

Stainless Transfer Pump

Description

NOTE: The components within the fluid-wetted path of this pump are stainless steel and Teflon.

CAUTION

This pump is tested in mineral oil. Flush the pump thoroughly with a solvent compatible with the product dispensed as required.

The major components of pump model 7216-S3 consist of a reciprocating differential air motor and a double-acting pump tube. This low-pressure (1:1 ratio) pump is equipped with a 2" PT (m) bung adapter and a stainless extension that allows operation directly from original 55-gallon (200/205 l) drums.

Models 7216-S and 7216-S3

Model 7216-S is obsolete. Repair parts are still available.

Specifications

Differential Air Motor

Piston Diameter x Stroke		Effective Piston Area *		Air Inlet	Maximum Air Pressure	
In	Cm	In ²	Cm ²		psi	Bars
2-1/16 x 4	5.2 x 10.2	1.67	10.8	1/4" NPTF (f)	200	13.8

For details on the air motor, refer to Service Guide SER 318450-4.

See **Figure 3** for performance curves.

* The effective piston area of a differential air motor is equal to one-half the actual area of the piston.

Pump Tube

Fluid Outlet	Max. Fluid Pressure		Max. Free-Flow Delivery/Minute *		Displacement per Cycle	
	psi	Bars	Gallons	Liters	In ³	Cm ³
1" NPTF (f)	200	13.8	14	53	10.5	172

See **Figure 3** for performance curves.

* SAE 10 oil at 75 ° F (24 ° C) and 100 psi [6.9 Bars] air pressure.

Table 1 Transfer Pump Model 7216-S3 Specifications

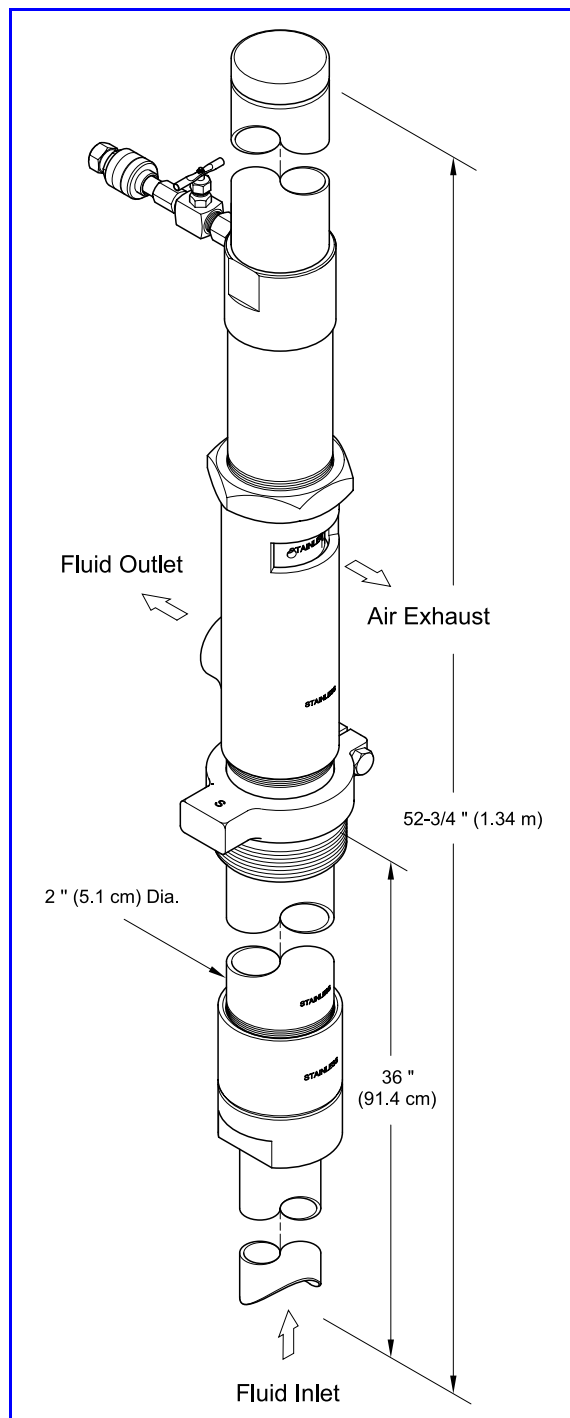


Figure 1 Stainless Transfer Pump Model 7216-S3

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SER 7216-S3
Revision (10-02)

