



WHERE
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SB300 Valve

OWNER'S MANUAL

Rev A

Precision Valve & Automation
Six Corporate Drive
Halfmoon, NY 12065

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2. Introduction

Before you operate this system, read the operation and setup manual. This will help you to become familiar with the product and ensure successful operation.

If any questions or problems arise, contact PVA's Customer Service Department for support.

2.1 PVA Contact Information

Main Office	PVA
	Six Corporate Drive
	Halfmoon, NY 12065
	Tel +1-518-371-2684
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2.2 Document History

Revision	Revision Date	Reason for Changes
REV A	April 2014	Initial Release

NOTE: All photographs and CAD model representations in this document are a "general representation" of the valve and its components. The actual appearance of the valve and its components can differ based upon customer specific configuration.

2.3 Safety

Certain warning symbols are affixed to the machine and correspond to notations in this manual. Before operating the system, identify these warning labels and read the notices described below. Not all labels may be used on any specific system.



Always wear approved safety glasses when you operate or work near the workcell.



Before you operate the system, read and understand the manuals provided with the unit.



Never put hands or tools in areas with this symbol when the machine is in operation. A dangerous condition may exist.



Read and understand the manuals provided with the unit before any repairs or maintenance is done. Only a qualified individual should do service.



Use caution when there are pressurized vessels. Find and repair any leaks immediately. Always wear appropriate safety equipment when you work with pressurized vessels or vessels that contain chemicals.



Shear hazard from moving parts. Avoid contact.

2.4 Theory of Operation

The SB300 is a high pressure valve with a low maintenance design. It dispenses a high flow of medium to high viscosity material with adjustable snuff back. There are two main versions of this valve, one with the 1/4" NPT end fitting and one with a luer outlet.

2.5 Personal Protective Equipment

Operators must use eye protection because material contents are under pressure. Always wear gloves when handling materials and solvents. Refer to MSDS sheets on the material being dispensed for other precautions.

2.6 Waste Disposal

Dispose of all used parts and materials in accordance with local laws and regulations.

2.7 Necessary Tools

PVA offers tools and cleaning accessories to maintain the SB300 valve.

Part Number	Description
02506	Hook and Pick Set
9463-K33	Lubricant for O-ring seals
B62-2048	2.5cc Silicone Grease
B62-0752	Mineral Oil Lubricant

3. Setup

Before you operate the valve, know the valve components. Do the steps instructed below for safe and correct operation.

1. Make sure your valve is correctly connect to the dispense system. Refer to your fluid schematic.
2. Make sure you know the valve specifications and do not operate the valve outside of the specifications.

3.1 Overview

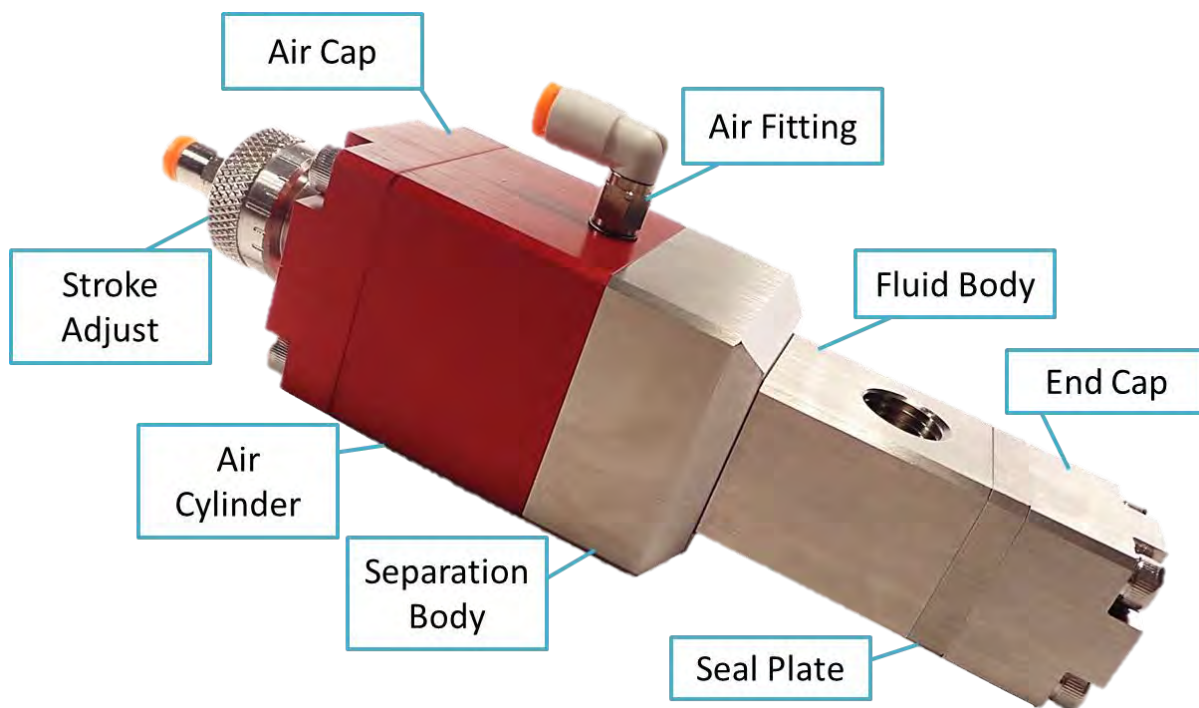


Figure 1: Valve Components

4. Operation

NOTE: Refer to Section 6 for part reference numbers. All part numbers refer to the NPT version of the valve (drawing 112-07519) unless otherwise specified.

NOTE: Use only compatible solvents and materials or the seals and O-rings will be damaged.

Operation Notes:

The sections that follow are in the recommended order to operate the valve. To operate the valve, do every sub-section in Section 4, in the order shown.

1. Set the operating air pressure to 60-100 psi.
2. Cycle the valve. Make sure the piston can be heard going up and down.
3. Make sure the fluid delivery system is correctly connected and pressurized as necessary.

4.1 Bleed the Valve

1. Use the purge button on the teach pendant to purge the valve. Push the purge button through step 4.
2. As material dispenses, turn the stroke adjust clockwise until it is fully engaged.
3. Then, turn the stroke-adjust counterclockwise to loosen it until the material dispenses without any breaks in the flow of material.
4. Release the purge button.

NOTE: If the material has drips or strings after dispensing there is still air in the valve and it must be bled again.

5. After the valve has been correctly bled, continue with normal operation.

NOTE: If the stroke adjust is down too far, the valve will not close and the valve will continue to dispense or leak.

4.2 Adjust Snuff Back

Snuff back stops material from dispensing after the valve closes. The stroke adjust (9) is used to change snuff back. The snuff back setting will be different for each dispense procedure, the steps below are for a general setting. It may be necessary to continue to adjust snuff back to get the correct results for your procedure.

1. To set or reset your snuff back, turn the stroke adjust (9) clockwise until it is fully engaged.

2. Turn the stroke adjust (9) counterclockwise for two full turns.



Figure 2: Turn the Stroke Adjust Two Full Turns

3. Operate the valve at this stroke adjust (9) setting. Adjust as necessary for your application.

NOTE: Turn the stroke adjust counterclockwise to increase snuff back and turn the stroke adjust clockwise to decrease snuff back.

4. If you cannot get the necessary results, turn the stroke adjust counterclockwise until it is fully loosened. Some applications work best this way. Decrease the snuff back as necessary.

