lock	2
15	7-42-05004	Link, Left Hand	1
16	7-42-05003	Link, Right Hand	1
17	2-00-00593	Nut, Hex Hy.Jam 3/8-16 x .687 x .234	4
18	2-00-00209	Screw, 3/8 - 16 x 1.250 HHC	4
19	2-00-02698	Screw, 1/2 - 20 x 3.500 HHC	2
20	2-00-00405	Flat Washer, 1.062 x .531 x .093	4
21	7-76-00016	Spring	2
22	7-23-03058	Nut, Hanger Rod	2
23	2-00-00640	Nut, Hex Fiber Insert 1/2 - 20	2
24	2-00-02313	Lock Washer, Helical Spring 5/8	2
25	2-00-02703	Screw, 5/8 - 18 x 1.500 HHC	2
26	7-55-08082	Rod	1
27	7-15-01014	Setscrew Collar, 1.625 x 1.000 x .750	4
28	2-95-01931	Setscrew, 5/16-18 x .312 HS-CP(Nylok)	4
29	9-01-03081	Plate, Locking	2
30	9-01-03080	Caster	2
31	2-00-02216	Hose Clamp, 1.562 - 2.500	4
32	7-33-02048-1	Hose	2
33	2-00-00104	Screw 1/4-20x1.00 RHM	2

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## SQUEEGEE TOOL - EXPLODED VIEW

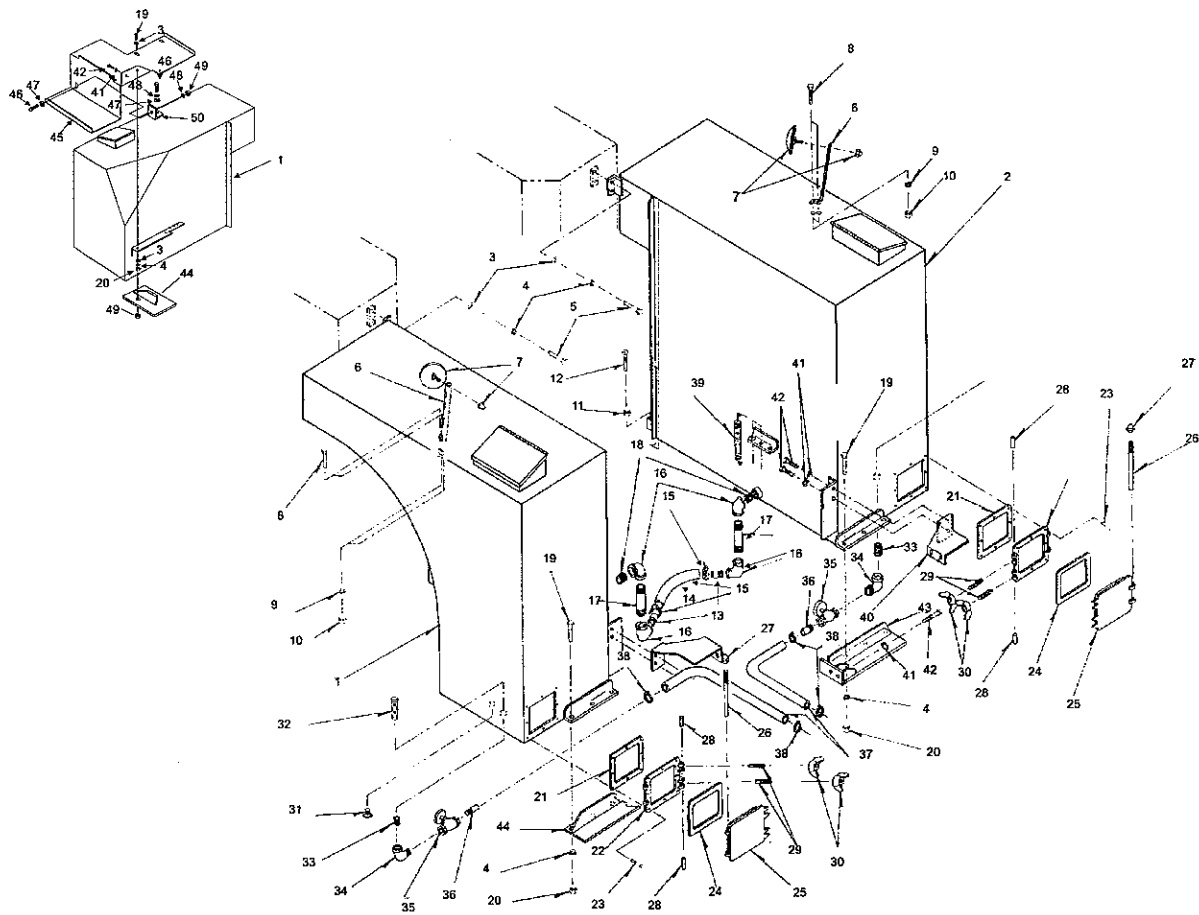


## SOLUTION TANK - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-83-04149	R.H. Solution Tank	1
2	7-83-04089	L.H. Solution Tank	1
3	2-00-00405	Flatwasher, 1.063 x .531 x .094	8
4	2-00-02312	Washer, .50 Split	12
5	2-00-00239	Screw, HHC .50-13 x 1.000	4
6	7-08-00122	Bracket, Mirror	2
7	7-48-07001	Mirror	2
8	2-00-00220	Screw, 1/4 - 20 x .625 HHC	4
9	2-00-00518	Lock Washer, Helical Spring	4
10	2-00-00594	Nut, Fmsh. Hex. .25-20	4
11	2-00-02371	Nut, Hex Jam 1/2 - 13 x .750 x .312	2
12	2-00-02981	Screw, Set Hd. Cp. Course Thd.	2
13	7-56-05003	Pipe Nipple, 1 1/4 NPT x 2.812 (Thd. one end)	2
14	7-33-02072-1	Hose, Solution Tank Coupling	1
15	2-00-02216	Hose Clamp, 1.562 - 2.500	2
16	2-00-03583	Pipe Elbow, 90x 1 1/4 NPT	4
17	2-00-04263	Pipe Nipple, 1 1/4 NPT x 6.000	2
18	2-00-03861	Pipe Nipple, 1 1/4 NPT x 1.625 Close	2
19	2-00-00240	Screw, 1/2 - 13 x 1.250 HHC	6
20	2-00-00596	Nut, Hex 1/2 - 13 x .750 x .437	6
21	7-29-00016	Gasket, Cleanout Door Frame	2
22	7-27-07016	Frame, Cleanout Door	2
23	2-00-02790	Screw, #10 - 32 x .750 FHM Brass	16
24	7-29-00015	Gasket, Cleanout Door	2
25	7-19-08002	Door, Cleanout	2
26	7-55-08016	Pin, Cleanout Door Hinge	2
27	2-00-02325	Nut, #10 - 32 Hex Cap Ni. Pl. Brass	2
28	2-00-01475	Pin, .125-75 Elastic Stop Nut	4
29	7-80-05004	Stud, Cleanout Door Lock	4
30	2-00-00668	Wing Nut, .313-18	4
31	2-00-02475	Plug, .75 Pipe Galv.	1
32	7-24-04004	Filter, Inlet	2
33	2-00-03586	Pipe Nipple, 3/4 NPT x 2.000 Short	2
34	2-95-04268	Elbow, .75 90° St. Galv.	2
35	7-88-00019	Gate Valve, 3/4	2
36	2-00-03585	Pipe Nipple, 3/4 NPT x 2.000 (Thd. one end)	2
37	7-33-02044	Water Feed Hose, 1" x 29"	2
38	2-00-03404	Hose Clamp, Witteck C24P	4
39	8-76-00041	Spring	4
40	7-08-00535	Bracket, Solution Tank L.H.	1
41	2-00-00522	Lock Washer, Helical Spring 3/4	6
42	2-00-03850	Screw, 3/4-10 x 1.500 HHC	6
43	7-08-00310	Bracket, Mounting Solution Tank L.H.	1
44	7-08-00311	Bracket, Mounting Solution Tank R.H.	1
45	7-08-00778	Bracket, Solution Tank R.H.	1
46	2-00-00209	Screw, HHC 3/8-16-1.25	2
47	2-00-00410	Flatwasher, 3/8	2
48	2-00-02310	Lockwasher, 3/8	2
49	2-00-02369	Nut, Hex 3/8-16	2
50	7-08-00779	Bracket	1

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## SOLUTION TANK - EXPLODED VIEW



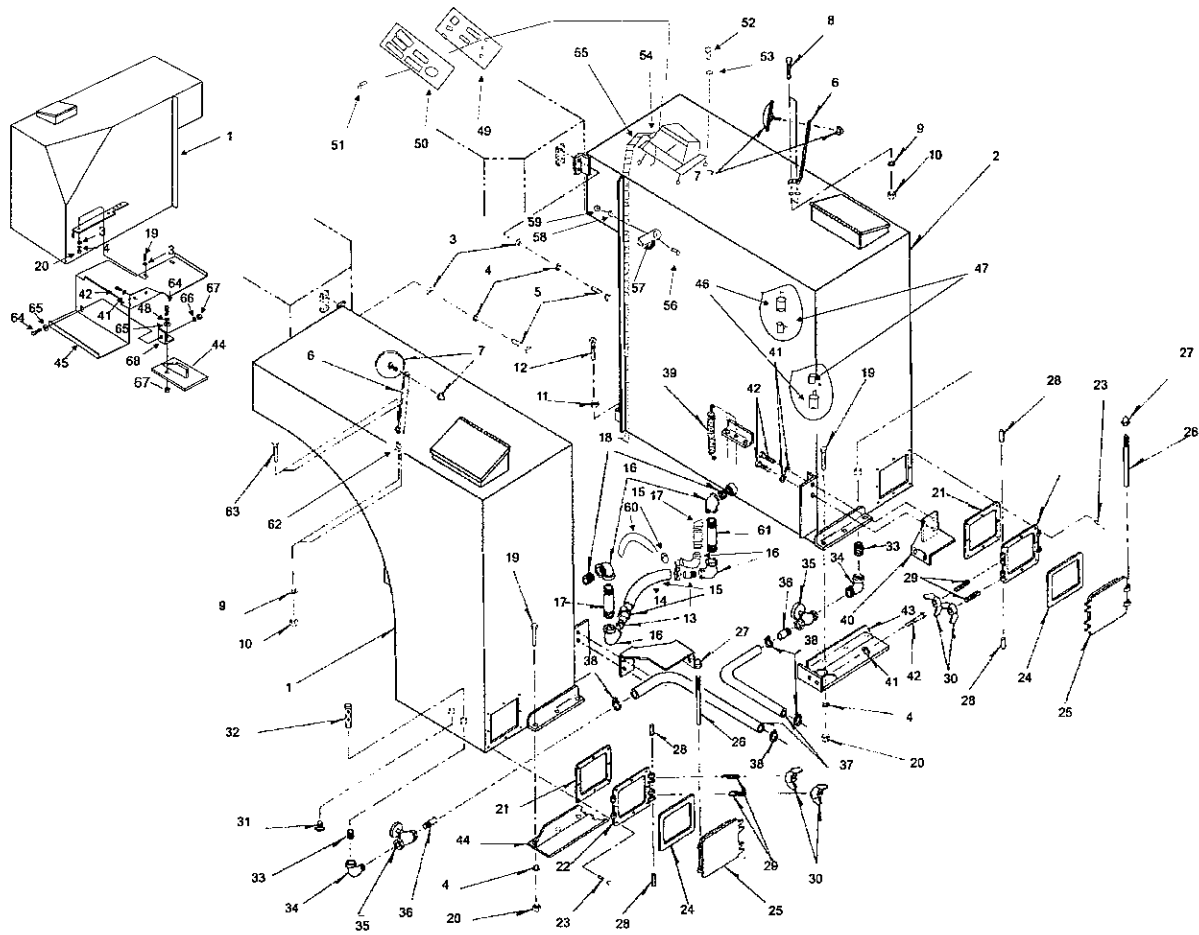
P4000/9309

## CAMEL SOLUTION TANK - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-83-04148	R.H. Solution Tank	1
2	7-83-04141	L.H. Solution Tank	1
3	2-00-00405	Washer, PL 1.063 x .531 x .094	8
4	2-00-02312	Washer, .50NSplit	12
5	2-00-00239	Screw, HHC .50-13 x 1.000	4
6	7-08-00122	Bracket, Mirror	2
7	7-48-07001	Mirror (US Tool & MFG. Company 30 BROR)	2
8	2-00-00220	Screw, HHC .25-20 x .625	2
9	2-00-00518	Washer, Helical Spring ¼ Med.	4
10	2-00-00594	Nut, Fnsh. Hex .25-20	4
11	2-00-02371	Nut, Hex Jam .50-13 Sll.	2
12	2-00-02961	Screw, Set Sq. Hd. Cp. Coarse Thd.	2
13	7-56-05003	Nip, Spcl	4
14	7-33-02072-1	Hose, Cplg. Tank Solution	1
15	2-00-02216	Clamp, Hose (Ideal Corp. 5232)	4
16	2-00-03583	Elbow, Blk 90° 1.25 NPT	8
17	2-00-04263	Nipple, 1.25 x 6.00	2
18	2-00-03861	Nipple, Close Galv. 1.25 NPT	4
19	2-00-00240	Screw, .50-13 x 1.25 HHC	8
20	2-00-00596	Nut, ½-13 Hex.	8
21	7-29-00016	Gasket, Frame Cleanout Door	2
22	7-27-07016	Frame Cleanout Door	2
23	2-00-02750	Screw, #10-32 x .750 FHM Brass	16
24	7-29-00015	Gasket, Cleanout Door	2
25	7-19-08002	Door, Cleanout	2
26	7-55-08016	Pin, Hinge Cleanout Door	2
27	2-00-02325	Nut, #10-32 Hex Cap Ni. Pl. Brass	2
28	2-00-01475	Pin, .125-.75 Radial Locking	4
29	7-80-05004	Stud, Lock Cleanout Door	4
30	2-00-00668	Wingnut .313-18	4
31	2-00-05188	Plug, 2.00 NPT	2
32	7-24-04022	Strainer, Inlet	2
33	2-00-03586	Nipple, .75 NPT x 2.00 Pipe Galv Short	2
34	2-95-04268	Elbow, .75 NPT 90° St. Galv.	2
35	7-88-00019	Valve, .75 NPT Gate Brass	2
36	2-00-03585	Nipple, .75 NPT x 2.00 Galv. (Thd. One End)	2
37	7-33-02044	Hose, Feed Water 1 x 29 Single	2
38	2-00-03404	Clamp, Hose Witteck C24P	4
39	8-76-00041	Spring	4
40	7-08-00535	Bracket, Solution Tank (L.H.)	1
41	2-00-00522	Lockwasher, .75 Helical Spring	6
42	2-00-03850	Screw, .75-10 x 1.50 HHC	6
43	7-08-00310	Bracket, Mounting Solution L.H.	1
44	7-08-00311	Bracket, Mounting Solution R.H.	1
45	7-08-00778	Bracket, Solution Tank R.H.	1
46	7-82-00017	Float Switch	2
47	2-00-05035	Fitting, 90° Elbow	2
48	7-53-00125	Weldment, Recycle Panel	1
49	7-58-05252	Plate, Recycle Front	1
50	7-18-00190	Decal, Recycle Panel	1
51	2-00-03059	Screw, #10-24 x .375 THM	4
52	2-00-03061	Screw, #10-24 x .500 THM	4
53	2-00-00519	Lockwasher, #10 Helical Spring	1
54	8-09-01082	Bushing, Universal	Ref.
55	0795-097	Harness, Camel	2
56	2-00-00221	Screw, .25-20 x .750 HHC	2
57	2-00-04602	Clamp	2
58	2-00-00518	Lockwasher, .25 HS Med.	2
59	2-00-00594	Nut, .25-20 Hex	1
60	7-33-02319	Hose, Solution Tank Coupling	1
61	2-00-04350	Pipe Nipple, 1.25 NPT x 8" Lg.	2
62	7-75-01152	Spacer, Mirror	1
63	2-00-01769	Screw, .25-20 x 1.75 HHC	2
64	2-00-00209	Screw, HHC 3/8-16 x 1.25	2
65	2-00-00410	Flatwasher 3/8 B.S.	2
66	2-00-02310	Lockwasher 3/8	2
67	2-00-02369	Nut, Hex 3/8-16	2
68	7-08-00779	Bracket	1
69	7-20-06011	Duct-Wire	2

