

Low-Pressure Stub Pump

Description

The major components of the stub pumps in the model 9968 series consists of an air-operated motor and a pump tube. The air motor connects directly to a double-acting reciprocating pump tube. These low-pressure stub pumps (5:1 ratio) are designed to deliver all grades of oil.

Pump Extensions

Extensions that screw directly into the pump's fluid inlet allow the pump to accommodate different size drums and tanks. Extensions are accessory items and are not included with the pump. See **Table 2**.

Models 9968 Series Comparison

Model 9968 and 9968-M * include a 2 " NPTF (m) bung adapter that allows installation directly onto original containers or bulk tanks. The bung adapter is not included with model 9968-A.

* Model 9968-M contains components (See **Table 1**) manufactured with BSPT(P) thread connections that include:

- air motor model **339413-A1**
- a fluid outlet adapter in the pump tube's body

Specifications

Air Motor

Air Motor Model	Piston Dia. x Stroke		Air Inlet	Maximum Air Pressure	
	in.	cm		psi	bar
339413	3 x 3-5/16	7.6 x 8.4	1/4 " NPTF (f)	150	10.3
339413-A1			1/4 " BSPT (f)		

For details on the air motors, refer to Service Guide SER 339413

Pump Tube

Pump Model	Fluid Outlet in Body	Max. Fluid Pressure		Delivery/Min. (Approximate)*		Displacement per Cycle	
		psi	bar	gals	liters	in ³	cm ³
9968, 9968-A	1/2 " NPTF (f)	750	52	7	26.5	7.2	118
9968-M	1/2 " NPTF (f) **						

* For detailed information, refer to **Figure 3**

** Includes a 1/2 " BSPP (f) x 1/2 " NPTF (m) fluid outlet adapter

Table 1 Low-Pressure Stub Pump Specifications

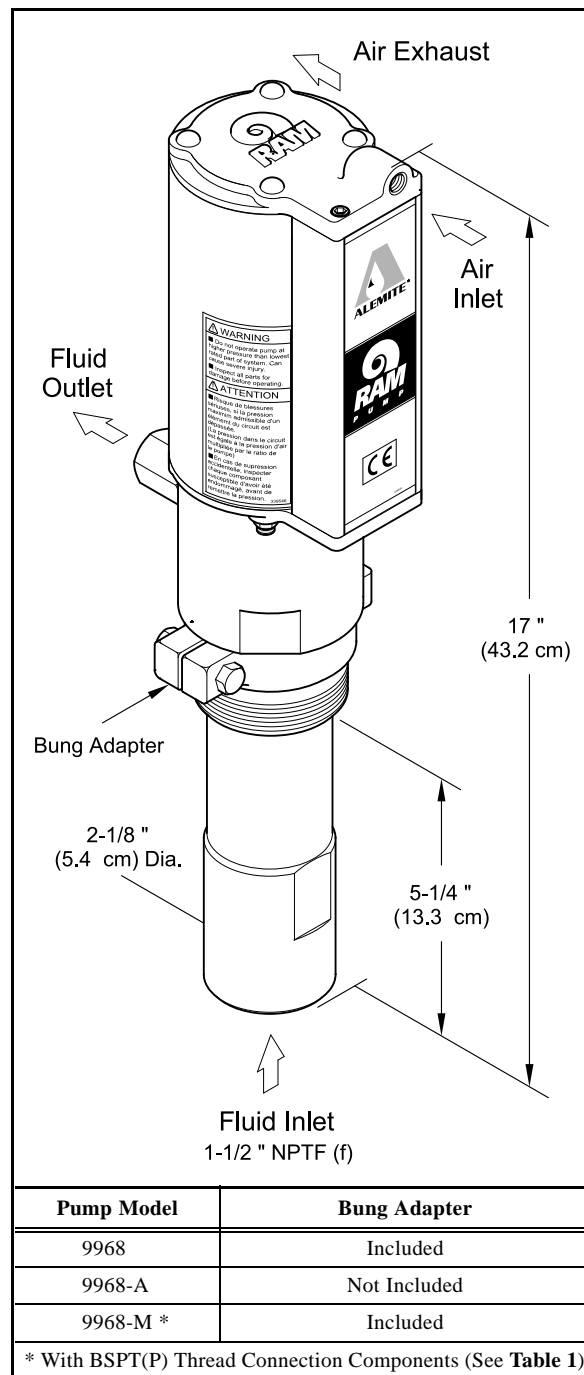


Figure 1 Stub Pump Model 9968 Series
Model 9968-M Shown

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SER 9968
Revision (8-10)