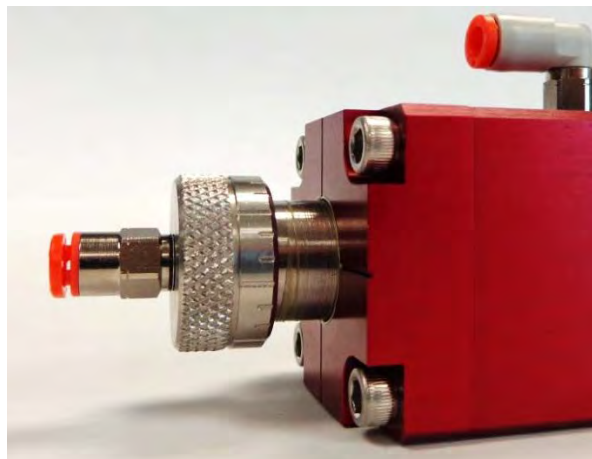


Figure 3: Stroke Adjust Fully Loosened

4.3 Shutdown

1. Release the pressure in the system, refer to the workcell manual.
2. Open the valve and let any material dispense until the system pressure is close to zero.

3. Close the valve.
4. Clean off any material on the valve.
5. Install a night cap, if necessary.

5. Maintenance

Interval	Action
Daily	<ul style="list-style-type: none">• Examine the material outlets for contamination and cured material.
As Necessary	<ul style="list-style-type: none">• Replace O-rings and lip seals if they are worn or damaged.

It will be necessary to clean and rebuild the valve after some time. Before you start the procedure make sure you have the necessary spare parts, refer to Section 6.2 and 6.4.

- All O-rings and seals must be lubricated.
- Removable thread locker must be applied to the set screw that goes on the piston.

5.1 Valve Lubricant

There are three different kinds of lubricants used on this valve.

- Lubricant: This is used on many of the O-rings and lip seals for lubrication and to improve the seal.
- Grease: This is applied to many of the air section components.
- Oil: This is used on the threads of the stroke adjust to make sure it turns smoothly.

5.2 Disassembly

1. Decrease air and fluid pressure to the valve.
2. Remove the valve from the workcell.
3. Remove all pneumatic and fluid hoses. Use a wrench to remove the air fittings.
4. Use a hex wrench to remove the four air cap screws (17).

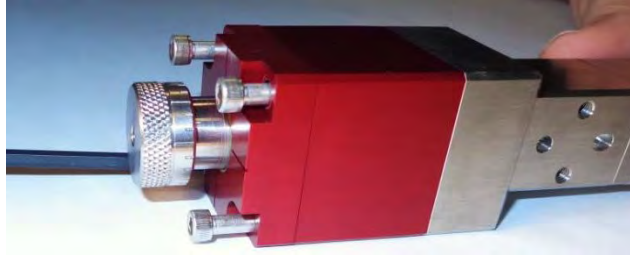


Figure 4: Loosen and Remove the Four Air Cap Screws

5. Pull on the air and fluid sections to separate the sections.

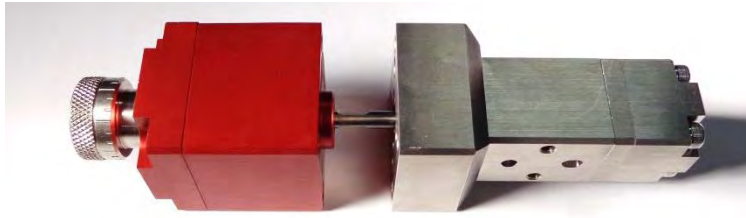


Figure 5: Air and Fluid Sections Separated

6. Use a hex wrench to remove the four separation body screws (14).



Figure 6: Remove the Four Screws

7. Remove the separation body (6) from the fluid body (7).

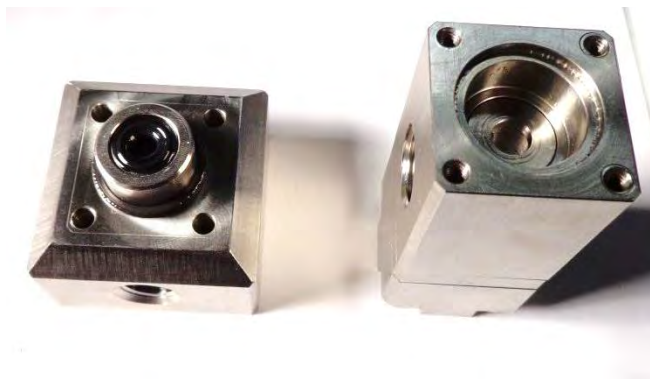


Figure 7: Separation Body and Fluid body

8. Use the pick to remove the lip seal (11).



Figure 8: Remove the Lip Seal

9. Use the pick to remove the O-ring (22).

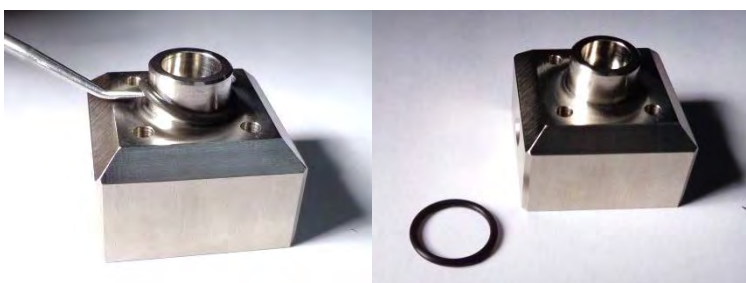


Figure 9: Remove the O-ring

10. Use a hex wrench to remove the end cap screws (16). For valves with a luer outlet, continue to step 13.



Figure 10: Remove End Cap Screws

11. Separate the end cap (10) from the seal plate (1).

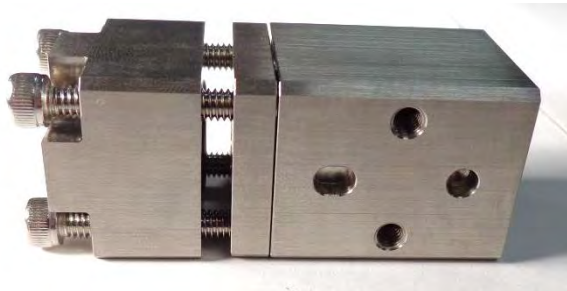


Figure 11: Separate Sections

12. Use a pick to remove the O-ring (21).



Figure 12: Remove the End Cap O-ring

Continue to step 19 for valves with the 1/4" NPT end fitting.

For For valves with a luer outlet:

NOTE: part numbers for steps 13-18 refer to drawing number 112-07384.