P4000a/0011

## CAMEL SOLUTION TANK - EXPLODED VIEW

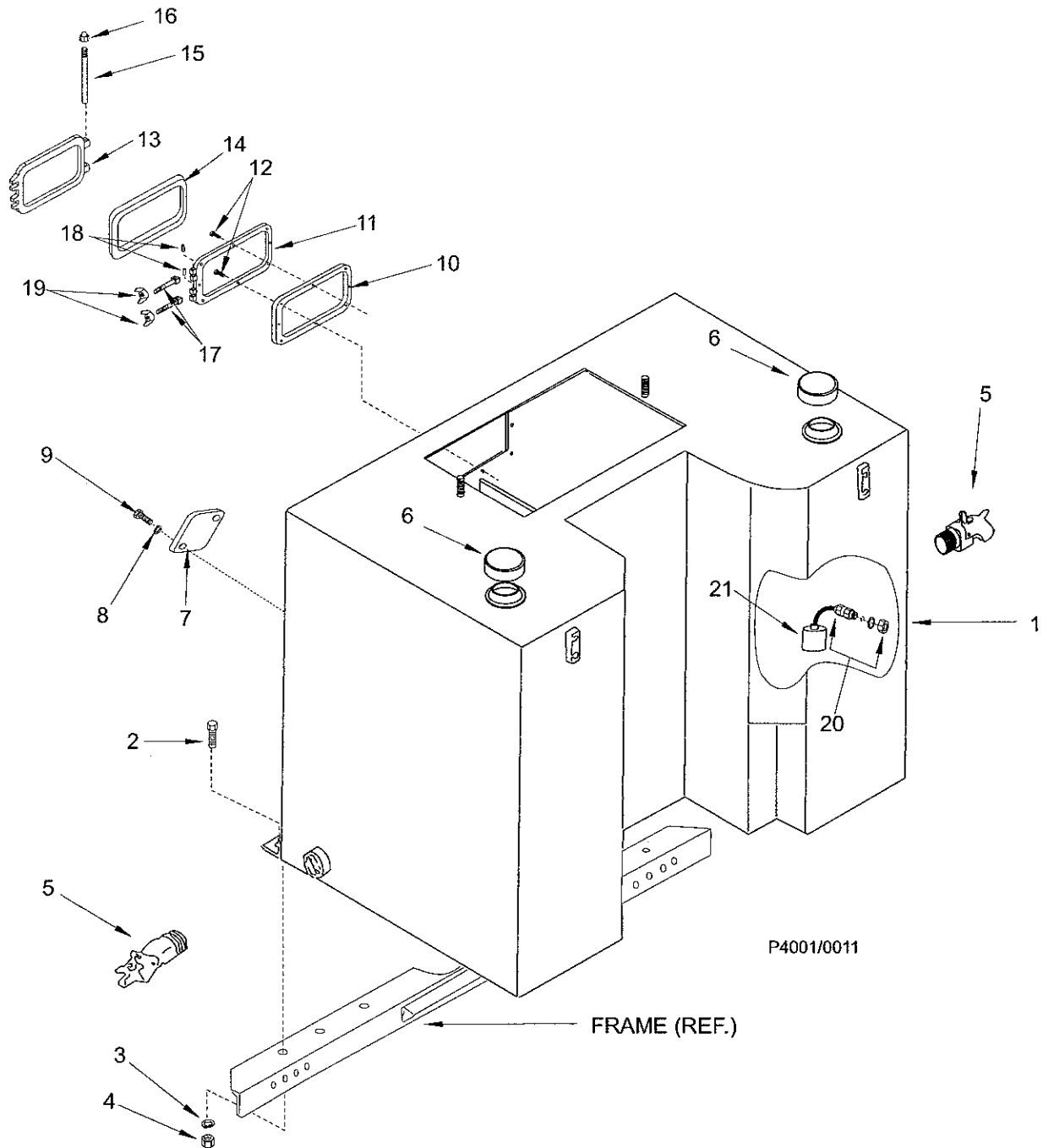


## RECOVERY TANK - PARTS LIST

<u>KEY NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	7-83-04055-1	Tank, Recovery	1
2	2-00-00240	Screw, 1/2 - 13 x 1.250 HHC	6
3	2-00-02312	Lock Washer, Helical Spring 1/2 Med	6
4	2-00-00596	Nut, Hex 1/2 - 13 x .750 x .437	6
5	7-88-00008	Gate Valve, 2	2
6	7-11-00014	Cap, Cleanout	2
7	7-63-04001	Reflector	2
8	2-00-00518	Lock Washer, Helical Spring 1/4 Med	4
9	2-00-00054	Screw, 1/4 - 20 x .500 RHM	4
10	7-29-00016	Gasket, Cleanout Door Frame	4
11	7-27-07016	Frame, Cleanout Door	4
12	2-00-02790	Screw, #10 - 32 x .750 FHM	32
13	7-19-08002	Door, Cleanout	4
14	7-29-00015	Gasket, Cleanout Door	4
15	7-55-08016	Pin, Cleanout Door Hinge	4
16	2-00-02325	Nut, Cap #10 - 32 x .410 x .375	4
17	7-80-05004	Stud, Cleanout Door Lock	8
18	2-00-01475	Radial Locking Spring Pin, .125 x .750	8
19	2-00-00668	Wing Nut, 5/16 - 18	8
20	8-09-01083	Connector, Bulkhead	1
21	0775-164	Switch, Dirty water warning	1

P4001/0011

# RECOVERY TANK - EXPLODED VIEW



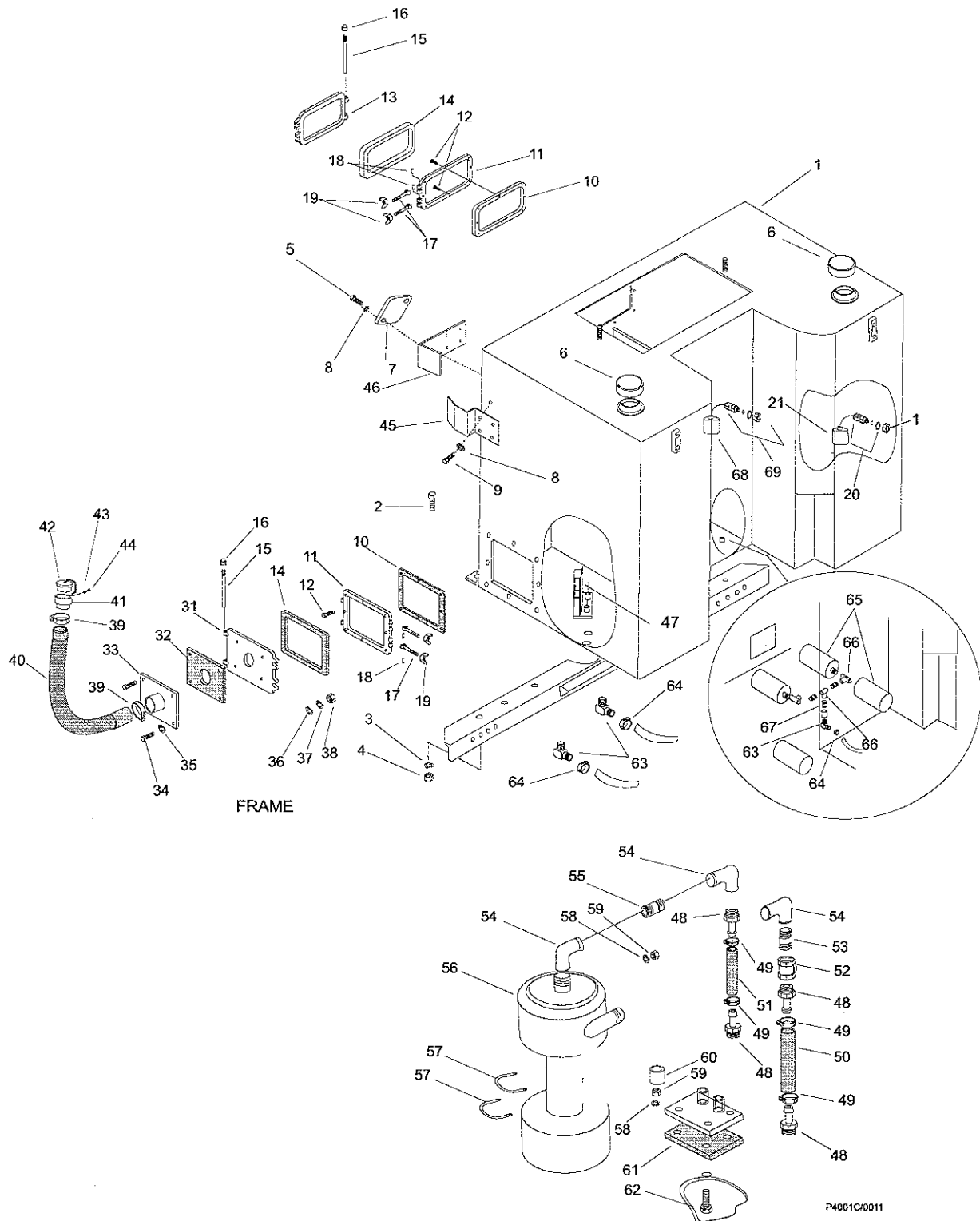


## CAMEL RECOVERY TANK - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-83-04142	Tank, Recovery	1
2	2-00-00240	Screw, 1/2-13 X 1-1/4 Hex Hd	6
3	2-00-02312	Lockwasher, 1/2	6
4	2-00-00596	Nut, 1/2-13 Hex	6
5	2-00-00078	Screw, 1/4-20 X 5/8 Rhm	4
6	7-11-00014	Cap, Cleanout	2
7	7-63-04001	Reflector	2
8	2-00-00518	Lockwasher, 1/4	8
9	2-00-00054	Screw, 1/4-20 X 1/2 Rd Hd	4
10	7-29-00016	Gasket, Cleanout Door Frame	6
11	7-27-07016	Frame, Cleanout Door	6
12	2-00-02787	Screw, # 10-32 X 5/8 Fl Hd Brass	48
13	7-19-08002	Door, Cleanout	4
14	7-29-00015	Gasket, Cleanout Door	6
15	7-55-08016	Pin, Cleanout Door Hinge	6
16	2-00-02325	Nut, # 10-32 Hex Cap, Brass	6
16	7-80-05004	Stud, Cleanout Door Lock	12
18	2-00-01475	Pin, 1/8 X 3/4 Radial Lock	12
19	2-00-00668	Nut, 5/16-18 Wing	12
20	8-09-01083	Connector-bulkhead	1
21	0775-164	Switch-(dirty Water Warning)	1
31	7-19-08038	Lower Cleanout Door	2
32	7-29-00100	Gasket	2
33	7-25-02072	Weldment, Drain Fitting	2
34	2-00-00248	Screw, 1/4-20 X 3/4 Hhc	8
35	2-00-03702	Flatwasher, 1/4	8
36	2-00-04590	Washer, 1/4 Sealing	8
37	2-00-00501	Lockwasher, 1/4 Int. Tooth	8
38	2-00-00594	Nut, 1/4-20 Hex	8
39	2-00-02214	Hose Clamp	4
40	7-33-02291	Tank Drain Hose	2
41	7-25-02032	Fitting, Drain Hose	2
42	7-25-02033	Drain Hose Plug	2
43	2-00-00519	Lockwasher, #10 Hs	2
44	2-00-03059	Screw, #10-24 X 3/8 Thm	2
45	7-13-07135	Lower Clamp, Drain Hose	2
46	7-13-07134	Upper Clamp, Drain Hose	2
47	7-25-02034	Fitting, Separator Mtg.	1
48	7-25-02040	Fitting, Pipe To Hose	4
49	2-00-03407	Clamp	4
50	7-33-02155	Hose, Separator Inlet	1
51	7-33-02156	Hose, Separator Outlet	1
52	7-88-00030	Valve, Check (1/2 Npt)	1
53	2-00-04682	Nipple, Pipe 1/2 Npt X 2" Galv	1
54	2-95-02527	Elbow, Pipe 90 Deg. 1/2 Npt Galv	3
55	2-95-02517	Nipple, Pipe 1/2 Npt X 3 1/2" Galv	1
56	7-24-04036	Filter, Inline Separator	1
57	2-00-04579	U-bolt	2
58	2-00-04691	Lockwasher, 5/16 (stainless)	8
59	2-00-04692	Nut, 5/16-18 Hex (stainless)	8
60	7-56-05012	Fitting, Separator Purge	1
61	7-29-00122	Gasket, Separator	1
62	2-00-04693	Screw, 5/16-18 X 1.00 Hhcs (stainless)	4
63	7-25-02038	Fitting, 90 Deg. Pipe To Hose	3
64	2-00-02220	Clamp, Hose	3
65	7-24-04022	Strainer, Pump Inlet	4
66	7-25-02037	Fitting, Tee	3
67	7-25-02036	Fitting, Nipple	3
68	0775-203	Float Switch	1
69	8-09-01083	Float Switch Connector	1

