

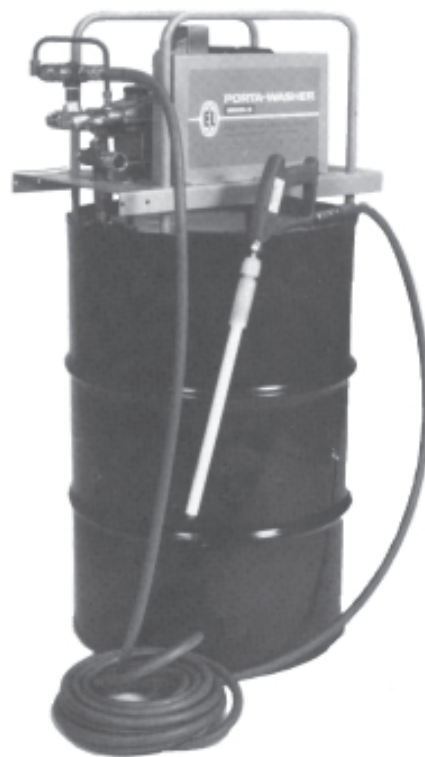
PORTA-WASHER

High Pressure Cleaning System

Installation and Operation Manual



MODEL P



MODEL S

PORTA-WASHER

Installation and Operation Manual

1.0	PORTA-WASHER - MODEL P	1
1.1	Specifications	1
1.2	Assembly	1
1.3	Lubrication Schedule	1
1.3.1	Crankcase	1
1.3.2	Piston Rod Wicks	1
1.4	Principles of Operation	1
2.0	OPERATION - MODEL P	3
2.1	Pressure Adjustment	4
2.2	Product Usage Information	4
2.3	Product Recommendations	5
2.4	Magnus Notes	5
2.5	Foam Adjustment	5
3.0	PORTA-WASHER - MODEL S	6
3.1	Specifications	6
3.2	Assembly	6
3.3	Lubrication Schedule	6
3.3.1	Crankcase	6
3.3.2	Piston Rod Wicks	6
3.4	Principles of Operation	6
4.0	OPERATION - MODEL S	8
4.1	Pressure Adjustment	9
4.2	Product Usage Information	9
4.3	Product Recommendations	9
5.0	SERVICING THE PUMP SECTION - MODEL P AND MODEL S	10
5.1	Servicing Discharge Valves and Valve Seats	13
5.2	Reassembly Instructions	14
5.3	Note on Porta-Washer Motor	14
6.0	SERVICING DRIVE BELT - MODEL P AND MODEL S	15
7.0	ROUTINE MAINTENANCE SCHEDULE - MODEL P AND MODEL S	16
8.0	TROUBLESHOOTING	18

1.0 PORTA-WASHER - MODEL P

1.1 Specifications:

Volume	3.0 GPM (11.5 liter/min.)
Maximum Pressure	600 psi
Fresh Water Source	160° F (70°C) Maximum, at 20-40 psi
Fresh Water Inlet	3/4" Female Hose Adapter
Drive Motor	1-1/2 HP, 120 VAC
Electrical Requirements	120 VAC, 16.2 Amp
Power Cord	12 Gauge, 3 Wire, 600 V. 8 ft. Length
Extension Cord (if required)	12 Gauge, 3 Wire, 600 V. up to 50 feet
Pressure Hose	40 foot length, rated at 1,125 psi

1.2 Assembly

1. Using bolts and washers supplied, assemble the handle and panel assembly to the pump frame. Insert bolt from top, placing a curved washer at each end. Use nut and star lock washer to secure. Then assemble the wheel brackets to the base as shown on the cover of this Manual.
2. Refer to LUBRICATION SCHEDULE below for initial lubrication instructions.

Attach short hose from unloader valve on pump to manifold on the panel assembly. (*Figure 1*)
3. Attach the 40' high-pressure discharge hose to the swivel connector on the panel assembly.
4. Insert a gallon plastic bottle of product in holder on panel and insert strainer assembly in bottle.
5. Attach water supply to 3/4" female hose fitting at fresh water inlet on pump, DO NOT RUN PUMP DRY.

NOTE: To ensure water-tight connection, use Teflon tape or pipe sealant when making hose connection.

1.3 Lubrication Schedule:

NOTE: Good lubrication is the easiest most efficient and least expensive method of preventive maintenance.

1.3.1 Crankcase:

Pumps are filled with oil to the fill dot on the oil gauge window at the factory. Verify the gauge window as a reference for future oil changes. Crankcase drain plug is located on back of pump just below oil gauge window (*See Figure 19, Section 7*). Change the crankcase oil after 200 hours of operation or every 60 days, whichever comes first.

Use CAT Pump oil or a high grade SAE 30 non-detergent motor oil. This supersedes any other lubrication schedule recommended.

1.3.2 Piston Rod Wicks:

Applies only to units shipped prior to 7-15-75. Prior to initial operation, saturate wicks with approximately 60 drops of oil in each of the three lubricator housing holes. For optimum operating service add 30 drops of oil to each hole every week or 100 operating hours.

1.4 Principle of Operation:

Refer to *Figure 1*. Set the Porta-Washer in an area accessible to a 120 volt, 20 amp, grounded power source. Connect the water supply to the 3/4" female hose adapter at the suction port of the pump. **Be sure that the water supply is on and not restricted.**

With the selector valve handle in the vertical position (RINSE), high pressure water will flow through the unloader valve on the pump, the manifold assembly on the panel, the 40-foot length of high pressure hose and the wand and spray nozzle. With the nozzle supplied with the wand, and the unloader valve in the factory preset position, pressure at the nozzle will be 600 psi.

For washing, place a gallon container of the desired detergent in the holder assembly on the back panel. Insert the aspirator suction tube and strainer in the product reservoir. Turn the selector handle to the horizontal position (WASH). This diverts the water flow through the aspirator, causing it to draw product from the detergent reservoir. Because of pressure loss through the aspirator, pressure at the discharge nozzle will be approximately 300 psi. To change product concentration, the metering tip that is screwed into the suction port of the aspirator must be changed. (*Model P is supplied with "A" tip installed*). Refer to *Section 2, Product Usage Information* for listing of alternate metering tips.

The high pressure hose assembly is equipped with an automatic shut-off high pressure gun assembly. For short periods of time the gun assembly may be in the "OFF" position. (The unloader valve will automatically bypass water to the suction side of the pump.) *To prevent unnecessary damage to the pump, the pump motor should be turned off if the high pressure gun assembly will be "OFF" for more than 5 MINUTES.*

Optimum performance is obtained with a water supply providing 20-40 psi inlet pressure. In addition, the CAT Pump is capable of drawing a negative 20 foot head (-8.5 psi) of water with primed suction. Inlet pressures above 40 psi create increasing stress on inlet manifold piston rod seals with consequent reduction in seal life.

It is recommended that excessive pressures be avoided by installation of a 30 psi pressure reducing valve in the inlet line. Use of excessive pressure will void the warranty.

Water supply must not exceed 160°F (70°C).

