SPX POWER TEAM®

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Form No. 101645

Parts List and
Operating Instructions for:

PA6A-HYTORC

MODEL F

AIR HYDRAULIC PUMP

WITH EXTERNAL PRESSURE REGULATOR

Max. Capacity: 10,000 PSI (700 Bar)

- Carefully inspect the pump upon arrival. The carrier, not the manufacturer, is responsible for any damage resulting from shipment.
- These instructions should be read and carefully followed. Most problems with new equipment are caused by improper operation or installation.

SAFETY PRECAUTIONS

⚠ WARNING

- All WARNING statements must be carefully observed to help prevent personal injury.

Hydraulic Hose

- Before operating the pump, tighten all hose connections using the proper tools. Do not overtighten the connections. Connections need only be tightened securely and leak-free. Overtightening may cause premature thread failure or high pressure fittings to split at pressures lower than their rated capacities.
- Should a hydraulic hose ever burst, rupture, or need to be disconnected, immediately shut off the pump. Never attempt to grasp a leaking hose under pressure with your hands. The force of the escaping hydraulic fluid could cause serious injury.
- Do not subject the hose to potential hazard such as fire, extreme heat or cold, sharp surfaces, or heavy impact. Do not allow the hose to kink, twist, curl or bend so tightly that the oil flow within the hose is blocked or reduced. Periodically inspect the hose for signs of wear because any of these conditions can damage the hose and may result in personal injury.
- Do not use the hose to move attached equipment. Stress may damage the hose and cause personal injury.
- Hose material and coupler seals must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as creosote-impregnated objects and some paints. Consult the manufacturer before painting a hose. Never paint the couplers. Hose deterioration due to corrosive materials may result in personal injury.

Pump

- Do not exceed the PSI hydraulic pressure rating noted on the pump nameplate or tamper with the internal high relief valve. Creating pressure beyond rated capacities may result in personal injury.
- Before replenishing the oil level, retract all cylinders to prevent overfilling the pump reservoir. An overfill may cause personal injury due to excess reservoir pressure created when cylinders are retracted.

Cylinder

- Do not exceed rated capacities of the cylinders. Excess pressure may result in personal injury.
- Do not set poorly-balanced or off-center loads on a cylinder. The load may tip and cause personal injury.

Air Supply

- Shut off and disconnect the air supply when the pump is not in use or before breaking any connection in the system.

Rev. 6 Date: 8 Sept. 1999

Litho in USA

PREPARATION & SET-UP

Air Supply

The air supply should be capable of providing 20 CFM at 100 PSI to obtain the rated hydraulic output. Shop air line pressure should never fall below 40 PSI and should be regulated to a maximum of 125 PSI.

Hydraulic Connections

Clean areas around all oil ports of the pump and cylinders. Inspect all threads and fittings for signs of wear or damage and replace as needed. Clean all hose ends, couplers or union ends. Remove the thread protectors from the hydraulic oil outlets. Manually fill the clamps (if so equipped) and hoses with oil. Connect the hose assembly to the hydraulic oil outlet and couple the hose to the cylinder (if so equipped).

IMPORTANT: Seal all external pipe connections with a high grade, non-hardening thread sealant. Teflon tape can also be used to seal hydraulic connections if only one layer of tape is used. Apply the tape carefully, two threads back, to prevent it from being pinched by the coupler and broken off inside the system. Any loose pieces of tape could travel through the system and obstruct the flow of oil or cause jamming of precision-fit parts.

⚠ WARNING: To help prevent personal injury,

- **Ensure that all hydraulic connections are secure and tight before building pressure in the system.**

Adjusting the Pressure Regulating Valve

The pressure regulating valve can be adjusted to bypass oil at a given pressure setting while the pump continues to run.

IMPORTANT:

- **For easy adjustment of the pressure regulating valve, always adjust the pressure by *increasing* it to a desired pressure setting. The pressure range for this unit is from 1,000 PSI to 10,000 PSI.**

1. Loosen the locknut on the pressure regulating valve, and turn the adjusting screw a few turns counterclockwise (CCW) to decrease the pressure setting to a lower than desired pressure.
2. Connect the pump completely.
3. Slowly turn the adjusting screw in a clockwise (CW) direction to gradually increase the pressure setting. When the desired pressure setting is reached, lock the adjusting screw into position by tightening the locknut.