13. Use a hex wrench to remove the end cap screws (16).

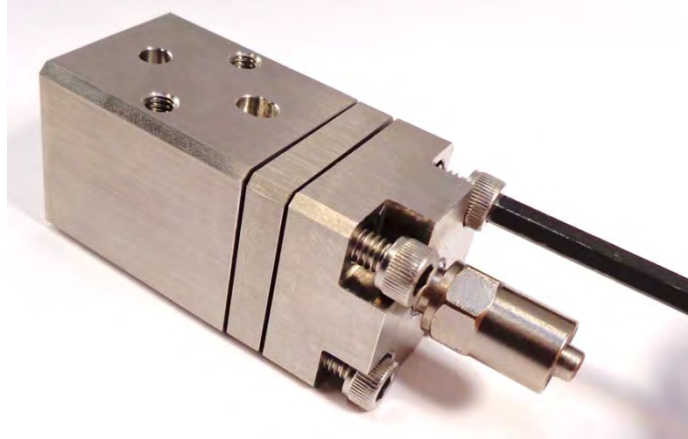


Figure 13: Remove the Screws from the End Cap

14. Separate the end cap (3) from the seal plate (1).

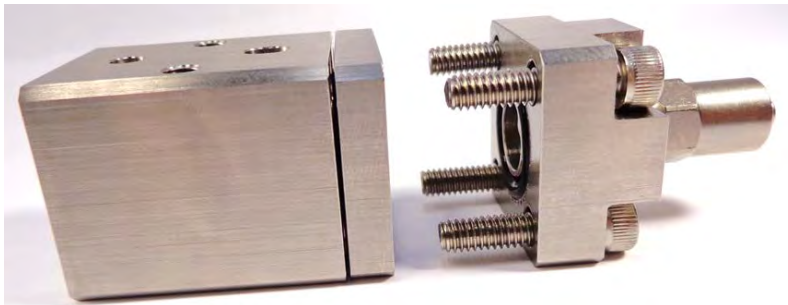


Figure 14: Separate the End Cap from the Seal Plate

15. Use a wrench to loosen and remove the luer adaptor (20).

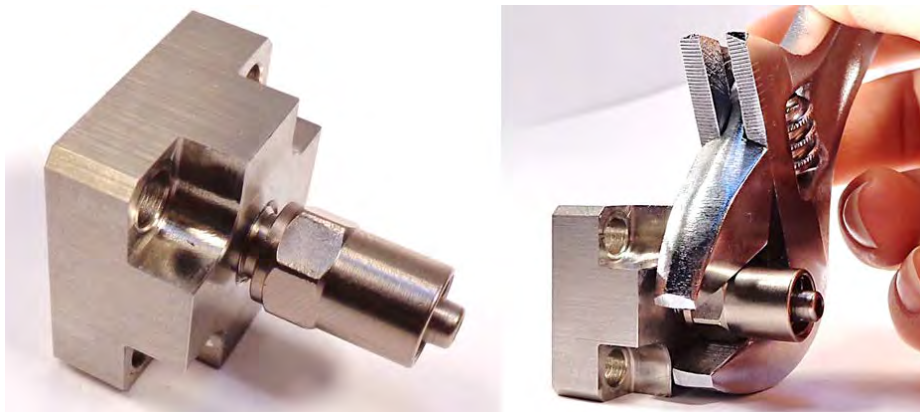


Figure 15: Remove the Luer Adaptor

16. Use a pick to remove the washer (19) from the end cap (3).



Figure 16: Remove the Washer from the End Cap

17. Use a pick to remove the O-ring (23) from the end cap (3).



Figure 17: Remove the O-ring from the End Cap

Do the steps below for both valve types.

18. Separate the seal plate (1) from the fluid body (7).

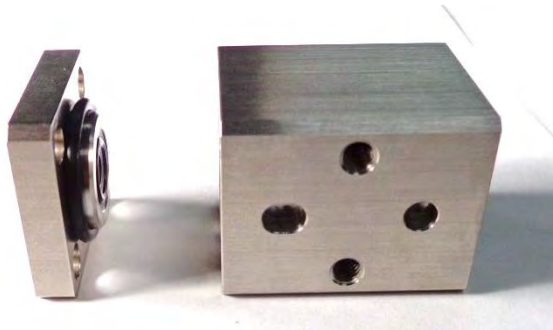


Figure 18: Separate the Seal Plate from the Fluid Body

19. Use a pick to remove the seal plate O-ring (22).

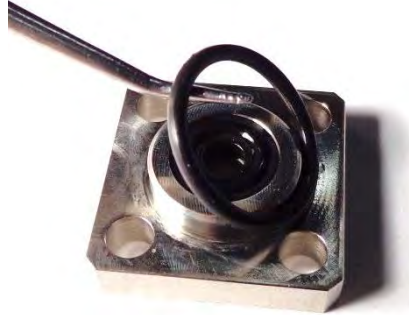


Figure 19: Remove the O-ring

20. Use a pick to remove the lip seal (12) from the seal plate (1).



Figure 20: Remove the Lip Seal

21. Use a pick to remove both of the washers (2) from the fluid body (7).



Figure 21: Washers in the Fluid Body

22. Separate the air cap (5) from the air cylinder (3).

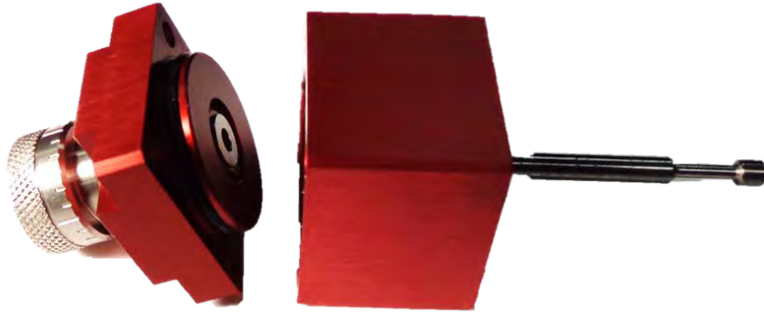


Figure 22: Separate the Air Sections

23. Push on the rod (8) to remove the piston-rod assembly from the air cylinder (3). Pull the piston-rod assembly out of the air cylinder.

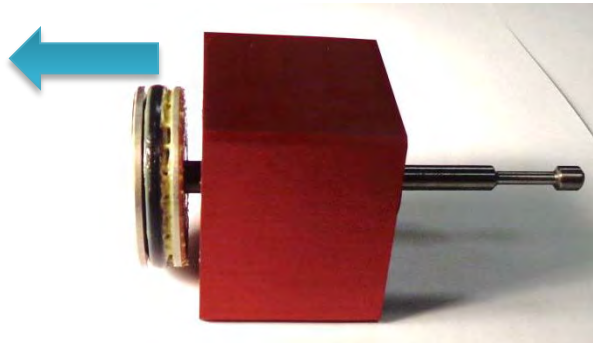


Figure 23: Remove the Piston Rod Assembly

24. Pull the spring (18) out of the air cylinder (3). Use a pick if necessary.

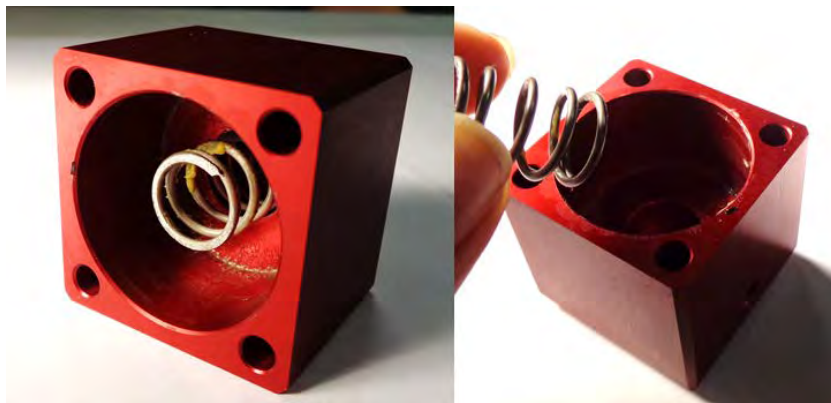


Figure 24: Remove the Spring

25. Use a pick to remove the air cylinder O-ring (19).

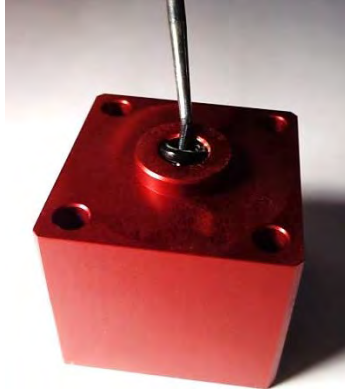


Figure 25: Remove the Air Cylinder O-ring

26. Use a pick to remove the piston O-ring (24).



Figure 26: Remove the Piston O-ring

27. Use a hex wrench to remove the set screw (15) in the piston (4). Hold the flat section on rod (8) with a wrench and turn the set screw until it is loose.



Figure 27: Disassemble the Piston-Rod Assembly

28. Disassemble the piston-rod assembly.



Figure 28: Disassembled Piston-Rod Assembly

29. Use a pick to remove the air cap O-ring (23).



This is the end of the normal disassembly procedure. If it is necessary to disassemble the air cap (5) and stroke adjust (9), do the steps below.

30. Turn the stroke adjust (9) so that the threads can be seen at the bottom of the air cap (5).
31. Use snap ring pliers to remove the snap ring (13) from the stroke adjust (9).