Principle of Operation – Model P

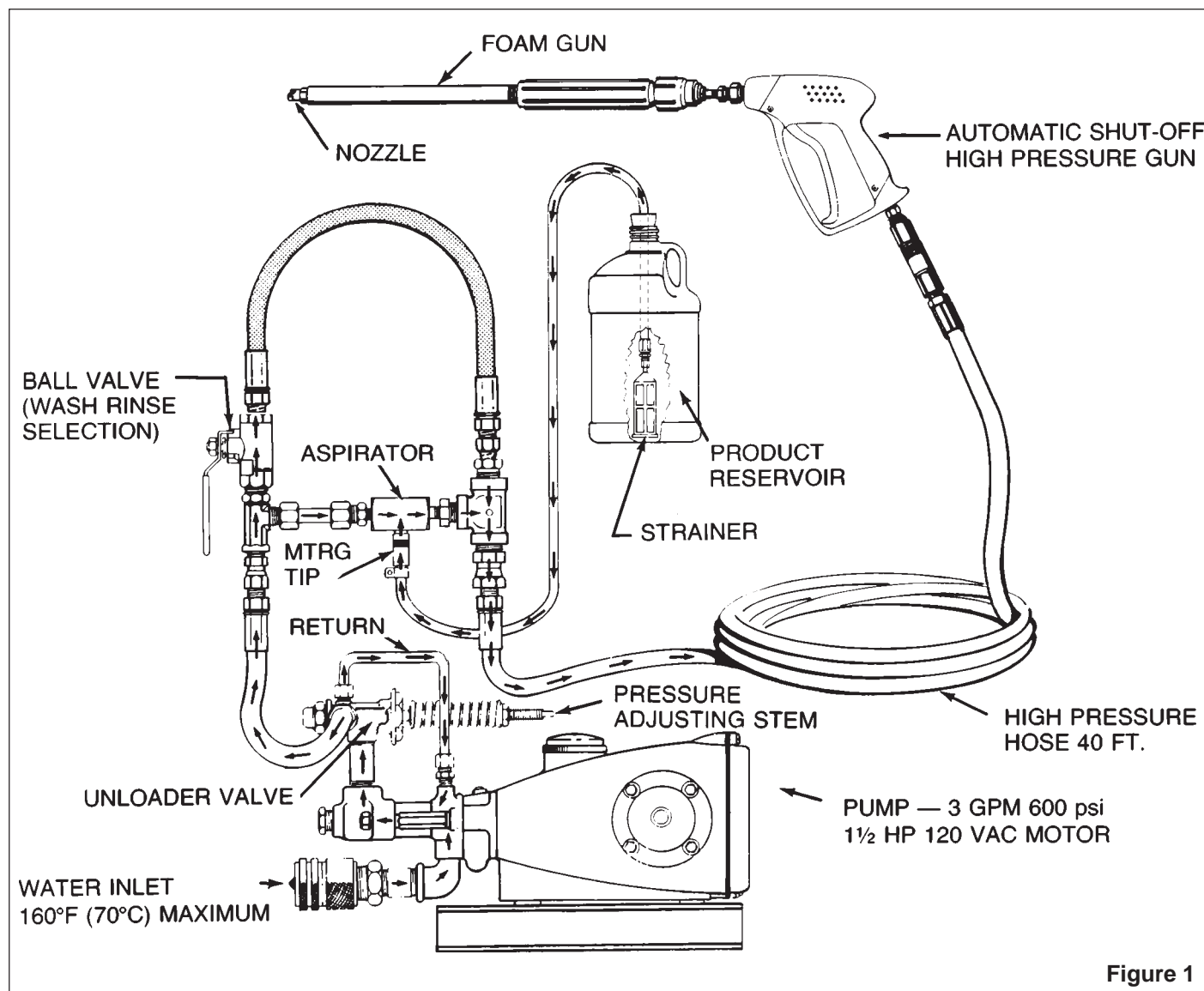


Figure 1

Distributed by:

NELSON JAMESON
INC.

800-826-8302 nelsonjameson.com

2.0 OPERATION - MODEL P

WARNING:

Pump Must Not Be Run Dry

Make certain water supply to Porta-Washer is “on”.

Do not operate unit with H.P. Gun in Off position for more than 5 minutes.

Unit must be completely drained of water before exposure to freezing temperatures.

Before starting the Porta-Washer Model P, read the following warnings and cautions carefully:

1. **WARNING:** High-pressure sprays and hot liquid sprays can cause serious bodily injury.

NEVER

- a. Allow children or unauthorized personnel to handle equipment.
- b. Put your hand or finger in front of the high pressure gun.
- c. Point gun at body or anyone else.
- d. Leave high pressure gun unattended without releasing pressure and engaging trigger-lock.
- e. Use mechanical means to hold trigger in open position.

ALWAYS

- a. Before pulling trigger grasp gun firmly in both hands.
 - b. Adopt proper body stance to anticipate high recoil force by high-pressure spray gun.
 - c. When spraying hot liquids, avoid hand or body contact with non-insulated parts of extension and inlet body of high-pressure gun.
2. **CAUTION:** If skin is hit by high-pressure sprayed liquids, contact physician immediately because any skin penetration may cause injury.
DO NOT operate the equipment if there are any leaks from the high pressure spray gun, fittings or hoses.
 3. **CAUTION:** When using the Porta-Washer or any high pressure spray cleaning device, it is recommended that protective eye coverings (goggles or a face shield) be worn by the operator and other persons in the area where this equipment is being used. When applying certain cleaning products through the Porta-Washer it is also advised that the equipment operator wear long-sleeved clothing and rubber gloves for additional personal protection. If a strong cleaning product is being applied in a fine spray or mist, the operator should also wear an inhalator, to protect nose and mouth tissues from possible irritation. Check the label of the product being used for specific precautionary information.
 4. Be sure that product reservoir is full.
 5. Attach fresh water hose to inlet.
 6. Connect the electrical cord to 20 amp grounded outlet.
 7. Turn on power switch and select “RINSE” or “WASH” operation with selector valve on back panel.

2.1 Pressure Adjustment:

Attach pressure gauge (*optional*) and bushing to 3/8" outlet on the head of the pump (*Figure 2*). To adjust pressure, use wrench to secure stem of unloader valve and prevent it from turning, adjust using wrench on 1/2" hex nut at end of spring to increase or decrease pressure (*tighten to increase pressure, loosen to decrease pressure*). Adjustment is to be made while pump is operating, selector is in "RINSE" position and the wand valve is opened. Adjust to 600 psi - **do not exceed 600 psi**.

Pressure gauge should not be installed permanently: use gauge only when checking or adjusting pressure.

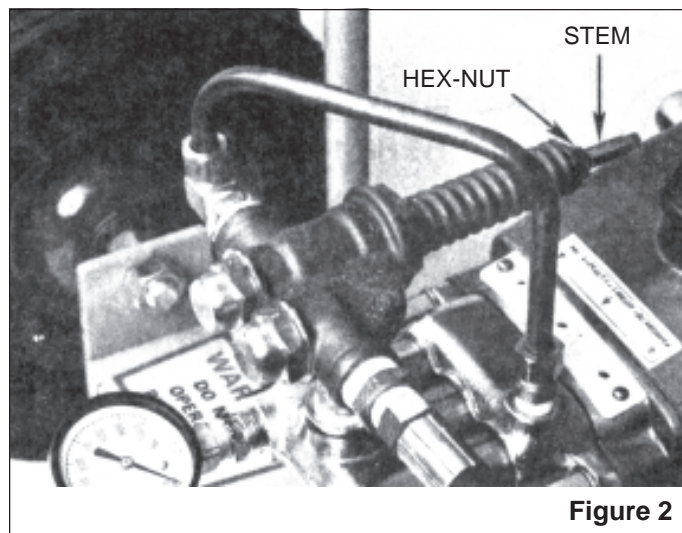
2.2 Product Usage Information:

Replaceable metering tips for the Model P aspirator are available per part numbers as shown:

Tip	Orifice Size	Part Number
Orange (1)	.0115	9406-2148 (Included with Porta-Washer P)
Dark Gray (4)	.016	9406-2155 (Included with Porta-Washer P)
Brown (5)	.018	9406-2163 (Included with Porta-Washer P)
Red (A)	.020	9233-2279 (Included with Porta-Washer P)
White (C)	.025	9233-2287 (Not Included)
Dark Blue (E)	.028	9233-2295 (Not Included)
Black (G)	.037	9233-2238 (Not Included)
Light Gray (I)	.062	9233-2220 (Not Included)

To replace metering tip, remove plastic tubing from suction port of aspirator. Remove metering tip and insert desired size.

It will be noted that when the unit is operated in the "WASH" position, output pressure will be approximately one-half of pressure when operated in "RINSE". This is normal. It is generally recognized that the most efficient method of cleaning is to apply product and allow it to work on soil deposit. Full high pressure, 600 psi, is available to remove loosened soil (after detergent has been applied), when handle on selector valve is in vertical "RINSE" position.



2.3 Product Recommendations:

The Porta-Washer Model P is capable of dispensing liquid products. However, the most efficient type of product in nearly all high pressure cleaning applications is mild, general purpose cleaner which is high in wetting agent content.

Acid products are beneficial in certain applications such as lime scale removal. Also, acids used as an occasional alternate will help to keep the aspirator clean on those units which are normally used with neutral or alkaline products.

Highly alkaline products can be used, but high-pressure cleaning neither requires nor makes the best use of such products. Mist from those products can damage skin, eyes and respiratory system.