PREVENTIVE MAINTENANCE

NOTE: Any repair or servicing that requires dismantling the pump must be performed in a dirt-free environment by a qualified service technician.

Lubrication

It is recommended that an in-line filter/regulator/lubricator be installed as close to the pump as possible. Set the unit to feed approximately 1 drop of SAE 10 oil per minute. If no lubricator is used, or when the unit will be idle for a long time, add a few drops of SAE 30 oil directly to the air intake weekly.

Bleeding Air from the System

Upon initial startup or after prolonged use, a significant amount of air may accumulate within the hydraulic system. This entrapped air can cause the cylinder to respond slowly or behave in an unstable manner. To remove the air, run the system through several cycles (extending and retracting cylinders) free of any load. **NOTE: The cylinder must be at a lower level than the pump to allow air to be released through the pump reservoir.**

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Inspecting the Hydraulic Fluid Level

Check the oil level in the reservoir periodically. With all cylinder(s) retracted, the oil level should come to within 1/2" of the filler/breather cap. Drain, clean and replenish the reservoir with high-grade, approved Power Team hydraulic fluid yearly or more often if necessary. The frequency of oil change will depend upon the general working conditions, severity of use and overall cleanliness and care given the pump.

Maintenance Cleaning

1. Keep the outer surface of the pump as free from dirt as possible.
2. Protect all unused couplers.
3. Keep all hose connections free of dirt and grime.
4. Keep the filler/breather cap clean and unobstructed at all times.
5. Equipment connected to the pump must be kept clean.
6. Use only high-grade, approved Power Team hydraulic fluids in this pump. Change as recommended.

Draining and Cleaning the Reservoir

IMPORTANT: Clean the pump exterior before the pump interior is removed from the reservoir.

1. Remove the screws that fasten the pump assembly to the reservoir. Remove the pump assembly from the reservoir. Do not damage the gasket, filter or safety valve.
2. Drain the reservoir of all fluid. Refill half full with clean Power Team hydraulic fluid.
3. Place the pump assembly back onto the reservoir and secure with two machine screws assembled on opposite corners of the housing.
4. Run the pump for several minutes. Remove the two cover screws and lift off the pump assembly again. Drain and wipe out the reservoir with a clean, lint-free cloth.
5. Fill the reservoir with high-grade, approved Power Team hydraulic fluid to within 1/2" of the top lip of the reservoir. Place the pump assembly (with gasket) on the reservoir and install the screws. Tighten securely and evenly.

Adding Oil to the Reservoir

1. Cylinder(s) must be fully retracted and the air supply disconnected when adding oil to the reservoir.
2. Clean the entire area around the filler/breather cap before removing the filler/breather cap.
3. Use a clean funnel with filter when adding oil.
4. Use only approved Power Team hydraulic fluids.
5. Fill to within 1/2" of the filler/breather cap.

Priming the Pump Unit

1. Connect the oil line to the pressure port. Place the other end of the oil line in the pump filler hole.
2. Attach air line with shut-off valve to the pump.
3. Open the air valve. Pump will begin to reciprocate, and oil will advance through the hose or oil line and return to the pump reservoir. Allow the pump to cycle approximately 15 seconds.
4. Plug the manifold pressure port. If both pumping units build pressure and stall, the unit has successfully been primed.

Periodic Cleaning

IMPORTANT: The greatest single cause of failure in hydraulic pumps is dirt. Keep the pump and attached equipment clean to prevent foreign matter from entering the system.

All unused couplers must be sealed with thread protectors. All hose connections must be free of grit and grime. Use only high-grade, approved Power Team hydraulic fluid in this unit and change at least once a year.

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Gauges

WARNING: To help prevent personal injury, use a gauge of the proper rating for the pressure used.

Installing an In-line Air Pressure Gauge

1. Remove the male fitting from the air filter and install a tee adapter, with gauge, between the hose and air filter.
2. Install male fitting into the tee adapter and securely tighten the hose to the male fitting.

Installing an In-line Hydraulic Pressure Gauge

1. Install a tee adapter, with gauge, between the valve and the cylinder.
2. Tighten all connections securely but do not overtighten.

Fire-Resistant Hydraulic Fluid

Flame Out 220™* fire-resistant hydraulic fluid is compatible with all Power Team equipment. The use of this fluid does not require the changing of seals in any Power Team pump or cylinder and is available through your local Power Team distributor.

* Flame Out 220™ is approved by Factory Mutual Research.