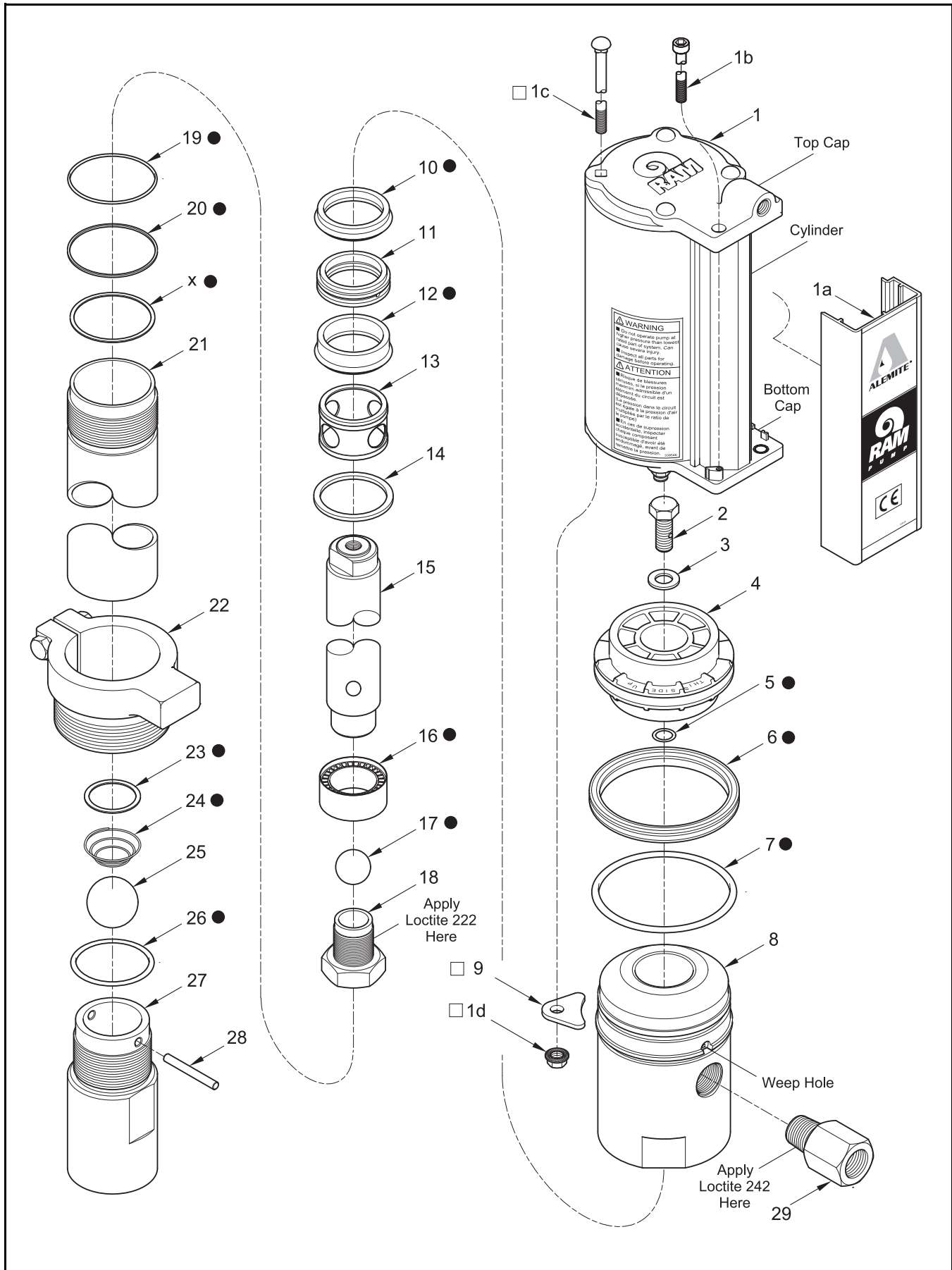


Figure 2 Low-Pressure Stub Pump Model 9968 Series - Exploded View

Item No.	Part No.	Description	Qty	Notes	Numeric Order Part # (Item #)
1		Motor Assembly, Air *	1	See SER 339413	14536 (3)
1a	340053	Cover (w/o Decals)	1	Included w/ Motor Assembly	X171000-7 (5)
1b		Screw, Cap, 1/4 " -20 x 6-1/2 "	1		X171003-10 (7)
1c		Bolt, Carriage, 1/4 " -20 x 7-1/2 "	4		X171008-37 (6)
1d		Nut, Serrated Flange, 1/4 " -20	4		171009-31 (27)
2		Screw, 3/8 " -24 x 3/4 "	1		171009-51 (19)
3		Washer, 3/8 "	1		171700-36 (17)
4	339429	Piston, Air	1		172190-22 (10)
5	X171000-7	O-Ring, 3/8 " ID x 1/2 " OD	1	Pack of Ten (10)	172190-23 (14)
6	X171008-37	Quad-Ring, 2-5/8 " ID x 3 " OD	1		172270-13 (25)
7	X171003-10	O-Ring, 2-3/4 " ID x 3 " OD	1		172409 (2)
8		Body	1		323693 (x)
9	339412	Keeper	4		323707 (18)
10		Seal, 1-5/16 " ID x 1-9/16 " OD	1		323713 (28)
11	338060	Bearing (Brass)	1		323778 (27)
12		Seal, 1-5/16 " ID x 1-11/16 " OD	1		326750-B1 (22)
13		Spacer	1		335481 (24)
14	339606	Washer, 1.56 "	1		335483 (23)
15	338106	Rod	1		338059 (13)
16	338120	Piston (Nylon)	1		338060 (11)
17		Ball, 9/16 " Dia.	1		338089 (8)
18	323707	Seat, Valve	1		338090 (21)
19		O-Ring, 1-7/8 " ID x 2 " OD	1		338091 (20)
20		Ring, Back-Up	1		338106 (15)
21	338090	Tube	1		338120 (16)
22	326750-B1	Adapter, Bung, 2 " NPTF (m)	1	Model 9968, -M	339375 (1d)
23		Washer, 1-1/8 " OD	1		339412 (9)
24		Spring, Tapered	1		339413 (1)
25	172270-13	Ball, 1-1/16 " Dia	1		339413-A (1)
26		O-Ring, 1-11/16 " ID x 1-7/8 " OD	1		339425 (1c)
27	323778	Valve, Foot	1		339429 (4)
28	323713	Pin, 1/4 " Dia. x 1-25/32 " Long	1		339606 (14)