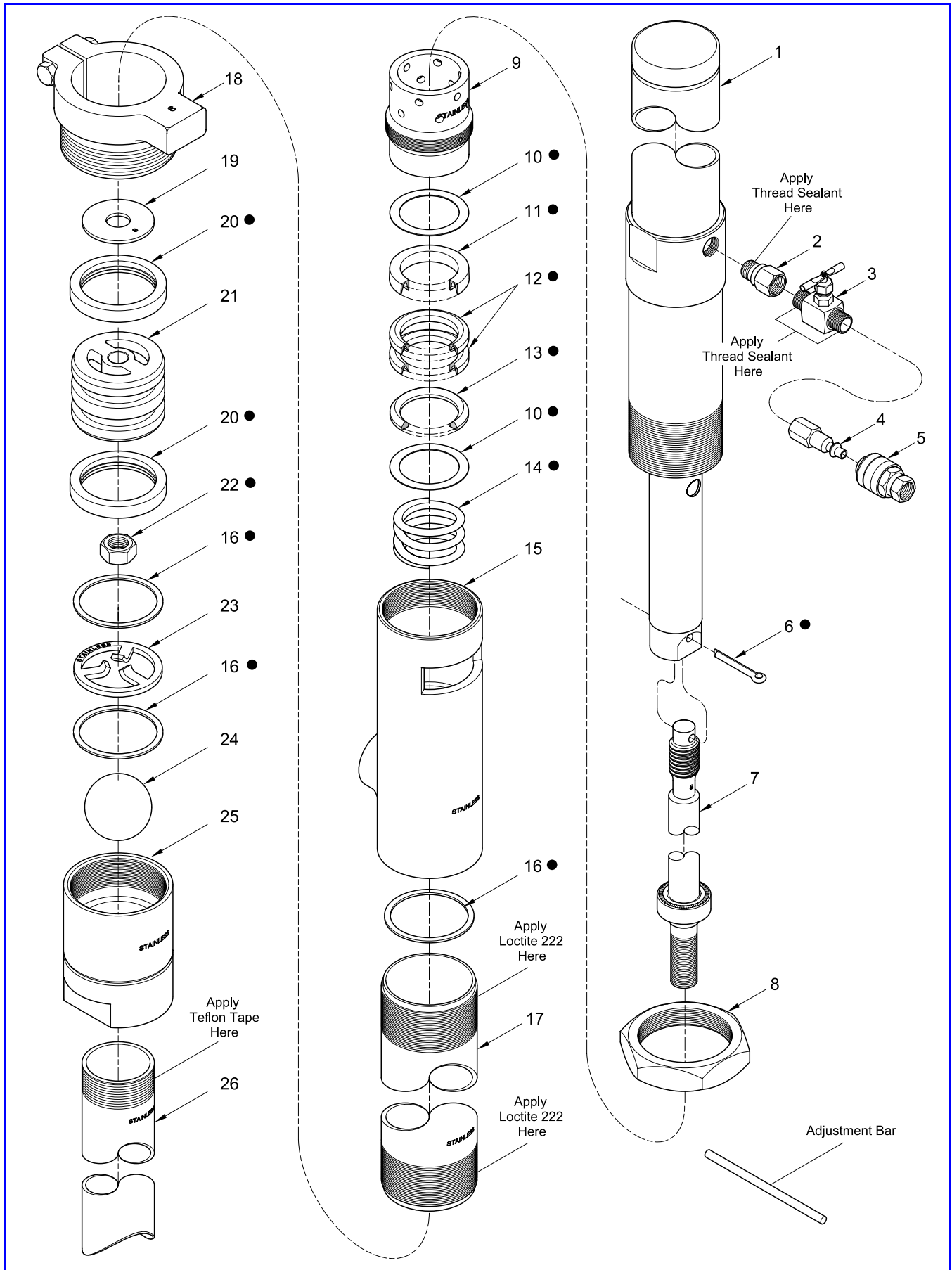


Figure 2 Transfer Pump Model 7216-S3 - Exploded View

Item No.	Part No.	Description	Qty	Notes	Numeric Order Part # (Item #)
1		Motor Assembly, Air	1	See SER 318450-4	(1)
2	53176	Adapter, 1/4 " NPTF (m) x 1/4 " NPTF (f)	1		53176 (2)
3	319391	Valve, 1/4 " PT (m)	1		171701-80 (24)
4	B330605	Adapter, 1/4 " NPTF (f)	1		171724 (22)
5	328030	Coupler, Air, 1/4 " NPTF (f)	1		317419 (23)
6	318859	Pin, Cotter, 1/8 " Dia. x 1.25 " Long (SS)	1	●	318859 (6)
7		Rod and Stop Assy, 9-1/2 " Long (SS)	1		319391 (3)
8	332272	Nut, 2-1/4 " -16	1		320033-82 (12)
9	332262	Screw Assy, Packing (w/ nylon insert) (SS)	1		320472 (20)
10	332268	Washer (Stainless Steel)	2	●	326750-A1 (18)
11	332270	Ring, Female Adapter (Virgin Teflon)	1	●	328030 (5)
12		Packing, 1-3/8 " ID x 1-7/8 " OD (Teflon)	2	●	B330605 (4)
13		Ring, Male Adapter (Virgin Teflon)	1	●	332258 (26)
14	332269	Spring (Stainless Steel)	1	●	332262 (9)
15	332265	Body Assembly (Stainless Steel)	1		332265 (15)
16	333388	Gasket (Stainless Steel)	3	●	332268 (10)
17	332273	Cylinder (Stainless Steel)	1		332269 (14)
18	326750-A1	Adapter, Bung, 2 " NPTF (m) (SS)	1		332270 (11)
19	332274	Valve (Stainless Steel)	1		332271 (13)
20	320472	Ring, Packing (Teflon)	2	●	332272 (8)
21	338598	Plunger (Stainless Steel)	1		332273 (17)
22	171724	Nut, Elastic Stop, 3/8 " -24 (Stainless Steel)	1	●	332274 (19)
23	317419	Washer, Stop (Stainless Steel)	1		333388 (16)
24	171701-80	Ball, 1-14 " Dia. Stainless Steel)	1		333689 (25)
25	333689	Body, Valve (Stainless Steel)	1		337824 (7)
26	332258	Extension (Stainless Steel)	1		338598 (21)
Legend: Part numbers left blank (or in <i>italics</i>) are not available separately ● designates a repair kit item SS = Stainless Steel					

Repair Kit

Part No.	Kit Symbol	Description
393309-2	●	Kit, Major Repair

Performance Curves

A pump's ability to deliver fluid is based on the pressure (psi/Bars) 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/Bars (left Y axis).