P4001a/0011

# CAMEL RECOVERY TANK - EXPLODED VIEW

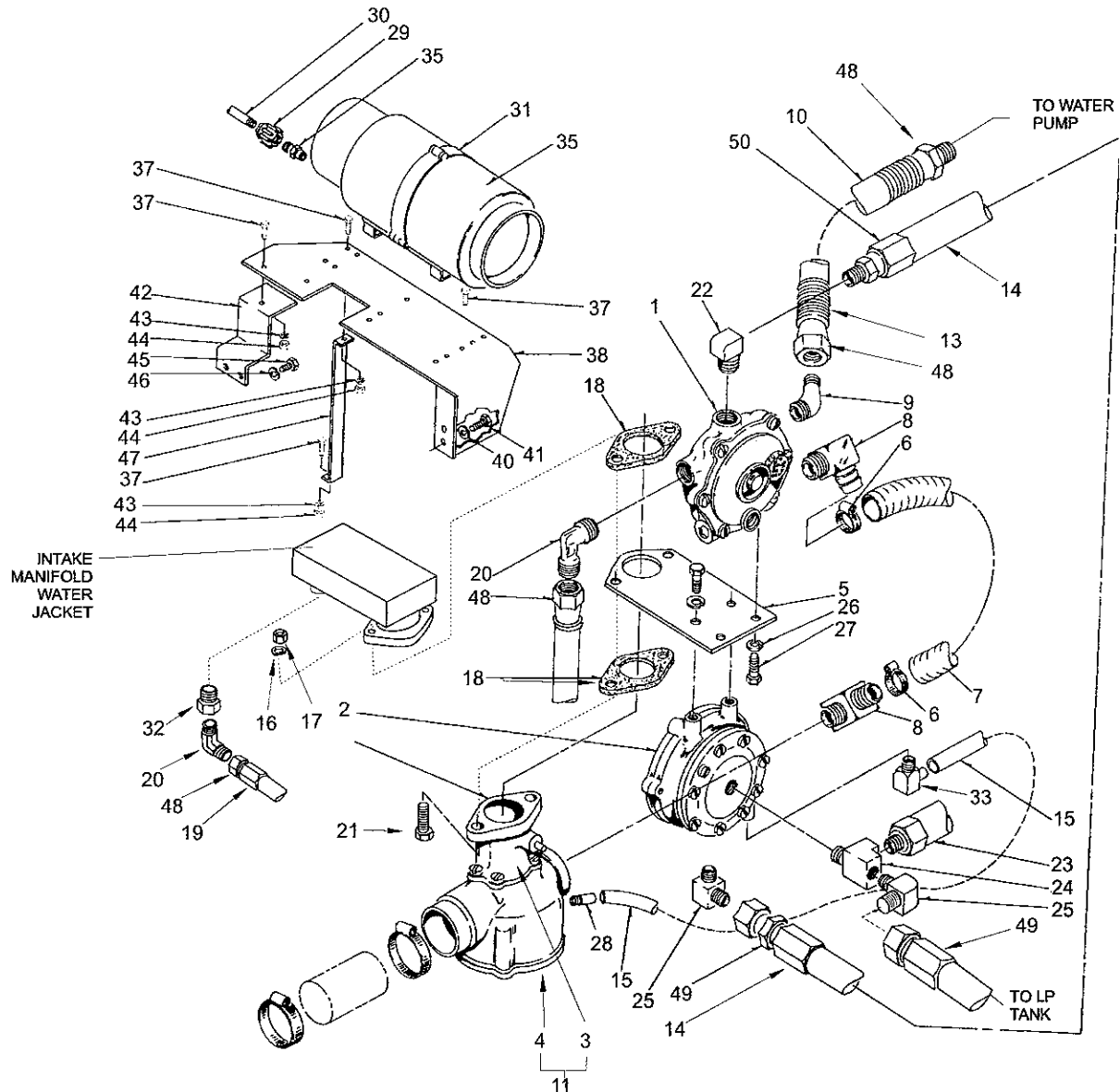


## LIQUID PROPANE - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-11-04005	Regulator, Primary	1
2	7-11-04006	Fuel Lock Filter	1
3		Throttle Body Assy.	1
4		Air Valve Assembly	1
5		Bracket	1
6	2-00-03407	Clamp	2
7		Vapor Hose 5/8 i.d. x 7.00 in.	1
8		Fitting, 90 Deg.	2
9		Fitting, 45 Deg.	1
10		Hose, Water 3/8 I.D. x 21.00	1
11	0769-009	Carburetor (Consists of Item 3 and 4)	1
12			
13		Steel Guard 20.00 In. Long	1
14		Hose, 5/16 I.D. Steel Braided 15.00 In. Long	1
15		Hose, Vacuum 1/4 I.D. x 6.00 Long	1
16	2-00-00520	Lockwasher, 3/8 Split	1
17	2-00-02360	Nut 3/8-16 Hex	2
18		Gasket	2
19		Hose, Water 3/8 I.D. x 8.00 Long	1
20		Fitting	2
21	2-00-03799	Screw, 3/8-16 x 1.50 Long	2
22		Fitting	1
23	7-88-00021	Relief Valve	1
24		Street Tee	1
25	8-25-02012	Fitting, 90 Deg.	2
26	2-00-00518	Lockwasher, 1/4 Split	4
27	2-00-00220	Screw, 1/4-20 x .63" Long	4
28		Fitting	1
29	2-00-03473	Female Coupling	1
30	7-33-02076	Hose, 5/16 I.D. Steel Braided 55.0 In. Long	1
31	7-08-00059	Bracket Tank	1
32	2-00-02953	Bushing	1
33		Fitting	1
34			
35	8-83-04016	Tank, L/P (33.5 lbs.)	1
36			
37	2-00-00233	Screw, 3/8-16 x 1.00 HHC	7
38	7-08-00656	Bracket, L/P Tank Mounting	1
39			
40	2-00-00522	Lockwasher, 3/4 Split	2
41	2-00-03850	Screw, 3/4-10 x 1.50" Long	2
42	7-08-00533	Bracket, Support	2
43	2-00-02310	Lockwasher, 3/8 Split	7
44	2-00-02360	Nut, Hex 3/8-16	7
45	2-00-03850	Screw, 3/4 x 1.50" Long	2
46	2-00-00522	Lockwasher, 3/4 Split	2
47	7-08-00326	Bracket, Support	1
48		Fitting	4
49		Fitting	2
50		Fitting	2
51	0780-053	LP Gas Conversion Kit	1

P3978A/9310

# LIQUID PROPANE - EXPLODED VIEW



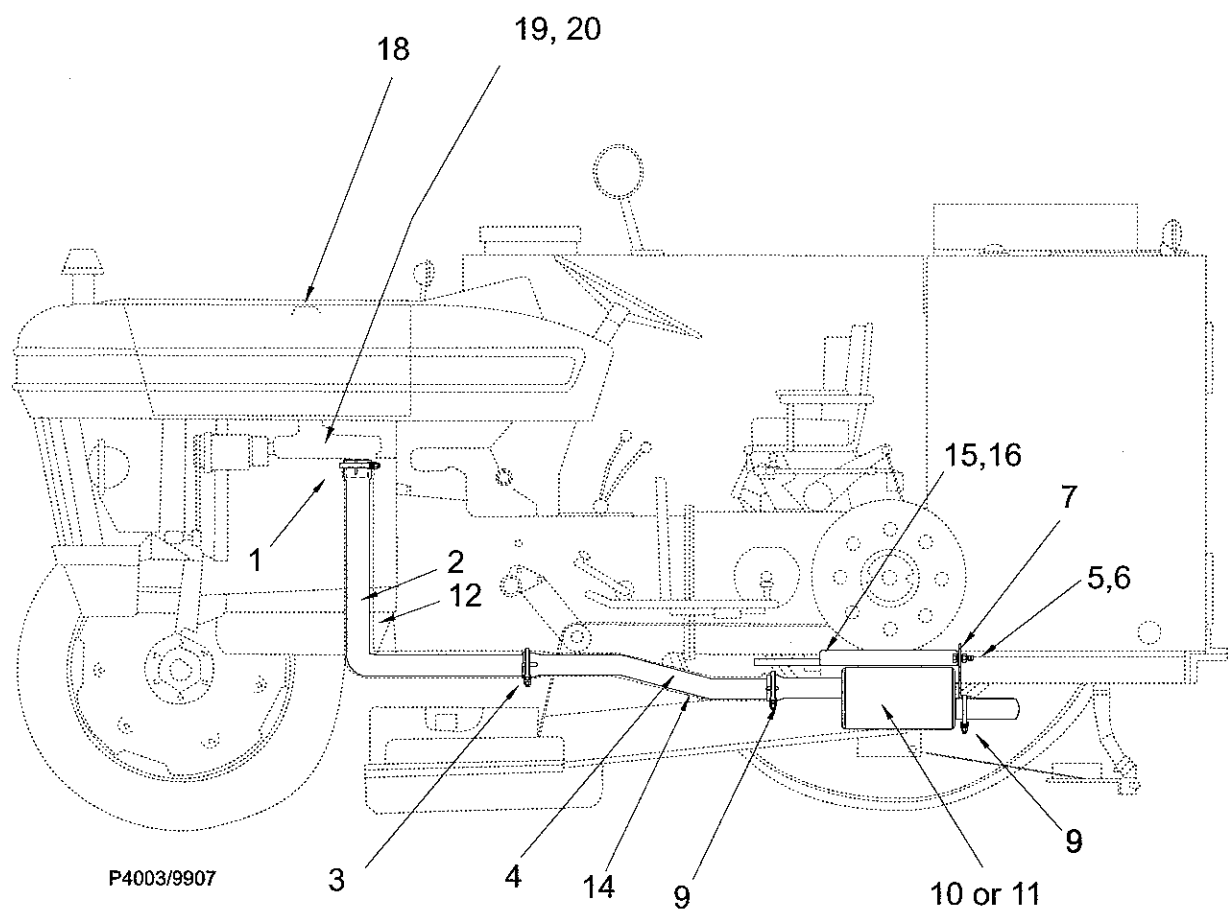
P3978A/9907

## EXHAUST SYSTEM - PARTS LIST

<u>KEY NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	2-00-04309	Muffler Clamp, 2.250 Tube	1
2	7-56-04049	Exhaust Pipe	1
3	7-13-07098	Muffler Clamp, 1.875 Tube	1
4	7-56-04041	Tailpipe	1
5	2-00-00209	Screw, 3/8-16 x 1.250 HHC	1
6	2-00-02310	Lockwasher, Helical Spring 3/8 Med.	1
7	7-31-07017	Hanger	1
8			
9	7-13-07075	Muffler Clamp, 1.625 Tube	2
10	7-49-00028	Muffler - (Gas, LP, Only)	1
11	0778-042	Muffler - (Diesel)	1
12	7-34-09024	Sleeve, insulating	1
13			
14	7-30-05068	Guard, Exh. Pipe & Muffler	1
15	2-00-00221	Screw, 1/4-20 x 3/4	2
16	2-00-00518	Lockwasher, 1/4 Split	2
17			
18	7-16-07379	Button Plug	1
19	7-48-00031	Exhaust Manifold	1
20	7-23-00227	Exhaust Manifold Gasket	1