29	340120	Adapter, 1/2 " BSPP (f) x 1/2 " NPTF (m)	1	Model 9968-M	340027 (1b)
Kit Component for Early Model 9668 Pump					340053 (1a)
x	323693	Gasket (Aluminum)	1		340120 (29)

Legend:
 * See Table 1
 Part numbers left blank (or in *italics*) are not available separately
 ● □ designates a repair kit item

Repair Kits

Part No.	Kit Symbol	Description
393715	●	Kit, Repair (Includes tube of 393590 Teflon lubricant)
393708	□	Kit, Repair, Air Motor Keeper
393530-22		Kit, Seal [includes five (5) of item number 10]
393530-23		Kit, Seal [includes five (5) of item number 12]

Accessories

Extension Description	Drum			Tank	
	16-Gallon	55-Gallon	200/205 liter	250-Gallon Bench-Top	275-Gallon Obround
V-Cut	338147-1	338147-2		338147-3	338147-7
Threaded at both ends *	338246-1	338246-2		338246-3	338246-6

* NOTE: For use with low level cut-off valve part number 321206

Cover Assembly Description	Drum		
	5-Gallon	16-Gallon	55-Gallon
Bolt-On	-	338145 *	-
w/ 2-Inch Bung Adapter Fitting	327817-4	338977 *	318040-4

* w/ sealing gasket

Table 2 Low-Pressure Stub Pump Model 9968 Series Accessories

Performance Curves

A pump's ability to deliver fluid is based on the pressure (psi/bar) and quantity (cfm/lpm) of air supplied to the motor and the amount of fluid discharge [back] pressure to be overcome within the system.

This chart contains curves based on three different air pressures. The curves relate delivery in gallons (liters) per minute (X axis) to air consumption in cubic feet (liters) per minute (right Y axis) and to fluid discharge pressure in psi/bar (left Y axis).