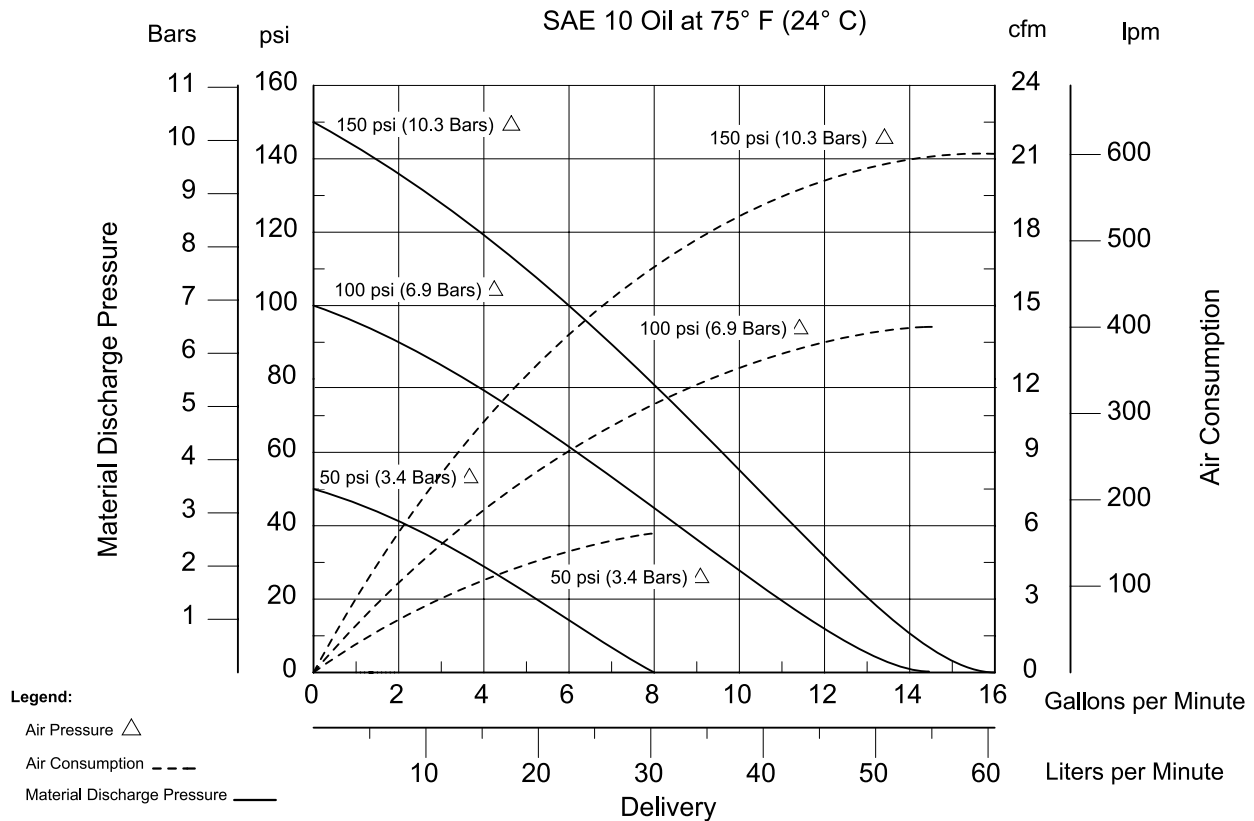


Figure 3 Delivery versus Discharge Pressure and Air Consumption

Overhaul

NOTE: Refer to **Figure 2** 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

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. Product discharged at high velocity can penetrate the skin and cause severe injury. Should any fluid appear to puncture the skin, get medical care immediately.

Read each step of the instructions carefully. Make sure a proper understanding is achieved before proceeding.

Disassembly

Separate Pump Tube from Air Motor

1. Clamp Body Assembly (15) horizontally in a soft-jaw vise.

CAUTION

Support the pump tube assembly during removal. Damage to components can occur.

2. Unscrew Cylinder (17) from the Body Assembly.
 - Remove the Cylinder [with attached components].
3. Pull on Rod and Stop Assembly (7) to expose the end of the Air Motor's piston rod as required.
4. Remove Cotter Pin (6) that secures the Air Motor's piston rod to the Rod and Stop Assembly.
5. Unscrew the Rod and Stop Assembly from the Air Motor's piston rod.

6. Loosen Jam Nut (8) that secures Air Motor Assembly (1) to the Body Assembly.

7. Unscrew and remove the Air Motor Assembly from the Body Assembly.

8. Remove the Jam Nut from the Air Motor Assembly as required.

Pump Tube Assembly

Body Assembly

9. Remove Gasket (16) from the bottom of the Body Assembly.
10. Remove Packing Screw Assembly (9) from the Body Assembly.
11. From the top of the Body Assembly remove:
 - Washer (10) Qty 1
 - Female Adapter Ring (11) Qty 1
 - Packings (12) Qty 2
 - Male Adapter Ring (13) Qty 1
 - additional Washer (10) Qty 1
 - Spring (14) Qty 1

Cylinder Assembly

12. Unscrew Nut (22) that secures Plunger (21) to the Rod and Stop Assembly.
 - Remove the Plunger and Valve (19) from the Rod and Stop Assembly.
13. Remove both Packing Rings (20) from the Plunger.
14. Remove Bung Adapter (18) from the Cylinder as required.