TROUBLE-SHOOTING GUIDE

PROBLEM	CAUSE	SOLUTION
Pump reciprocates but no oil delivery. (cylinder will not extend)	1. Low oil level.	1. Add oil as instructed in Preventive Maintenance section.
	2. Pump not primed.	2. Prime pump as instructed in Preventive Maintenance section.
	3. Oil filter contamination.	3. Clean filter.
Cylinder(s) advance to desired stroke but pump does not build desired hydraulic pressure (air motor running)	1. Faulty gauge.	1. Replace gauge.
	2. Reservoir not vented.	2. Vent reservoir by removing shipping plug and installing filler/vent cap.
	3. Oil level too low.	3. Fill reservoir to within 1/2" of fill hole with cylinders retracted.
	4. Leaky connection or hose.	4. Tighten connections or replace hose.
	5. Excess air in oil.	5. Bleed unit as instructed in Preventive Maintenance section.
	6. Pressure regulator set too low.	6. Increase pressure regulator setting.
Pump will not build to maximum pressure (air motor stopped running)	1. Inadequate air supply.	1. Check air supply. Minimum of 100 PSI air pressure is needed to obtain 10,000 PSI hydraulic pressure.
	2. Air regulator not set properly.	2. Increase or decrease hydraulic pressure by turning regulator clockwise or counterclockwise to achieve desired pressure.
	3. Leaking air line or connections.	3. Repair or replace.

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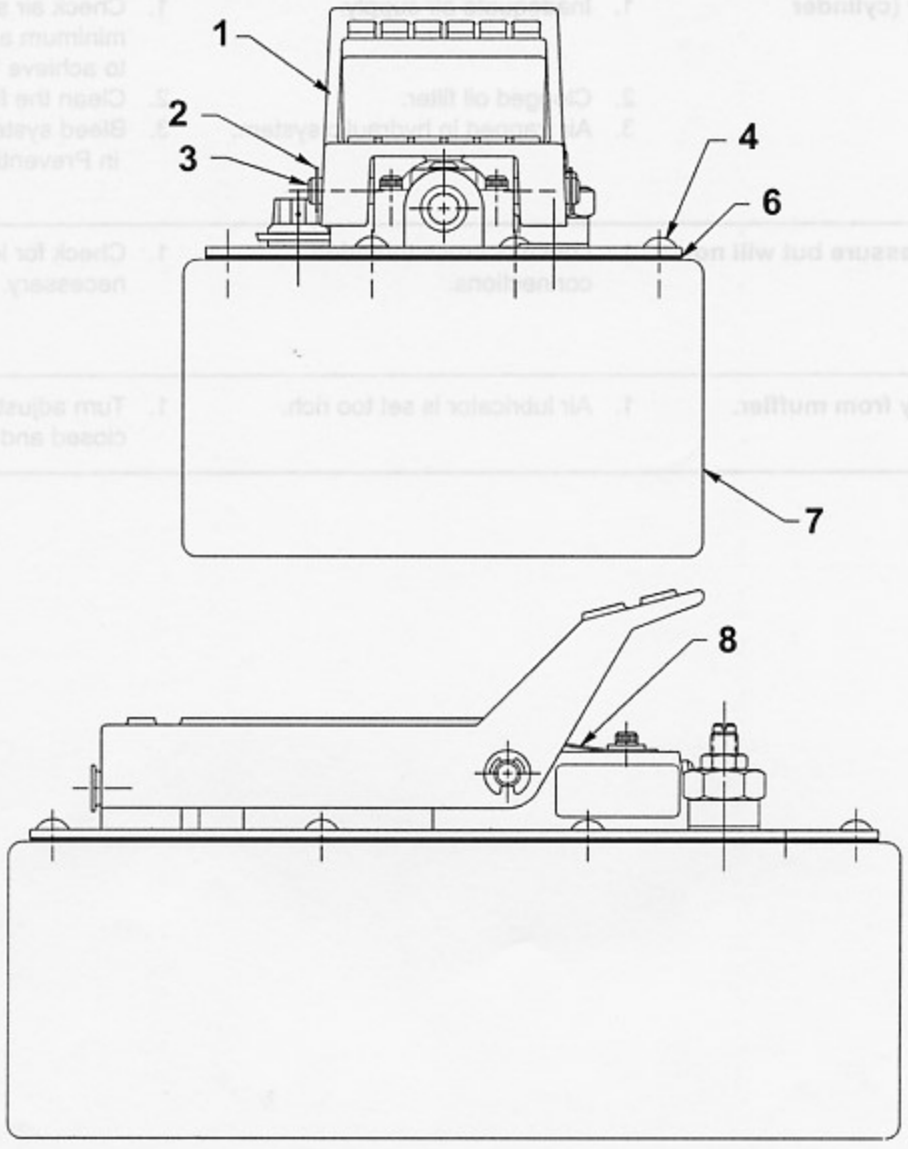
Trouble-shooting Guide Cont'd