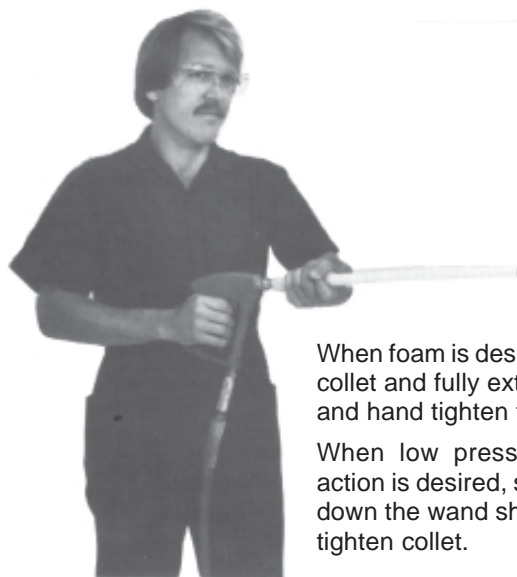
2.4 Magnus Notes:

1. Solvent type products such as Magnusol 728 will attack the "EVA" plastic pick-up tubing supplied with the Porta-Washer Model P. Replacement should be made using the less flexible 3/8" O.D. Poly-Flo tubing. Poly-Flo tubing is more resistant to solvents.
2. Also, when using solvent type products, the O-ring within the aspirator metering tip adapter (*Section 7, Figure 20*) should be replaced with a special solvent resistant O-ring made of "Viton"

% Concentration/Ounces Per Gallon

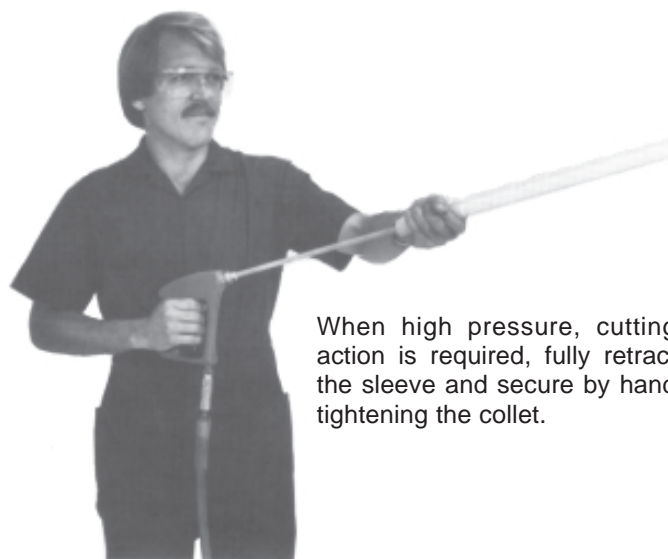
0.2%	=	1/4 Ounce per gallon of use-solution
0.4%	=	1/2 Ounce per gallon of use-solution
0.6%	=	3/4 Ounce per gallon of use-solution
0.8%	=	1 Ounce per gallon of use-solution
1.0%	=	1-1/4 Ounce per gallon of use-solution
2.0%	=	2-1/2 Ounce per gallon of use-solution
4.0%	=	5 Ounce per gallon of use-solution
10.0%	=	12-3/4 Ounce per gallon of use-solution

2.5 Foam Adjustment:



When foam is desired, loosen the collet and fully extend the sleeve and hand tighten the collet.

When low pressure, "pushing" action is desired, slide the sleeve down the wand shaft 6" to 8" and tighten collet.



When high pressure, cutting action is required, fully retract the sleeve and secure by hand tightening the collet.

Distributed by:

NELSON JAMESON INC.

800-826-8302 nelsonjameson.com

3.0 PORTA-WASHER - MODEL S

3.1 Specifications:

Volume	3.0 GPM (11.5 liter/min.)
Pressure	600 psi
Fresh Water Source	160°F (70°C) Maximum, at 20-40 psi
Fresh Water Inlet	3/4" Female Hose Adapter
Drive Motor	1-1/2 HP, 120 VAC
Electrical Requirements	120 VAC, 16.2 Amp
Power Cord	12 Gauge, 3 Wire, 600 V. 8 ft. Length
Extension Cord (if required)	12 Gauge, 3 Wire, 600 V. up to 50 feet
Pressure Hose	40 foot length, rated at 1,125 psi

3.2 Assembly

1. Refer to LUBRICATION SCHEDULE below for initial lubrication instructions.
2. Attach suction inlet hose and high pressure discharge hose.
3. Fill a clean 55 gallon steel drum with desired detergent solution. When using powdered detergents, pre-dissolve in pail before adding to drum. The Model S should only be used on a 55 gallon steel drum. Any other size drum or barrel will not accommodate the Model S Porta-Washer.
4. Place unit on the drum so all four legs are inside of the rim.
5. Attach fresh water hose to inlet. Inlet plumbing must be at least 1/2 inch pipe, preferably larger. Restrictions in the inlet plumbing will cause cavitation in the pump, drastically reducing cup life and cylinder life. All joints must be air tight.

NOTE: To ensure water-tight connection, use Teflon tape or pipe sealant when making hose connections.

3.3 Lubrication Schedule:

NOTE: Good lubrication is the easiest, most efficient and least expensive method of preventive maintenance.

3.3.1 Crankcase:

Pumps are filled with oil to the fill dot on the oil gauge window at the factory. Verify the gauge window as a reference for future oil changes. Crankcase drain plug is located on back of pump just below oil gauge window (*See Figure 19, Section 7*). Change the crankcase oil after 200 hours of operation or every 60 days, whichever comes first.

Use CAT Pump oil or a high grade SAE 30 non-detergent motor oil. **This supersedes any other lubrication schedule recommended.**

3.3.2 Piston Rod Wicks:

Applies only to units shipped prior to 7-15-75. Prior to initial operation, saturate wicks with approximately 60 drops of oil in each of the three lubricator housing holes. For optimum operating service, add 30 drops of oil to each hole every week or 100 operating hours.

3.4 Principles of Operation:

Refer to *Figure 5*. The Model S Porta-Washer has two (2) separate inlet systems. When the selector valve is turned to the "RINSE" position, a fresh water source is being used. When the ball valve is turned to the "WASH" position, the unit is then drawing product from the 55 gallon drum. The Model S provides 600 psi at the nozzle in both "WASH" and "RINSE" operations. The product or solution in the 55 gallon drum must be manually prepared to provide the concentration desired. There is no product metering device in the Model S. The Model S is turned off at the main unit mounted on the barrel.

The Model S must be set up in an area providing access to a 120 VAC, 20 amp, grounded power source.