Vale Body Assembly

15. Unscrew Valve Body (25) from the Cylinder.
16. Remove Gasket (16), Stop Washer (23), additional Gasket (16), and Ball (24) from the Valve Body.
17. Remove Extension (26) from the Valve Body as required.

Clean and Inspect

*IMPORTANT: Replace a worn old style nylon 11 Plunger with the current Plunger and Ring assembly (See **Figure 4**). If the old style Plunger is desired, order part 337693.*

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 Rings (**20**) for wear.
 - Replace as necessary.
4. Inspect the bore of Cylinder (**17**) for any score marks.
 - 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 (**24**) into Valve Body (**25**). Fill the Valve Body with solvent. Make sure no leakage occurs.

Assembly

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

Pump Tube Assembly

Body Assembly

1. Clamp Body Assembly (**15**) [exhaust port upward] in a soft-jaw vise.
2. Install and seat the following components in order:
 - Spring (**14**).....Qty 1
 - Washer (**10**)Qty 1
 - Male Adapter Ring (**13**) [ridge upward]Qty 1
 - Packings (**12**) [ridge upward]Qty 2
 - Female Adapter Ring (**11**) [flat side upward] ..Qty 1
 - additional Washer (**10**).....Qty 1

3. Screw Packing Screw Assembly (**9**) into the Body Assembly loosely.

*IMPORTANT: The Packing Screw Assembly will require adjustment. Refer to the section entitled **Bench Test and Operation** for details.*

4. Screw Jam Nut (**8**) onto Air Motor Assembly (**1**).
5. Screw the Air Motor Assembly into the Body Assembly.
 - Tighten the Air Motor Assembly securely.
6. Tighten the Jam Nut that secures the Air Motor Assembly to the Body Assembly.
7. Install Gasket (**16**) into the Body Assembly.

Rod and Stop Assembly

8. Install Packing Rings (**20**) onto Plunger (**21**).
9. Install Valve (**19**) and Plunger assembly [flat surface first] onto the bottom of Rod and Stop Assembly (**7**).
10. Install Nut (**22**) onto the Rod and Stop Assembly.
 - Tighten the Nut securely.
11. Screw the Rod and Stop Assembly into the piston of the Air Motor Assembly.
 - Make sure the cotter pin holes align.
12. Install Cotter Pin (**6**) that secures the Piston Assembly to the Rod and Stop Assembly.

Valve Body and Cylinder Assembly

13. Install Ball (**24**), Gasket (**16**), Stop Washer (**23**) [flat side first], additional Gasket (**16**), into Valve Body (**25**).
14. Screw Cylinder (**17**) [with Loctite 222] into the Valve Body.
 - Do not tighten at this time.
15. Install Bung Adapter (**18**) onto the Cylinder.
16. Install the Cylinder (with Loctite 222) [with attached components] onto the Plunger.
 - Use care not to damage the Packing Rings.