PROBLEM	CAUSE	SOLUTION
Low oil delivery (cylinder extends slowly)	1. Inadequate air supply. 2. Clogged oil filter. 3. Air trapped in hydraulic system.	1. Check air supply -- 40 CFM minimum at 100 PSI is required to achieve full speed. 2. Clean the filter. 3. Bleed system of air as instructed in Preventive Maintenance sec.
Pump builds pressure but will not hold pressure.	1. Loose or cross-threaded connections.	1. Check for leakage and re-fit if necessary.
Excess oil spray from muffler.	1. Air lubricator is set too rich.	1. Turn adjuster clockwise until closed and then open 1/8 turn.

GENERAL ASSEMBLY



Item No.	Part No.	No. Req'd	Description
1	**41322**	1	Foot Pedal
2	***11032**	2	Retaining Ring
3	**28386**	1	Pin
4	**252952**	12	Machine Screw
6	***46271**	1	Reservoir Gasket
7	**64153BK2**	1	Reservoir
8	**302466**	1	Spring Clip

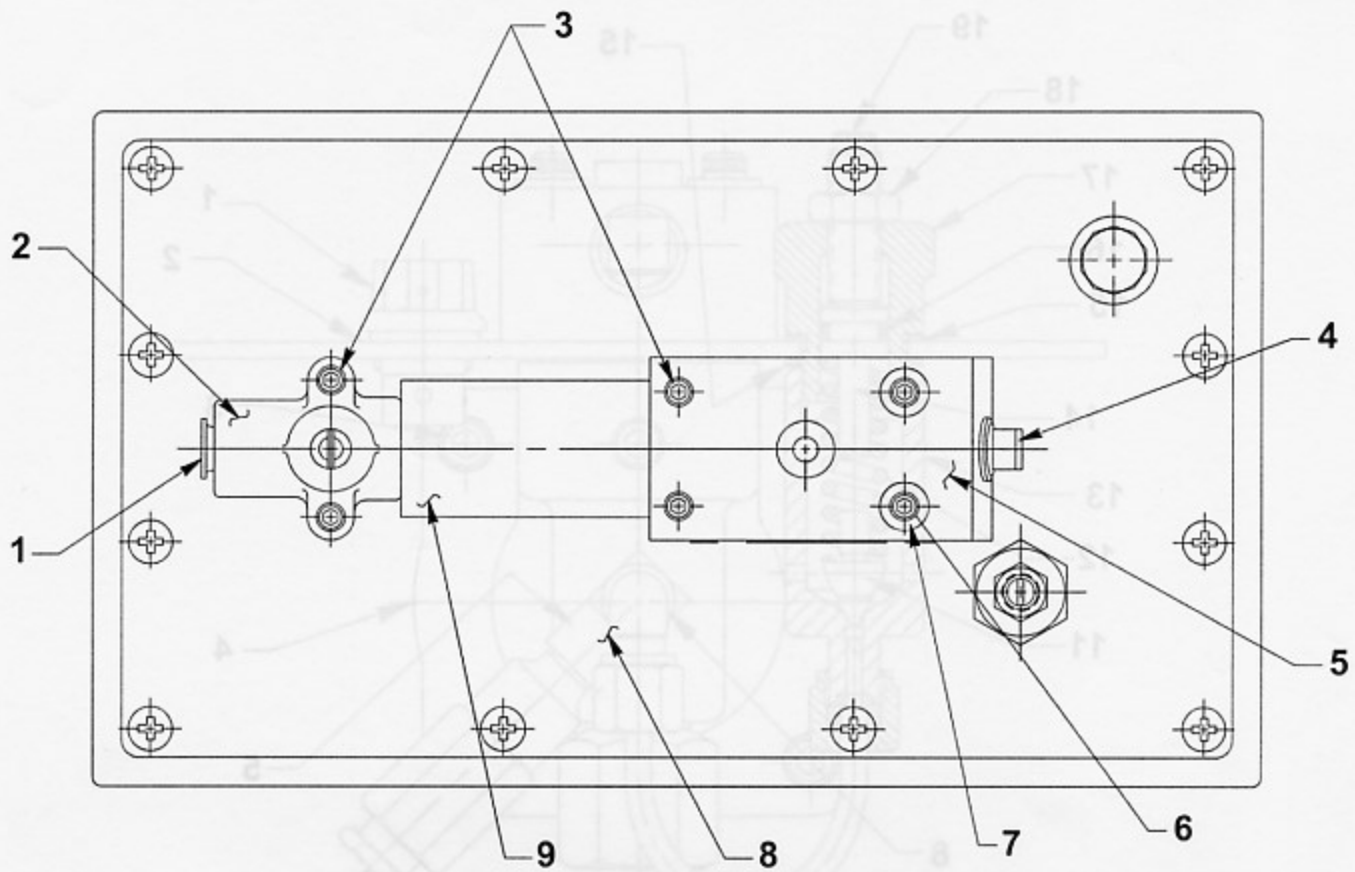
PARTS INCLUDED BUT NOT SHOWN

305494	1	Decal

Part numbers marked with an asterisk (*) are contained in Repair Kit No. 300841.

Note: Shaded areas reflect last revision(s) made to this form.