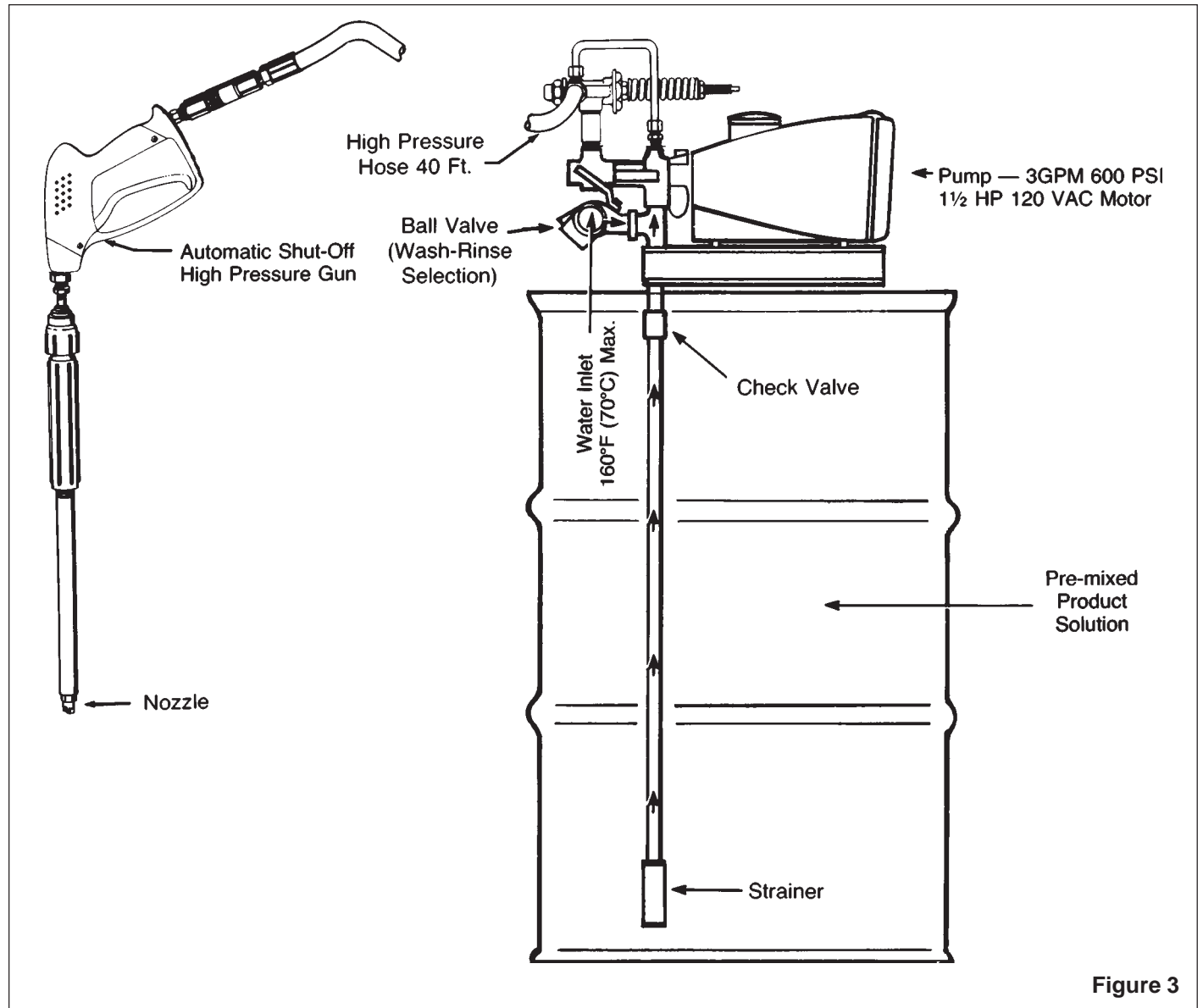
Optimum performance is obtained with a water supply providing 20-40 psi inlet pressure. In addition, the CAT Pump is capable of drawing a negative 20 foot head (-8.5 psi) of water with primed suction. Pressures above 40 psi create increasing stress on inlet manifold piston rod seals with consequent reduction in seal life.

It is recommended that excessive pressures be avoided by installation of a 30 psi pressure reducing valve in the inlet line. Use of excessive pressure will void the warranty.

The temperature of the fresh water supply as well as the temperature of the solution in the drum must not exceed 160°F (70°C).

The high pressure hose assembly is equipped with an automatic shut-off high pressure gun assembly. For short periods of time the gun assembly may be in the "OFF" position. (The unloader valve will automatically bypass water to the suction side of the pump.) To prevent unnecessary damage to the pump, the pump motor should be turned off if the high pressure gun assembly will be "OFF" for more than 5 minutes.

Principle of Operation – Model S



Auxiliary Accessories – Model S

Magnu-Matic

Part Number 9332-7005

Device which automatically maintains proper level in solution drum and meters desired amount of liquid product into that solution.

4.0 OPERATION - MODEL S

WARNING: **Pump Must Not Be Run Dry**

Before starting the Porta-Washer Model S, read the following warnings and cautions carefully:

1. **WARNING:** High-pressure sprays and hot liquid sprays can cause serious bodily injury.

NEVER

- a. Allow children or unauthorized personnel to handle equipment.
- b. Put your hand or finger in front of the high pressure gun.
- c. Point gun at body or anyone else.
- d. Leave high pressure gun unattended without releasing pressure and engaging trigger-lock.
- e. Use mechanical means to hold trigger in open position.

ALWAYS

- a. Before pulling trigger grasp gun firmly in both hands.
 - b. Adopt proper body stance to anticipate high recoil force by high-pressure spray gun.
 - c. When spraying hot liquids, avoid hand or body contact with non-insulated parts of extension and inlet body of high-pressure gun.
2. **CAUTION:** If skin is hit by high pressure sprayed liquids, contact physician immediately because any skin penetration may cause injury.
DO NOT operate the equipment if there are any leaks from the high pressure spray gun, fittings or hoses.
 3. **CAUTION:** When using the Porta-Washer or any high pressure spray cleaning device, it is recommended that protective eye coverings (goggles or a face shield) be worn by the operator and other persons in the area where this equipment is being used. When applying certain cleaning products through the Porta-Washer, it is also advised that the equipment operator wear long-sleeved clothing and rubber gloves for additional personal protection. If a strong cleaning product is being applied in a fine spray or mist, the operator should also wear an inhalator, to protect nose and mouth tissues from possible irritation. Check the label of the product being used for specific precautionary information.
 4. Be sure that product reservoir is full.
 5. Attach fresh water hose to inlet.
 6. Connect the electrical cord to 20 amp grounded outlet.
 7. Turn on power switch and select "RINSE" or "WASH" operation with selector valve on back panel.

4.1 Pressure Adjustment:

Attach pressure gauge (optional) and bushing to 3/8" outlet on the right side of discharge hose (Figure 6). Loosen and move pressure clamp to a new position on the bypass hose. Start pump and adjust pressure to 600 *psi* while drawing from the drum. Tighten clamp to increase pressure, loosen clamp to decrease pressure.

4.2 Product Usage Information:

The Model S does not utilize a product metering/injection device. Consequently, the use-solution of the detergent product selected must be prepared in the 55 gallon drum which serves both as the detergent reservoir and as the mounting for the Model S. If a powder product is being used, it should be dissolved in a bucket before addition to the drum. Any temperature water, to a maximum of 160°C can be used to prepare the product use-solution in the drum.

4.3 Product Recommendations:

Powder or liquid products are suitable for use through the Model S with the following limitations (take careful note of these):

1. Product **must not** be abrasive in nature.
2. **Do not** use any solvent containing products.
3. Phosphoric acid based products only can be used providing the concentration of the use-solution prepared in the drum **does not exceed** 1% (1-1/4 oz. per gallon of water).

NOTE: Use of phosphoric acid based products may result in more frequent pump service requirements.

As a general rule, the most effective type of product in nearly all high pressure cleaning applications is the mild general purpose cleaner which is high in wetting agent content.

Acid products are beneficial in certain applications such as lime scale removal – providing the limitation with respect to the use of acids noted above, is kept in mind.

Highly alkaline products can be used, but high-pressure cleaning neither requires nor makes the best use of such products. Mist from those products can damage skin, eyes and respiratory system.

% Concentration/Ounces Per Gallon

0.2%	=	1/4 Ounce per gallon of use-solution
0.4%	=	1/2 Ounce per gallon of use-solution
0.6%	=	3/4 Ounce per gallon of use-solution
0.8%	=	1 Ounce per gallon of use-solution
1.0%	=	1-1/4 Ounce per gallon of use-solution
2.0%	=	2-1/2 Ounce per gallon of use-solution
4.0%	=	5 Ounce per gallon of use-solution
10.0%	=	12-3/4 Ounce per gallon of use-solution

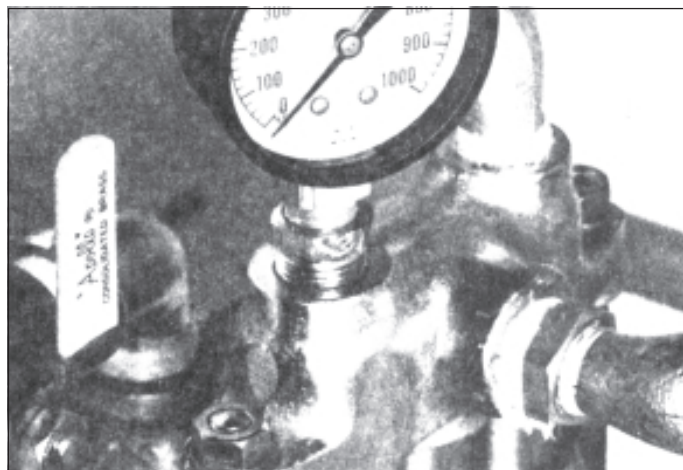


Figure 4

Products Recommended for Porta-Washer Model P and S

Express	DK Blu (E) Tip	2-3% Conc.
Click	WHT (C) Tip	2-3% Conc.
Greasecutter	DK BLU (E) Tip	3-4% Conc.
SAPC	DK BLU (E) Tip	3-4% Conc.
Liquid "S"	DK BLU (E) Tip	4% Conc.
Regain	LT GRY (I) Tip	5-6% Conc.
Mikro-Quat	WHT (C) Tip	3-4% Conc.