Item No.	Description
1	Air Motor piston rod
17	bore of Cylinder

Table 3 Components Lubricated in Clean Mineral Oil

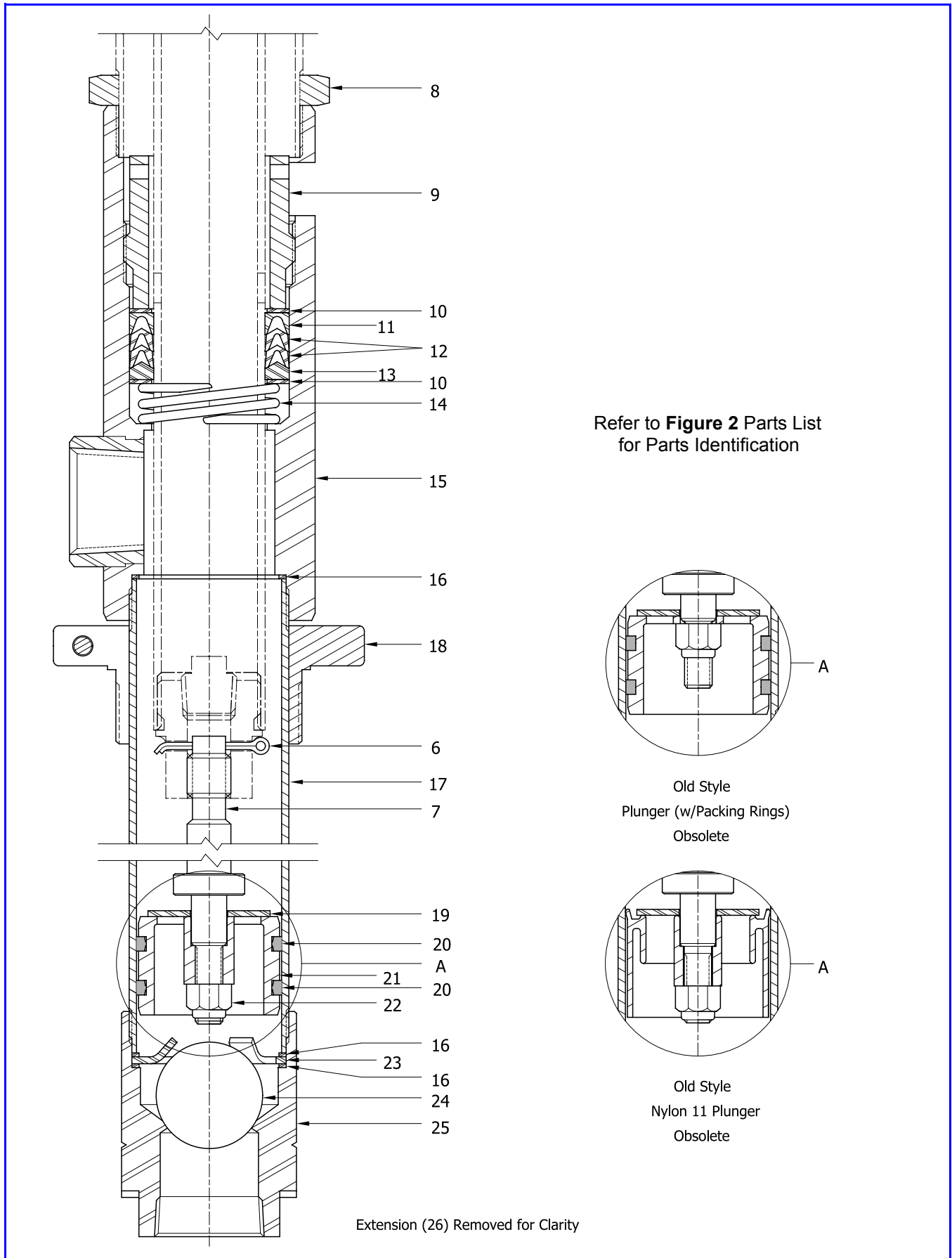


Figure 4 Pump Tube Assembly - Section View

Connect Pump Tube to Air Motor

17. Screw the Cylinder into the Body Assembly.
 - Make sure the Gasket has not moved.
18. Tighten the Valve Body into the Cylinder and at the same time the Cylinder into the Body Assembly.
 - Make sure to properly crush the Gaskets.
19. Screw Extension(26) [with Loctite 222] into the Valve Body.
 - Tighten the Extension securely.

Bench Test and Operation



WARNING

Do not exceed the lowest pressure rating of any component in the system.

Ensure all components are in operable condition. Replace any suspect parts prior to operation.

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

Initial Prime

1. Place the pump in the fluid to be dispensed.
2. Connect a product hose to the pump's fluid outlet.
 - Direct the hose into an appropriate collection container.
3. Screw Adapter (2) [with thread sealant] into the inlet of the Air Motor Assembly.
4. Screw Valve (3) [with thread sealant] into the Adapter.
5. Screw Adapter (4) into the Valve [with thread sealant].
 - Tighten the Adapter securely.
6. Install Air Coupler (5) onto the air supply line.
7. Make sure air pressure at the regulator reads zero.
8. Connect the Air Coupler to the Adapter.
9. Slowly supply air pressure to the pump's motor.
10. Allow the pump to cycle slowly until the fluid is free of air.