P4003/9310

**EXHAUST SYSTEM - EXPLODED VIEW**

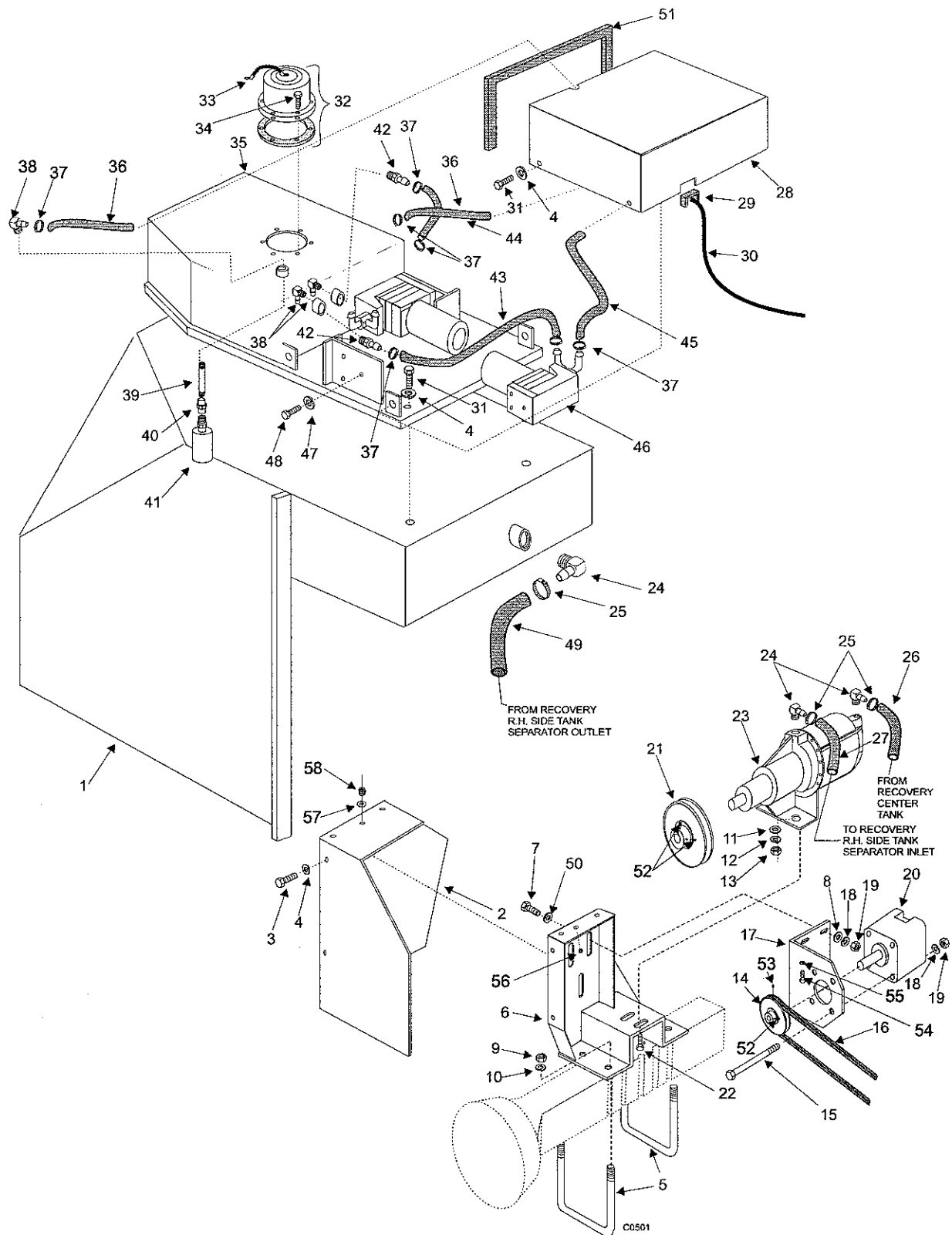


## CAMEL RECYCLING SYSTEM - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-83-04140	Solution Tank (R.H.)	Ref
2	7-16-07352	Cover/guard	1
3	2-00-00054	Screw ¼-20x.500 RHM	5
4	2-00-00518	Lockwasher ¼ H.S. Med.	13
5	7-23-03095	U-bolt 5/8-18x5.00x7.00	2
6	7-08-00754	Pump Mount	1
7	2-00-00207	Screw 5/16-18x1.25 Lg. H.H.C.	3
8	2-00-00451	Washer, 5/16	3
9	2-00-00590	Nut 5/8-18 Hex.	4
10	2-00-02313	Lockwasher 5/8 H.S. Med.	4
11	2-00-00402	Washer, 3/8	2
12	2-00-02310	Lockwasher 3/8 H.S. Med.	2
13	2-00-02360	Nut 3/8-16 Hex	2
14	7-60-00164	Pulley - Hyd. Motor	1
15	2-00-04506	Screw 5/16-18x4.25 Fhm	4
16	2-00-05178	Belt 3v x 250	1
17	7-81-00181	Support - Hyd. Motor Mount	1
18	2-00-00530	Lockwasher 5/16 H.S. Med.	7
19	2-00-00585	Nut 5/16-18 Hex.	7
20	0782-128	Hydraulic Motor	1
21	7-60-00163	Pulley - Recycle Pump	1
22	2-00-03750	Bolt - Carriage 3/8-16 x 1.50	2
23	7-60-05007	Recycling Pump	1
24	7-25-02038	90 Deg. Barb Stem Elbow 3/4 Npt	3
25	2-00-02220	Hose Clamp .812-1.500	3
26	7-33-02295	Hose - Rec. To Pump	1
27	7-33-02096	Hose - Pump To Sepatr.	1
28	7-16-07354	Detergent Pump Cover	1
29	8-21-04031	Edging 4.50"	1
30	0795-097	Wire Harness	Ref
31	2-00-00219	Screw ¼-20x.500 H.H.C.	8
32	7-11-00031	Filler Assembly	1
33	2-00-00830	Terminal	1
34	2-00-00068	Screw # 8-32x.625 RHM	6
35	7-83-04144	Soap Tank	1
36	7-87-02128	Tube 9.50" Lg.	2
37	7-13-07084	Hose Clamp	7
38	2-00-04654	90 Deg. Elbow 1/4 Npt To Barb	3
39	2-00-05360	Nipple ¼ Npt X 3.00" Lg.	1
40	2-00-05032	Reducer Coupling ¼-1/8 Npt	1
41	7-82-00017	Float Switch	1
42	2-00-05193	Nylon Fitting .38 Barb x ¼ NPT	2
43	7-87-02130	Tube 12.00" Lg.	1
44	7-87-02171	Tube To R.h. Brush Deck	1
45	7-87-02172	Tube To L.h. Brush Deck	1
46	7-60-05008	Pump-metering	2
47	2-00-00519	Lockwasher # 10 H.S.	6
48	2-00-02728	Screw # 10-32x.375 BHM	6
49	7-33-02297	Hose-sepatr To Soln.	1
50	2-00-01803	Washer 1.062x.328x.062	3
51	7-29-00215	Gasket-soap Tank	1
52	2-95-01930	Setscrew ¼-20x.375 HS-CP	3
53	2-00-00281	Setscrew # 8-32x2.50 HS-CP	1
54	2-00-04303	Screw ¼-20 x .375 HS-CP	3
55	2-00-00409	Flatwasher - .687 x .344 x .062-5	1
56	2-00-02341	Hex nut Jam 5/16-18	1
57	2-00-00410	Flatwasher 7/8 x 3/8 x 1/16	1
58	2-00-00644	Fibre Nut 5/16-18	1

C0501/0104

# CAMEL RECYCLING SYSTEM - EXPLODED VIEW





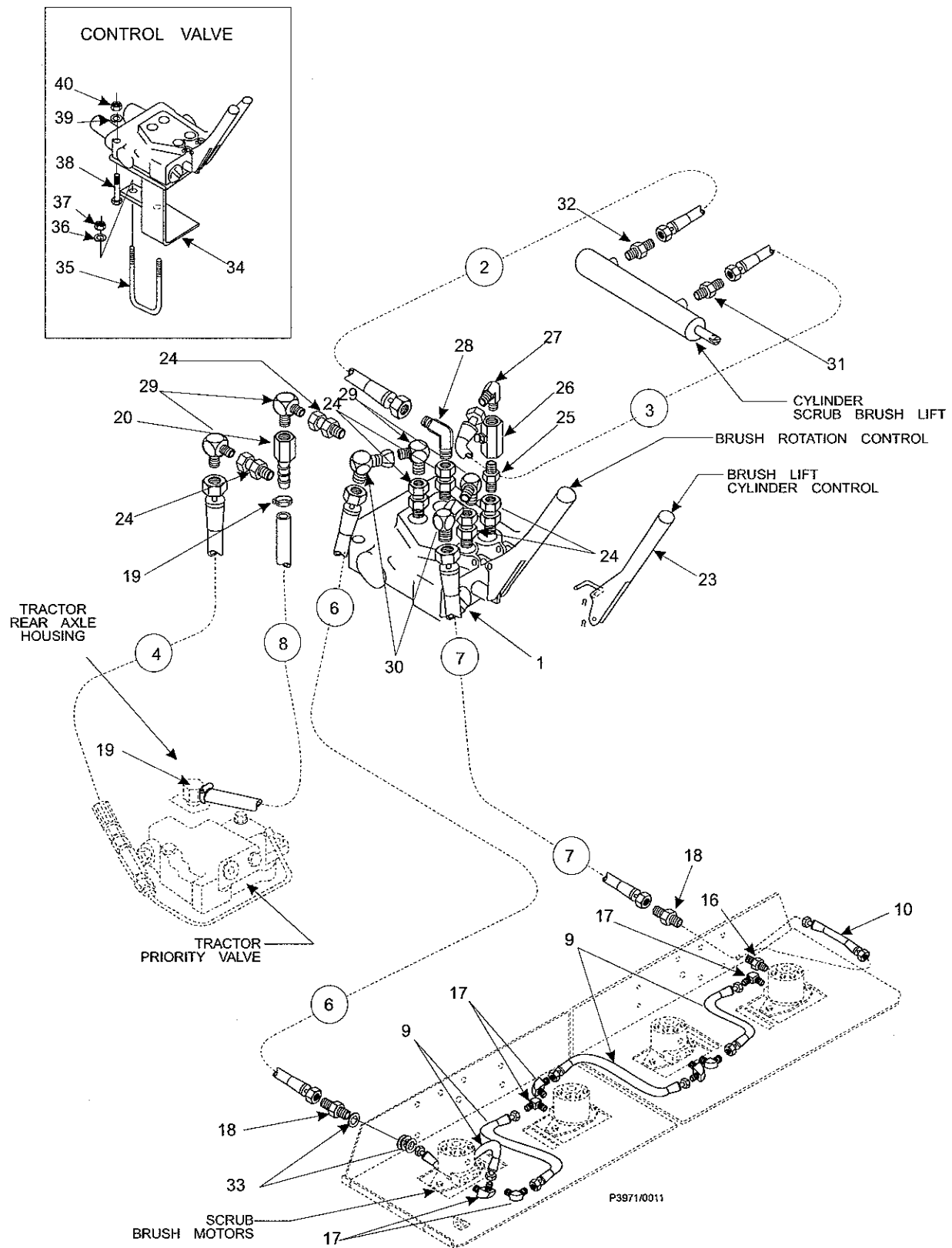
## HYDRAULICS (SCRUBBING SYSTEM) - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	8-88-00024	Valve, Hyd. Control (Metro)	1
2	8-33-02117	Hose, Control Valve to Cylinder	1
3	8-33-02117	Hose, Control Valve to Cylinder	1
4	7-33-02165	Hose, Tractor Pump to Control Valve	1
5			
6	8-33-02063	Hose, Control Valve to Scrub Brush Motor	1
7	7-33-02140	Hose, Scrub Brush Motor to Control Valve	1
8	7-33-02284	Hose, From Control Valve to Tractor Rear Axle Housing	1
9	7-33-02108	Hose, Scrub Brush Mtr to Scrub Brush Mtr	4
10	7-33-02106	Hose, Scrub Brush Motor	1
11	2-00-04826	37E JIC Str. Thd. 90E Elbow, 7/16-20	2
12	7-33-02170	Hose, Case Drain (Side)	2
13	2-00-04827	37E Str. Thd. Tee, 7/16 - 20	2
14			
15			
16	2-00-04234	37E JIC Str. Thd. Connector, 7/8-14 / 3/4-16	1
17	2-00-04217	37E JIC Str. Thd. 90E Elbow, 7/8-14 / 3/4-16	7
18	2-00-04242	37E JIC Bulkhead Union, 1/2 x 2.375	2
19	2-00-03407	Hose Clamp, .562 - 1.062	2
20	2-00-04613	Hose Fitting Barbed, F 37x Flare Swivel 3/4-16	1
21			
22			
23*	7-31-06063	Handle	2
24*	2-00-04640	37E JIC Swivel Adapter, 9/16-18 / 3/8-18	6
25*	2-00-04628	Reducer Bushing,	1
26*	8-88-00023	Valve, Lockoff	1
27*	2-00-04477	37E JIC 90E Elbow M, 1/4-18 / 9/16-18	1
28*	2-00-04472	37E JIC 90E Elbow M, 3/8-18 / 9/16-18	1
29*	2-00-04547	37E JIC 90E Elbow M, 3/8-18 / 3/4-16	4
30*	2-00-04244	90E Swivel Nut Elbow, 1/2	2
31	8-25-02034	37E JIC Restrictor, 3/8	1
32	2-00-04528	37E JIC Male Connector, 1/2-14 / 3/4-16	1
33	2-00-03170	Flat Washer, 1.500 x .750 x .125	4
34	7-81-00110	Support Valve Mtg.	1
35	7-23-03095	U-Bolt, 5/8-18 x 5.000 x 7.000	1
36	2-00-02313	Lock Washer, Helical Spring 5/8 Med	2
37	2-00-00590	Nut, Hex 5/8 - 18 x .937 x .546	2
38	2-00-02589	Screw, 1/4 - 20 x 2.00 HHC	2
39	2-00-00518	Lock Washer, Helical Spring 1/4 Med	2
40	2-00-00594	Nut, Hex 1/4 - 20 x .437 x .218	2
41	2-00-04721	Molding, Hydraulic Hose	2

\*Part of 0760-274 Valve Assembly.

P3971/9309

## HYDRAULICS (SCRUBBING SYSTEM) - EXPLODED VIEW

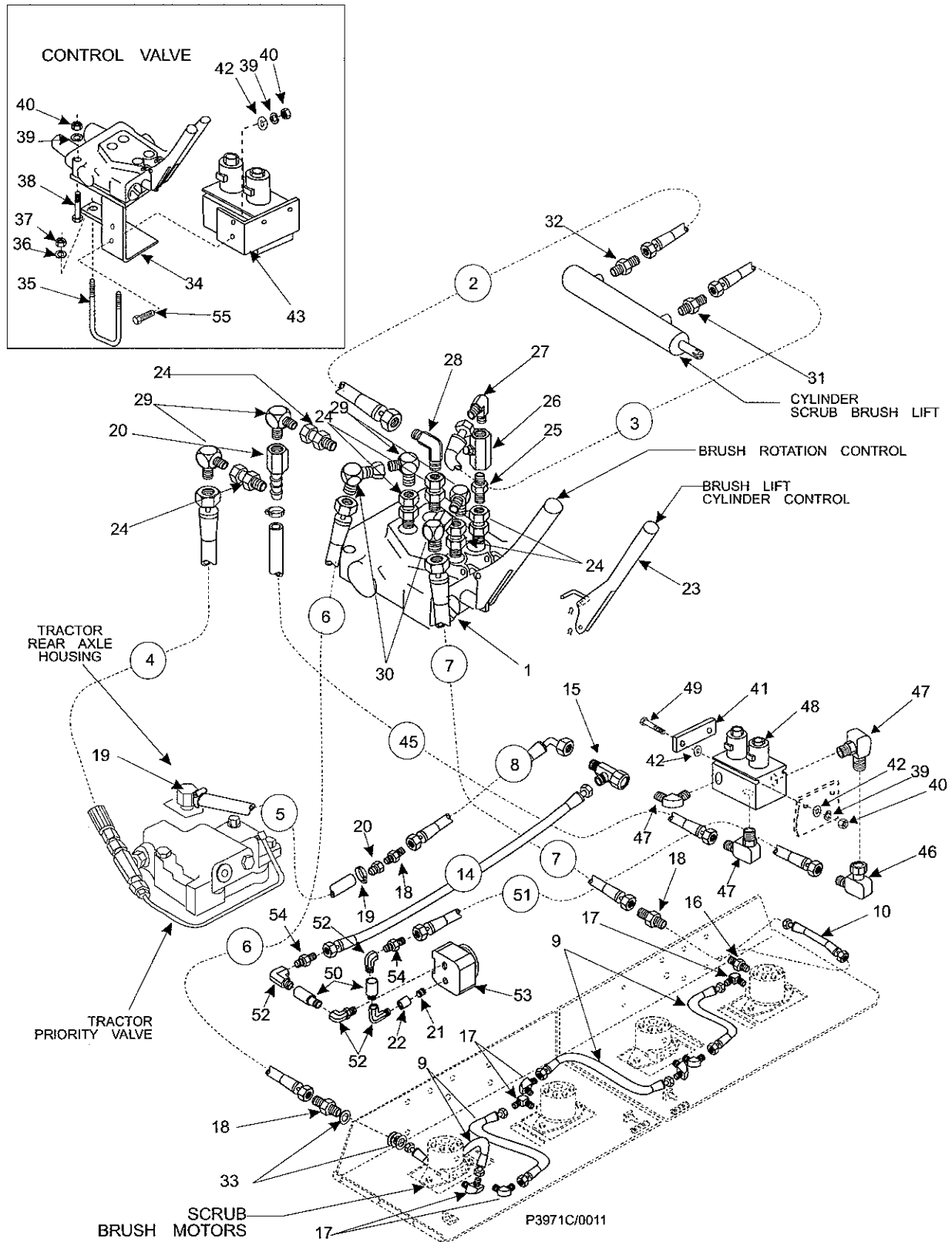


## CAMEL HYDRAULICS (SCRUBBING SYSTEM) - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	8-88-00024	Valve, Hyd. Control (metro)	1
2	8-33-02117	Hose, Control Valve To Cylinder	1
3	8-33-02217	Hose, Control Valve To Cylinder	1
4	7-33-02165	Hose, Tractor Pump To Control Valve	1
5	7-33-02284	Hose, Control Valve Return	1
6	8-33-02063	Hose, Control Valve To Scrub Brush Motor	1
7	7-33-02140	Hose, Scrub Brush Motor To Control Valve	1
8	8-33-02209	Hose, Ors 37 Deg. Jic 29.00" Lg.	1
9	7-33-02108	Hose, Scrub Brush Mtr To Scrub Brush Mtr	4
10	7-33-02106	Hose, Scrub Brush Motor Hydraulic Hose	1
11			
12			
13			
14	7-33-02199	Hose, 13/16 Ors (1) 45 Deg. 67.00" Lg.	1
15	2-00-04928	Run Tee, 13/16 Ors # 8	1
16	2-00-04234	Fitting, Str.	1
17	2-00-04217	Fitting, 90°	7
18	2-00-04242	Fitting, Bulkhead	2
19	2-00-03407	Clamp, Hose	2
20	2-00-04613	Fitting, Barb	1
21	2-00-04641	Pipe Nipple 3/8 Npt	1
22	2-00-05194	Pipe Connector 3/8 Npt	1
23	7-31-06063	Handle	2
24	2-00-04640	Fitting Str. Swivel	5
25	2-00-04628	Fitting, Str.	1
26	8-88-00023	Valve, Lockoff	1
27	2-00-04477	Fitting, 90°	1
28	2-00-04472	Fitting, 90°	1
29	2-00-04547	Fitting, 90°	3
30	2-00-04244	Fitting, 90° Swivel	2
31	8-25-02034	Fitting, Restrictor	1
32	2-00-04611	Fitting, Str.	1
33	2-00-03170	Washer, 3/4 Flat	4
34	7-81-00110	Support Valve Mtg.	1
35	7-23-03095	U-bolt	1
36	2-00-02313	Lockwasher, 5/8	2
37	2-00-00590	Nut, 5/8-18	2
38	2-00-02589	Screw, Hhc 1/4-20 X 2.00	2
39	2-00-00518	Lockwasher, 1/4 Split	12
40	2-00-00594	Nut, Hex 1/4-20	6
41	8-65-00043	Retainer, Valve	1
42	2-00-00407	Flatwasher, 1/4	6
43	7-08-00756	Bracket, Valve Mount	1
44	2-00-04977	Fitting, St. 13/16-16 Ors To 9/16-16 Ors	1
45	8-33-02193	Hose, 113/16-16 Ors 18.00" Lg.	1
46	2-00-05046	Elbow, 90° Swivel Nut 13/16-16 Ors	1
47	2-00-04885	Elbow, 90° 1/4-16 Sae X 13/16-16 Ors	3
48	7-88-00052	Valve, Motor Shut Off	1
49	2-00-05216	Screw, 1/4-20 X 5.00 Hhc	2
50	7-56-05022	Pipe Fitting, 3/8 Npt	2
51	7-33-02298	Hose, 13/16-16 Ors Strt. 48.00" Lg.	1
52	2-00-04589	Street Elbow, 3/8 Npt	4
53	0782-128	Hydraulic Motor, Camel System	Ref.
54	2-00-05195	Adapter, 13/16-16 Ors 3/8 Npt	2
55	2-00-02587	Screw, 1/4-20 X 1.25 Hhc	2