Klenzade Products*

• Liquid K	• 2100 Acid
• Redi-Kleen	• Automate 2
• Speed-Wash	• Automate 3
• Cir-Klenz	• 2313 Liquid
• Heavy Duty Acid	• Klenz-Solv
• Defoam Acid	

Use instructions per your Klenzade representative.

Distributed by:

NELSON JAMESON
INC.
800-826-8302 nelsonjameson.com

5.0 SERVICING THE PUMP SECTION - MODEL P AND MODEL S

1. **Model P & S** – Remove pump discharge hose (*Figure 5*) - first, disconnect at swivel fitting which secures hose to “WASH/RINSE” valve manifold; second, disconnect hose from pump.

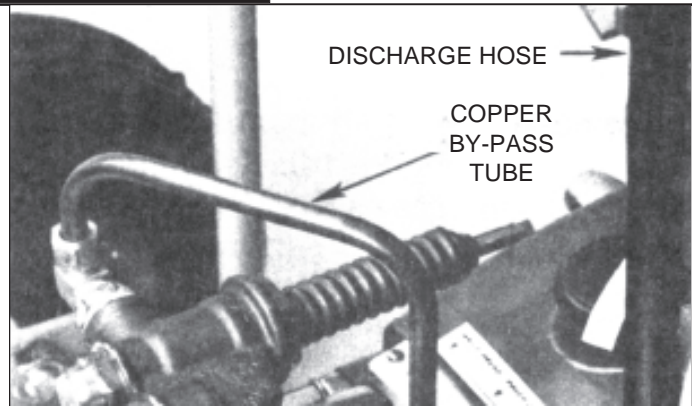


Figure 5

2. **Model P & S** - Remove the copper bypass tube from pump by removing compression fittings at both ends of the tube (*Figure 5*).

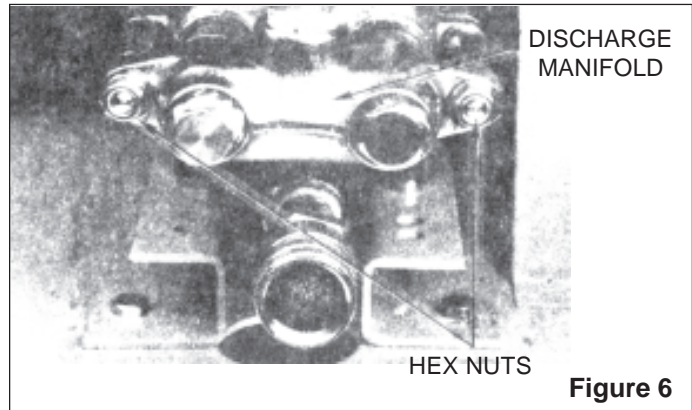


Figure 6

3. Remove pump discharge manifold by removing the two hex nuts and lock washers which secure manifold to the pump assembly (*Figure 6*) - pull manifold away from pump assembly (*Figure 7*). Make certain manifold shims (washers) remain on stud (*Figure 7*). After manifold is removed, replace hex nuts and lock washers on studs to prevent their loss.

When removing manifold, any one of the three discharge valve assemblies (retainer, valve spring, discharge valve and discharge valve seat) may fall free of the discharge manifold – replace these in the manifold to await reassembly (*Figure 8*).

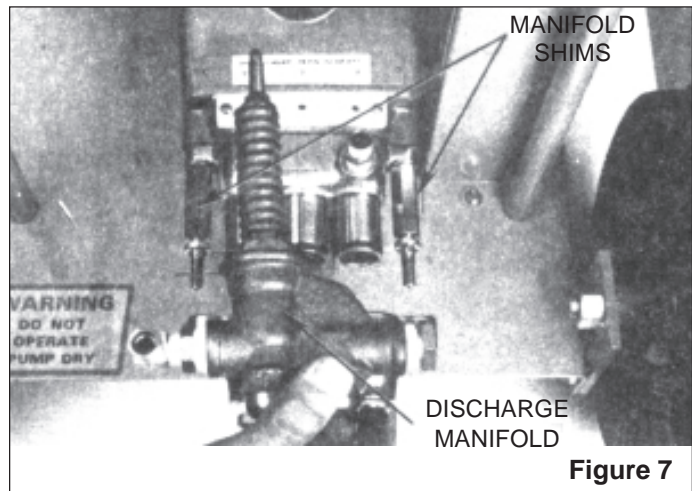


Figure 7

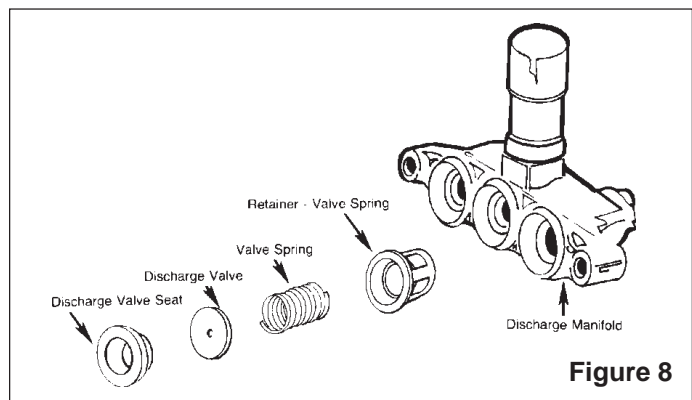


Figure 8

4. Remove the three pump cylinders by pulling straight out (*Figure 9*). Keep these in exact order from left to right as they must be replaced in their original position.

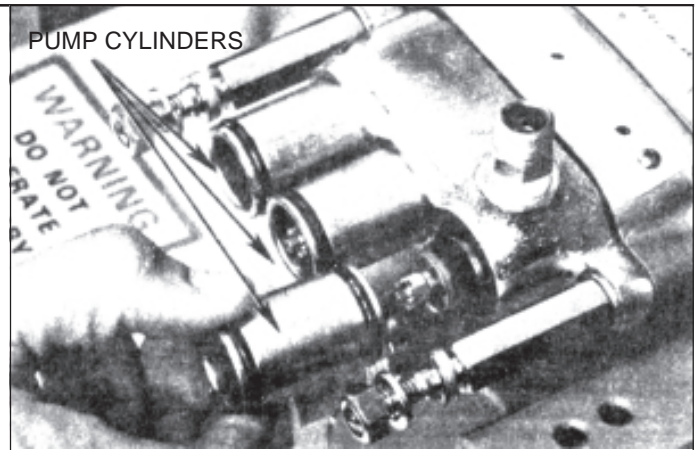


Figure 9

5. Remove cups;
- Remove cotter pin and piston retainer nut (castellated nut) from the piston shaft (*Figure 10*).

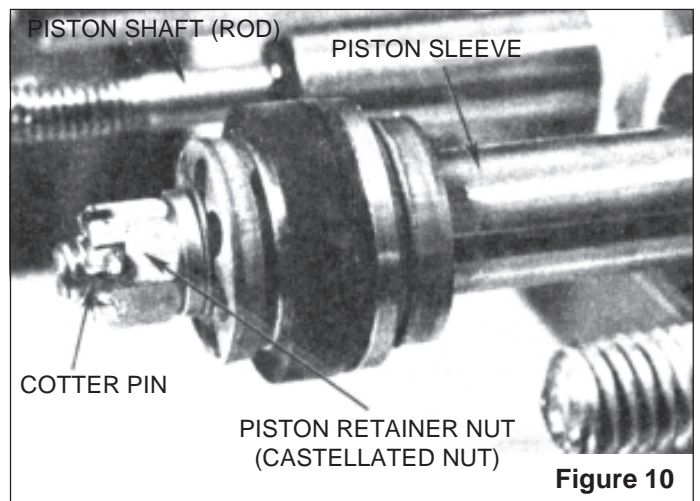


Figure 10

- Remove cup and piston assembly in following order, maintain in this order for reassembly (*Figure 11*).

- 1) Cup Washer
- 2) Piston Retainer
- 3) Cup Piston
- 4) Piston Spacer
- 5) Inlet Valve

Repeat above for each cup and piston assembly.