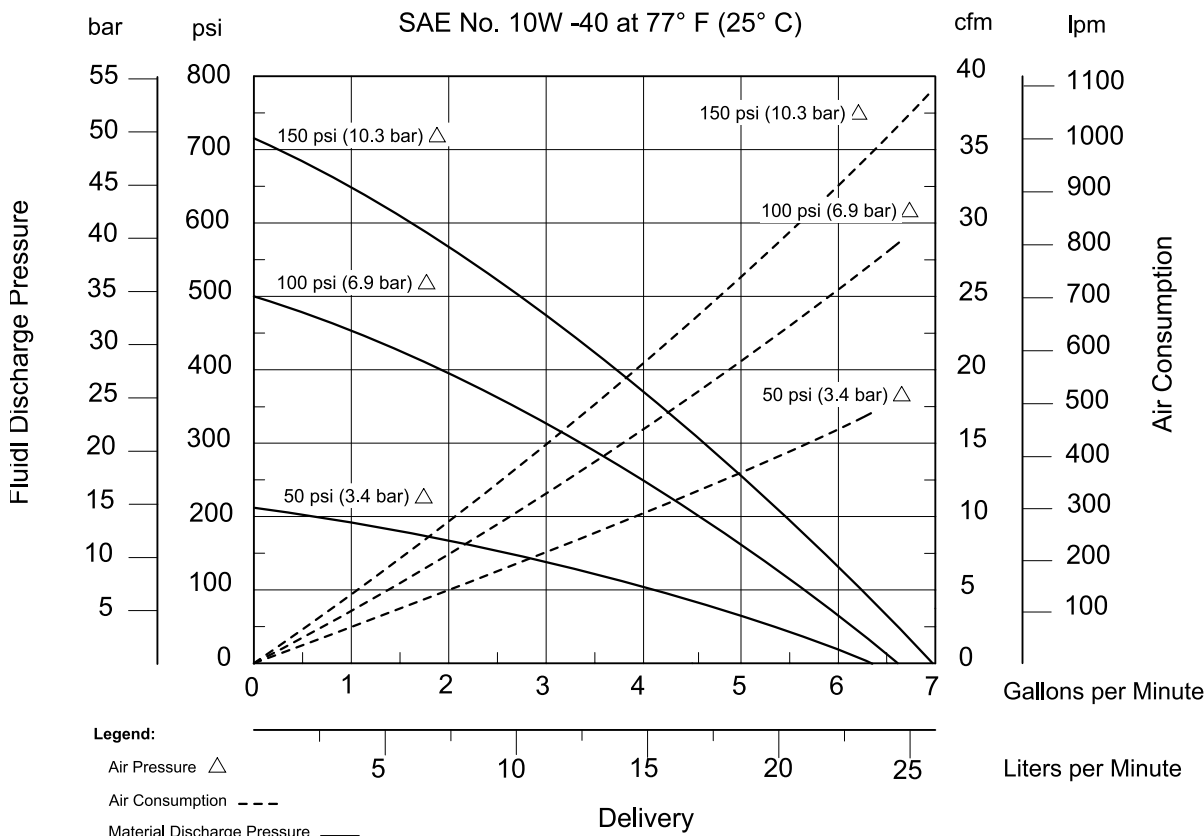
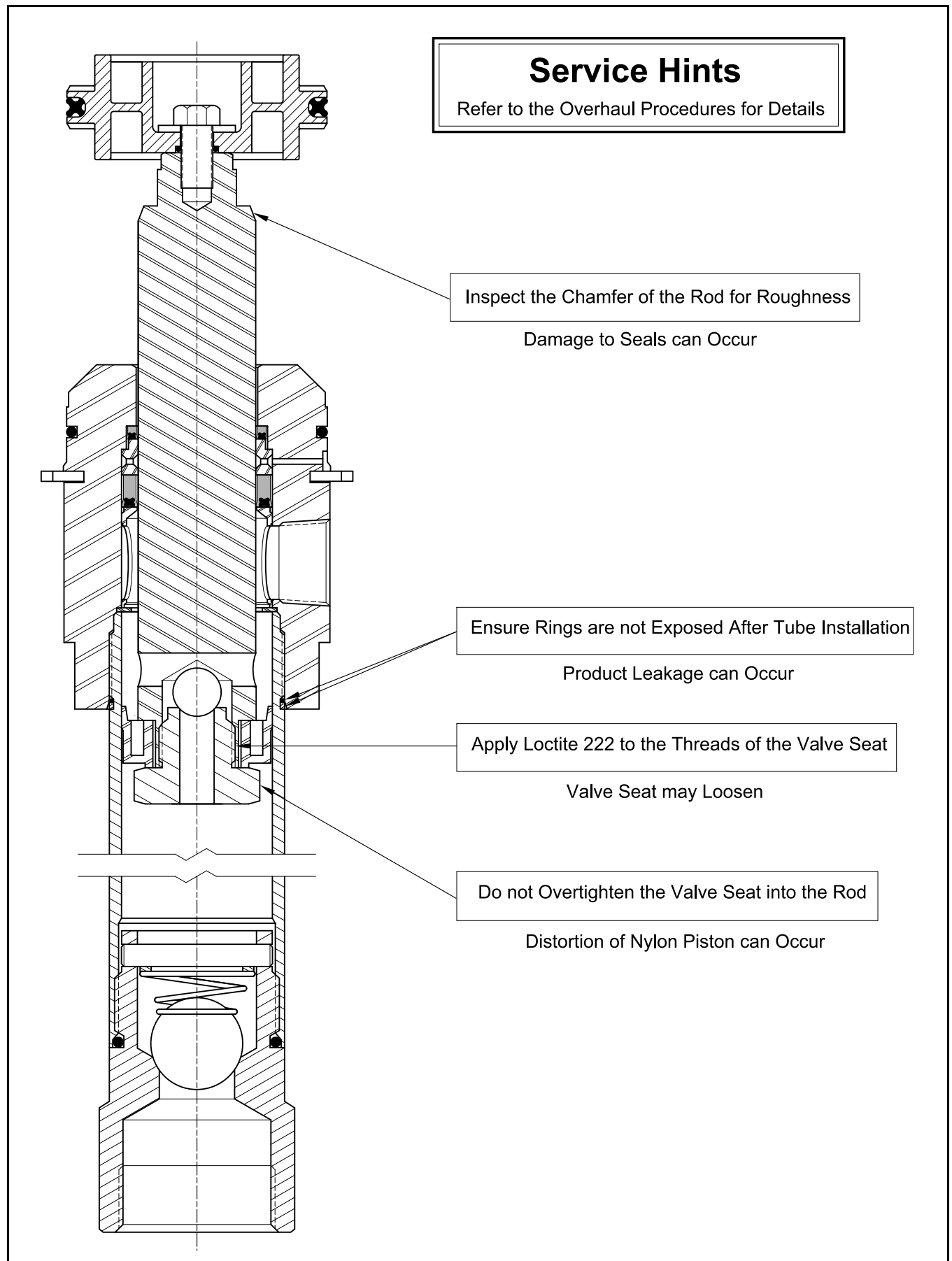