P3971C/0011

# CAMEL HYDRAULICS (SCRUBBING SYSTEM) - EXPLODED VIEW

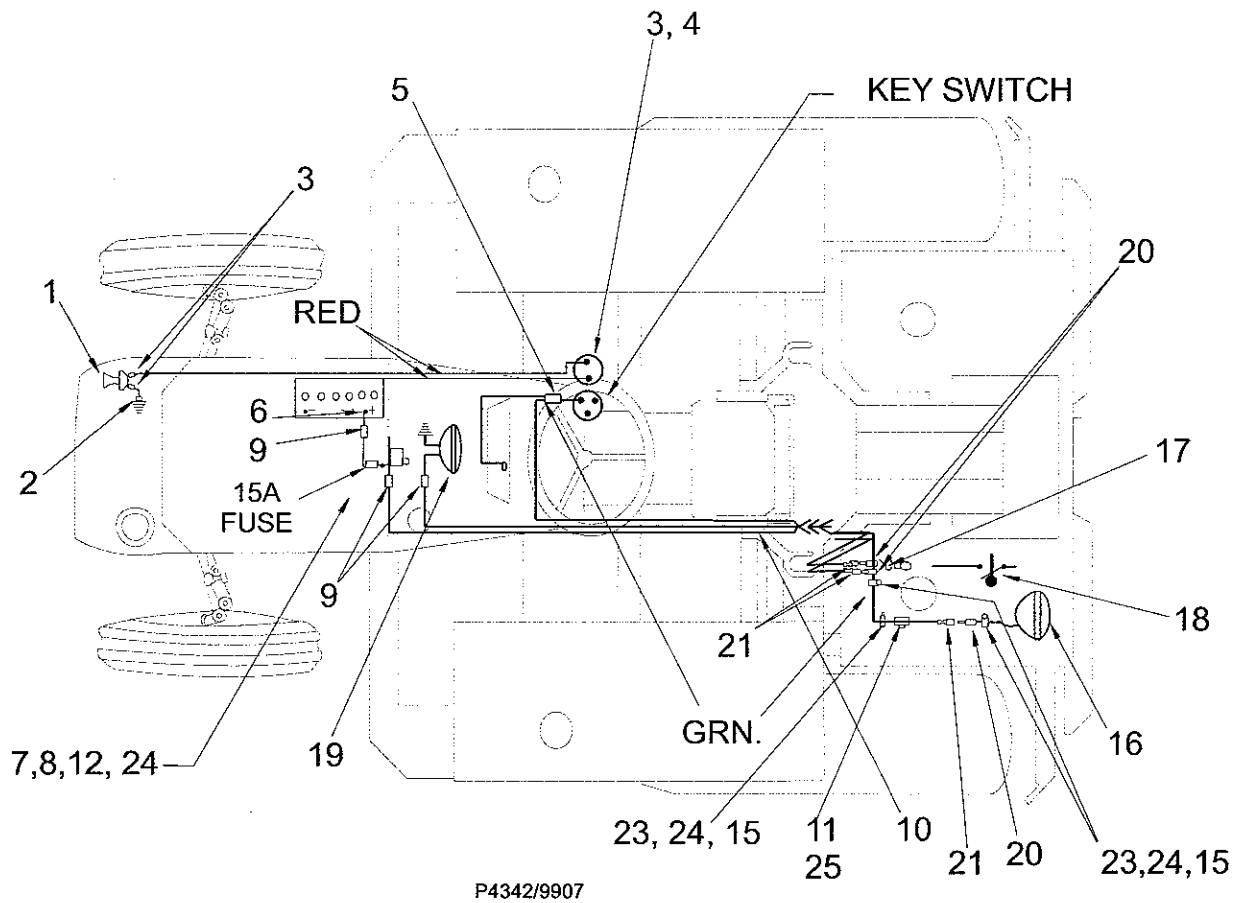


## ELECTRICAL ASSEMBLY - PARTS LIST

<u>KEY NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	8-32-09007	Horn	1
2	2-00-02010	Terminal, Ring 16-14 / .44 x 1.03 .53	1
3	2-00-00844	Terminal, Spade 16-14 / .28 x .53 x .37	4
4	2-95-02205	Button, Horn (H-PB)	1
5	2-00-04479	Connector	2
6	2-00-03476	Terminal	1
7	7-73-05004	Socket, Flasher	1
8	7-26-01004	Flasher	1
9	2-00-01128	Terminal, Butt Connector	2
10	0795-016	Harness, Wiring (M-WH)	1
11	2-00-03061	Screw 10-24 x .50 THM BR2C	2
12	2-00-00519	Washer Lock #10	2
N/S	3-61-00193	16 ga. Stranded Wire Red Insulation	Ref.
N/S	7-13-07096	Clamp Adjustable	Ref.
15	2-00-00519	Washer Lock #10	1
16	0775-017-1	Lamp, Signal	1
17	2-00-04378	Clamp	2
18	0775-164	Switch Dirty Warning	1
19	7-40-05008	Lamp	1
20	2-00-04578	Terminal Insulated Bullet Male	1
21	2-00-04626	Terminal Insulated Bullet Female	3
N/S	3-61-00189	16 Ga. Stranded Blk. Wire Insulated	Ref.
23	2-00-04209	Clamp, Cable	2
24	2-00-03061	Screw 10-24 x .50 THM BR. ZC.	4

P4342/9907

## ELECTRICAL ASSEMBLY - EXPLODED VIEW



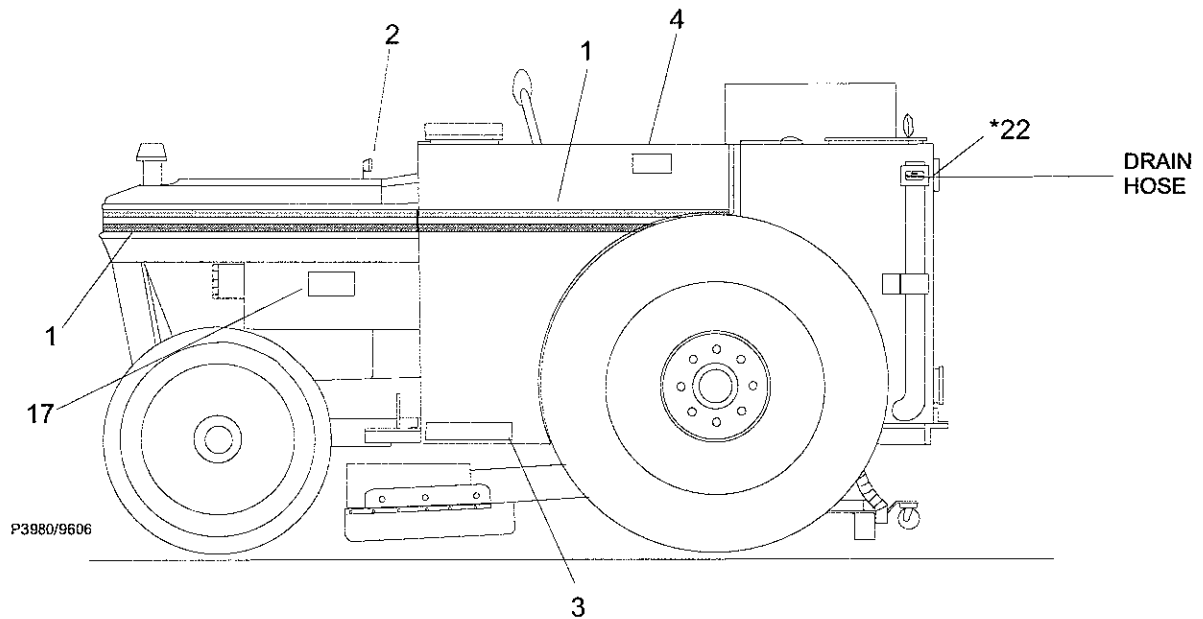
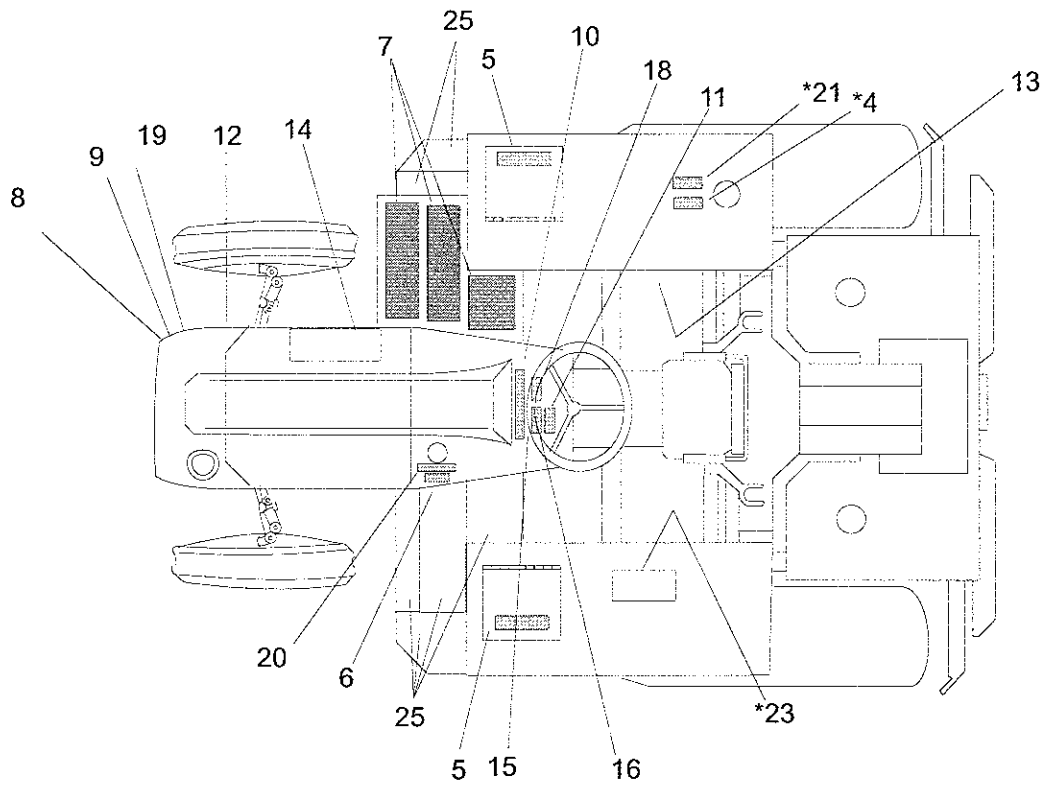
## DECALS - PARTS LIST

<u>KEY NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QTY</u>
*1	8-18-00544	Decal, Alto	2
2	7-18-00118	Decal, Drain Dirty Water	1
3	8-18-00346	Decal, American-Lincoln	2
4	8-18-00212	Decal, 772	2
*4	8-18-00459	Decal, 772	2
5	7-18-00099	Decal, Warning	2
6	8-18-00085	Decal, Gas	1
	7-18-00074	Decal, L.P.	1
	7-18-00073	Decal, Diesel	1
7	7-50-05052	Pad, Foot	2
8	8-18-00228	Decal, Decal - Patent	1
9	8-50-00014	Serial, Plate	1
10	2-14-03390	Decal, Warning	1
11	7-18-00067	Decal, Parking Brake	1
12	8-18-00071	Decal, Radiator	1
13	7-18-00086	Decal, Cautions	1
14	7-18-00219	Decal, Service Chart	1
15	8-18-00235	Decal, Safe Operation	1
16	8-18-00236	Decal, Warning	2
17	0777-037	3930 Ford Tractor (L.P.)	1
	0777-036	3930 Ford Tractor (Gas)	1
	0777-035	3930 Ford Tractor (Diesel)	1
18	7-18-0122	Decal, Caution	1
19	8-18-04115	Rivet	2
20	8-18-00310	Decal, Gasoline Only	1
*21	7-18-00103-1	Decal, Warning Suds	1
*22	7-18-00094-1	Decal - Drain Hose	1
*23	7-18-00190	Decal - Recycling Panel	Ref.
24			
25	7-18-00236	Decal, No Step	6

\*Camel Machine Only

P3980/9310

## DECALS - EXPLODED VIEW

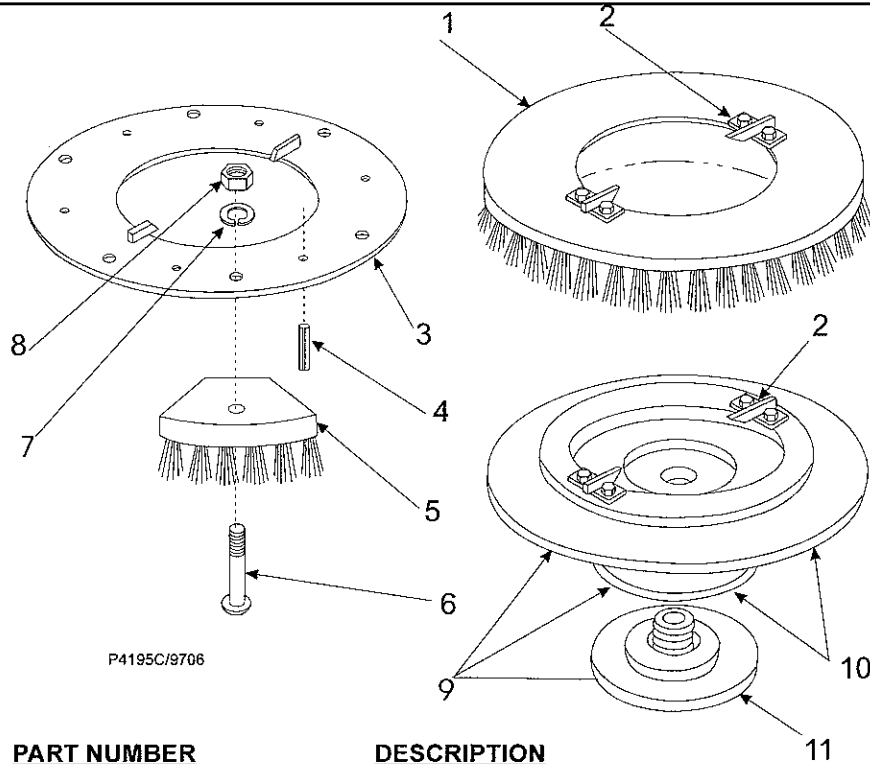




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## BRUSH OPTIONS



KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-08-03173	Straight Wire	4
1	7-08-03191	Wire/ Amerfil	4
1	7-08-03205	Supergrit	4
2	7-44-05026	Lug	2