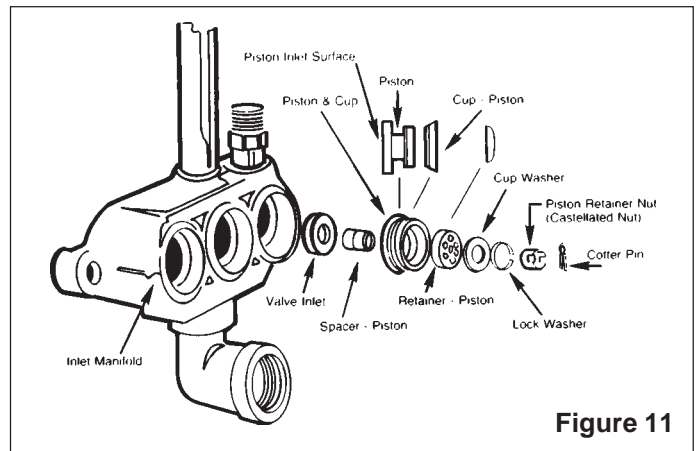


Figure 11

6. Replacing Manifold Piston Rod Seals (seal leak permits water to enter oil wick area). Remove studs as shown in photo (Figure 12).

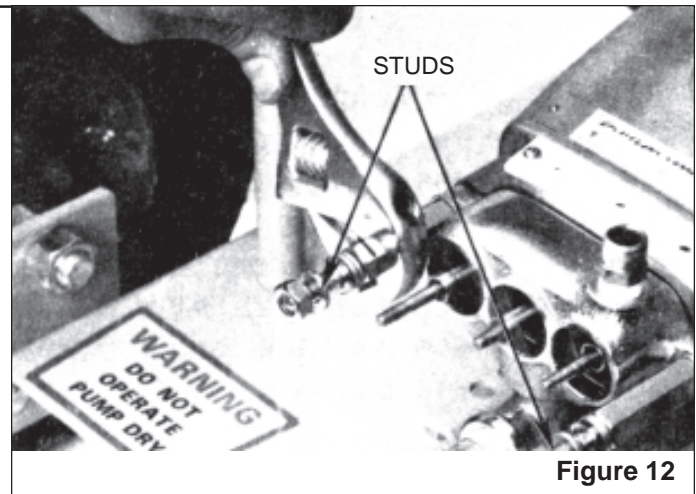


Figure 12

- a. Remove inlet Manifold by pulling straight away from pump (Figure 13).

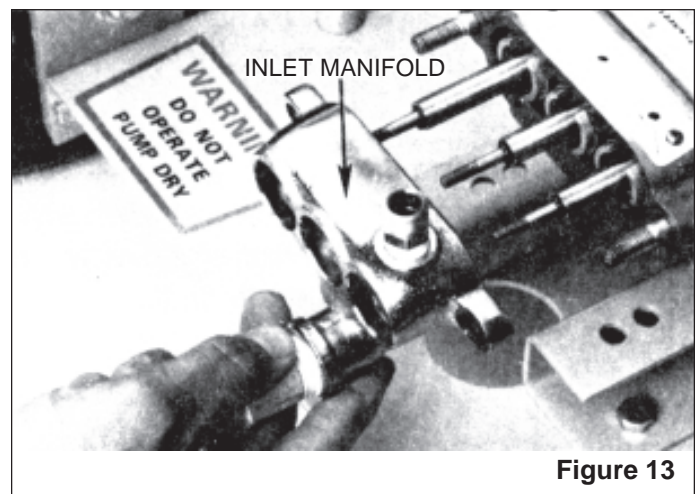


Figure 13

- b. Seals can be removed from manifold using a 1/2" socket and a hammer (Figure 14). Support the manifold on each side as shown and drive the seal out of the manifold.
- c. New seals are inserted into the manifold, make certain blue dot on seal faces towards back of manifold or towards you (Figure 16). Seals can be seated by driving with a 5/8" socket and hammer (Figure 15).
- d. Using No. 400 grit sandpaper or emery cloth – wet with oil and lightly sand or clean piston rod sleeves (Figure 10).

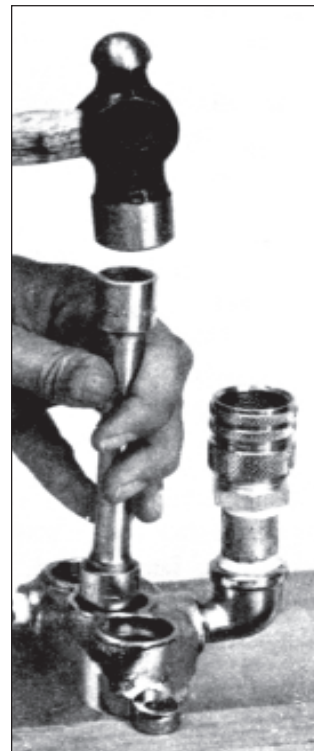


Figure 14

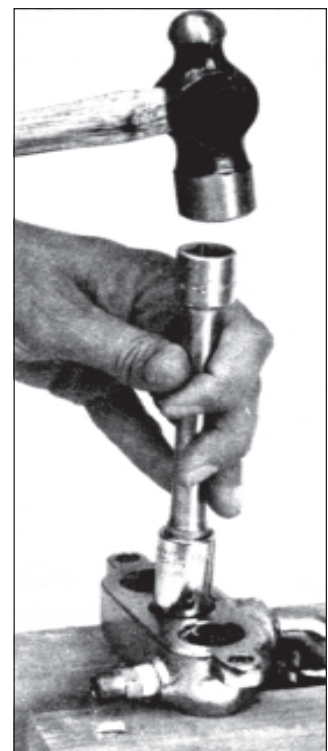


Figure 15

7. Once the pumping section is disassembled carefully inspect the following items.

Inspect inlet valves and inlet valve surfaces (*Figure 8*). If inlet valve is pitted or damaged, replace it.

If the major diameter of the piston **next to the cup** has a sharp edge or if the piston inlet surface is pitted or damaged, replace piston (*Figure 11*).

If cups are worn, install new cups (*Figure 17*). Install new cup by placing cup inserter over the small end of the piston. **Apply a thin film of oil to cup inserter.** Grasp the new cup between thumb and index finger with the small diameter toward the cup inserter. Apply pressure to the cup, forcing the small diameter opening downward on the inserter. **DO NOT allow the cup to turn inside out. It is extremely important the cup is completely seated in the groove on the piston.** Take a small screwdriver and work around the inner side of the cup. Faulty Installation will cause cup failure.

After the cups have been replaced, lubricate with a thin film of oil so cups will be lubricated before liquid enters the cylinders. **Always use a new cotter pin when reassembling pump.**

Check condition of the cylinder interior wall. If chrome plating is scored, worn or etched, it will cause rapid wearing of piston cups. Replace with new cylinder and cylinder O-rings.

5.1 Servicing Discharge Valves and Valve Seats:

To aid in servicing of the discharge manifold, see *Figure 8*. Remove the discharge valve seats and invert the manifold. The discharge valve springs and spring retainers will fall out.

Inspect the discharge valve for wear or ridges. If damaged, replace them. Check valve seats. If nicked or rough, replace. Check seat by placing the discharge valve tightly over face of valve seat and blow through the valve. No air will pass through if properly seated.

Reassemble valve seats in the manifold – spring retainer first, then the spring and then the valve. The flat side of the discharge valve faces out. The recess side of the discharge valve fits over the spring. Insert the discharge valve seats.