Figure 3 Delivery versus Discharge Pressure and Air Consumption



Service Hints
Refer to the Overhaul Procedures for Details

Inspect the Chamfer of the Rod for Roughness
Damage to Seals can Occur

Ensure Rings are not Exposed After Tube Installation
Product Leakage can Occur

Apply Loctite 222 to the Threads of the Valve Seat
Valve Seat may Loosen

Do not Overtighten the Valve Seat into the Rod
Distortion of Nylon Piston can Occur

Overhaul

NOTE: Refer to **Figures 2** and **3** for component identification on all overhaul procedures.

Prior to performing any maintenance procedure, the following safety precautions must be observed. Personal injury may occur.



WARNING

Do not use halogenated hydrocarbon solvents such as methylene chloride or 1,1,1-trichloroethane in this pump. An explosion can result when aluminum and/or zinc-plated parts in the pump come in contact with halogenated hydrocarbon solvents.

Release all pressure within the system prior to performing any overhaul procedure.

- Disconnect the air supply line from the pump motor.
- Into an appropriate container, operate the control valve to discharge remaining pressure within the system.

Never point a control valve at any portion of your body or another person. Accidental discharge of pressure and/or fluid can result in injury. Read each step of the instructions carefully. Make sure a proper understanding is achieved before proceeding.

Disassembly

Separate Air Motor from Pump Tube

1. Clamp the pump assembly in a soft-jaw vise at Bung Adapter (22) or Body (8).
2. Remove Cover (1a).
 - Pry and swing the Cover sideways away from the Cylinder.
 - Refer to SER 339413 for details.
3. Remove Screw (1b) from the Top Cap.
4. Remove Nuts (1d) that secure the Body to Air Motor Assembly (1).
5. Remove Carriage Bolts (1c) from the Top Cap.
 - Remove Keepers (9) from the Body.
6. Remove the Top Cap from the Cylinder.

CAUTION

Remove the Cylinder with care. Damage to Quad-Ring (6) and/or O-Ring (7) can occur.

7. With a side-to-side motion, pull the Cylinder from the Body and Air Piston (4).
8. Remove O-Ring (7) from the Body.
9. Remove the Bottom Cap from the Body.

Pump Tube Assembly

Tube Assembly

1. Unscrew Tube (21) from the Body.

Step for Model 9968 and 9968-M Only

2. Remove the Bung Adapter from the Tube as required.

3. Remove O-Ring (19) and Back-Up Ring (20) from the Tube.

Air Piston Assembly

4. Remove Screw (2) that secures Air Piston (4) to Rod (15).
 - Remove the Air Piston from the Rod.
5. Remove Washer (3) Quad-Ring (6), and O-Ring (5) from the Air Piston.

Rod Assembly

6. Pull the Rod assembly from the bottom of the Body.
7. Unscrew Valve Seat (18) from the Rod.
 - Remove Ball (17) and Nylon Piston (16).

Body Assembly

8. Remove O-Ring (7) from the Body.
9. Remove Washer (14), Spacer (13) and Seal (12) from the Body.
10. Remove Bearing (11) and Seal (10) from the Body.

Step for Model 9968-M Only

11. Unscrew Adapter (29) from the Body only when necessary.
 - Adapter is secured with Loctite 242.

Foot Valve Assembly

12. Unscrew Foot Valve (27) from Tube (21).
13. Remove O-Ring (26) from the Foot Valve.
14. Remove Pin (28) from the Foot Valve.
15. Remove Washer (23), Spring (24), and Ball (25) from the Foot Valve.