### Sectional Brushes

3	0760-283	Brush Plate Attachments	3
4	2-00-04221	Radial Locking Spring Pin, .375 x 1.000	6

### Wood Back Sectional Brushes

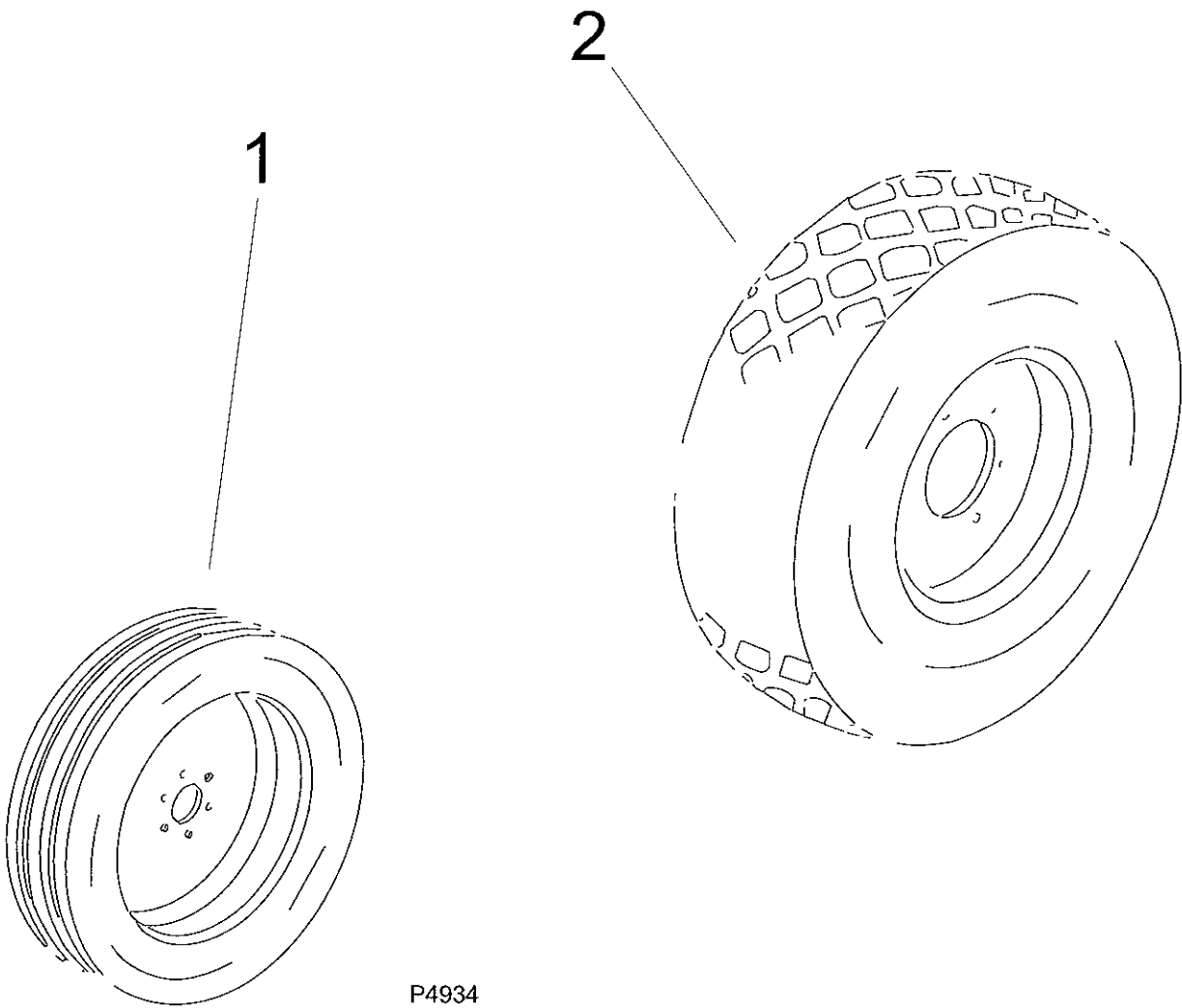
5	7-08-03070	Bassine	24
5	7-08-03144	Amergrit	24
5	7-08-03207	Super Grit	24

### Plastic Back Sectional Brushes

5	7-08-03192	Bassine	24
5	7-08-03193	Straight Wire	24
5	7-08-03194	Nylon (Black)	24
5	7-08-03195	Amerfil (.025)	24
5	7-08-03196	Amerfil (.040)	24
5	7-08-03197	Amergrit	24
6	2-00-02706	Screw, 1/4 - 20 x 1.000 HHM	6
7	2-00-00518	Washer, Helical Spring 1/4 Med	6
8	2-00-00594	Nut, Hex 1/4 - 20 x .437 x .218	6

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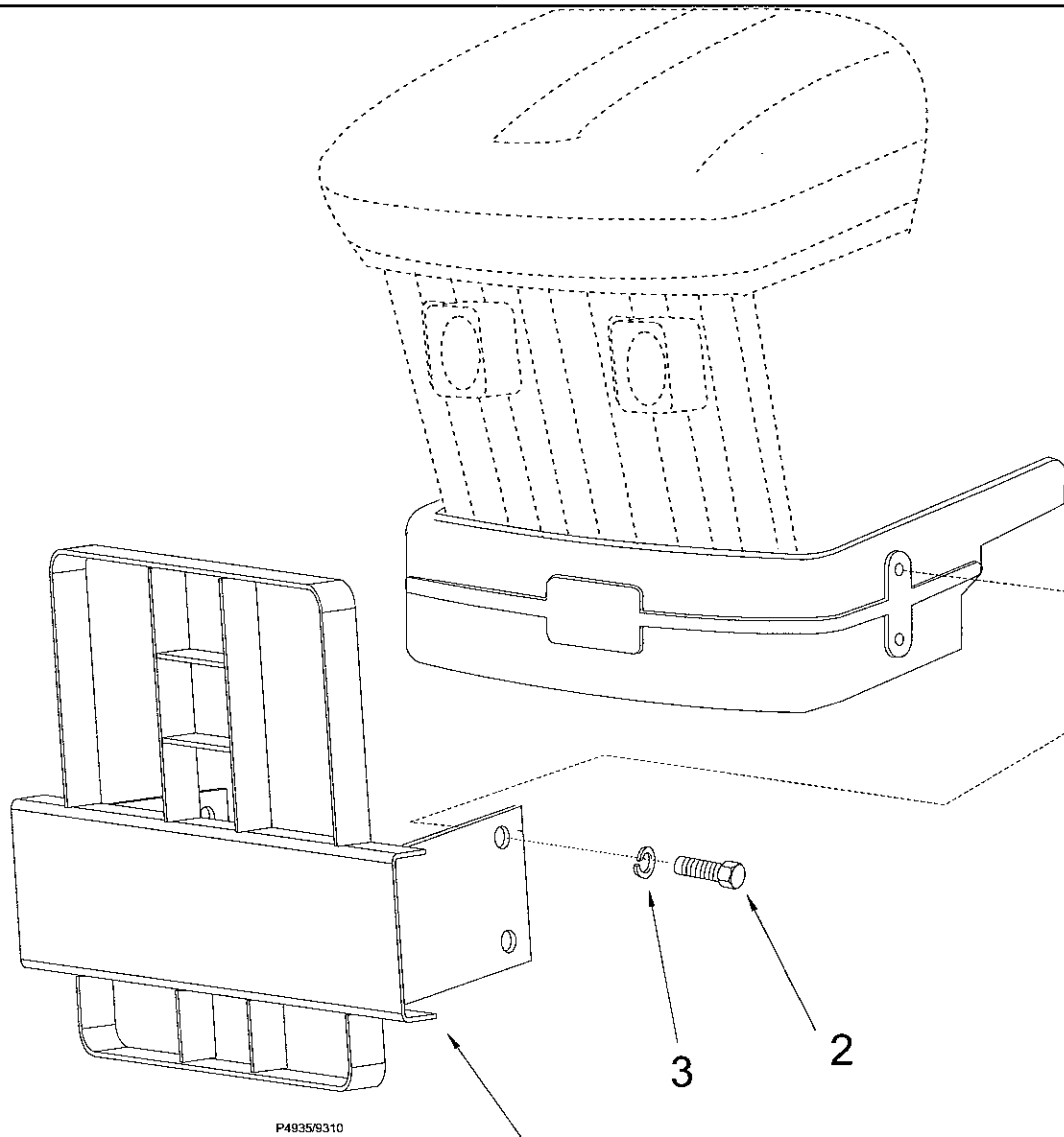
**FOAM FILLED TIRES OPTION**



<u>KEY NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	0797-020	Foam Filled Front Tire	2
2	0797-021	Foam Filled Rear Tire	2

P4934

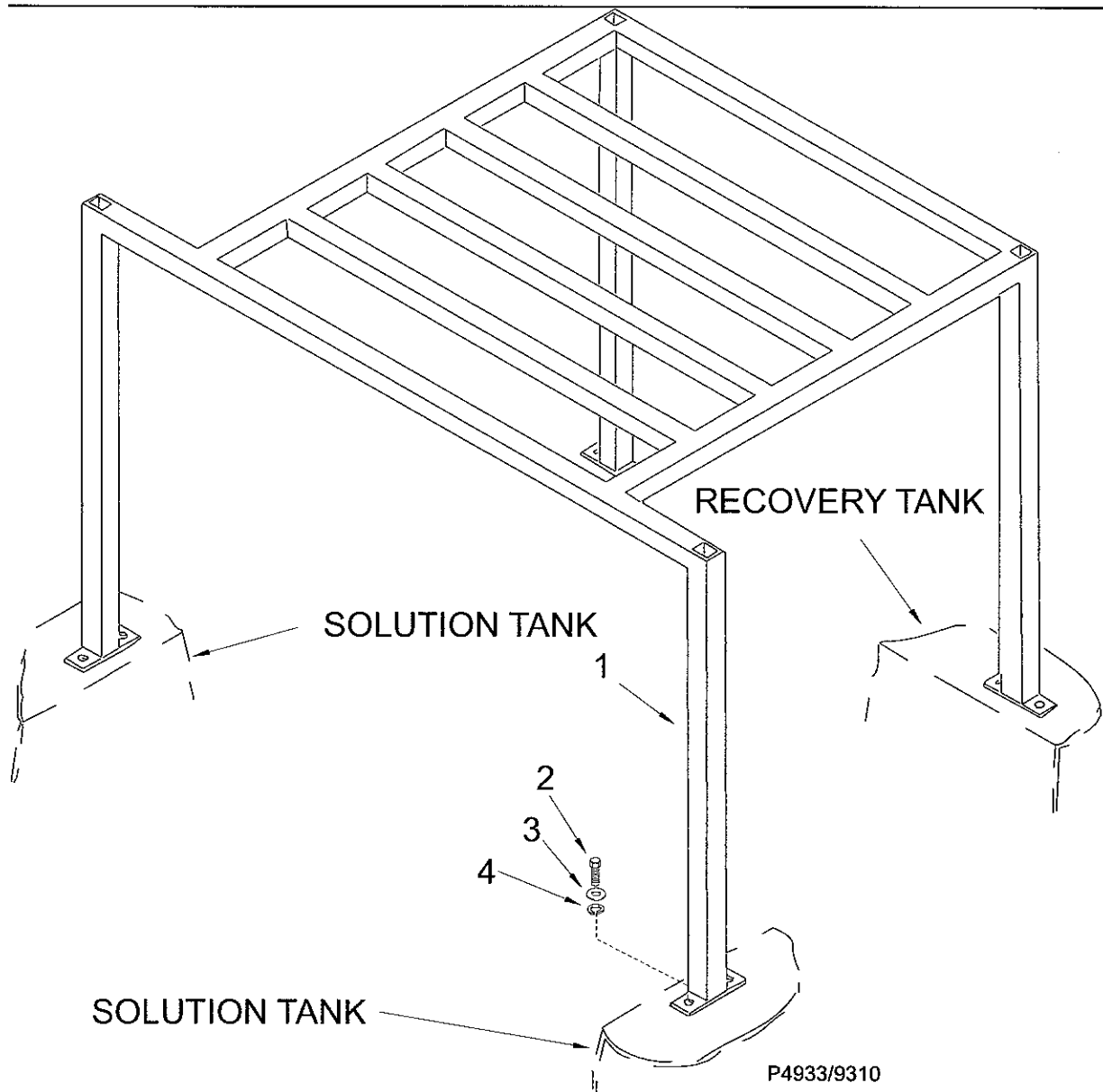
## FRONT BUMPER OPTION



KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-08-07057	Front Bumper	1
2	2-00-03850	Screw, 3/4 -10 X 1.50 HHC	4
3	2-00-00522	Lockwasher, 3/4 Hel. Spring	4