Figure 29: Snap Ring Removed

32. Turn the stroke adjust (9) counterclockwise to loosen the stroke adjust until it is removed from the air cap (5).



Figure 30: Stroke Adjust Removed from Air Cap

33. Remove the O-ring (20) from the stroke adjust (9).



Figure 31: Remove the O-ring from the Stroke Adjust

5.3 Clean the Valve Components

Use a compatible solvent to clean the valve components. All components should be cleaned and there should be no material on valve components.

1. Examine and clean all of the O-rings (19, 20, 21, 22, 23, 24).
2. If there is any wear or damage, replace the O-ring.



Figure 32: Examine O-rings

3. Examine and clean the lip seals (11, 12).
4. If they are damaged or show wear, replace the lip seals.



Figure 33: Examine Lip Seals

5.3.1 End Cap

Clean the end cap (10). Use cotton tipped swabs, lint free wipes, and solvent.

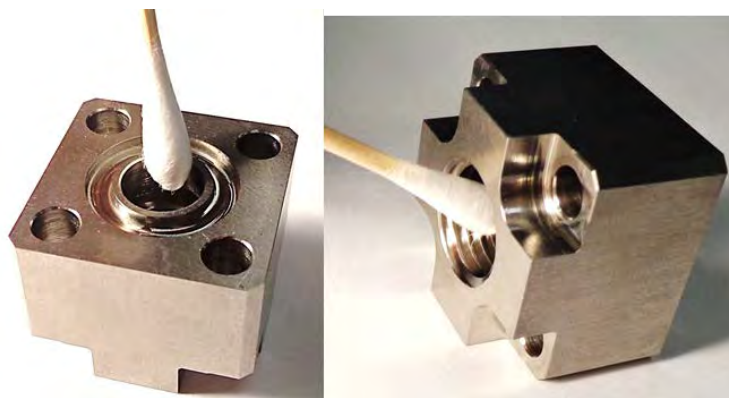


Figure 34: Clean End Cap

5.3.2 *Fluid Body*

Clean the fluid body (7). Use cotton tipped swabs, lint free wipes, and solvent.



Figure 35: Clean the Fluid Body

5.3.3 *Separation Body*

Clean the separation body (6). Use cotton tipped swabs, lint free wipes, and solvent.

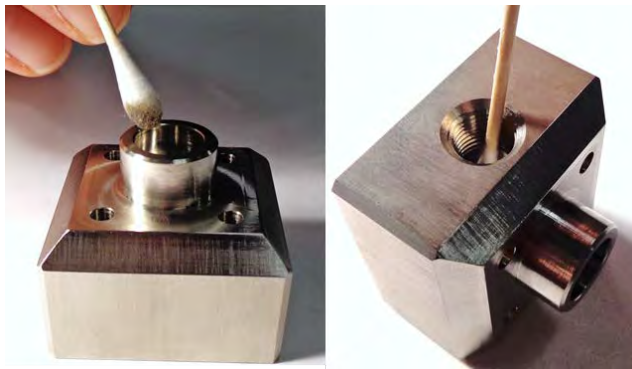


Figure 36: Clean the Separation Body

5.3.4 *Air Cylinder*

Clean the Air Cylinder (3). Use cotton tipped swabs, lint free wipes, and solvent.



Figure 37: Air Cylinder

5.3.5 *Air Cap*

Clean the Air Cap (5). Use cotton tipped swabs, lint free wipes, and solvent.



Figure 38: Clean the Air Cap

5.4 Assemble the Valve

Do the steps below to assemble the valve after it has been cleaned.

If you disassembled the air cap (5) and stroke adjust (9), put it together again.

1. Install the O-ring (20) on the stroke adjust (9).



Figure 39: Install the Stroke Adjust O-ring

2. Apply grease to the inside of the air cap (5).

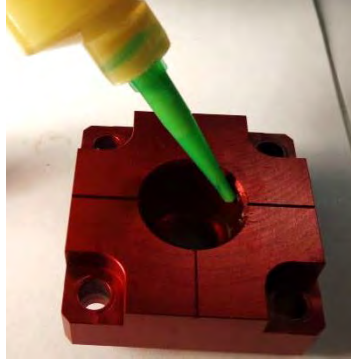


Figure 40: Apply Grease to the Air Cap

3. Put a small amount of oil on the threads of the stroke adjust (9).



Figure 41: Apply Oil to the Stroke Adjust Threads

4. Apply grease to the stroke adjust O-ring (20).



Figure 42: Apply Grease to the O-ring

5. Install the stroke adjust (9) into the air cap. Turn the stroke adjust clockwise until it is engaged and the threads can be seen coming through the air cap (5).

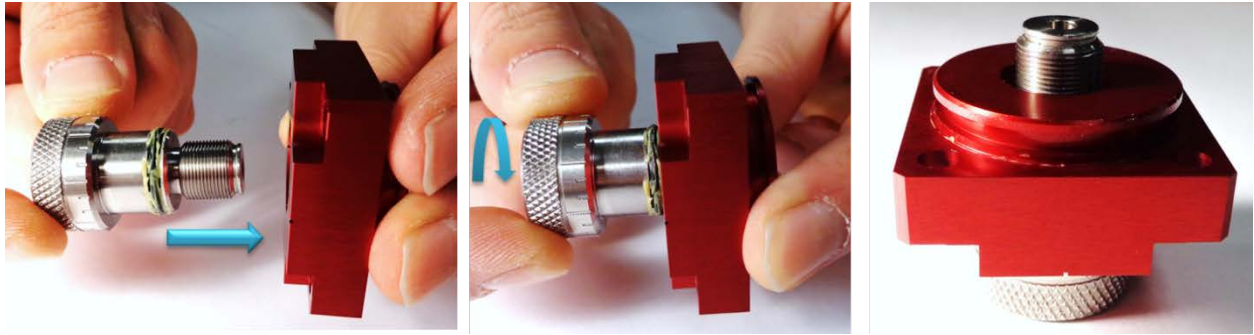


Figure 43: Install the Stroke Adjust Screw

6. Use snap ring pliers to install the snap ring (13).

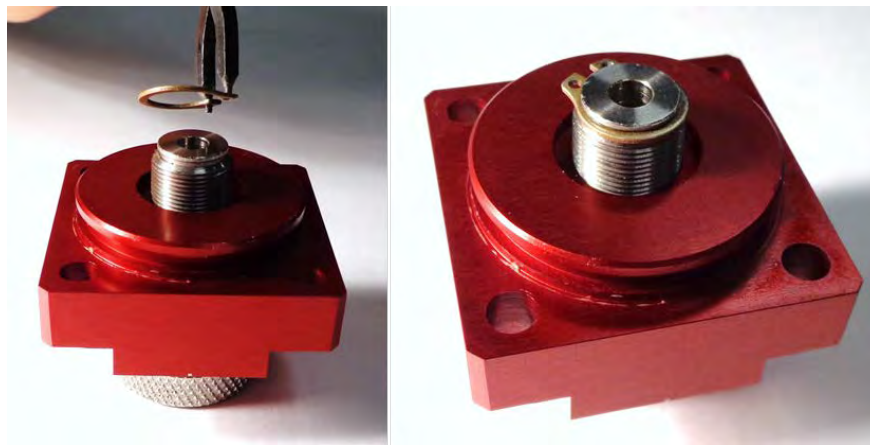


Figure 44: Install the Snap Ring

7. Turn the stroke adjust (9) counterclockwise to decrease the threads the show on the bottom of the air cap (5).
8. Install the O-ring (23) on the air cap (5).