Clean and Inspect

NOTE: Use the appropriate repair kit for replacement parts. Make sure all the components are included in the kit before discarding used parts.

1. Clean all metal parts in cleaning solvent. The solvent should be environmentally safe.
2. Inspect all parts for wear and/or damage.
 - Replace as necessary.
3. Inspect Air Piston (4) for fatigue cracks.
 - Replace as necessary.
4. Inspect Nylon Piston (16) and Rod (15) closely. Use a magnifying glass to detect any score marks on the Rod.
 - Replace as necessary.
5. Closely inspect the mating surfaces of all check valve components for any imperfections. Ensure a smooth and clean contact is obtained when assembled.

EXAMPLE: Place Ball (25) into Foot Valve (27). Fill the Foot Valve with solvent. Make sure no leakage occurs.

Assembly

NOTE: Prior to assembly, certain components require lubrication. Refer to **Table 3** for details.

NOTE: Refer to **Figure 4** for a section view of the pump tube assembly.

Foot Valve

1. Install O-Ring (26) onto Foot Valve (27).
2. Install Ball (25), Spring (24) [small diameter first], and Washer (23) into the Foot Valve.
3. Install Pin (28) into the Foot Valve.
 - Make sure the Pin retains the Washer properly and is flush with the Foot Valve.

Body

4. Install O-Ring (7) onto the upper groove of Body (8).
5. Install and seat Seal (10) [heel end first] into the bottom of the Body.
6. Install and seat Bearing (11) [small diameter first] into the Body.
7. Install and seat Seal (12) [heel end first] into the Body.
8. Install Spacer (13) [small diameter first] and Washer (14) into the Body.

Step for Model 9968-M Only

9. Screw Adapter (29) [with Loctite 242] into the Body as required.

Tube and Rod

10. Install and seat Nylon Piston (16) [openings upward] onto the bottom of Rod (15).

Item No.	Description	Item No.	Description
Clean Oil			
5	O-Ring, 3/8 " ID x 1/2 " OD	10	Seal, 1-5/16 " ID x 1-9/16 " OD
6	Quad-Ring, 2-5/8 " ID x 3 " OD	12	Seal, 1-5/16 " ID x 1-11/16 " OD
7	O-Ring, 2-3/4 " ID x 3 " OD	19	O-Ring, 1-7/8 " ID x 2 " OD
		26	O-Ring, 1-11/16 " ID x 1-7/8 " OD
Magnalube-G Teflon Grease *			
Coat the Bore of the Air Motor Assembly			
* Part number 393590 is a 0.75 ounce (21.8 gm) tube of Magnalube-G Teflon grease			