P4935/9310

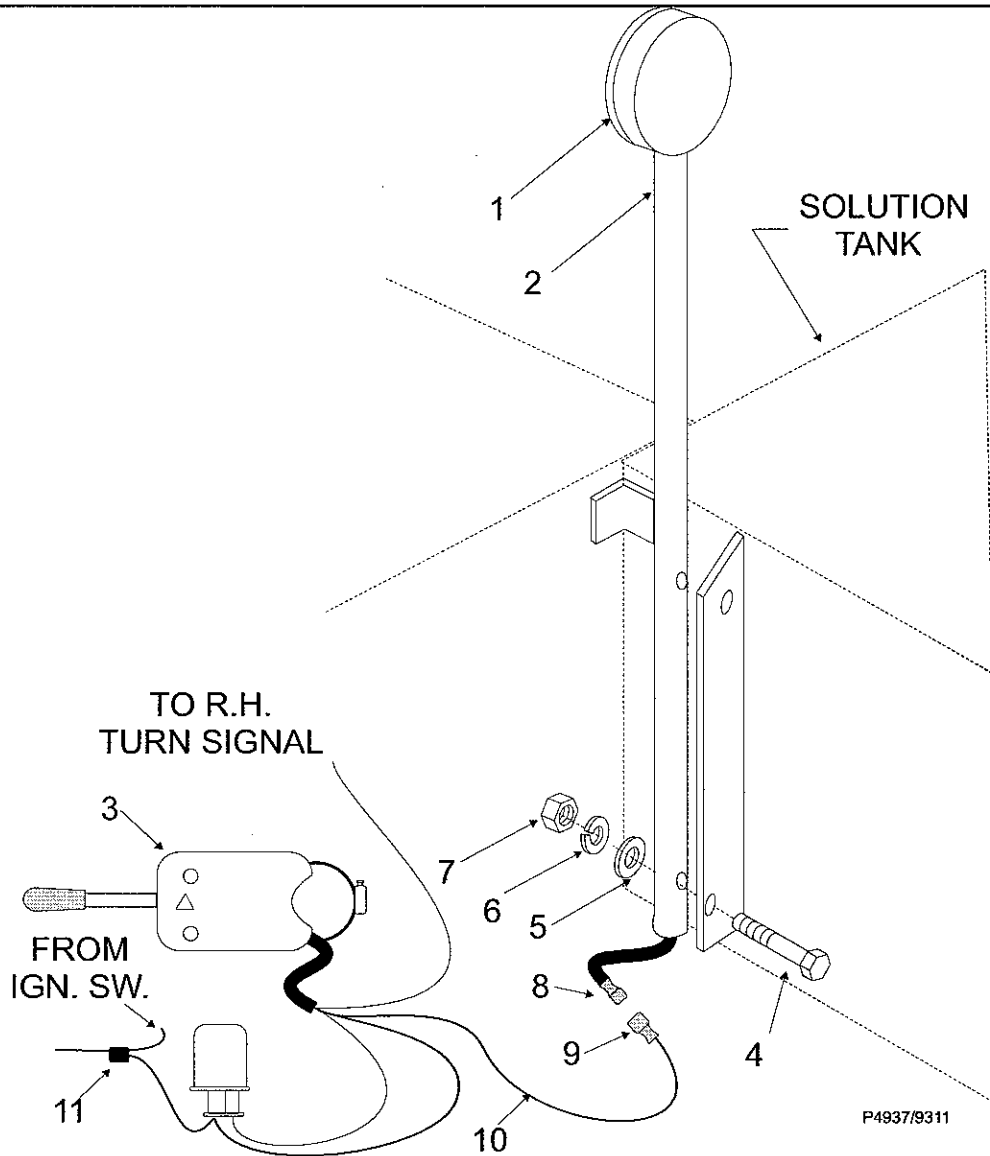
OVERHEAD GUARD OPTION



KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	0702-090	Overhead Guard	1
2	2-00-02208	Screw, 5/16 - 18 x .750 HHM	8
3	2-00-00530	Lock Washer, Helical Spring 5/16 Med	8
4	2-00-00409	Flat Washer, .687 x .343 x .062	8

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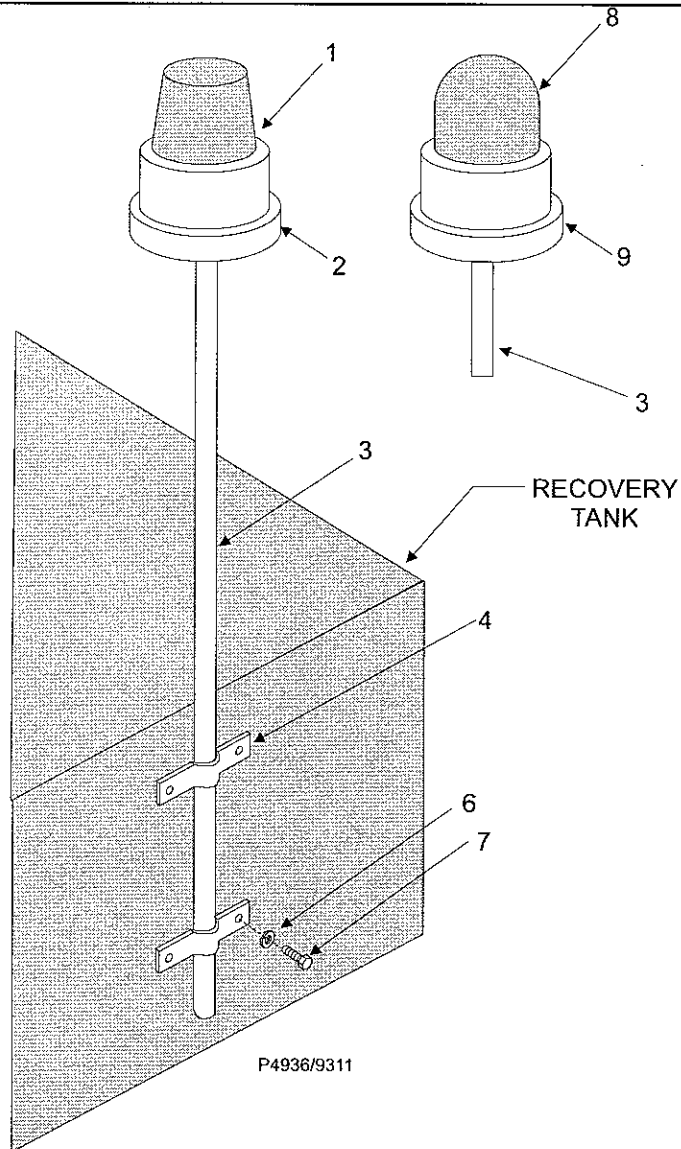
## TURN SIGNAL OPTION



KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	8-40-05006	Turn Signal	2
2	8-87-02012	Bracket, Flasher Light	2
3	8-82-00025	Turn Signal Switch	1
4	2-00-00203	Screw, 1/4-20x1.50 HHC	4
5	2-00-03702	Flt. Washer .625x.281x.062	4
6	2-00-00518	Lk. Washer 1/4 Hel. Spring	4
7	2-00-00594	Nut, 1/4 - 20 x .437 x .218	4
8	8-11-00015	Terminal .25 Male Tab	2
9	2-00-03418	Terminal .25 Female Tab	2
10	3-61-00189	16 Ga. Blk Wire	26'
11	2-00-04479	Wire Connector 3 Way	1

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## WARNING LIGHT OPTION



KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	8-40-05010	Rotating Light	1
2	8-58-05144	Mounting Plate	1
3	8-05-07073	Bar	1
4	8-08-00338	Upper Bracket	1
5	8-08-00339	Lower Bracket	1
6	2-00-00530	Lock Washer, Helical Spring 5/16 Med	4
7	2-00-04310	Screw, 5/16 - 18 x 1.000 HHC	4
8	7-40-05007	Flashing Light	1
9	8-58-05143	Mounting Plate	1
	801-502	Rotating Light Option	
	801-492	Flashing Light Option	

P4936/9311

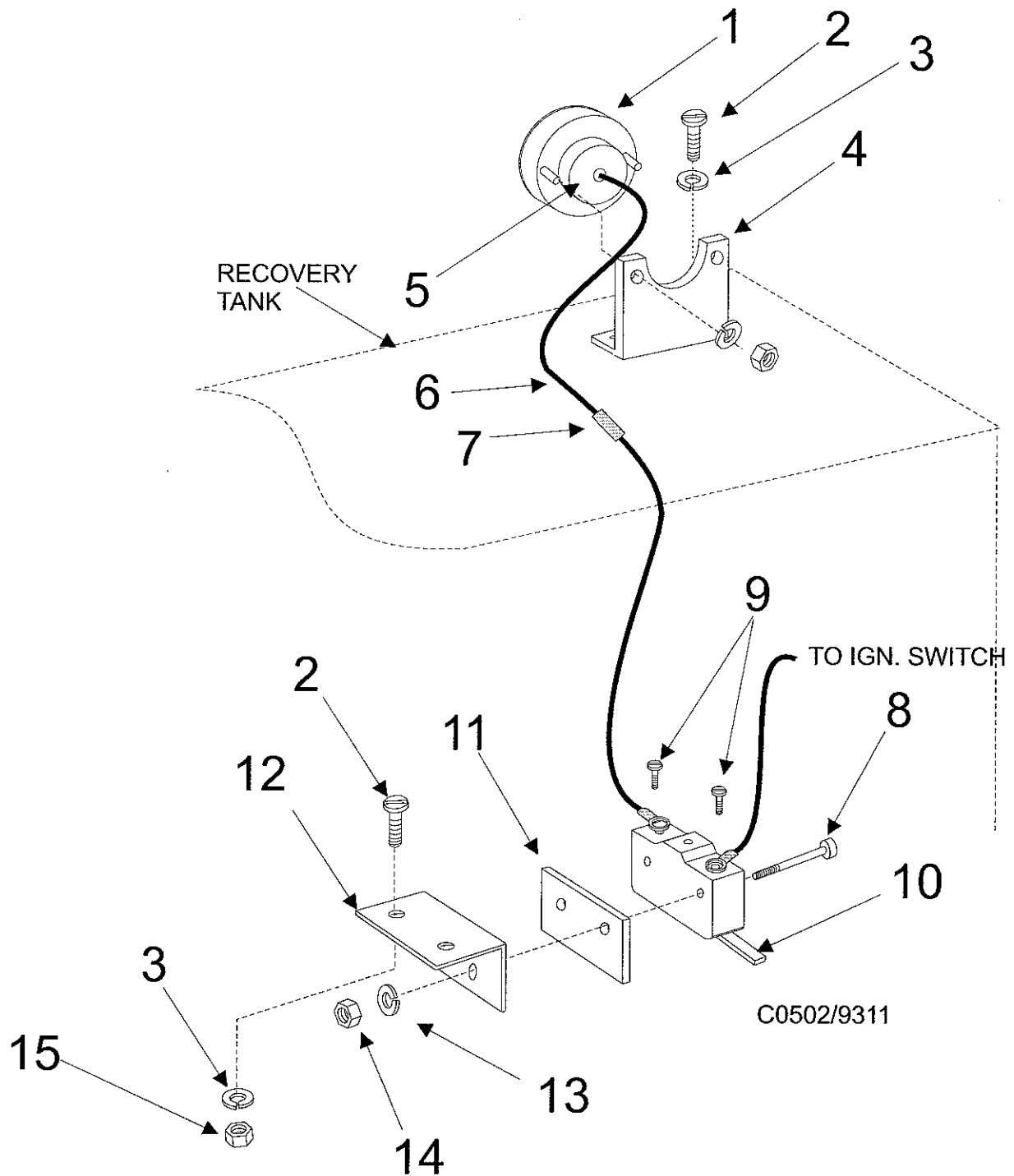
## **BRAKE LIGHT OPTION - PARTS LIST**

<b><u>KEY NO.</u></b>	<b><u>PART NUMBER</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>QTY</u></b>
1	7-40-05021	Brake Light	1
2	2-00-00221	Screw, 1/4-20 X .75 HHC	4
3	2-00-00518	Lockwasher, 1/4 Med. H.S.	4
4	7-08-00377	Brakcet, Brake Light	1
5	2-00-04033	Tab Disconnect .25	1
6	3-61-00189	16 Ga. Black Wire	24'
7	2-00-01128	Butt Connector	3
8	2-00-04037	Screw, #4-40 X .75 RHM	2
9	2-00-04077	Tab Disconnect .19	2
10	2-00-04020	Switch	1
11	8-35-00015	Insulation Paper	1
12	7-08-00378	Bracket, Brake Switch	1
13	2-00-00510	Lockwasher, # 10	2
14	2-00-02380	Nut, # 4-40 MS	2
15	2-00-00594	Nut, 1/4-20 Hex	2

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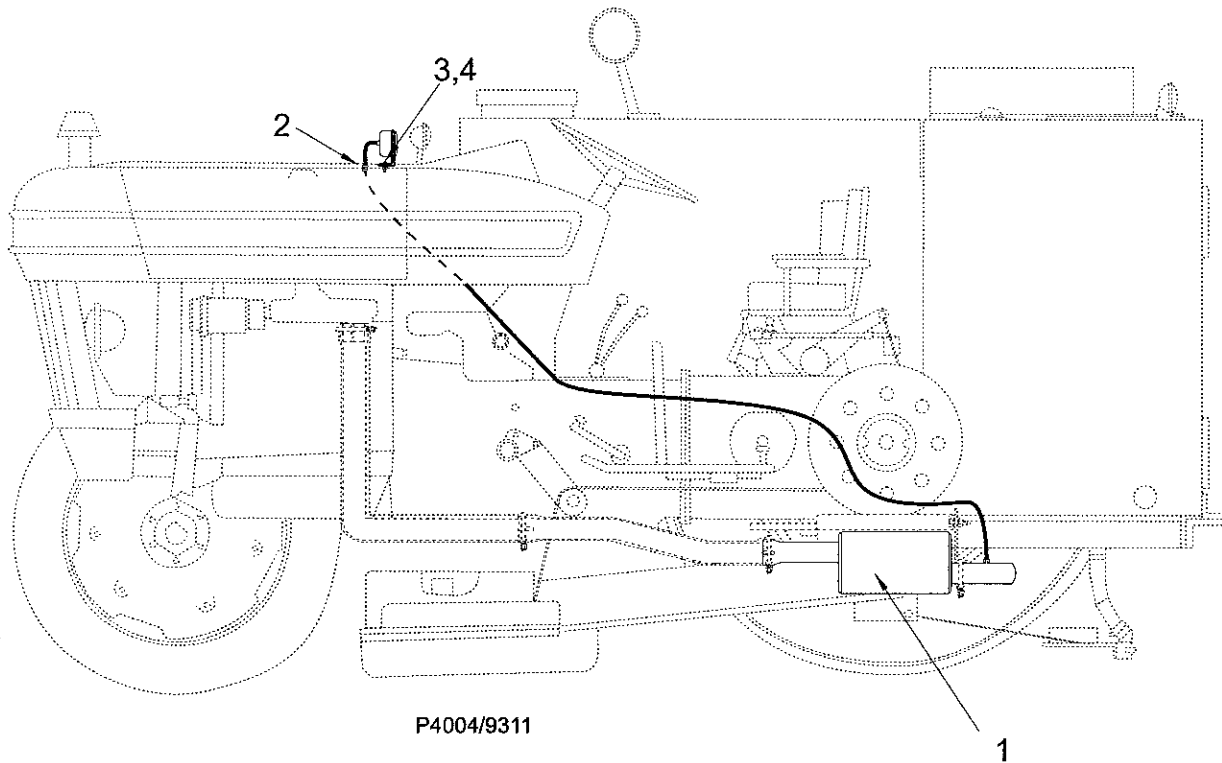