Figure 45: Install the Air Cap O-ring

9. Apply grease to the air cylinder (3) and use the dispense tip to make an even layer.

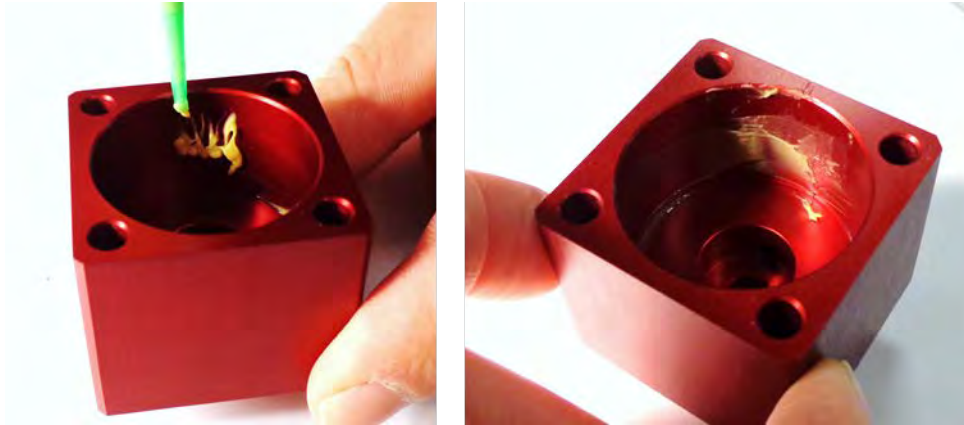


Figure 46: Apply Grease to the Air Cylinder

10. Get the piston (4), rod (8), set screw (15), and O-ring (24).



Figure 47: Piston-Rod Assembly Components

11. Apply removable thread locker to the set screw (15).



Figure 48: Apply Removable Thread Locker

12. Put the rod (8) on the side of the piston (4) with the groove in it.



Figure 49: Rod on the Grooved Side of the Piston

13. Install the set screw (15). Use a hex wrench to tighten the screw. Hold the flat section of the rod (8) with a wrench and make sure the screw is fully engaged in the piston (4) with the hex wrench.

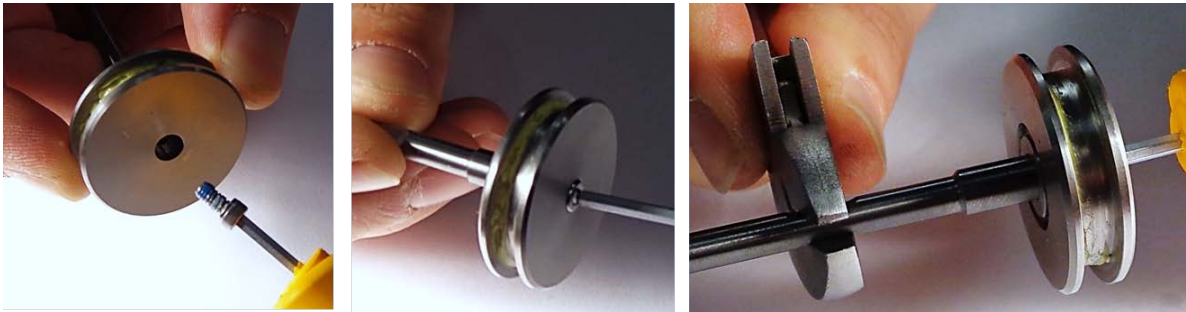


Figure 50: Piston-Rod Assembly

14. Install the piston O-ring (24).



Figure 51: Install the Piston O-ring

15. Apply grease to the piston O-ring (24).



16. Install the spring in the air cylinder (18).



17. Put the piston-rod assembly in the air cylinder (3).

18. Hold the air cylinder (3) in one hand and pull down on the rod (8) until the piston (4) is below the edge of the air cylinder.



19. Put the air cylinder O-ring (19) on your finger and apply grease to. Squeeze the O-ring between two fingers to coat the O-ring with grease.



Figure 52: Grease the Rod O-ring

20. Put the O-ring (19) on the rod (8) and push it down to the air cylinder (3).



Figure 53: Rod O-ring Installed

21. Install the lip seal (11) in the separation body (6). You should be able to see the O-ring in the lip seal when it is installed correctly.

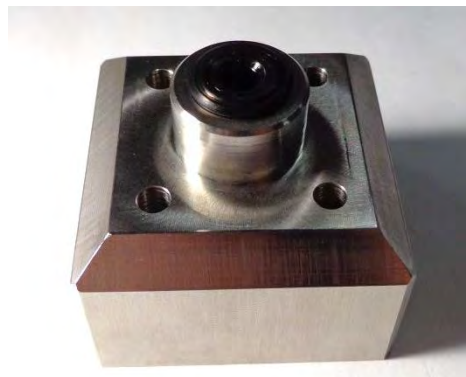


Figure 54: Lip Seal Installed in the Separation Body

22. Apply lubricant to the top of the lip seal (11).



Figure 55: Apply Lubricant to the Top of the Lip Seal

23. Apply a small amount of lubricant to the lowest edge inside the fluid body. Do this for both sides



Figure 56: Apply Lubricant to the Fluid Body

24. Install the washer (2) in the fluid body. Do this for both sides.

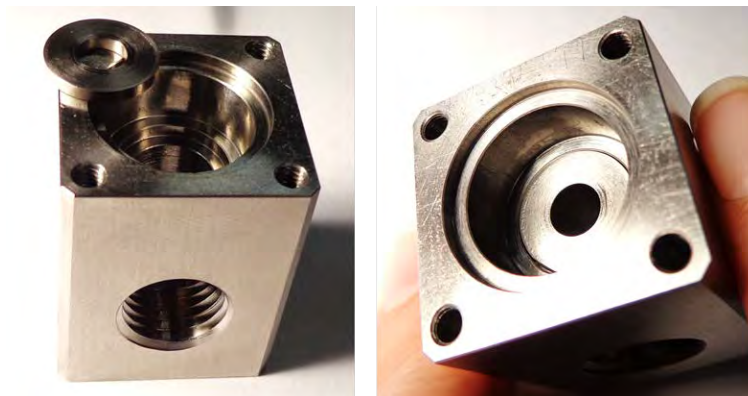


Figure 57: Install the Washers in the Fluid Body

25. Install the separation body O-ring (22).



Figure 58: Separation Body O-ring

26. Apply lubricant to the O-ring (22).



27. Put the fluid body (7) on the separation body (6).



Figure 59: Separation Body and Fluid Body

28. Install the separation body screws (14) and tighten them equally with a hex wrench. Make sure the components are aligned.