Table 3 Lubricated Components

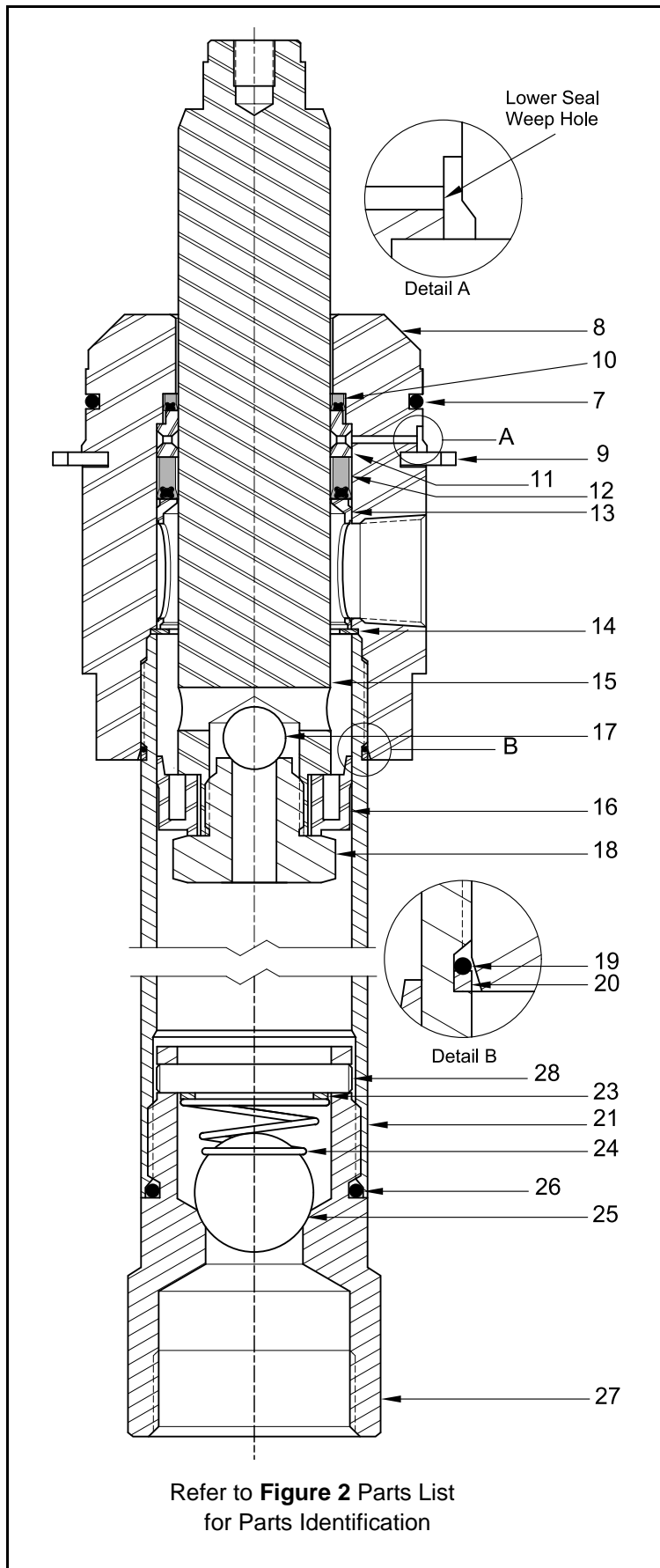


Figure 4 Pump Tube Assembly 338067-B1- Section View

11. Install Ball (17) into the Rod.

IMPORTANT: Do not tighten the Valve Seat more than 1/4-turn once it contacts the Ny-lon Piston. Distortion of the Nylon Piston can occur which causes excessive drag on the Tube.

12. Screw Valve Seat (18) [with Loctite 222] into the Rod. See **Figure 2**.
 - Follow the thread sealant manufacturer's recommendations.

CAUTION

Install the Rod into the Body with a twisting motion. Use care not to damage the Seals.

13. Install the Rod assembly into the bottom of the Body.
 - Position the Nylon Piston flush with the bottom of the Body.
14. Install Back-Up Ring (20) [concave upward] onto Tube (21).
15. Install O-Ring (19) on top of the Back-Up Ring.
16. Screw and seat the Tube assembly into the Body.
 - Make sure both Rings are not visible.

Step for Model 9968 and 9968-M Only

17. Slide Bung Adapter (22) onto the Tube.
18. Screw the Foot Valve assembly into the Tube.
 - Tighten the Foot Valve assembly securely to the Tube and the Tube to the Body.

Air Piston

19. Install Quad-Ring (6) onto Air Piston (4).
20. Install and seat O-Ring (5) into the bottom of the Air Piston.
21. Place the Air Piston [observe THIS SIDE UP] on top of the Rod.
22. Install Screw (2) and Washer (3) that secures the Air Piston to the Rod.
 - Tighten the Screw to 15 ft.-lbs. (20.7 Nm).

Attach Air Motor to Pump Tube

23. Clamp the pump assembly in a soft-jaw vise at Bung Adapter (22) or Body (8).
24. Install the **Bottom Cap** onto the Body.
25. Install O-Ring (7) onto the upper groove of the Body.

CAUTION

Install the Cylinder with care. Damage to Quad-Ring (6) and/or O-Ring (7) can occur.

HINT: Angle the **Cylinder** onto the Quad-Ring.

26. Install the **Cylinder** over the Body's O-Ring and seat it properly onto the **Bottom Cap**.
27. Install the **Top Cap** onto the **Cylinder**.
 - Use care passing the O-Ring.
28. Install Keeper (9) into the groove of the Body.
 - Make sure the hole aligns with Carriage Bolt (1c).
29. Install one Carriage Bolt through the Air Motor and through the Keeper.
30. Install Flange Nut (1d).
 - Do not tighten the Flange Nut at this time.
31. Repeat procedural steps 27 - 29 for the additional Keepers and Carriage Bolts.

CAUTION

Do not overtighten Flange Nuts (1d). Component damage can occur.

32. Torque each Flange Nut in an alternate pattern from 60 to 70 inch-pounds (6.8 - 7.9 Nm).
33. Install Screw (1b) into the **Top Cap**.
 - Tighten the Screw to 50 inch-pounds (5.6 Nm).
34. "Snap" Cover (1a) onto the **Cylinder**.

Bench Test and Operation

1. Slowly supply air pressure [recommended minimum of 25 psi (1.7 Bars)] to the pump's motor.
 - The pump assembly should cycle.

If the pump assembly does not cycle, refer to the **Troubleshooting Chart** for details.