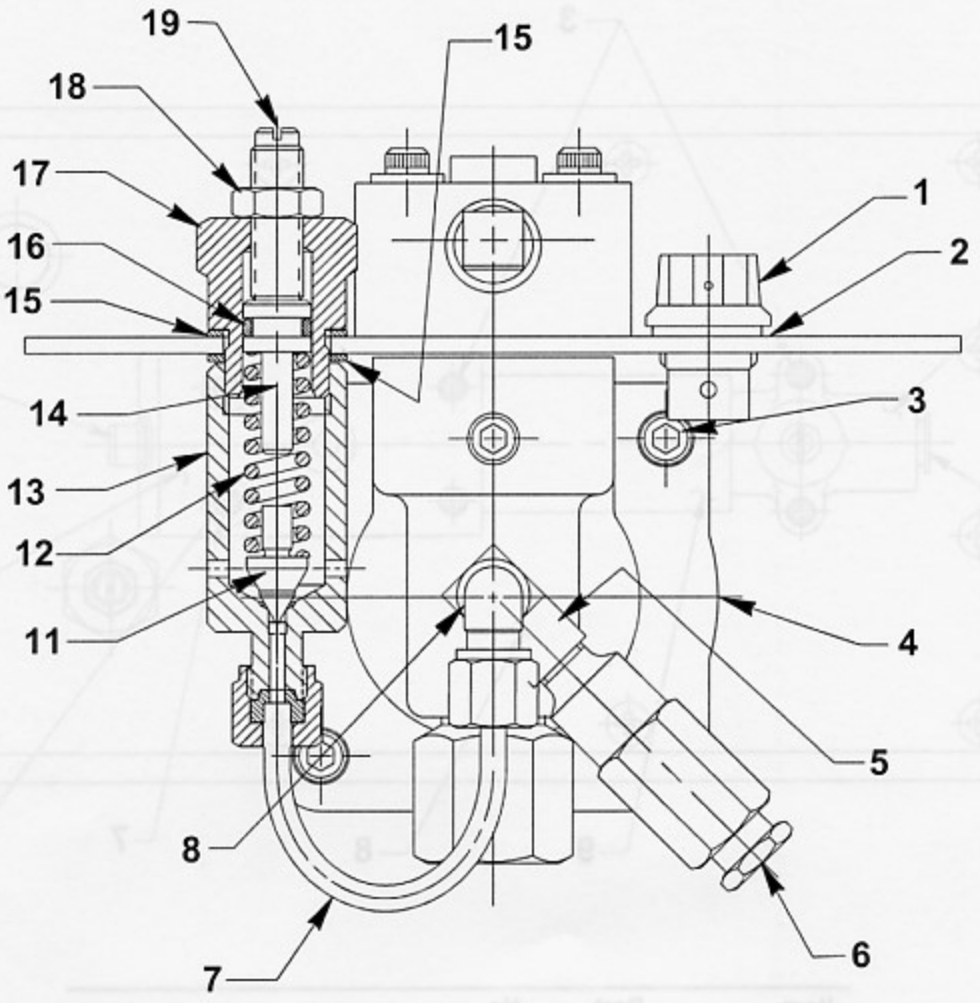
BASIC PUMP TOP VIEW



Item No.	Part No.	No. Req'd	Description
1	14794	1	Plastic Cap
2	37199	1	Intake Air Valve Body
3	11151	4	Cap Screw (10-24 UNC X 1-1/4" Lg.; Torque to 50/60 in. lbs.)
4	11127	1	Pressure Plug
5	58563	1	Release Valve Body
6	11435	2	Soc. Hd. Cap Screw (0-24 UNC x 1-3/4" Lg.; Torque to 50/60 in. lbs.)
7	11089	2	Washer (#10 bolt)
8	58704BK2	1	Cover Plate
9	*29992	1	Foam Tube

Part numbers marked with an asterisk (*) are contained in Repair Kit No. 300841.

BASIC PUMP END VIEW



Item No.	Part No.	No. Req'd	Description
1	**251689**	1	Filler/Breather Cap
2	***10273**	1	O-ring (13/16 X 5/8 X 3/32; Nitrile)
3	**17428**	4	Soc. Hd. Cap Screw (1/4-20 UNC X 3-1/2" Lg.; Torque to 85/95 in. lbs. oiled. Note: Cross torque in increments of 30 in. lbs.)