Figure 60: Tighten the Separation Body Screws

29. Put the lip seal (12) in the seal plate (1). The O-ring should be seen when the lip seal is correctly installed.



Figure 61: Lip Seal Install O-ring Up

30. Apply lubricant to the lip seal (12).

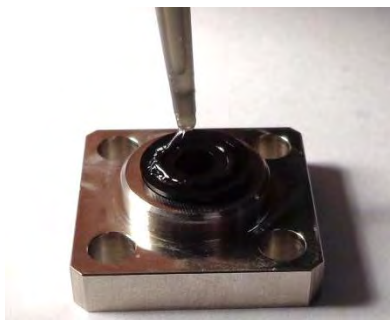


Figure 62: Apply Lubricant to the O-ring

31. Install the O-ring (22) in the seal plate (1).



Figure 63: Install the Seal Plate O-ring

32. Apply lubricant to the O-ring (22) in the seal plate (1).



Figure 64: Apply Lubricant to the Seal Plate O-ring

33. Install the seal plate (1) on top of the fluid body (7).

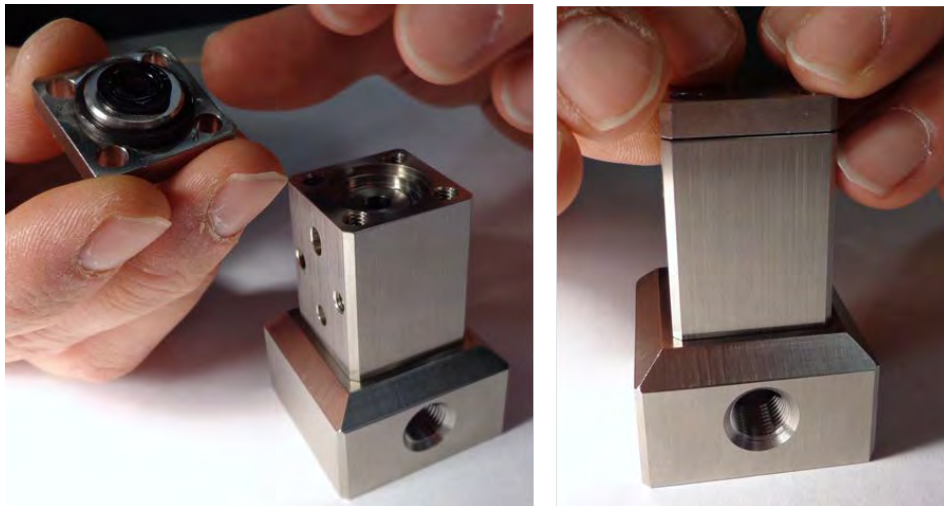


Figure 65: Install the Seal Plate

34. Apply lubricant to the O-ring groove in the end cap (10).

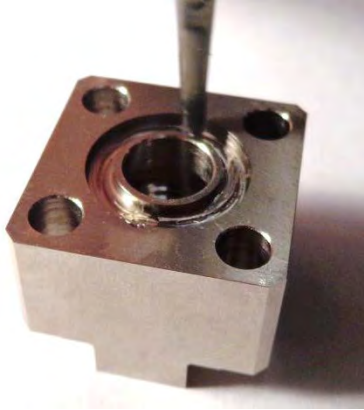


Figure 66: Apply Lubricant to the O-ring Groove

35. Install the O-ring (21) in the end cap (10).

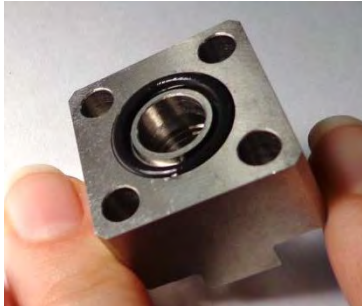


Figure 67: End Cap O-ring Installed

36. Apply lubricant to the end cap O-ring (21).

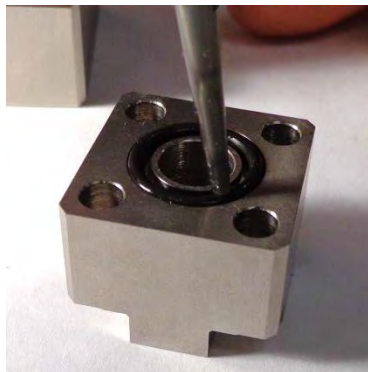


Figure 68: Apply Lubricant to the End Cap O-ring

37. Install the end cap (10) on top of the seal plate (1).



Figure 69: End Cap Installed

38. Install the end cap screws (16). Use a hex wrench to tighten them equally.



Figure 70: Tighten the End Cap Screws Equally

39. Make sure the valve is correctly aligned.

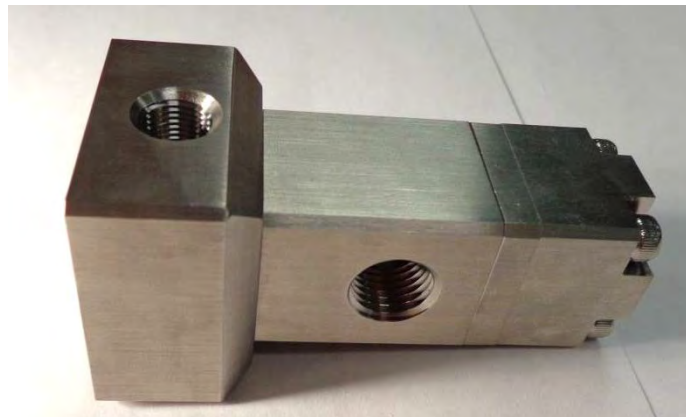


Figure 71: Sections Aligned

40. Apply lubricant to the rod (8).

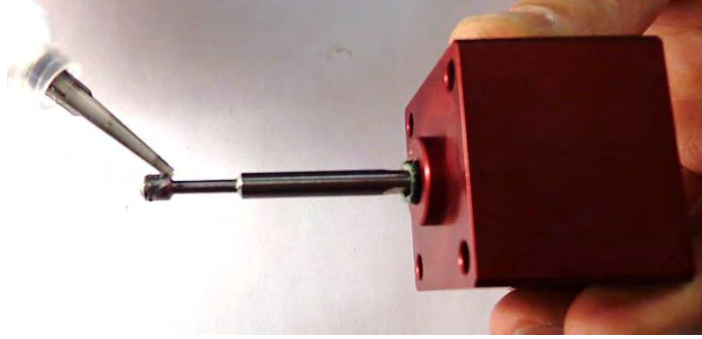


Figure 72: Apply Lubricant to the Rod

41. Install the rod (8) through the separation body (6) so that it is engaged in the rest of the valve.

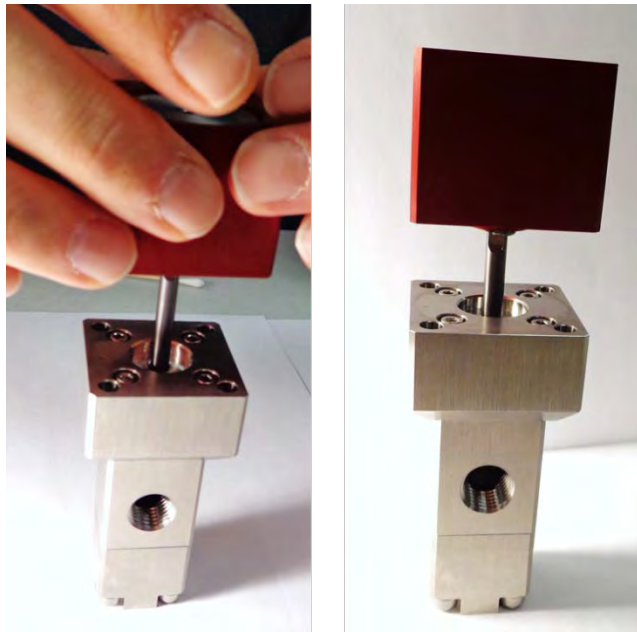


Figure 73: Install the Rod into the Fluid Section

42. When the rod (8) is installed to the where there is resistance, use a press to fully engage the rod in the fluid section of the valve.

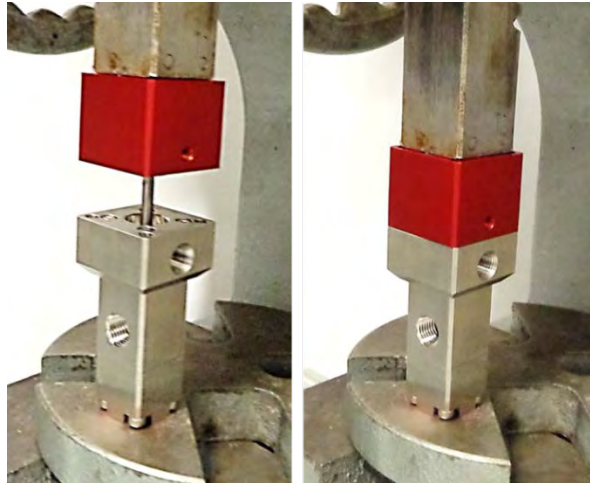


Figure 74: Use the Press to Fully Engage the Rod in the Fluid Section

- 43. Apply lubricant to the air cap O-ring (23).
- 44. Install the air cap (5).



Figure 75: Install the Air Cap

- 45. Install the air cap screws (17).