With air pressure at zero:

2. Connect a product hose to the pump's fluid outlet.
 - Direct the hose into an appropriate collection container.
3. Place the pump in oil.
4. Slowly supply air pressure to the pump's motor.
5. Allow the pump to cycle slowly until the oil is free of air.

If the pump assembly does not prime, refer to the **Troubleshooting Chart** for details.

WARNING



Should leakage occur anywhere within the system, disconnect air to the motor. Personal injury can occur.

With air pressure at zero:

6. Attach a control valve to the outlet hose of the pump.
 - Make sure the nozzle on the control valve is open.
7. Slowly supply air pressure to the pump's motor.
8. Allow the pump to cycle slowly until the oil is once again free of air.
9. Set the air pressure to the normal operating pressure.
10. Operate the control valve into a container.
11. Shut off the control valve.
 - Visually inspect the pump for external leaks.
 - The pump should not cycle more than once or twice in one hour.

If the pump does not stall, refer to the **Troubleshooting Chart** for details.

12. Check the motor for air leakage.

If the motor leaks, refer to the **Air Motor Service Guide** for details.

Installation

Additional items that should be incorporated into the air piping systems are listed in **Table 4**.

Part Number	Description
5604-2	Moisture Separator
7604-B	Regulator and Gauge

Table 4 Air Line Components

Troubleshooting Chart

Pump Indications	Possible Problems	Solution
Pump does not cycle	<ol style="list-style-type: none"> 1. Air motor not operating properly 2. Pump tube jammed and/or contains loose components 3. Insufficient air pressure 	<ol style="list-style-type: none"> 1. Inspect air motor and rebuild or replace as necessary 2. Rebuild pump tube 3. Increase air pressure
Pump will not prime	<ol style="list-style-type: none"> 1. Excessive cycling speed 2. Pump leaking internally 3. Extension not sufficiently tight and/or thread sealant missing or inadequate 	<ol style="list-style-type: none"> 1. Reduce air pressure 2. See Internal Leaks 3. Apply thread sealant* to male pipe threads and tighten extension
Pump cycles rapidly	<ol style="list-style-type: none"> 1. Product source empty 2. Extension not sufficiently tight and/or thread sealant missing or inadequate 	<ol style="list-style-type: none"> 1. Replenish product 2. Apply thread sealant* to male pipe threads and tighten extension
Pump will not stall (cycles more than once or twice/hour)	<ol style="list-style-type: none"> 1. Pump requires break-in period 2. Pump leaking internally 3. Pump leaking externally 4. Distribution system leaking 5. Extension not sufficiently tight and/or thread sealant missing or inadequate 	<ol style="list-style-type: none"> 1. Operate the pump against moderate fluid pressure for up to one hour 2. See Internal Leaks 3. See External Leaks 4. Correct leak 5. Apply thread sealant* to male pipe threads and tighten extension
External Leaks		
Product leakage visible at weep hole in Body (8)	<ol style="list-style-type: none"> 1. Damaged Seal (12) 2. Damaged Rod (15) 	<ol style="list-style-type: none"> 1. Replace Seal (12) 2. Inspect Rod (15) and replace as necessary
Product leakage visible at bottom of Body (8)	<ol style="list-style-type: none"> 1. Tube (21) not sufficiently tight 2. Damaged O-Ring (19) 	<ol style="list-style-type: none"> 1. Tighten Tube (21) into Body (8) 2. Separate Tube (21) from Body (8) and replace O-Ring (19)
Air leakage at weep hole in Body (8)	Damaged Seal (10)	Replace Seal (10)
Product leakage visible between Tube (21) and Foot Valve (27)	<ol style="list-style-type: none"> 1. Foot Valve (27) not sufficiently tight 2. Damaged O-Ring (26) 	<ol style="list-style-type: none"> 1. Tighten Foot Valve (27) into Tube (21) 2. Separate Foot Valve (27) from Tube (21) and replace O-Ring (26)
Internal Leaks		
Continuous slow air leak	Worn or damaged O-Ring (7)	Replace O-Ring (7)
Pump does not prime or cycles continuously, or slowly (once or twice/hour)	<ol style="list-style-type: none"> 1. Foreign material between Ball (17) and Valve Seat (18) 2. Foreign material between Ball (25) and Foot Valve (27) 3. Worn or damaged Ball (17) 4. Worn or damaged Valve Seat (18) 5. Worn or damaged Ball (25) 6. Worn or damaged Foot Valve (27) 7. Worn or damaged Nylon Piston (16) 	<p>Locate and eliminate source of foreign material</p> <p>Disassemble pump tube, clean, inspect, and replace worn or damaged components</p>
* Do not apply thread sealant to the first two (2) threads. Contamination can occur.		

Changes Since Last Printing

Added item 5 to Repair Kit. Items 8 and 13 no longer available