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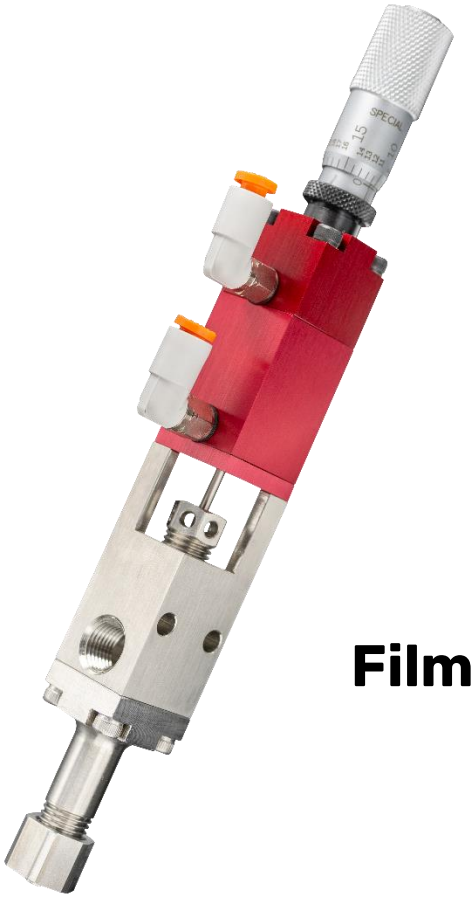

Film Coat Dispense Valve

FC100-CF

(PVA Tip)

Operation Manual

Revision C

Precision Valve & Automation
6 Corporate Drive
Halfmoon, NY 12065

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Table of Contents

1. Introduction

Before you operate this valve, 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 Technical Support department.

1.1 PVA Contact Information

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1.2 Document History

Revision	Revision Date	Reason for Changes
C	January 2024	Updated to Reflect New PVA Tip
B	December 2021	Updated Bill of Materials and Drawings
A		Initial Release

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

1.3 System Description

IMPORTANT: The PVA FC100-CF was redesigned to include a new film tip nozzle in January 2024. This manual is for users who are currently using the new PVA nozzle. If you are unsure which FC100-CF version you are using, please contact Customer Service at cs@pva.net or +1 (518) 371-2684 or your PVA Regional Sales Manager.

The FC100-CF is a front closing stainless steel film coat dispense valve designed to apply fluids in a non-atomized method to deliver transfer efficiency greater than 99%. This valve is typically used for low viscosity coatings.

The FC100-CF has a divorced design comprising of two major sections. These include:

1. Air section (red anodized portion)
2. Fluid section (stainless steel portion)

The air section is an aluminum body with a simple piston/cylinder combination used to open and close the valve. A micrometer adjustment, Figure 8: Micrometer Adjustment Breakdown, in the upper air body controls how far the piston and needle assembly can retract thus regulating the rate of fluid flow. The micrometer will display a distance that the piston and needle will travel.

The fluid section is a stainless steel body, which includes a needle and seat combination to control fluid flow. Fluid dispenses as the needle retracts out of the seat, then stops as the needle moves back into the seat. The micrometer adjustment regulates the distance that the needle can retract out of the seat, thus controlling the orifice size and the rate of fluid flow. A film tip nozzle at the end of the valve will fan the liquid outward without the need for atomizing air to apply thin ribbon coating patterns. Fluids typically include solvent based or low viscosity conformal coatings.

Wetted parts on the FC100-CF include:

- 303, 304 stainless steel
- Teflon
- Kalrez

2. Safety

Due to material contents being under pressure eye protection is required for operators. Refer to MSDS sheets on material being dispensed for other precautions.

3. Setup

The FC100-CF requires a 2-position, 4-way air solenoid valve to actuate the air section. The valve should be operated with clean, dry air between 60-100 psi. Two #10-32 threaded air ports are located on the air section of the valve. The port located furthest from the midsection of the valve is air to close the valve. The port located closest to the mid-section of the valve is air to open the valve. Quick connect air fittings are typically supplied with the FC100-CF to fit 5/32 in tubing.

Note: The valve should normally be in the closed position.

Fluid is supplied to the FC100-CF through the 1/8 in fnpt port located on the stainless steel fluid section of the valve.

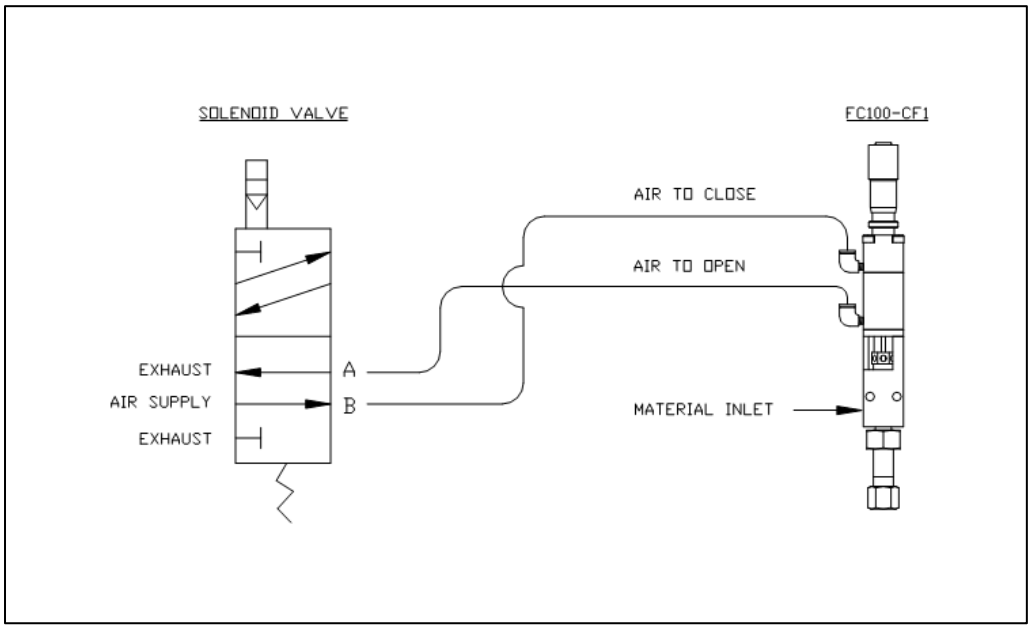

Figure 1: Solenoid Valve

3.1 Tool Kit

PVA offers standard tool kits for all dispensing valves. The tool kit for the FC100-CF includes all necessary tools and lubricating grease to perform maintenance on this dispense valve.

Quantity	Part Number	Description
2	0266244	8 in Adjustable Wrench
2	26563	3/32 in Allen Key
1	26561	5/64 in Allen Key
1	26559	1/16 in Allen Key
1	5516A18	Tweezers
1	B62-0752	2.5cc Mineral Oil Lubrication Kit
1	B62-2048	2.5cc Silicone Lubricant
1	9570K71	Hook and Pick Set
1	0266255	Pliers
2	53085A61	Soft Plastic Cover for Pliers
1	PB135/2	Micrometer Screw Driver, #2
1	PT17184	Micrometer Adjustment Wrench
1	MM115	Removable Thread Locker

Figure 2: B12-1986 Tool Kit

3.2 Operation

Refer to Figure 7: FC100-CF Cross Section for part reference numbers.

1. Plumb up the valve as outlined above in the Setup procedures.
2. Regulate the air pressure operating the valve between 60-100 psi.
3. Ensuring the valve is not aimed toward anyone, cycle the valve several times. When the valve is cycling, the piston can be heard hitting the micrometer adjustment, and the needle (**3**) can be seen going up and down in the center.

Note: If the valve is not cycling properly, refer to the Troubleshooting section.

4. When the fluid delivery system is connected to the valve, pressurize the material to be dispensed.
5. Once again, cycle the valve open to purge. Fluid should begin to dispense from the for tip nozzle of the valve, continue dispensing until all air is removed.
6. Check the fluid connection and the packing nut (**19**) for leaks.

Note: If the valve is leaking, refer to the Troubleshooting section.

7. Turn the micrometer adjustment head (**1**) until the desired flow rate is achieved. Turning the adjustment clockwise toward zero will decrease the material flow rate and counterclockwise will increase the material flow rate. If the micrometer adjustment is turned all the way down to zero, it will stop fluid flow entirely.
8. Once the micrometer setting is determined, the collar (Figure 8, Part E) on the micrometer head (**1**) can be turned clockwise to lock the adjustment.

3.3 Periodic Maintenance

Refer to Figure 6: FC100-CF Cross Section and Figure 7 for location of parts referenced in the following procedures.

1. Lubricate the packing (**18**) on the FC100-CF valve every 200 hours by placing a few drops of mineral oil or other light oil inside the packing nut.
2. The packing nut (**19**) may require occasional tightening, as wear occurs in order to prevent leaks through the packing.

Note: PVA offers a 2.5cc mineral oil lubrication kit; Part#: B62-0752

3.4 Routine Cleaning and Disassembly

Cleaning and rebuilding the valve will be required from time to time. A spare parts kit, Figure 3: 612-17605 Spare Parts Kit, is available with all the normal wear parts included.

1. Begin disassembly by removing air and fluid pressure from the valve.
2. Remove all the pneumatic tubing and fluid delivery fittings, hoses, etc. from the valve.
3. Using the tip of a 3/32 in Allen key, loosen the packing nut (**19**).
4. Using the same 3/32 in Allen key, evenly remove the two machine screws (**11**) that are located on the same corners as the fluid section standoffs (**6**).

Note: During removal there is a spring (13) forcing the air section away from the fluid section.

5. Pull the air section (red anodized portion) away from the fluid section (stainless steel portion).
6. Clean off the tip of the stainless steel needle (**3**).
7. From the fluid section of the valve, unthread and remove the packing nut (**19**), and the packing (**18**).
8. Using an adjustable wrench, unthread and remove the nozzle cap (**5**), nozzle (**7**), and O-ring (**21**).
9. Using the same 3/32 in Allen key, remove the four machine screws holding the locating nozzle (**8**) to the fluid body (**6**).
10. Remove the 014 Kalrez O-ring (**25**) from the nozzle adapter (**8**).
11. Using pliers, pull the seat (**17**) out of the fluid section (**6**) and remove the 006 Kalrez O-ring (**22Error! Reference source not found.**) from the seat.

Note: If the seat is stuck, it can be pushed through from the opposite side of the fluid section.

12. Clean all wetted parts thoroughly with an appropriate solvent.
13. On the air section, use a standard 3/32 in Allen key to evenly remove the final two machine screws (**9**) that thread into the end cap (**14**).

Note: During removal, the spring (13) will force the air section apart.

14. Separate the upper air body (**4**) from the lower air body (**15**) to remove the spring (**13**) then slide the end cap (**14**) off the needle (**3**).

15. Holding the lower air body (**15**) in one hand, grab the needle (**3**) and push the needle and piston (**16**) assembly out of the lower air body.

16. Remove the 004 Buna O-ring (**20**) from the lower air body (**15**).

17. Hold the piston (**16**) with an adjustable wrench then using the 5/64 in Allen key unthread and remove the set screw (**12**) to remove the needle (**3**) and remove the 014 Buna O-ring (**24**) from the piston (**16**).

18. Remove the 014 Buna O-ring (**24**) from the upper air body (**4**) then use a 1/16 in Allen key to remove the set screw (**2**).

19. Using pliers grip the collar (Figure 8, Part E) or body (Figure 8, Part D) of the micrometer head (**1**) and turn counterclockwise to loosen then unthread and remove from the upper air body (**4**) by hand.

20. Remove the 007 Buna O-ring (**23**) from the micrometer head (**1**).

21. Replace components with spares provided in the spare parts kit shown in Figure 3.

3.5 Assembly Instructions

3.5.1 General

- Lubricate all O-rings with a small amount of silicone grease.
- Apply a small amount of removable thread locker to the set screw (**12**).
- Assemble the air section and fluid section separately prior to connecting the assemblies.

3.5.2 Air Section

1. Mount one 007 Buna O-ring (**23**) on the end (Figure 8, Part F) of the micrometer (**1**) and slide it up to the threads.
2. Thread the micrometer head (**1**) into the upper air body (**4**) hand tight.
3. Holding the collar (Figure 8, Part E) of the micrometer head (**1**), turn the dial (Figure 8, Part C) counterclockwise until the number 5 can be seen on the gauge (Figure 8, Part D).
4. Using pliers, grab the gauge section of the micrometer (Figure 8, Part D) and turn clockwise to snug it onto the upper air body (**4**).
5. Use a 1/16 in Allen key to assemble the set screw (**2**) into the upper air section (**4**) securing the micrometer head (**1**) in place.
6. Mount one 014 Buna O-ring (**24**) on the end of the upper air body (**4**).
7. Drop the needle (**3**) into the piston (**16**) and assemble with the set screw (**12**) using an adjustable wrench and 5/64 in Allen key to tighten.
8. Mount the 014 Buna O-ring (**24**) onto the piston (**16**).
9. Apply a small amount of silicone grease to the inside of the lower air body (**15**) then drop in the piston and needle assembly.
10. Mount the 004 Buna O-ring (**20**) on the end of the needle and slide it down into the groove in the end of the lower air body (**15**).
11. Slide the end cap (**14**) onto the needle up to the lower air body (**15**), place the spring (**13**) on top of the piston (**16**), and assemble the two air bodies using two machine screws (**9**) tightening with a 3/32 in Allen key. Ensure the air holes are lined up on the same face.

3.5.3 Fluid Section

1. Drop the packing (**18**) into the fluid section (**6**), and screw in the packing nut (**19**), leaving finger tight until assembled with the air section.

2. Mount one 006 Kalrez O-ring (**22**) on the seat (**17**) and push the seat into the bottom of the fluid section (**6**). When inserting the seat, work the O-ring into the fluid body with a finger to prevent shearing of the edge of the O-ring.

3. Install the O-ring (**25**) into the locating nozzle adapter (**8**). Using a 3/32 Allen key, install four screws (**10**) to affix locating nozzle adapter (**25**) to lower fluid body (**8**).

4. Place the O-ring (**21**) into the lower portion of the locating nozzle adapter followed by the spray nozzle (**7**).

5. Install the nozzle cap (**5**) and tighten to compress the O-Ring. Ensure the nozzle is within locating features of the locating nozzle adapter (**8**) for correct functionality.

3.5.4 Assemble Section

1. Ensure the micrometer adjustment head (**1**) is backed out far enough so at least the number 1 can be seen on the gauge (Figure 8, Part D).

2. Apply a small amount of silicone grease to the end of the needle (**3**) and insert it into the packing nut (**19**). Connect the sections using the two machine screws (**11**), tightening them down evenly using a 3/32 in Allen key.

3. Using the tip of a 3/32 in Allen key, tighten the packing nut (**19**).

3.6 Spare Parts

PVA offers standard spare parts kits for all dispensing valves. These kits are stocked for immediate shipment and allow replacement of all wearable parts of the valve.

The spare parts kit for the FC100-CF, product number 612-17605, includes the following components:

Quantity	Part Number	Description
1	114-5247	FC100 Needle
1	3ALOK-316SET	3/16 Tube Ferrule Set
1	PT17184	Micrometer Adjustment Wrench
1	TFEBTB01250187B	3/16" Teflon Tubing – 84"
1	V302	Seat
1	V305	Packing
1	VLV—004B	O-ring, Buna
1	VLV-004K	O-ring, Kalrez
1	VLV-006K	O-ring, Kalrez
1	VLV-007B	O-ring, Buna
1	VLV-014B	O-ring, Buna
1	VLV-014K	O-ring, Kalrez

Figure 3: 612-17605 Spare Parts Kit

3.7 Drawings

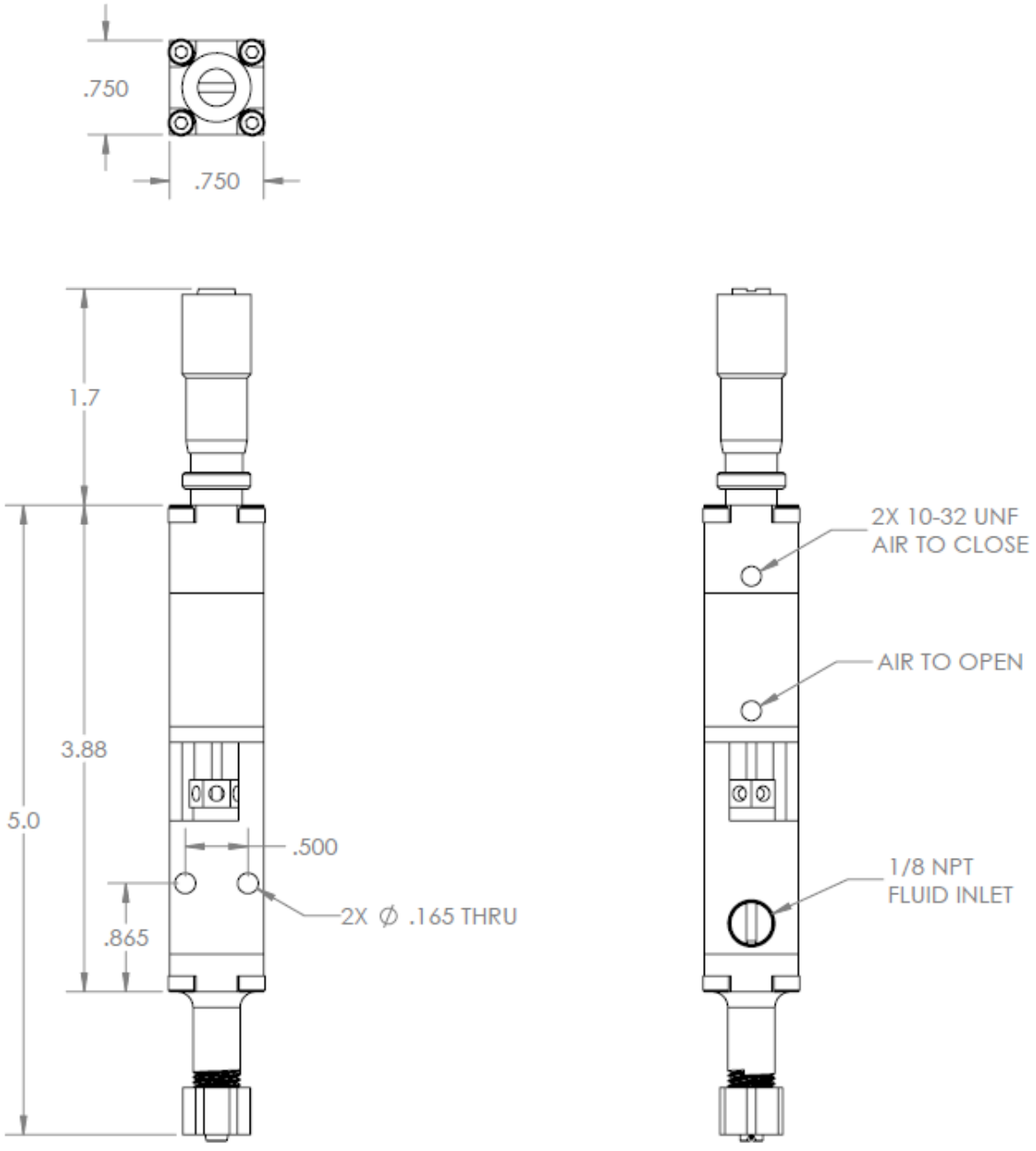

Figure 4: FC100-CF Dimensions

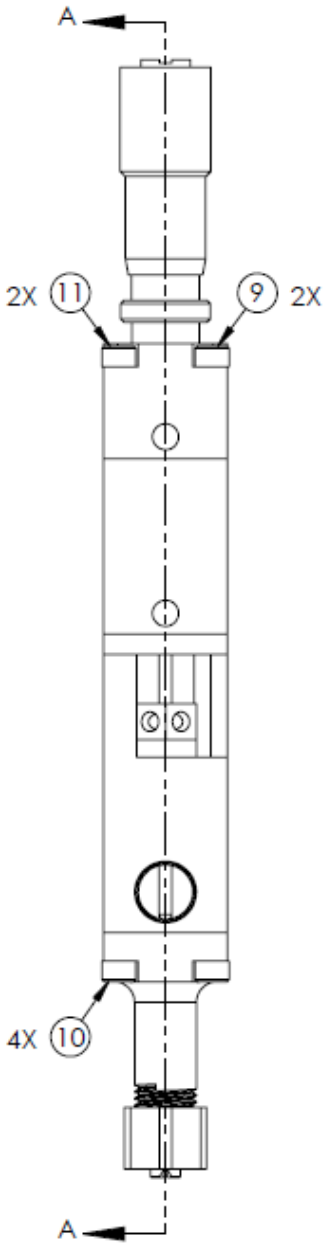

Figure 5: FC100-CF Flow Pattern

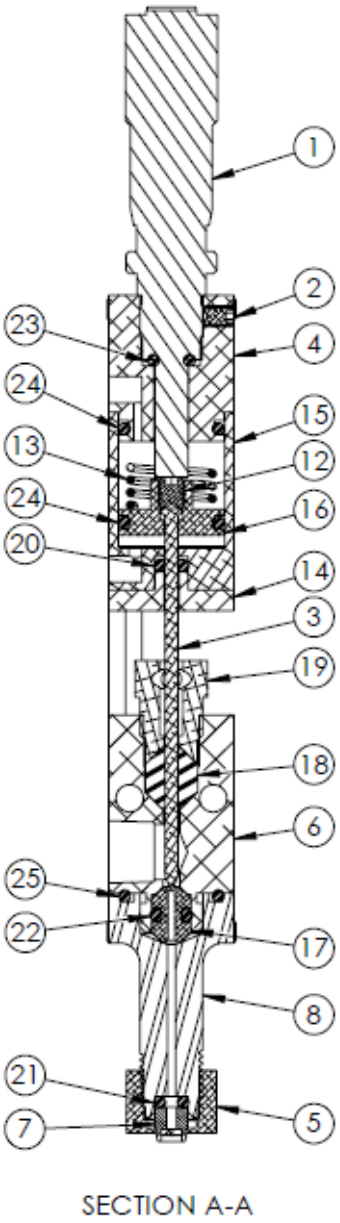

Figure 6: FC100-CF Cross Section

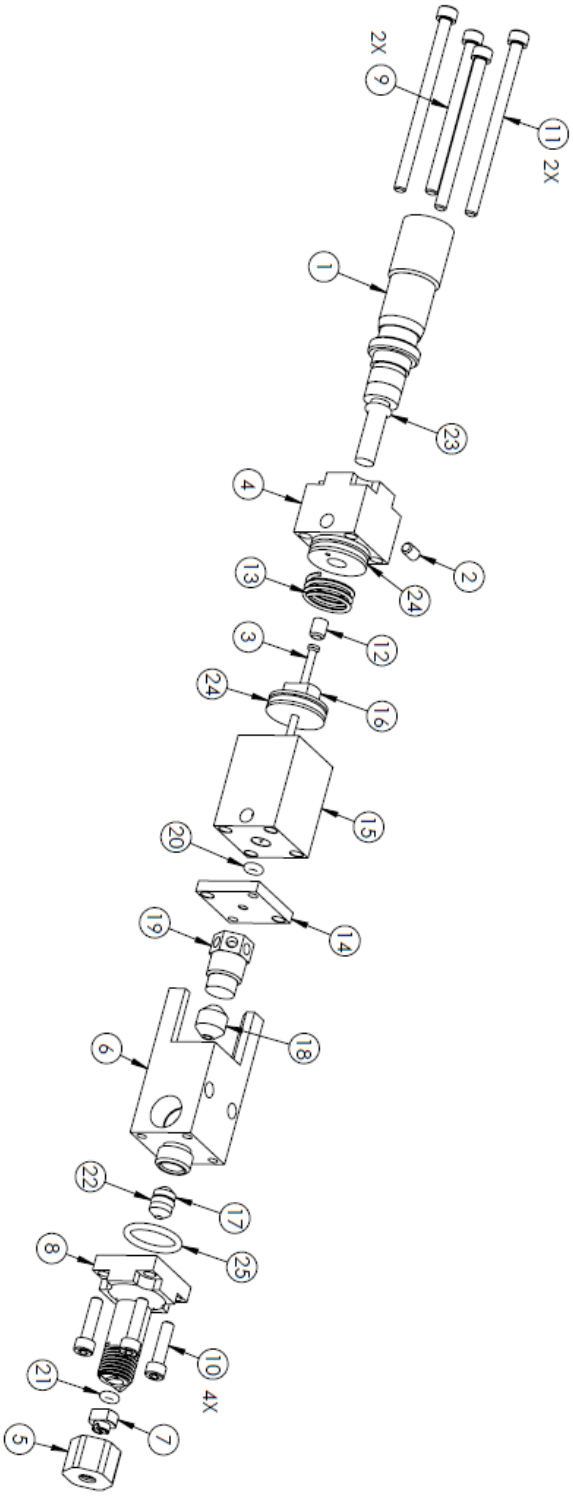

Figure 7: FC100-CF Cross Section

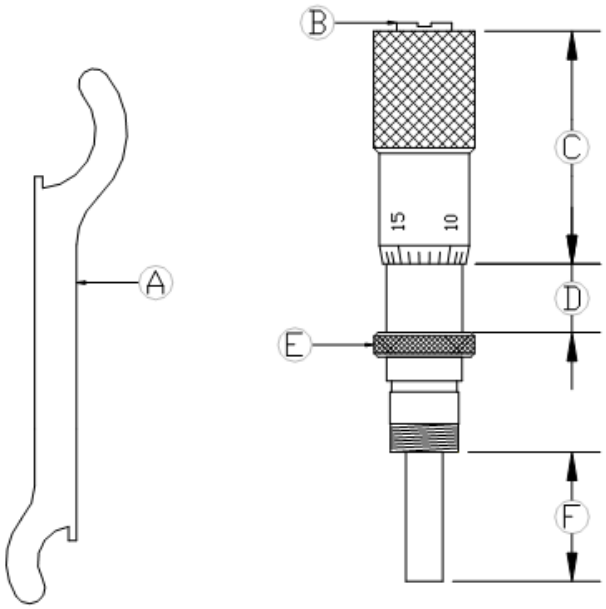

Figure 8: Micrometer Adjustment Breakdown

3.8 Bill of Materials

Item	Part Number	Description	Quantity
1	01423	MICROMETER HEAD	1
2	01469	SET SCREW, #5-40 x 3/16"	1
3	114-5247	FC100 NEEDLE	1
4	114-6556	UPPER AIR BODY	1
5	114-8053	NOZZLE CAP	1
6	214-0753	FLUID BODY, FC100, BOTTOM TAPPED	1
7	612-11177-2	CF SPRAY NOZZLE 25°	1
8	614-20215-1	CF VALVE NOZZLE, LOCATING	1
9	SHCS #5-40 X 1 3/4"	SOCKET HEAD CAP SCREW	2
10	SHCS #5-40 X 1/2"	SOCKET HEAD CAP SCREW	4
11	SHCS #5-40 X 2"	SOCKET HEAD CAP SCREW	2
12	V001	SET SCREW	1
13	V050	SPRING	1
14	V200	END CAP	1
15	V201	LOWER AIR BODY	1
16	V202	PISTON	1
17	V302	SEAT	1
18	V305	PACKING	1
19	V306	PACKING NUT	1
20	VLV-004B	O-RING, -004, BUNA-N	1
21	VLV-004K	O-RING, -004 KALREZ	1
22	VLV-006K	O-RING, -006, KALREZ	1
23	VLV-007B	O-RING, -007, KALREZ	1
24	VLV-014B	O-RING, -014, BUNA-N	2
25	VLV-014K	O-RING, -014, KALREZ	1

Figure 9: FC100-CF Bill of Materials

4. Troubleshooting

Troubleshooting Problem	Possible Cause	Corrective Action
Valve does not cycle	Air pressure to the air section is too low	Increase the air pressure to 60-100 psi
	Packing nut is too tight	Loosen the packing nut until valve begins to cycle; retighten the packing nut
	Micrometer adjustment bolt has bottomed out	Back out the micrometer adjustment bolt by turning it counterclockwise
	Material is cured in the valve	Disassemble and clean the valve
	Valve was assembled without lubricating the O-ring seals	Disassemble the valve, lubricate the seals, and re-assemble the valve
Material leaks from the valve tip	Packing nut is too tight	Loosen the packing nut
	Needle and/or seal are worn	Replace the parts as necessary
	Air bubble trapped in fluid body or in nozzle adapter	Flip the valve upside down and cycle until the air bubbles are removed
	O-ring is worn or missing the nozzle extension	Replace the O-ring
Valve leaks from the mid-section	Packing nut is loose	Tighten the packing nut until it is snug
	Packing is worn	Replace the packing
Valve does not dispense anything	Fluid pressure is too low	Increase the fluid pressure
	Material cured in fluid section	Disassemble the valve and clean
	Micrometer adjustment bolt is set too close to zero	Back out the micrometer adjustment bolt by turning it counterclockwise
Air bubbles in fluid	Valve is not properly purged	Flip the valve upside down and cycle until the air bubbles are removed
	Problem with the fluid delivery system	Diagnose and repair
Dispense rate is too fast	The micrometer adjustment bolt is set too far from the zero mark	Turn the micrometer adjustment bolt clockwise toward the zero mark
Dispense rate is too slow	The micrometer adjustment bolt is set too close to the zero mark	Turn the micrometer adjustment bolt counterclockwise away from the zero mark
Fluid does not dispense uniformly from the nozzle	Fluid pressure is too low	Increase the fluid pressure until the fluid fans out in a wide pattern
	Material is cured on the nozzle tip	Clean the tip with a cloth or solvent

5. 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 Technical Support 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: _____

6. Table of Figures