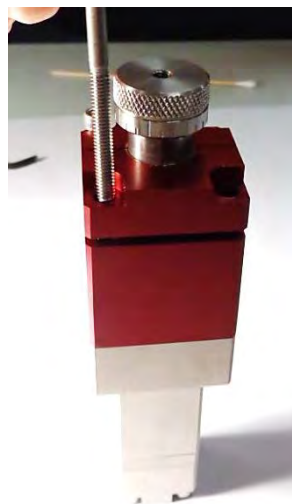


Figure 76: Install the Air Cap Screws

46. Make sure the valve is correctly aligned and use a hex wrench to tighten the screws (17) equally.



Figure 77: Tighten the Air Cap Screws

47. Use a wrench to install the air fittings if necessary.

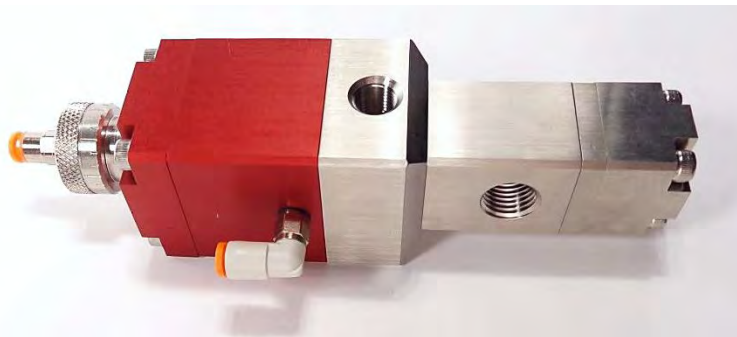


Figure 78: Fully Assembled Valve

5.5 To Replace O-rings

If an O-ring is damaged or worn, replace it.

1. Do the valve disassembly procedure to get access to the necessary O-ring(s). Refer to Section 5.2.
2. Remove the O-ring and discard it.
3. Replace the damaged or worn O-ring with a new O-ring.

Note: There are many different size O-rings, make sure you use the correct O-ring when you replace one. Refer to Section 6 for more information.

4. Follow the assemble procedure in Section 5.4.
5. Make sure you lubricate the O-ring as necessary.

5.6 To Replace Lip Seals

If a lip seal is damaged or worn, replace it.

1. Do the valve disassembly procedure to get access to the necessary lip seal(s).
Refer to Section 5.2.
2. Use the hook and pick set to remove the lip seal and discard it.
3. Replace the damaged or worn lip seal with the correct, new lip seal.
4. Follow the assemble procedure in Section 5.4.
5. Make sure you lubricate the lip seals as necessary.

6. Exploded View

6.1 Exploded View of the NPT Version

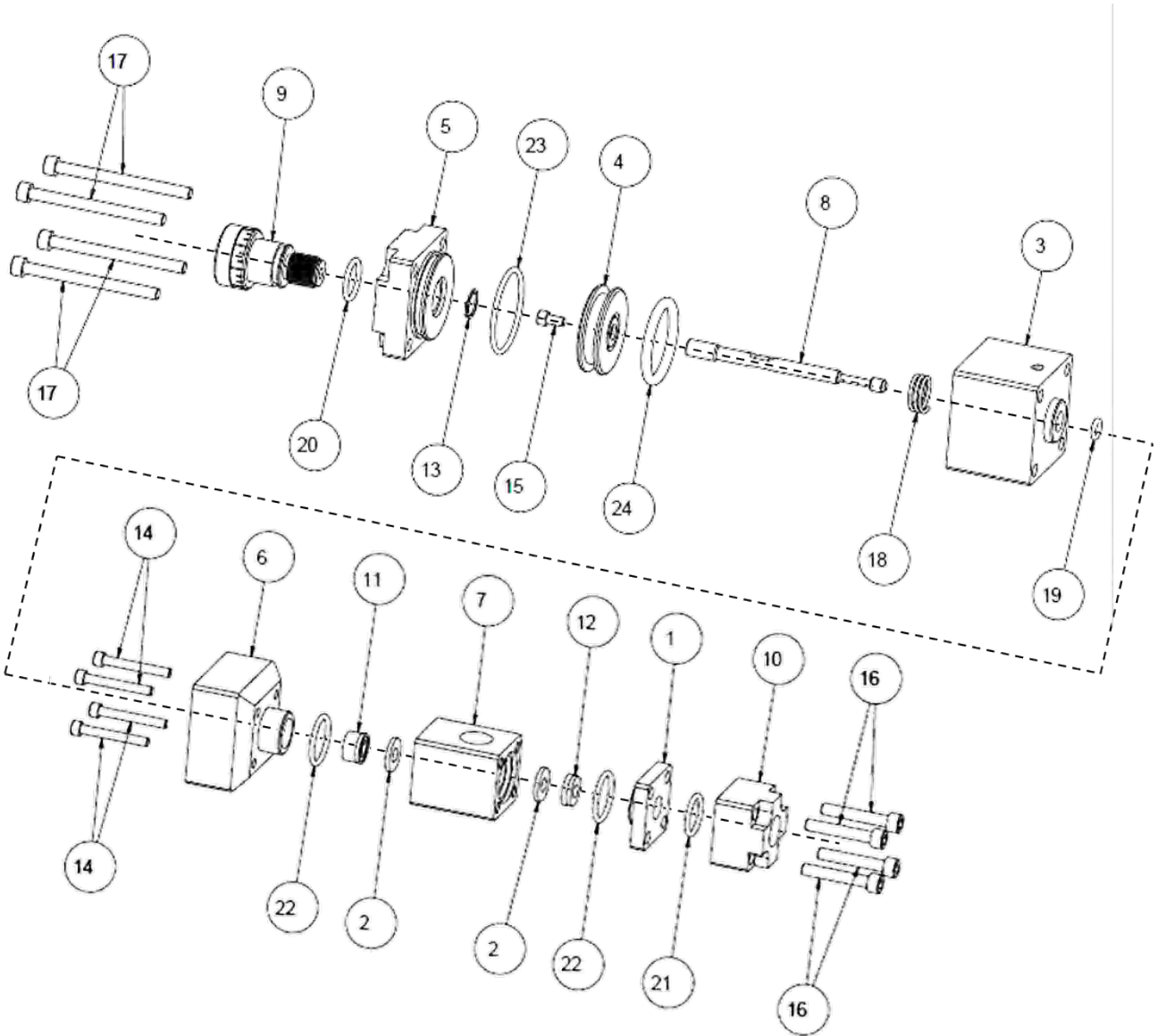


Figure 79: Drawing 112-07519, NPT Version

6.2 Item Numbers and Descriptions for 112-07519, NPT version

Table 1: Replacement Parts and Accessories

Item	Description	Part Number	Notes
1.	Seal Plate	114-9685	
2.	Washer	114-9692	
3.	Air Cylinder	214-09685	
4.	Piston	214-09686	
5.	Air Cap	214-09687	
6.	Separation Body	214-09688	
7.	Fluid Body	214-09917	
8.	Rod	214-3376-C	May also be referred to as a needle
9.	Stroke Adjust	214-3710	
10.	End Cap, NPT	214-3715	
11.	Lip Seal*	01525	
12.	Lip Seal*	12500187	
13.	Snap Ring	98410A117	
14.	Separation Body Screws	SHCS5-40X1000	
15.	Set Screw	SHCS5-40X250	
16.	End Cap Screws	SHCS8-32X1000	
17.	Air Cap Screws	SHCS8-32X2000	
18.	Spring	V056	
19.	O-ring*	VLV-008-B	
20.	O-ring*	VLV-014-B	
21.	O-ring*	VLV-014-V	
22.	O-ring*	VLV-016-V	
23.	O-ring*	VLV-024-B	
24.	O-ring*	VLV-214-B	

*Recommended spare parts. Refer to your bill of materials and schematic for specific options on your valve. The spare parts kit part number is SB300-SP and includes the recommended spare parts shown above.

Contact PVA for information on replacement parts or to order.