4	**64767**	1	Pump Body
5	**18969**	1	Pipe Tee
6	**21278**	1	Relief Valve Assembly (Apply loctite 592 [Power Team #905516] or equiv. & torque to 150/170 in. lbs.)
7	**253366**	1	Tube Assembly
8	**16177**	1	Tube Elbow

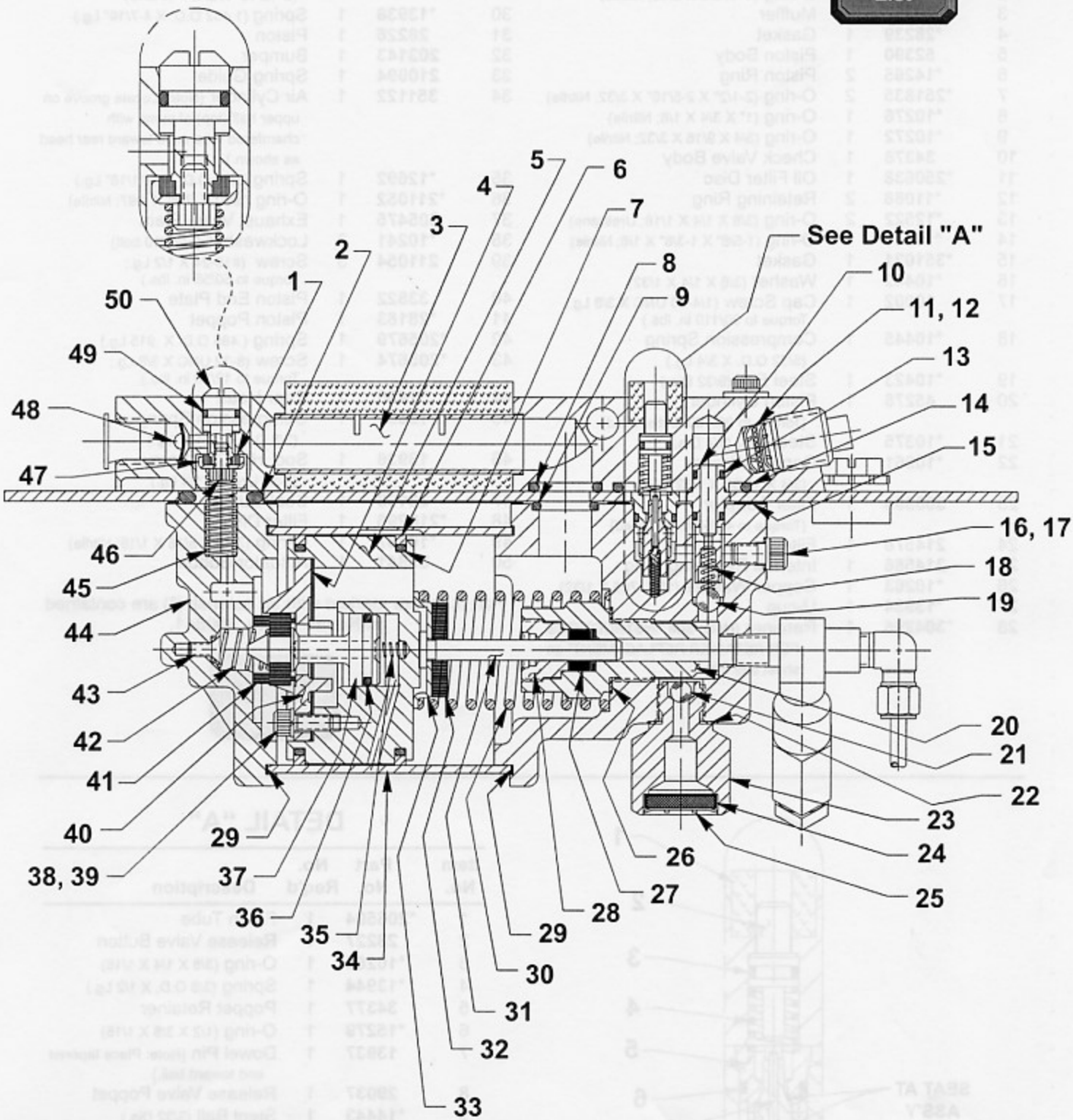
Item No.	Part No.	No. Req'd	Description
11	**21046**	1	Valve Stem
12	***10495**	1	Compression Spring (1/2 O.D. X 1-5/8" Lg.)
13	**22361**	1	Body
14	**21306**	1	Spring Guide
15	***10263**	2	Copper Washer (1" X .765 X 1/32; Note: Apply Permatex #80019 sealant or equiv. to both sides of bottom washer only.)
16	***10268**	1	O-ring (1/2 X 3/8 X 1/16; Nitrile)
17	**21305**	1	Valve Cap
18	**10386**	1	Nut (3/8-24 UNF)
19	**22362**	1	Adjusting Screw