## BRAKE LIGHT OPTION - EXPLODED VIEW



## CATALYTIC MUFFLER OPTION (GAS/LP)

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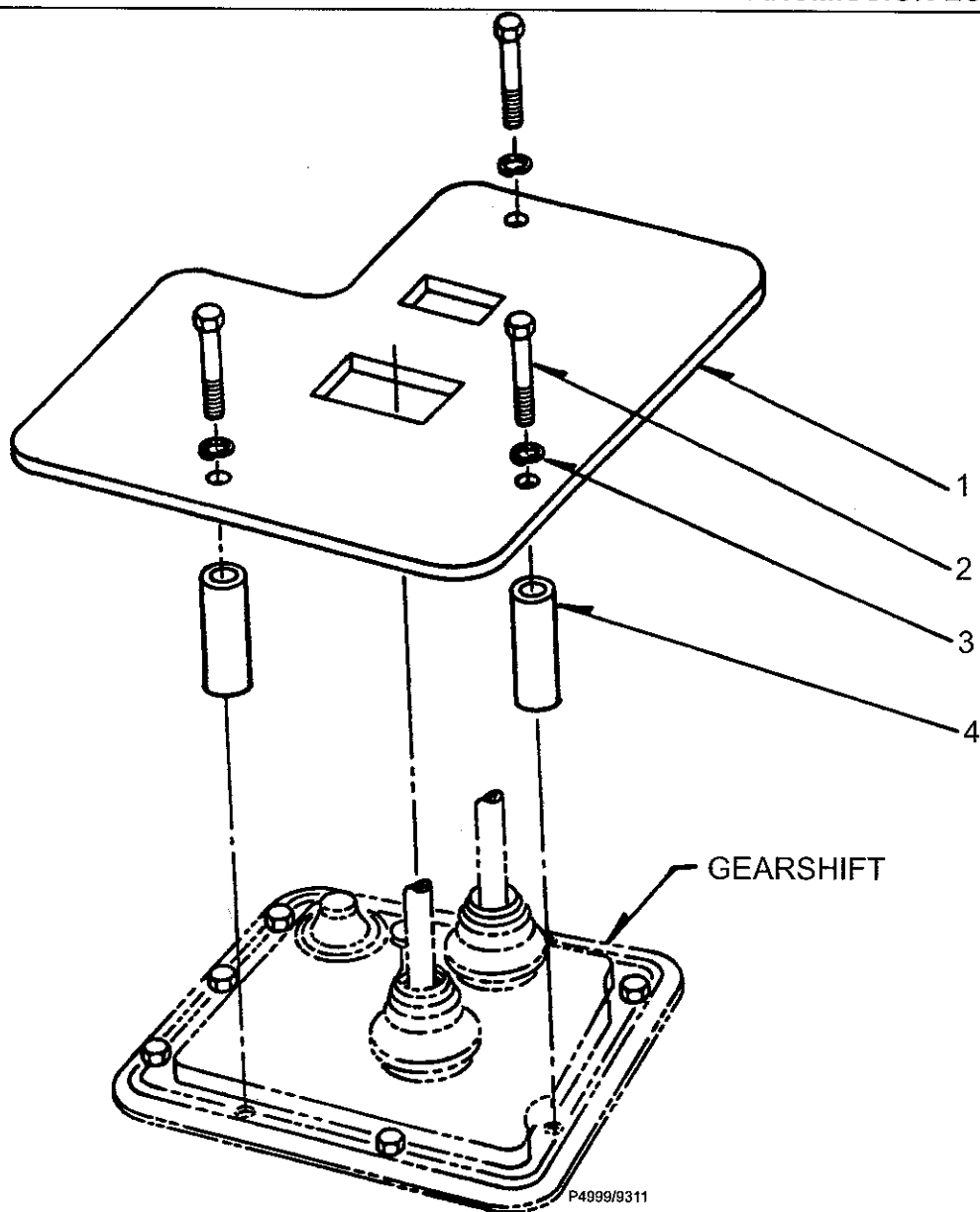
<u>KEY NO.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QTY</u>
1	0778-041	Muffler (Gas & LP)	1
2	2-00-00492	Grommet, .625 x .375 x .093	1
3	2-95-04266	Screw #10-24 X .50 HHM	2
4	2-00-01246	Nut #10-24 Fibre Lock	2

0778-040 Factory Installed Catalytic Muffler Assembly Option

0778-040-1 Field Installed Catalytic Muffler Assembly Option

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## TRANSMISSION LOCK OUT



KEY NO.	PART NUMBER	DESCRIPTION	QTY.
1	7-58-05195	Plate	1
2	2-00-02605	Screw, 3/8 - 16 x 4.500 HHC	3
3	2-00-02310	Lock Washer, Helical Spring 3/8 Med	3
4	2-95-01006	Spacer,	3
	0780-057	Transmission Lock Out Attachment Option	

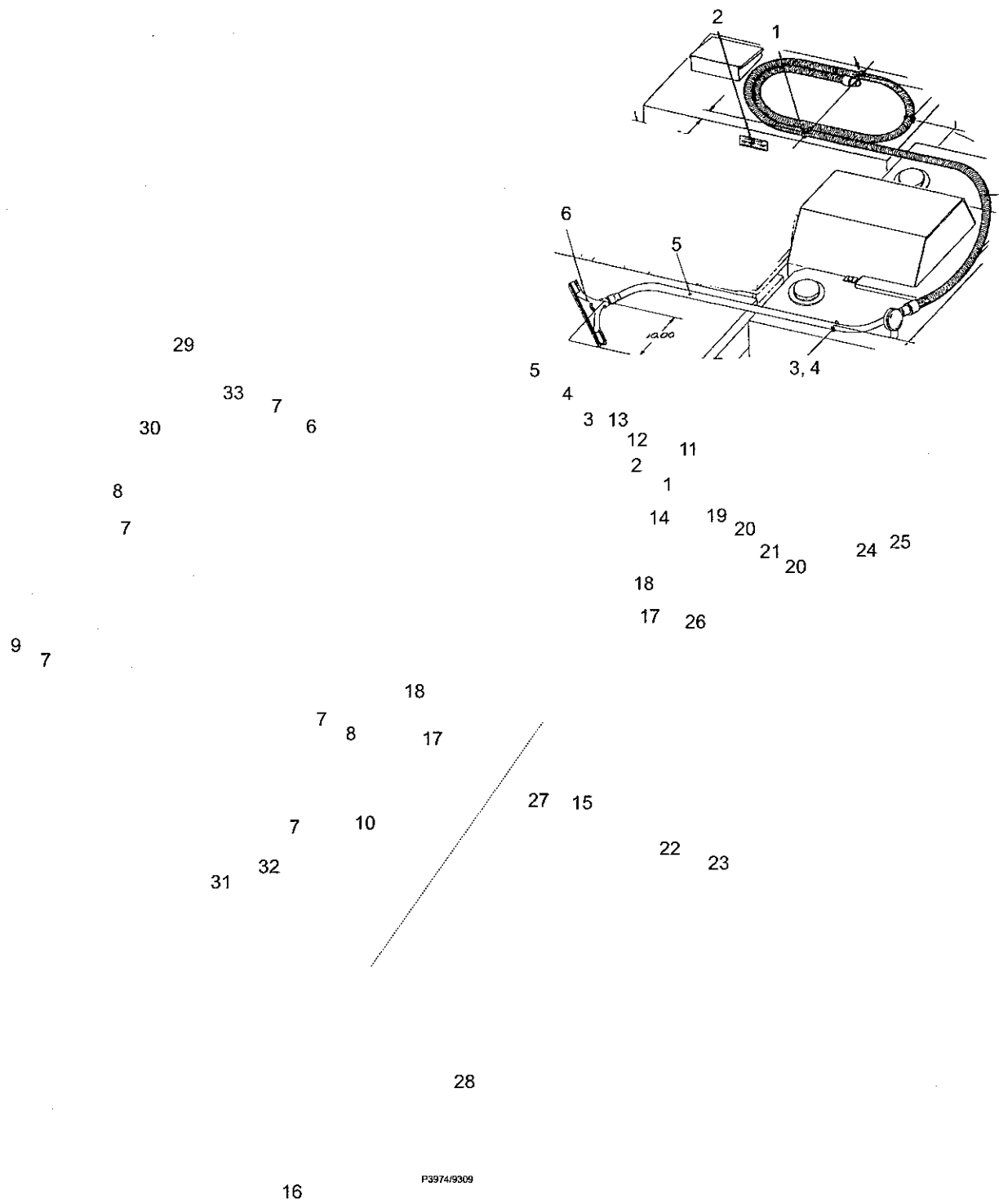
P4999

## VACUUM WAND - PARTS LIST

KEY NO.	PART NUMBER	DESCRIPTION	QTY
1	7-33-02213	Hose 1 1/2 x 15'-0"	1
2	7-18-00121	Decal, Warning	1
3	7-13-07097	Clip, Tool	5
4	2-00-04312	Screw, #10 - 24 x .625 T/C HH	5
5	0261-025	1 1/2 Wand Assembly	1
6	0261-024	14" Squeegee Assembly	1
7	7-05-07005	Inner Bar	2
8	2-00-02899	Screw, 1/4 - 20 x .750 RHM	36
9	2-00-00498	Lock Washer, 1/4 Ext	40
10	2-00-00606	Nut, Hex 1/4 - 20 x .437 x .218	4
11	7-77-00035	Squeegee - Inner Rubber	2
12	7-86-08018	Squeegee - Tool	2
13	2-00-00208	Screw, 5/16 - 18 x .750 HHC	5
14	7-77-00036	Squeegee - Outer Rubber	2
15	7-05-07115	Outer Bar	4
16	2-00-02907	Screw, 1/4 - 20 x 1.250 RHM	4
17	9-01-03080	Caster Wheel	2
18	2-00-02356	Nut, Hex Hvy. Jam 5/8-11 x 1.062 x .359	2
19	2-00-00585	Nut, Hex 5/16 - 18 x .500 x .265	2
20	2-00-00530	Lock Washer, Helical Spring 5/16 Med	2
21	2-00-00462	Flat Washer, .562 x .250 x .031	2
22	2-00-04681	Carriage Bolt, 5/16 - 18 x 1.250	2
23	7-58-05212	Valve Plate LH	1
24	2-00-00644	Nut, Hex Fiber Insert 5/16 - 18	8
25	7-25-06022	Valve Flange	2
26	7-05-07160	Guide LH	1
27	2-00-00409	Flat Washer, .687 x .343 x .062	4
28	2-00-04581	Flat Washer, .875 x .395 x 5/32	4
29	7-05-07159	Guide RH	1
30	7-58-05211	Valve Plate RH	1
31	2-00-00207	Screw, 5/16 - 18 x 1.250 HHC	4
	0780-084	Factory Installed Vacuum Wand Option	
	0780-084-1	Field Installed Vacuum Wand Option	

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# VACUUM WAND - EXPLODED VIEW



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AMERICAN-LINCOLN TECHNOLOGY  
RIDER SWEEPER / SCRUBBER  
"BUMPER-TO-BUMPER" LIMITED WARRANTY

**I. COVERAGE**

A. Subject to the terms and limitations stated herein, American-Lincoln warrants, to the original purchaser only, to repair or replace, at its option and upon the terms set out below, this product or any parts thereof (excluding normal maintenance items) which are defective in materials or workmanship, for a period of (2) two years or 2,000 hours of normal operation from the date of purchase, whichever comes first, but not to exceed (3) three years from the date of factory shipment, provided that the product is operated and maintained in accordance with American-Lincoln's Maintenance and Operations Instruction.

1. (a) During the first thirty (30) days from the date of purchase, American-Lincoln will provide, without charge, parts and on-site labor (including up to three (3) hours total round-trip travel time) to remedy a defective product or part.

(b) During the next eleven (11) months or 1,000 hours (whichever come first) American-Lincoln will provide, without charge, parts and labor to remedy a defective product or part; however all travel time for on-site remedy and all shipping and freight charges for off-site remedy of the product or parts thereof shall be the sole responsibility of the purchaser.

(c) During the remainder of the warranty period, as itemized herein above, American-Lincoln will provide, without charge, parts to remedy a defective product or part, however all labor, travel time for on-site remedy and all shipping and freight charges for off-site remedy of the product or parts thereof shall be the sole responsibility of the purchaser.

B. In addition to the terms above (except as to the one year period), any original equipment American-Lincoln Battery which becomes unserviceable under normal use within a period of ninety (90) days from date of sale to the original user will be repaired or replaced with one of equal specifications at our option, F.O.B. any authorized American-Lincoln Sales or service branch, with no charge to the user, except transportation costs. After expiration of the above ninety (90) day period, any battery which fails under normal use will be adjusted to the original user with a new battery of equal specifications on an eighteen (18) months pro rate basis from the date of purchase. Adjustment will be determined using the then current list price, plus transportation costs. Warranty is rendered NULL and Void if battery is not kept filled to the proper level with DISTILLED WATER.

C. In addition to the above, if applicable, American-Lincoln, warrants to the original purchaser only, to repair or replace, at its option and upon the terms set out below, the main frame, debris hopper, solution tank, and the recovery tank, for eight (8) years against failure caused by defects in workmanship or total rust through. For purposes of this coverage, cosmetic deterioration or surface rust does not constitute a failure.

Furthermore if this product is powered by a liquid cooled engine, American Lincoln Warrants to the original purchaser only, to provide replacement parts on the liquid cooled engine, which is defective in workmanship, for a period of three years or 2500 hours (whichever comes first) of normal operation. All labor, travel time, shipping and freight charges shall be the sole responsibility of the purchaser.

**II. EXCLUSIONS**

- A. This warranty does not cover normal maintenance parts and labor, including but not limited to, rubber parts, seals, flaps, brushes, engine maintenance parts, hoses, carbon motor brushes, fluids and routine adjustments.
- B. This warranty does not cover damage or failure of the product or any parts thereof which is the result of misuse, negligent operation, handling or repair, or which is the result of modification by any person other than an authorized American-Lincoln service representative.

**III. LIMITATIONS**

A. AMERICAN-LINCOLN MAKES NO WARRANTIES OTHER THAN THOSE SPECIFIED HEREIN. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED. AMERICAN-LINCOLN LIABILITY UNDER THIS WARRANTY IS LIMITED TO REPAIR AND/OR REPLACEMENT OF PRODUCTS OR PARTS AS SET OUT HEREIN. AMERICAN-LINCOLN SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM A PRODUCT OR PART DEFECT OR FAILURE. ANY EXTENSIONS OF OR MODIFICATIONS MADE TO THIS WARRANTY BY A DISTRIBUTOR OF AMERICAN-LINCOLN ARE THE SOLE RESPONSIBILITY OF THE DISTRIBUTOR.

IV. PROCEDURES AND CONDITIONS FOR WARRANTY CLAIMS AMERICAN-LINCOLN SHALL NOT BE LIABLE FOR REPAIR OR REPLACEMENT OF ANY DEFECTIVE PRODUCT OR PART THEREOF UNLESS AND UNTIL THE ORIGINAL PURCHASER FULFILLS THE FOLLOWING CONDITIONS PRECEDENT TO RECOVERY UNDER THIS WARRANTY:

1. The original purchaser shall promptly complete and return the warranty and installation registration form included with the product at the time of the purchase;
2. Upon product or part failure, the original purchaser shall promptly provide notice thereof to his nearest authorized American-Lincoln Service Representative; and
3. The original purchaser shall permit the product or part to be inspected by American-Lincoln or its authorized representatives, as necessary and expenses for shipping or travel time shall be borne by the parties itemized in paragraph I herein above.

American-Lincoln Technology reserves the right to make changes and improvements to its machines without notice. For best results, use only the correct American-Lincoln Service parts.

AMERICAN-LINCOLN TECHNOLOGY  
1100 HASKINS ROAD  
BOWLING GREEN, OHIO 43402