6.3 Exploded View of the Luer Version

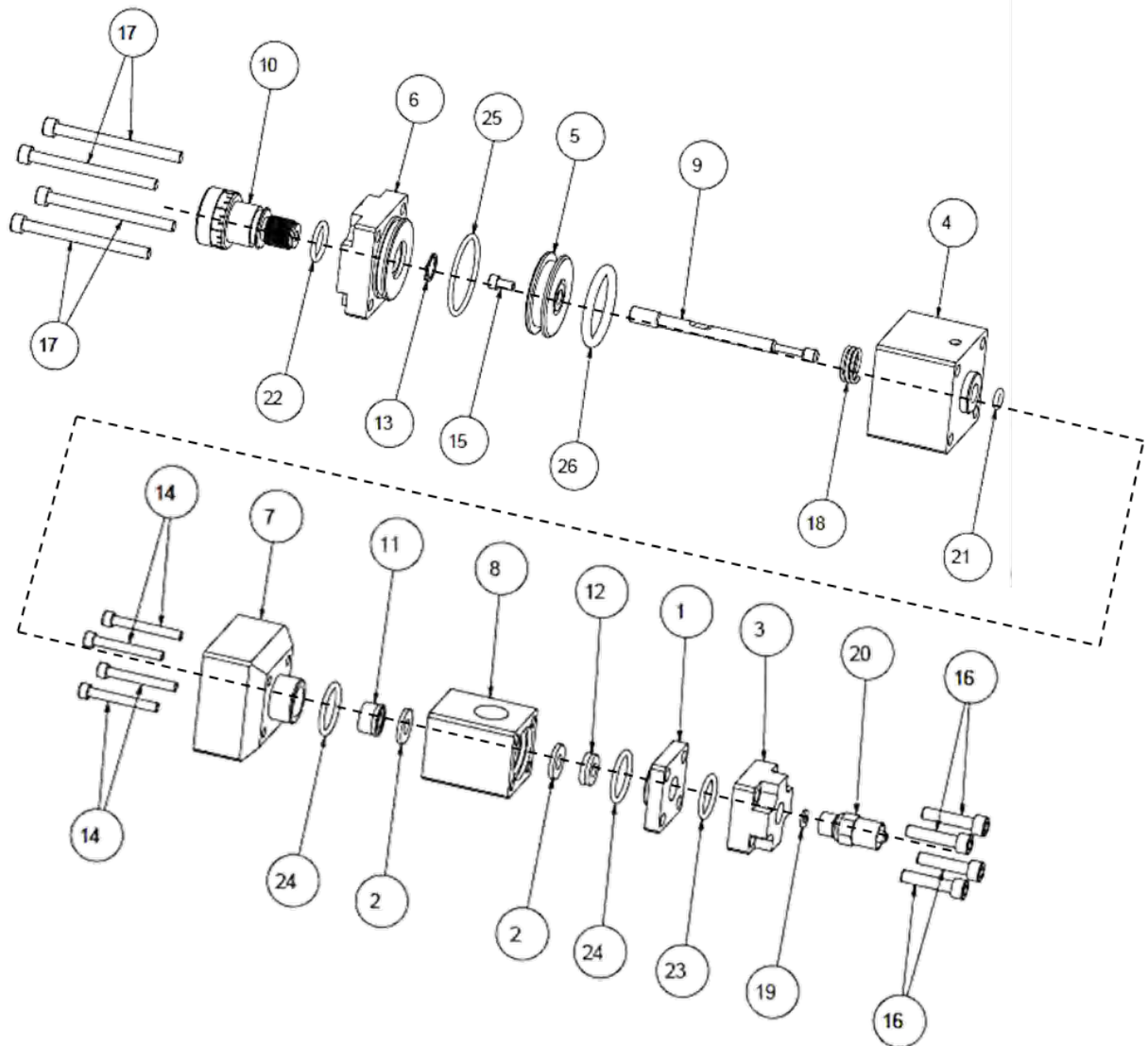


Figure 80: Drawing 112-07384, Luer Version

6.4 Item Numbers and Descriptions for 112-07384, Luer version

Table 2: Replacement Parts and Accessories

Item	Description	Part Number	Notes
1.	Seal Plate	114-9685	
2.	Washer	114-9692	
3.	End Cap	114-9700	
4.	Air Cylinder	214-09685	
5.	Piston	214-09686	
6.	Air Cap	214-09687	
7.	Separation Body	214-09688	
8.	Fluid Body	214-09917	
9.	Rod	214-3376-C	May also be referred to as a needle
10.	Stroke Adjust	214-3710	
11.	Lip Seal*	01525	
12.	Lip Seal*	12500187	
13.	Snap Ring	98410A117	
14.	Separation Body Screws	SHCS5-40X1000	
15.	Set Screw	SHCS5-40X250	
16.	End Cap Screws	SHCS8-32X0750	
17.	Air Cap Screws	SHCS8-32X2000	
18.	Spring	V056	
19.	Washer*	V125	
20.	Luer Adaptor	V300	
21.	O-ring*	VLV-008-B	
22.	O-ring*	VLV-014-B	
23.	O-ring*	VLV-014-V	
24.	O-ring*	VLV-016-V	
25.	O-ring*	VLV-024-B	
26.	O-ring*	VLV-214-B	

*Recommended spare parts. Refer to your bill of materials and schematic for specific options on your valve. The spare parts kit part number is SB300-SP and includes the recommended spare parts shown above.

Contact PVA for information on replacement parts or to order.

7. Technical Specifications

Table 3: SB300 Technical Specifications

Weight	Approximately 1.65lbs (0.75 kg)
Material inlet	1/4" NPT
Material outlet	1/4" NPT or Luer
Wetted parts	Stainless steel (300 series), Carbide, Viton, Urethane

8. Troubleshooting

Troubleshooting Problem	Possible Cause	Corrective Action
Valve does not cycle	<ul style="list-style-type: none"> Air pressure to air section is too low Material is cured in the valve O-rings were not lubricated when valve was assembled 	<ul style="list-style-type: none"> Increase air pressure to 60-100 psi Disassemble and clean the valve Disassemble the valve, lubricate the O-rings and seals and reassemble
Valve does not dispense material	<ul style="list-style-type: none"> The fluid pressure is too low Material is cured in the fluid section 	<ul style="list-style-type: none"> Increase the fluid pressure Disassemble and clean the valve
Valve leaks from the tip	<ul style="list-style-type: none"> Stroke adjust is down too far Rod or lip seals are worn Air bubble trapped in fluid section 	<ul style="list-style-type: none"> Turn stroke adjust counterclockwise Replace parts as necessary Flip valve upside down and cycle until all air is removed
Valve leaks from mid-section	<ul style="list-style-type: none"> Lip seal is worn 	<ul style="list-style-type: none"> Replace lip seal
There are air bubbles in fluid	<ul style="list-style-type: none"> Valve not correctly bled Stroke adjust is up too far Problem with the Fluid delivery system 	<ul style="list-style-type: none"> Do the complete bled procedure, flip valve upside down and cycle until the air is removed if necessary Turn the stroke adjust clockwise Diagnose and repair

9. Notes

10. Warranty

PVA Warranty Policy

PVA warrants the enclosed product against defects in material or workmanship on all components for one year from the date of shipment.

The warranty does not extend to components damaged due to misuse, negligence, or installation and operation that are not in accordance with the recommended factory instructions. Unauthorized repair or modification of the enclosed product, and/or the use of spare parts not directly obtained from PVA (or from factory authorized dealers) will void all warranties.

All PVA warranties extend only to the original purchaser. Third party warranty claims will not be honored at any time.

Prior to returning a product for a warranty claim, a return authorization must be obtained from PVA's customer service department. Authorization will be issued either via the telephone, facsimile, or in writing upon your request.

To qualify as a valid warranty claim, the defective product must be returned to the factory during the warranty period. Upon return, PVA will repair (or replace) all components found to be defective in material or workmanship.

(Retain this for your records)

Product Information:

PRODUCT: _____

SERIAL NUMBER: _____

DATE OF PURCHASE: _____

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