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

Starting Pressure

11. Set the air pressure to 30 psi (2.1 Bars).
12. Insert the Adjustment Rod into one of the holes in the Packing Screw Assembly.
13. Adjust the Packing Screw Assembly until the pump assembly stops.
14. Loosen the Packing Screw Assembly until the pump assembly begins to cycle.

Leakage and Stall



WARNING

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

With air pressure at zero:

15. Attach a control valve to the outlet hose of the pump.
 - Make sure the nozzle on the control valve is open.
16. Slowly supply air pressure to the pump's motor.
17. Allow the pump to cycle slowly until the fluid is once again free of air.
18. Set the air pressure to the normal operating pressure.
19. Operate the control valve into a container.
20. 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 leaks or does not stall, refer to the **Troubleshooting Chart** for details.

21. 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

Packing Adjustment

IMPORTANT: Break-in and wear of upper packings require the user to readjust the Packing Screw Assembly:

- after approximately 6 hours of initial operation *
- anytime the upper packings leak

1. Make sure the air pressure is zero.
2. Operate the control valve into a container.
 - This releases any pressure within the system.
3. Insert the Adjustment Rod into one of the holes in the Packing Screw Assembly.
4. Tighten Packing Screw Assembly (9) clockwise 1/4-turn.
5. Set the air pressure to 30 psi (2.1 Bars).
6. Hold the control valve open while aiming into a suitable collection container.
7. Loosen the Packing Screw Assembly until the pump assembly begins to cycle.

* Applies to new and overhauled pumps.

Troubleshooting Chart

Pump Indications	Possible Problems	Solution
Pump does not cycle	<ol style="list-style-type: none"> 1. Packings (12) too tight 2. Air motor not operating properly 3. Pump tube jammed and/or contains loose components 4. Insufficient air pressure 	<ol style="list-style-type: none"> 1. Adjust Packing Screw Assembly (9) 2. Inspect air motor and rebuild or replace as necessary 3. Rebuild pump tube 4. Increase air pressure
Pump will not prime	<ol style="list-style-type: none"> 1. Excessive cycling speed 2. Pump leaking internally 	<ol style="list-style-type: none"> 1. Reduce air pressure 2. See Internal Leaks
Pump cycles rapidly	Product source empty	Replenish product
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 	<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
External Leaks		
Product leakage visible at bottom of Body Assembly (15)	<ol style="list-style-type: none"> 1. Damaged Gasket (16) 2. Cylinder (17) not sufficiently tight 	<ol style="list-style-type: none"> 1. Replace Gasket (16) 2. Tighten Cylinder (17) into Body Assembly (15)
Product leakage at exhaust port in Body Assembly (15)	<ol style="list-style-type: none"> 1. Packings (12) too loose 2. Worn or damaged Packing(s) (12) 3. Worn or damaged air motor piston rod 	<ol style="list-style-type: none"> 1. Adjust Packing Screw Assembly (9) 2. Use Kit 393309-2 3. Replace air motor piston rod
Product leakage between Cylinder (17) and Valve Body (25)	<ol style="list-style-type: none"> 1. Worn or damaged Gaskets (16) 2. Valve Body (25) not sufficiently tight 	<ol style="list-style-type: none"> 1. Replace Gaskets (16) 2. Tighten Valve Body (25) into Cylinder (17)
Product leakage between Valve Body (25) and Extension (26)	Extension (26) not sufficiently tight	Tighten Extension (26) into Valve Body (25)
Internal Leaks		
Pump does not prime or cycles continuously, or slowly (once or twice/hour)	<ol style="list-style-type: none"> 1. Foreign material between Ball (24) and Valve Body (25) 2. Foreign material between Valve (19) and Plunger (21) 3. Worn or damaged Ball (24) 4. Worn or damaged Valve Body (25) 5. Worn or damaged Valve (19) 6. Worn or damaged Plunger (21) 	<p>Locate and eliminate source of foreign material</p> <p>Disassemble pump tube, clean, inspect, and replace worn or damaged components</p>

Changes Since Last Printing

Deleted Minor Repair Kit to **393624**