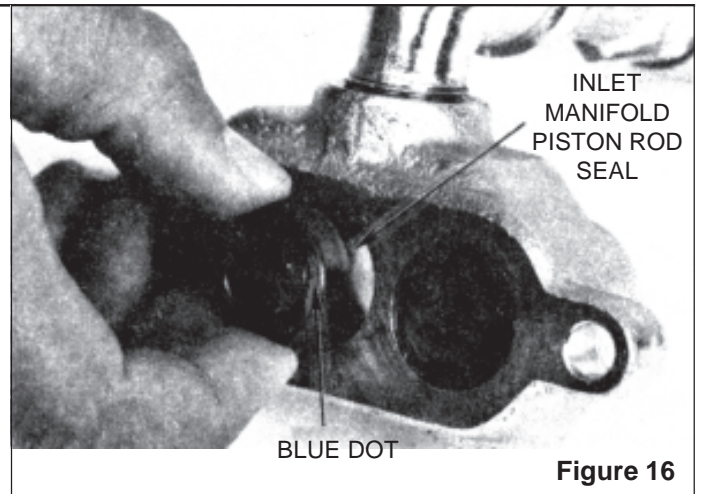


Figure 16

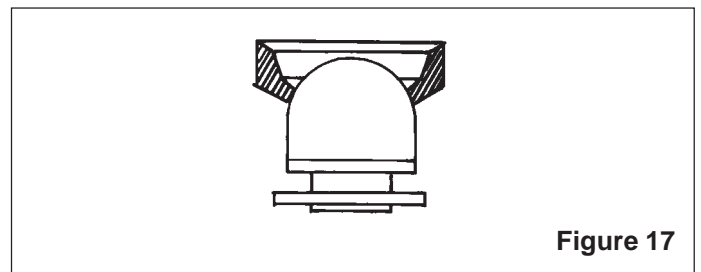
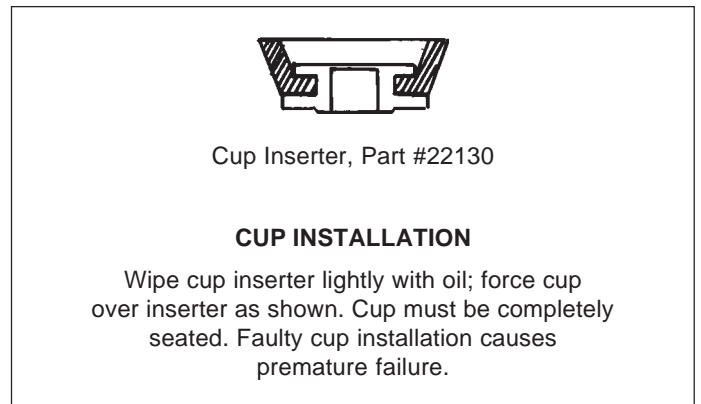


Figure 17



Distributed by:

NELSON JAMESON

INC.

800-826-8302 nelsonjameson.com

5.2 Reassembly Instructions:

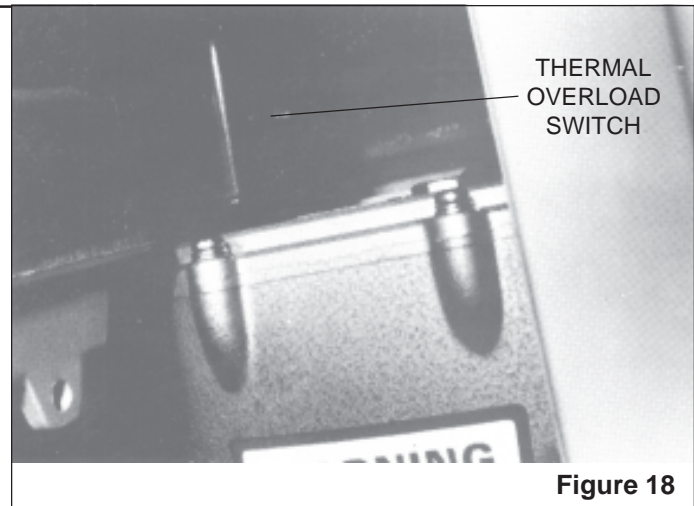
After the above has been completed, it is time to reassemble the pumping section. The preceding photographs and drawings can aid you in reassembling the pumping section. Replace the valve inlet, piston spacer, piston and cup, the piston retainer, cup washer, and the piston retainer nut - tighten nut snugly. Use a new cotter pin to hold the piston retainer nut in place. Make sure that you have lubricated the cups with a thin film of oil before you put the cylinders back on.

Reinstall cylinders by inserting them first into the discharge manifold and then positioning the manifold and cylinder assembly back on the pump. Do not extrude or damage the cylinder O-ring when slipping the cylinders into the manifold. Replace lock washers and nuts and tighten securely.

CAUTION: When restarting the pump, check carefully to see that there is no cylinder motion as it will cause premature failure of the O-ring cylinder seals. If cylinder motion is noted after starting the pump, reseal the cylinders and start the pump again. Cylinder motion, if any, must be eliminated. If cylinder motion is still evident, correct by removing one manifold shim from each stud coupling, replace washers and nuts.

5.3 Note on Porta-Washer Motor

The PORTA-WASHER motor has an ambient temperature rise of 105°F (40°C) which is quite normal for totally enclosed motors. Because of this temperature rise the motor will run quite hot. For instance, if the temperature of the room in which the PORTA-WASHER is being used is 60°F, the motor could be running at a temperature as high as 160°F, which is a 40°C ambient temperature rise. Unless problems occur such as tripping of the thermal overload (*Figure 18*), poor pressure, excessive amperage draw, or the circuit breaker or fuses start to blow, there should be no concern with the temperature of the motor.



6.0 SERVICING DRIVE BELT - MODEL P AND MODEL S

Check drive belt for proper tension. Maximum deflection of belt drive, at center of span, should be 1/4".

If for any reason the pump or motor should be moved or replaced, align the pulleys using a straight edge.

For proper tension and motor alignment, loosen motor locking nuts and use motor adjusting bolt on the motor base for correct positioning. Tighten the motor locking nuts securely.

If drive belt is worn and needs replacing, order Part Number 8753-0036. V-Belt A-31 (31" x 1/2").

Distributed by:



800-826-8302 nelsonjameson.com

7.0 ROUTINE MAINTENANCE SCHEDULE - MODEL P AND MODEL S

1. Add 30 drops of oil to each hole on the pump every week or 100 operating hours. Applies only to units shipped prior to 7-15-75.
2. Every 60 days of 200 hours, change crankcase oil with CAT OIL - Part Number 9490-2269 (*Figure 19*).
3. Check drive belt for tightness. See Section 6 for Servicing Drive Belt.
4. Check suction hose and check valve for proper operation (*Section 3, Figure 3*).
5. Check nozzle condition and replace if necessary. Part Number 8531-1777. DO NOT SUBSTITUTE ANY OTHER SIZE OR TYPE OF NOZZLE.
6. Check aspiration: Delime with LIME-A-WAY and hot water for 10-15 minutes.
7. Porta-Washer P Aspirator Body (*Figure 20*).

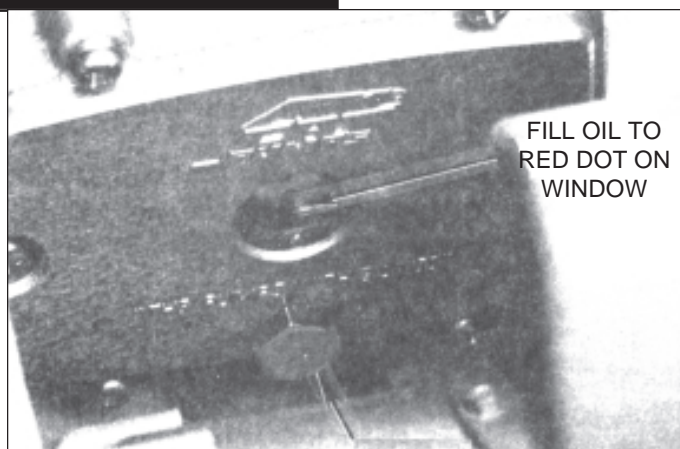


Figure 19

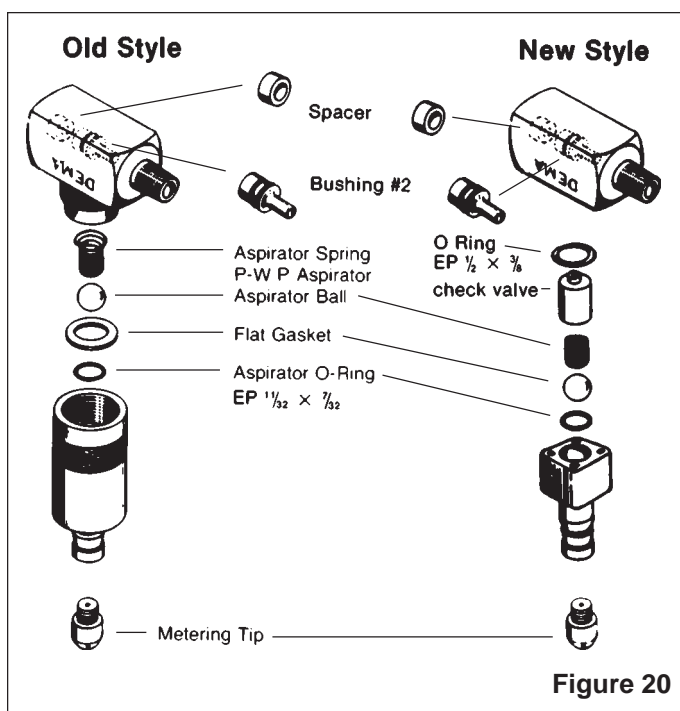


Figure 20

8. Hypro Unloader Valve (Figures 21 and 22).

NORMAL OPERATION: Liquid enters through inlet port at side of unloader, forcing outlet valve open. Liquid flows through outlet port and on through discharge line.