Part numbers marked with an asterisk (*) are contained in Repair Kit No. 300841.

Note: Removed Items 9 & 10 and made them available in an assembly (Item 7) at last revision(s) made to this form.

BASIC PUMP ASSEMBLY

To Parts List



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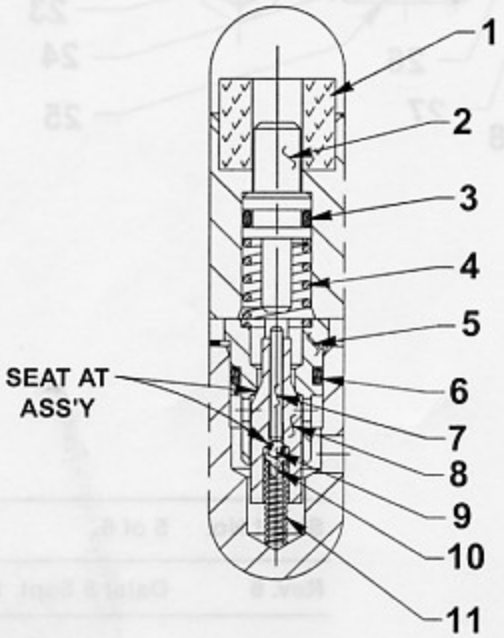
Item No.	Part No.	No. Req'd	Description
1	*28182	1	Air Valve Poppet
2	*251717	1	O-ring (1" X 5/8 X 3/16; Nitrile)
3	28387	1	Muffler
4	*28239	1	Gasket
5	52390	1	Piston Body
6	*14265	2	Piston Ring
7	*251835	2	O-ring (2-1/2" X 2-5/16" X 3/32; Nitrile)
8	*10276	1	O-ring (1" X 3/4 X 1/8; Nitrile)
9	*10272	1	O-ring (3/4 X 9/16 X 3/32; Nitrile)
10	34378	1	Check Valve Body
11	*250638	1	Oil Filter Disc
12	*11088	2	Retaining Ring
13	*12522	2	O-ring (3/8 X 1/4 X 1/16; Urethane)
14	*11841	1	O-ring (1-5/8" X 1-3/8" X 1/8; Nitrile)
15	*351021	1	Gasket
16	*10442	1	Washer (3/8 X 1/4 X 1/32)
17	10002	1	Cap Screw (1/4-20 UNC X 3/8 Lg.; Torque to 90/110 in. lbs.)
18	*10445	1	Compression Spring (5/32 O.D. X 3/4 Lg.)
19	*10423	1	Steel Ball (9/32 Dia.)
20	45278	1	Piston Cylinder (Torque to 90/100 ft. lbs. oiled)
21	*10375	1	Steel Ball (1/4 Dia.)
22	*10261	1	Copper Washer (3/4 X 19/32 X 1/32)
23	308893	1	Filter Adapter (Torque to 40/50 ft. lbs. oiled)
24	214578	1	Filter
25	214586	1	Internal Retaining Ring
26	*10263	1	Copper Washer (1" X .765 X 1/32)
27	*13934	1	U-cup
28	*304295	1	Retainer (Note: See "INSTRUCTIONS FOR RETAINER REPLACEMENT" on sheet 6 of 6.)
29	*17429	2	Backup Ring (2-15/16" X 2-3/4" X .045)
30	*13938	1	Spring (1.452 O.D. X 4-7/16" Lg.)
31	28226	1	Piston
32	203143	1	Bumper
33	210994	1	Spring Guide
34	351122	1	Air Cylinder (Note: Locate groove on upper half (top) of pump with chamfered tube ends toward rear head as shown.)
35	*12692	1	Spring (3/16 O.D. X 1-11/16" Lg.)
36	*211052	1	O-ring (.900 X .706 X .097; Nitrile)
37	305475	1	Exhaust Valve Stem
38	*10241	3	Lockwasher (For #10 bolt)
39	211054	3	Screw (#10-24 X 1/2 Lg.; Torque to 50/55 in. lbs.)
40	33822	1	Piston End Plate
41	*28183	1	Piston Poppet
42	*205679	1	Spring (.485 O.D. X .915 Lg.)
43	*205674	1	Screw (8-32 UNC X 3/8 Lg.; Torque to 12/18 in. lbs.)
44	51480	1	Rear Head
45	12691	1	Compression Spring (3/8 O.D. X 1-1/2" Lg.)
46	13936	1	Soc. Hd. Cap Screw (8-32 UNC X 1/4 Lg.)
47	28198	1	Seal Guide
48	*216296	1	Filter Disc
49	*10267	1	O-ring (7/16 X 5/16 X 1/16; Nitrile)
50	33841	1	Actuator Button

Part numbers marked with an asterisk (*) are contained in Repair Kit No. 300841.

To Drawing



DETAIL "A"

Item No.	Part No.	No. Req'd	Description
1	*206504	1	Foam Tube
2	28227	1	Release Valve Button
3	*10266	1	O-ring (3/8 X 1/4 X 1/16)
4	*13944	1	Spring (3/8 O.D. X 1/2 Lg.)
5	34377	1	Poppet Retainer
6	*15279	1	O-ring (1/2 X 3/8 X 1/16)
7	13937	1	Dowel Pin (Note: Place tapered end toward ball.)
8	29037	1	Release Valve Poppet
9	*14443	1	Steel Ball (3/32 Dia.)
10	209736	1	Ball Retainer
11	*13959	1	Compression Spring (1/8 O.D. x 1/2 Lg.)

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INSTRUCTIONS FOR RETAINER REPLACEMENT

Your pump's retainer is locked into place by one of the two following methods. Determine which method was used on your pump's retainer, then follow the appropriate steps to remove the old and install and stake the new.

Method 1 - Retainer shows no sign of stake marks

1. This retainer has been locked in place with a Loctite product. To replace it, a moderate amount of heat needs to be applied to the cylinder nut (in the area of the retainer) to soften the existing Loctite allowing it to be removed.

2. Install the new retainer into the cylinder nut and torque to 80/100 in. lbs. **Note: Do not use a Loctite product this time but stake the new retainer in place according to instructions in Step 3.**

3. To lock retainer into place, use a center punch positioned in the seam between the retainer and the cylinder nut and stake the new retainer in two places approximately 180° apart.

Method 2 - Retainer has two stake marks in the seam between the retainer and the cylinder nut

1. For replacement of this retainer, the stake marks must be removed. Using a 1/8" or larger diameter drill bit, remove the existing stakes by drilling a short distance into the stake marks. Remove the retainer.

2. Install the new retainer into the cylinder nut and torque to 80/100 in. lbs.

3. To lock retainer into place, use a center punch positioned in the seam between the retainer and the cylinder nut and stake the new retainer in two places approximately 180° apart.

   NOTE: Do not stake in the old stake marks.