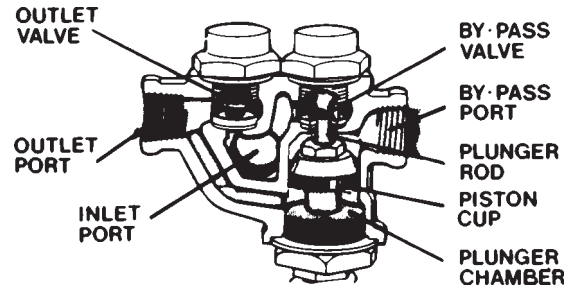


Figure 21

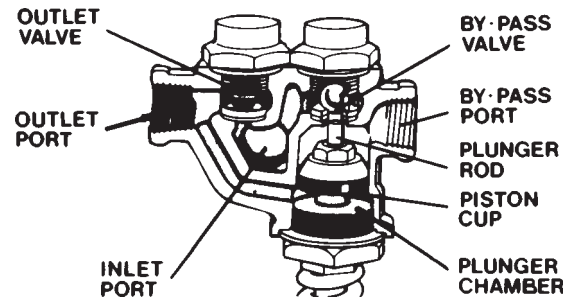


Figure 22

PARTIAL BY-PASS WHILE SPRAYING: If the orifice in the spray nozzle is too small to take all of the pump's capacity, pressure will build up in the plunger chamber. The piston will force the plunger rod to unseat the ball in the by-pass valve thus effecting a partial by-pass of the liquid pumped.

COMPLETE BY-PASS (UNLOADING): The instant that spray discharge is shut off, pressure builds up in plunger chamber, forcing plunger rod up and pushing by-pass valve ball completely off valve seat. At the same time, the outlet valve slams shut, traps the pressurized solution in the spray line and allows entire pump output to by-pass. Pressure at the pump drops immediately – saving pump and power. Pressure in discharge line remains at unloading pressure. When gun is opened, pressure is released in the plunger chamber. The spring pulls the plunger down, closing the by-pass valve.

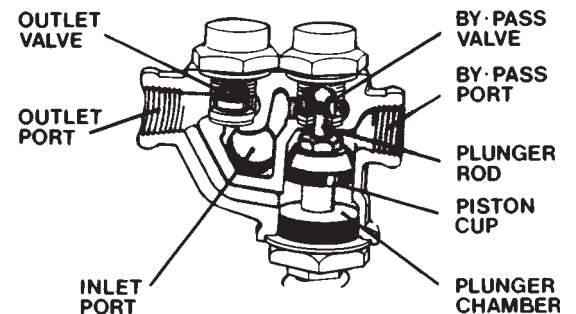


Figure 23

8.0 TROUBLESHOOTING

Symptom	Possible Cause	Action
Low Pressure	<ol style="list-style-type: none"> 1. Worn Nozzle. 2. Belt Slippage. 3. Unloader valve stuck, partially plugged or improperly adjusted: valve seat worn. 4. Inlet strainer clogged. 5. Worn piston cups. 6. Fouled or dirty inlet or discharge valves. 7. Worn inlet or discharge valves. 8. Air leak in inlet plumbing. 	<ol style="list-style-type: none"> a. Replace Nozzle - Part #8531-1777. This is the only nozzle that will allow proper operation of the Porta-Washer. b. Tighten or replace: use correct belt. c. Clean, readjust unloader valve, check for worn and dirty valve seats. d. Clean and check more frequently. e. Replace piston cups. f. Clean inlet and discharge valve assemblies. e. Replace worn valves and/or valve seats. g. Disassemble, reseal, and reassemble.
Pump runs extremely rough and pressure very low during rinse operation	<ol style="list-style-type: none"> 1. Restricted inlet to pump. 2. Damaged cup or stuck inlet or discharge valve. 	<ol style="list-style-type: none"> a. Proper size inlet plumbing, minimum 5 gpm. Check water supply. b. Replace worn cup or cups, clean out foreign material, replace worn valves.
Cylinder O-rings blown next to discharge manifold	<ol style="list-style-type: none"> 1. Pressures in excess of rated psi. 	<ol style="list-style-type: none"> a. Check for plugged nozzle, closed valves, or improperly adjusted hydro-unloader valve.
Leakage at the cylinder O-rings at the discharge manifold and black, powdery substance in the area of the O-rings	<ol style="list-style-type: none"> 1. Loose cylinders. Cylinder motion caused by improper shimming of the discharge manifold. 	<ol style="list-style-type: none"> a. Remove spacer shims on manifold studs. Do not remove too many shims or the ears of the manifold will be bowed when the manifold is re-tightened, causing looseness in the center cylinder.
Water leakage from under the inlet manifold	<ol style="list-style-type: none"> 1. Worn manifold piston rod seal. 	<ol style="list-style-type: none"> a. Install new seals. If piston rod sleeves are scored, replace sleeves and sleeve O-rings.
Oil leak between crankcase and pumping section	<ol style="list-style-type: none"> 1. Worn crankcase piston rod seals. 	<ol style="list-style-type: none"> a. Replace crankcase piston rod seals.
Excessive play in the end of the crankshaft pulley	<ol style="list-style-type: none"> 1. Worn main ball bearing from excessive tension on drive belt. 	<ol style="list-style-type: none"> a. Replace ball bearing. Properly align and tighten belt.
Water in crankcase	<ol style="list-style-type: none"> 1. May be caused by humid air condensing into water inside the crankcase. 	<ol style="list-style-type: none"> a. Change oil at 2 month or 200 hour intervals using CAT Crankcase Oil or approved Crankcase Oil S.A.E. #30, non-detergent.

Symptom	Possible Cause	Action
Oil leaking from underside of crankcase (wick style only)	1. May be caused by excessive oiling of the wick lubricators.	a. Wipe free of oil. Do not oil lubricators for a short period. If leakage continues, replace the crankcase piston rod seals.
Oil leaking at the rear portion of the crankcase	1. Damaged or improperly installed crankcase rear.	a. Replace or reinstall cover and gasket.
Oil leakage from drain plug	1. Loose drain plug or worn drain plug gasket.	a. Tighten drain plug or replace gasket.
Loud knocking noise in pump	1. Damaged connecting rod pounding on the crankshaft caused by faulty lubrication.	a. Inspect the crankshaft. If not scored or damaged, replace connecting rod or rods.
Frequent or premature failure of the manifold piston rod seals	1. Failure to oil the wick lubricators through the oil holes in cover. If not oiled regularly according to the lubrication instructions, the inlet manifold piston rod seals will fail. 2. Damaged or worn chrome plating on inside of the cylinders. 3. MODEL S: Abrasive material in the fluid being pumped. 4. Excessive pressure and/or temperature. 5. Improper installation of cups. 6. MODEL S: Chrome plating of cylinders damaged causing excessive wear of cups. May be caused by pumping too strong an acid solution. Concentration of acid products should not exceed 1%.	a. Replace inlet manifold piston rod seals and wick lubricator. Saturate wicks in oil before they are assembled into the manifold assembly. Oil each wick – 30 drops once a week or every 100 hours (wick style only). b. Replace the cylinders. c. Install proper filtration on pump inlet plumbing. d. Check pressures and fluid inlet temperature; be sure they are within specified range. e. Properly install lip of new cup into groove on the piston. If not properly installed, the cup will be extruded past the piston. Piston will run eccentric and premature failure will result. (See Section 3, Figure 18). f. Install new cups and cylinders. Pump only fluids compatible with chrome.

Distributed by:

