

# Pneumatic PD44

313904E

ENG

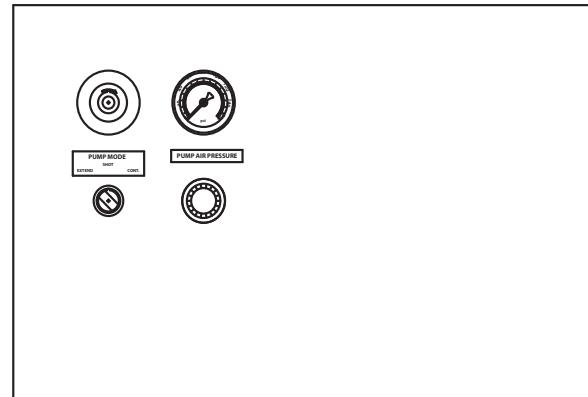
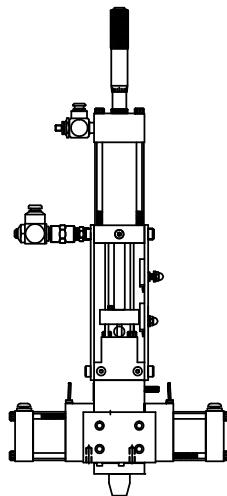
***Meter, mix and dispense valve for precise two-component micro-dispensing of sealants and adhesives. For professional use only.***



## Important Safety Instructions

Read all warnings and instructions in this manual. Save these instructions.

See page 3 for model information including maximum working pressures.



*Pump and Tank not shown*

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## Related Manuals

Components manuals in English. Manuals are available at [www.graco.com](http://www.graco.com).

<b>Feed System Manuals</b>	
<b>Manual No.</b>	<b>Description</b>
306565	Air-Driven, Stainless Steel Agitators
307043	Monark Air Motor
308116	Severe-Duty, UHMWPE/PTFE or PTFE Packed Stainless Steel Pumps
308167	Low Volume Air Regulators
308168	High Volume Air Regulators
308169	Air Filters, Lubricators and Kits
309306	Air-Operated Husky Diaphragm Pumps
312376	Stainless Steel Agitator Kit
313526	Check-Mate® Pump Packages
3A1452	20 oz Cartridge

# Model

Metering Valve Model	Max Outlet Fluid Working Pressure psi (MPa, bar)	Max Air Working Pressure psi (MPa, bar)	Max Inlet Working Pressure psi (MPa, bar)	
			Metal Sleeves	Plastic Sleeves
Micrometer	2000 (14, 138)	100 (0.7, 7)	1200 (8, 83)	400 (2.8, 28)

## Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbol refers to procedure-specific risk. Refer back to these warnings. Additional, product-specific warnings may be found throughout the body of this manual where applicable.

 <b>WARNING</b>	
  	<p><b>FIRE AND EXPLOSION HAZARD</b></p> <p>Flammable fumes, such as solvent and paint fumes, in <b>work area</b> can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <li>• Use equipment only in well ventilated area.</li> <li>• Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).</li> <li>• Keep work area free of debris, including solvent, rags and gasoline.</li> <li>• Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.</li> <li>• Ground all equipment in the work area. See <b>Grounding</b> instructions.</li> <li>• Use only grounded hoses.</li> <li>• Hold gun firmly to side of grounded pail when triggering into pail.</li> <li>• If there is static sparking or you feel a shock, <b>stop operation immediately</b>. Do not use equipment until you identify and correct the problem.</li> <li>• Keep a working fire extinguisher in the work area.</li> </ul> <p>Static charge may build up on plastic parts during cleaning and could discharge and ignite flammable materials and gases. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> <li>• Clean plastic parts in a well ventilated area.</li> <li>• Do not clean with a dry cloth.</li> </ul>
  	<p><b>SKIN INJECTION HAZARD</b></p> <p>High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. <b>Get immediate surgical treatment.</b></p> <ul style="list-style-type: none"> <li>• Do not point gun at anyone or at any part of the body.</li> <li>• Do not put your hand over the dispense outlet.</li> <li>• Do not stop or deflect leaks with your hand, body, glove, or rag.</li> <li>• Follow <b>Pressure Relief Procedure</b> in this manual, when you stop dispensing and before cleaning, checking, or servicing equipment.</li> </ul>

 <b>WARNING</b>	
	<b>EQUIPMENT MISUSE HAZARD</b> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> <li>• Do not operate the unit when fatigued or under the influence of drugs or alcohol.</li> <li>• Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See <b>Technical Data</b> in all equipment manuals.</li> <li>• Do not leave the work area while equipment is energized or under pressure. Turn off all equipment and follow the <b>Pressure Relief Procedure</b> in this manual when equipment is not in use.</li> <li>• Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.</li> <li>• Do not alter or modify equipment.</li> <li>• Use equipment only for its intended purpose. Call your distributor for information.</li> <li>• Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.</li> <li>• Do not kink or over bend hoses or use hoses to pull equipment.</li> <li>• Keep children and animals away from work area.</li> <li>• Comply with all applicable safety regulations.</li> </ul>
	<b>MOVING PARTS HAZARD</b> <p>Moving parts can pinch or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> <li>• Keep clear of moving parts.</li> <li>• Do not operate equipment with protective guards or covers removed.</li> <li>• Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the <b>Pressure Relief Procedure</b> in this manual. Disconnect power or air supply.</li> </ul>
	<b>TOXIC FLUID OR FUMES HAZARD</b> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> <li>• Read MSDS's to know the specific hazards of the fluids you are using.</li> <li>• Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.</li> <li>• Always wear impervious gloves when spraying or cleaning equipment.</li> <li>• If this equipment is used with isocyanate material, see additional information on isocyanates in Iso-cyanate Conditions Section of this manual.</li> </ul>
	<b>PERSONAL PROTECTIVE EQUIPMENT</b> <p>You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, inhalation of toxic fumes, burns, and hearing loss. This equipment includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• Protective eyewear</li> <li>• Clothing and respirator as recommended by the fluid and solvent manufacturer</li> <li>• Gloves</li> <li>• Hearing protection</li> </ul>
	<b>PLASTIC PARTS CLEANING SOLVENT HAZARD</b> <p>Use only compatible water-based solvents to clean plastic structural or pressure-containing parts. Many solvents can degrade plastic parts and cause them to fail, which could cause serious injury or property damage. See <b>Technical Data</b> in this and all other equipment instruction manuals. Read fluid and solvent manufacturer's warnings.</p>

# Isocyanate Conditions

Spraying or dispensing materials containing isocyanates creates potentially harmful mists, vapors, and atomized particulates.						
Read material manufacturer's warnings and material MSDS to know specific hazards and precautions related to isocyanates.						
Prevent inhalation of isocyanate mists, vapors, and atomized particulates by providing sufficient ventilation in the work area. If sufficient ventilation is not available, a supplied-air respirator is required for everyone in the work area.						
To prevent contact with isocyanates, appropriate personal protective equipment, including chemically impermeable gloves, boots, aprons, and goggles, is also required for everyone in the work area.						

## Material Self-ignition

Some materials may become self-igniting if applied too thickly. Read material manufacturer's warnings and material MSDS.						

## Moisture Sensitivity of Isocyanates

Isocyanates (ISO) are catalysts used in two component foam and polyurea coatings. ISO will react with moisture (such as humidity) to form small, hard, abrasive crystals, which become suspended in the fluid. Eventually a film will form on the surface and the ISO will begin to gel, increasing in viscosity. If used, this partially cured ISO will reduce performance and the life of all wetted parts.

**NOTE:** The amount of film formation and rate of crystallization varies depending on the blend of ISO, the humidity, and the temperature.

To prevent exposing ISO to moisture:

- Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. **Never** store ISO in an open container.
- Keep the ISO lube pump reservoir (if installed) filled with Graco Throat Seal Liquid (TSL), Part 206995. The lubricant creates a barrier between the ISO and the atmosphere.
- Use moisture-proof hoses specifically designed for ISO, such as those supplied with your system.
- Never use reclaimed solvents, which may contain moisture. Always keep solvent containers closed when not in use.
- Never use solvent on one side if it has been contaminated from the other side.
- Always lubricate threaded parts with ISO pump oil or grease when reassembling.

## Keep Components A and B Separate

NOTICE
To prevent cross-contamination of the equipment's wetted parts, <b>never</b> interchange component A (isocyanate) and component B (resin) parts.

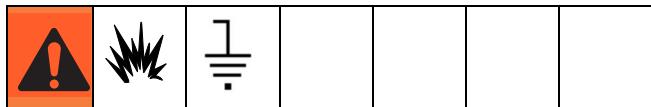
## Foam Resins with 245fa Blowing Agents

Some foam blowing agents will froth at temperatures above 90°F (33°C) when not under pressure, especially if agitated. To reduce frothing, minimize preheating in a circulation system.

## Changing Materials

- When changing materials, flush the equipment multiple times to ensure it is thoroughly clean.
- Always clean the fluid inlet strainers after flushing.
- Check with your material manufacturer for chemical compatibility.
- Most materials use ISO on the A side, but some use ISO on the B side.
- Epoxies often have amines on the B (hardener) side. Polyureas often have amines on the B (resin) side.

# Grounding



**To maintain grounding continuity when flushing or relieving pressure:** hold metal part of the dispense valve firmly to the side of a grounded metal pail, then trigger the valve.

The equipment must be grounded. Grounding reduces the risk of static and electric shock by providing an escape wire for the electrical current due to static build up or in the event of a short circuit.

 See Grounding illustration, FIG. 1 on page 7.

**Agitator:** agitators are grounded to pump through tank and stand. No ground wire is necessary. Regularly check continuity between agitator and pump grounding lug.

**Tanks:** tanks are grounded to pump through stand. No ground wire is necessary. Regularly check continuity between tank and pump grounding lug.

**Pumps:** connect a ground wire from the grounding lug on the pump to a true earth ground.

**Footswitch:** use a ground wire to ground the footswitch to the PosiDot Controls.

**PosiDot Controls:** use a ground wire to ground to a true earth ground.

**Dispense Valve:** connect ground wire from grounding post on right side of dispense valve to a true earth ground.

**Air and fluid hoses:** use only electrically conductive hoses.

**Air compressor:** follow manufacturer's recommendations.

**Fluid supply container:** follow your local code.

**Object being dispensed into:** follow your local code.

**Solvent pails used when flushing:** follow local code. use only conductive metal pails, placed on a grounded surface. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts grounding continuity.

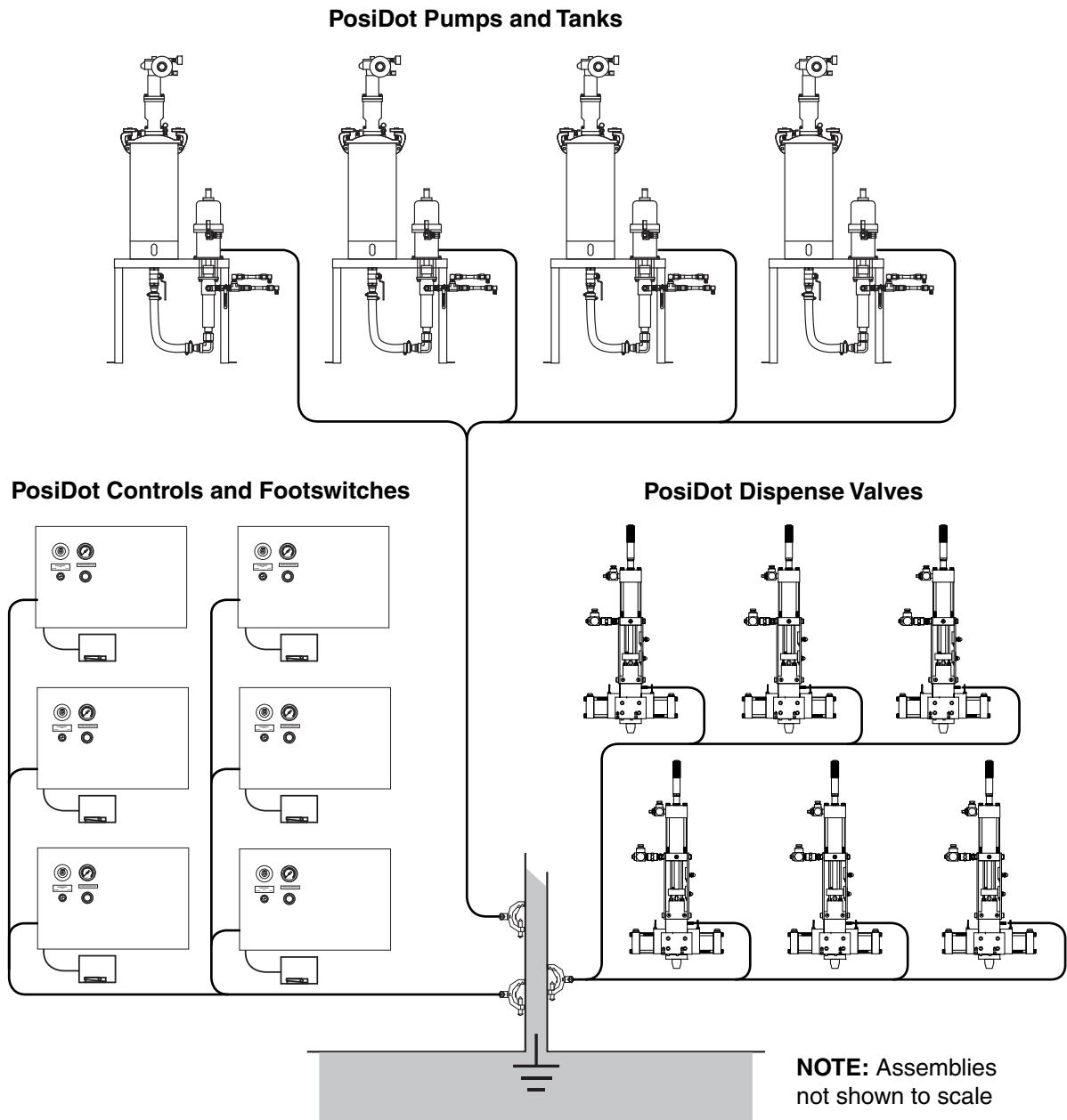


FIG. 1: Grounding Illustration

# Overview

This plural component meter, mix, and dispense device accurately meters liquid and semi-paste materials throughout a wide range of viscosities.

The machine is ideal for a two-component application of very small and precisely mixed shots.

The ratio of pneumatic cylinder to pump shaft area, provides the adjustable pressure intensification needed to move the separate liquids through the mixer with a flow rate quite suitable for production requirements.

The complete system is completely enclosed; mixing of the liquids takes place only in the mixing chamber at the final stage of the machine operation. The motion-less mixer keeps the volume of material to a minimum while ensuring adequate mixing.

All personnel charged with operating, maintaining, or cleaning the equipment should read this manual in its entirety.

**CAUTION:** Due to the precise nature of the machine, we recommend you contact Graco before making major adjustments.

Throughout this manual, references to the A side and B side are used. The A and B sides correspond to the particular material originally specified for use in the machine and relate to the corresponding label on the material supply and to the hoses. Any change of material supplier may require relabelling the supply, pumps, and hoses accordingly.

# Component Identification

## Controls

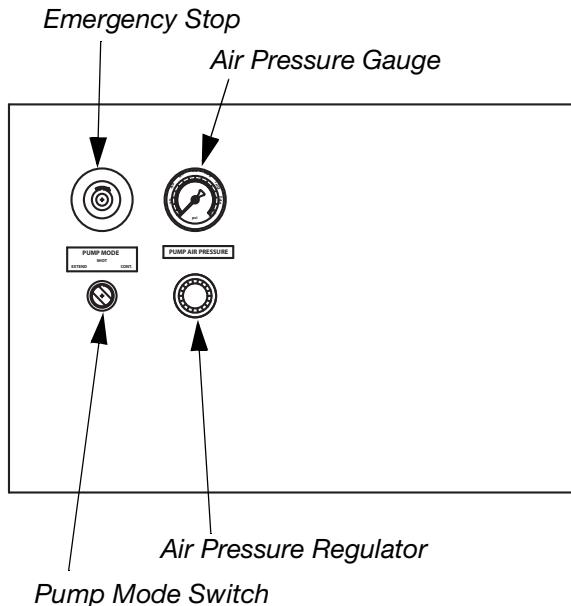


FIG. 2

## Other Features

### Foot Switch

The foot switch is used to initiate a PosiDot cycle when operating in SHOT Mode. The foot switch is referred to as a Start device in this manual. When the SHOT Mode is selected and the start device is pressed and released, the PosiDot will cycle.

### Customer Signal

This allows the controller to operate the PosiDot from a remote device. The Customer Signal air ports are located on the left side of the PosiDot Controls box.

**START Port:** When air is applied, the PosiDot will operate as if the foot switch is pressed and held.

**DONE Port:** When the PosiDot has completed the cycle, the DONE Port will discharge a pulse of air.

### Pump Mode Switch

**EXTEND:** The air cylinder and PosiDot rods will immediately extend and remain in the extended position. This is the position that the valve should be in if idle for an extended period of time.

**SHOT:** The PosiDot will complete one full cycle when the start device is pressed and released. The PosiDot will cycle continuously when the start device is pressed and held.

**CONTINUOUS:** The PosiDot will continually cycle when CONTINUOUS is selected. The PosiDot will continue to cycle until the Pump Mode switch is placed in the SHOT or the EXTEND position.

## Typical Feed System Components

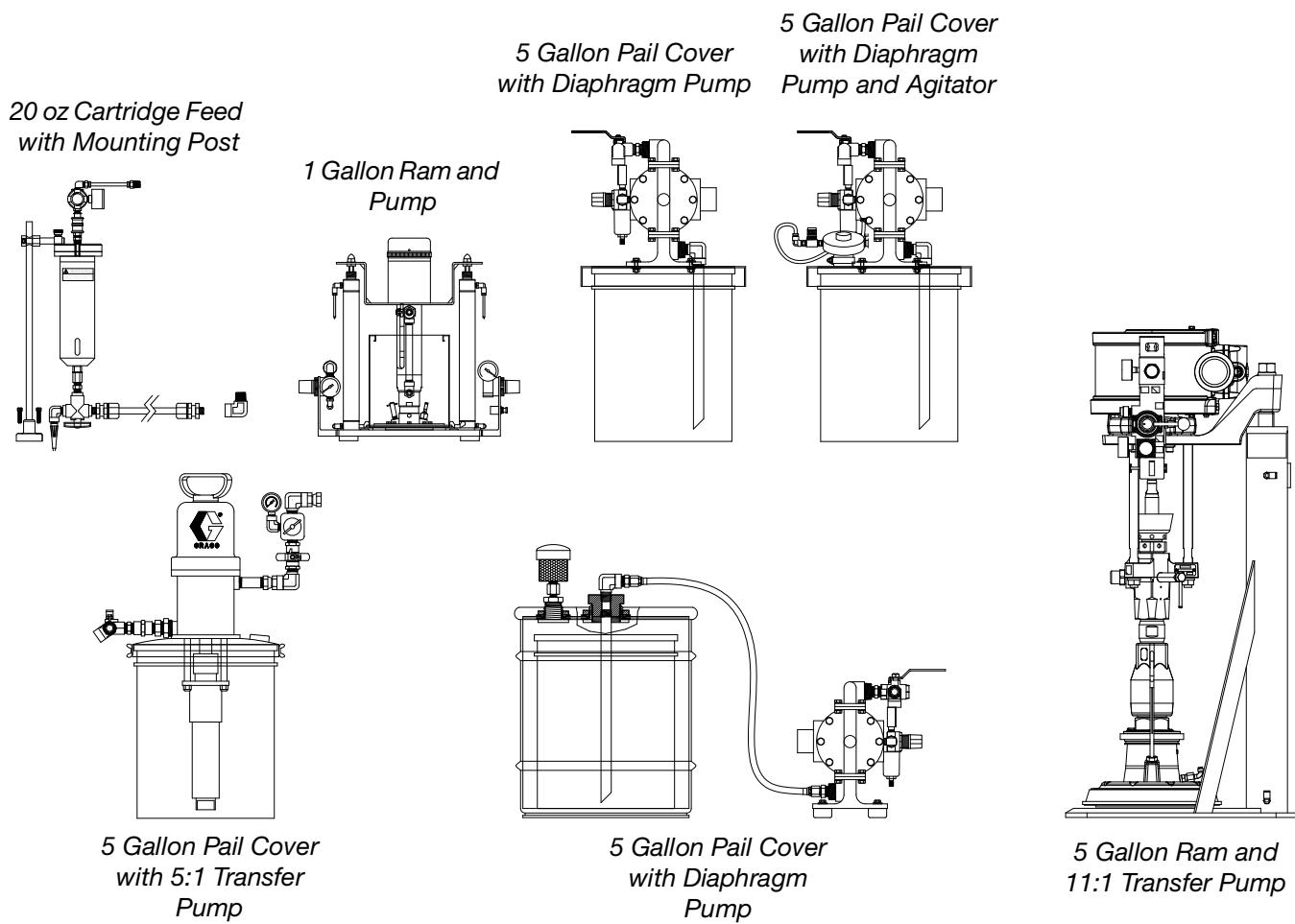
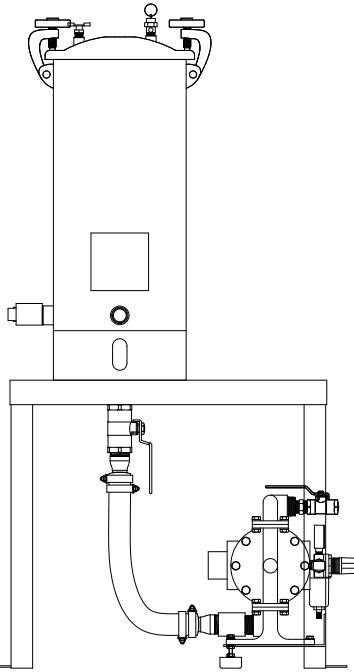
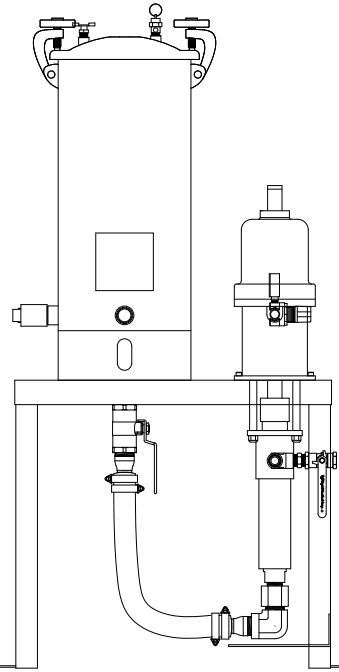


FIG. 3

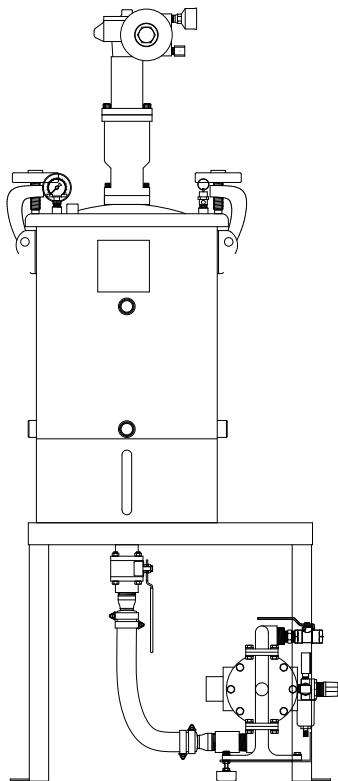
## Typical Feed System Components (continued)



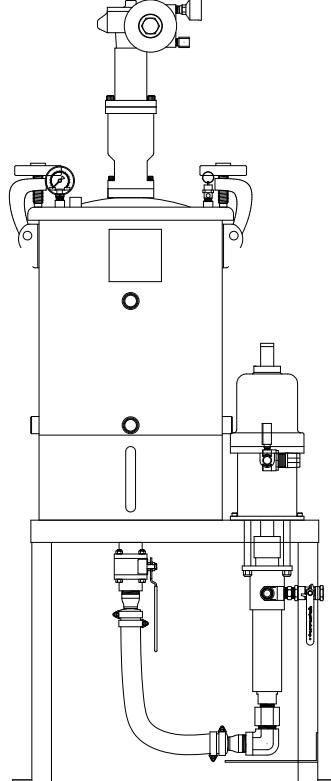
5 Gallon Tank with Diaphragm Pump and Stand



5 Gallon Tank with 5:1 Pump and Stand



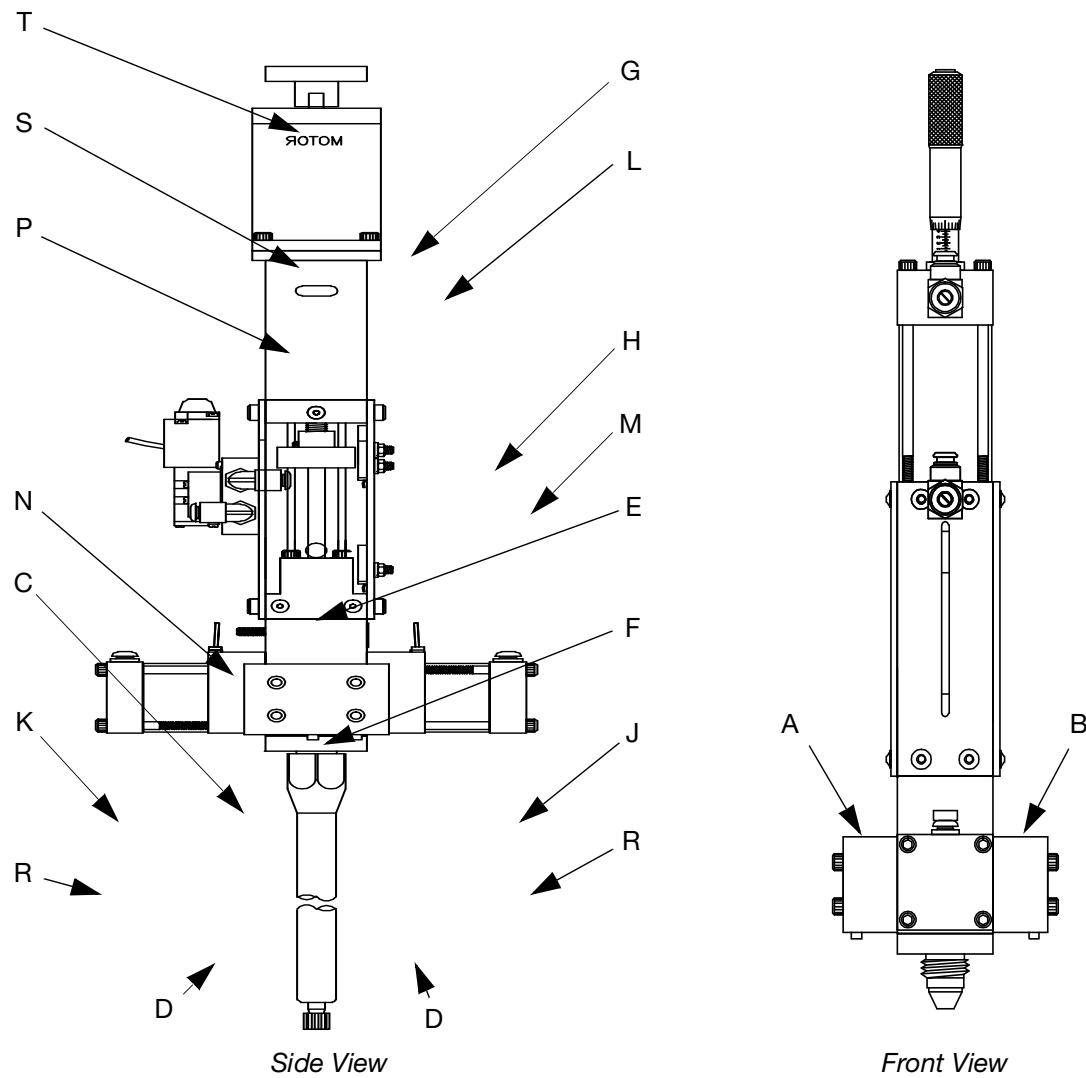
10 Gallon Tank with Diaphragm Pump, Agitator, Vacuum, and Stand



10 Gallon Tank with 5:1 Pump, Agitator, Vacuum, and Stand

FIG. 4

## Micrometer PD44 Metering Valve

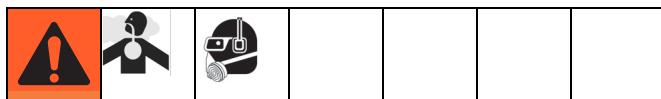


### Key:

A	A Material Inlet	L	Extend Air Flow Adjustment Knob
B	B Material Inlet	M	Retract Air Flow Adjustment Knob
C	Grounding Lug	N	Retract Switch
D	Spool Assemblies	P	Extend Switch
E	Metering Rods	R	Spool Valve Switch
F	Oil Cup Retaining Block	S	Shot Size Locking Ring
G	Extend Air Inlet	T	Shot Size Adjuster
H	Retract Air Inlet		
J	Dispense Air Inlet		
K	Reload Air Inlet		

FIG. 5

# Setup



**NOTE:** See **Typical Installation** diagram.

1. Perform Setup procedure for feed system components. See feed system manuals. See **Related Manuals** on page 2.
2. Place an in-line air pressure regulator, air-water separator/filter, and shut-off/bleed valve between the air supply and the control solenoids.

3. Connect each 1/4 in. outside diameter supplied air line to the corresponding control solenoid. See **Component Identification** starting on page 9.
4. Connect chemical lines from feed system to metering valve material inlets. See **Component Identification** starting on page 9.

## Typical Installation

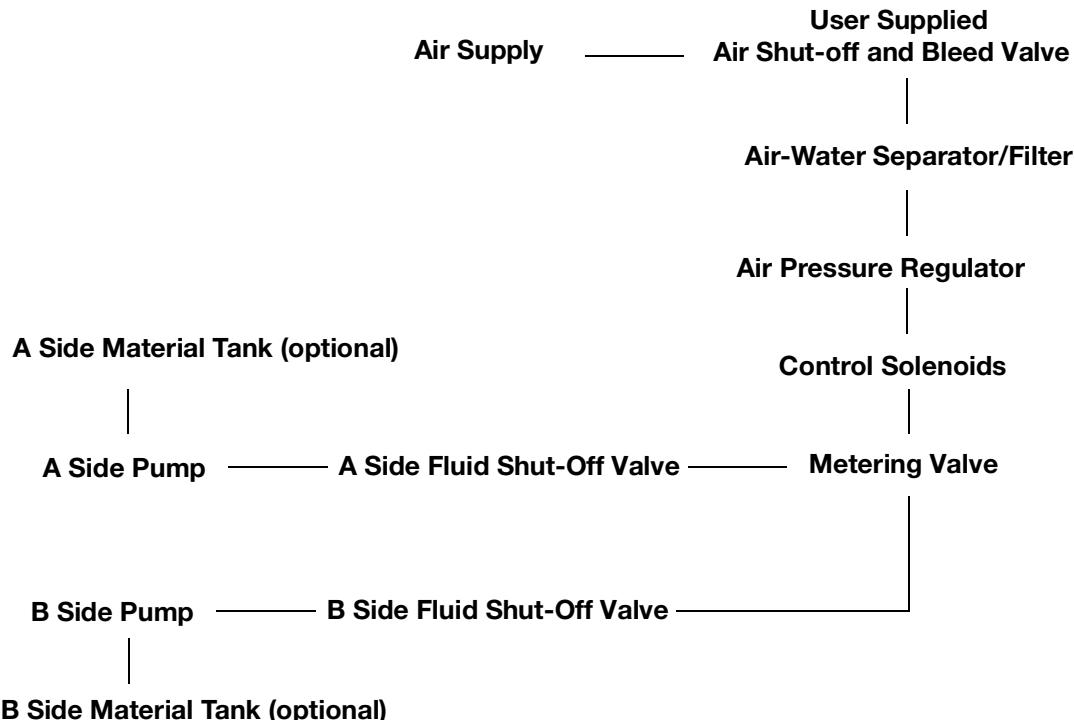


FIG. 6

## Valve Mounting Diagram

As desired, use the following diagram to mount the metering valve.

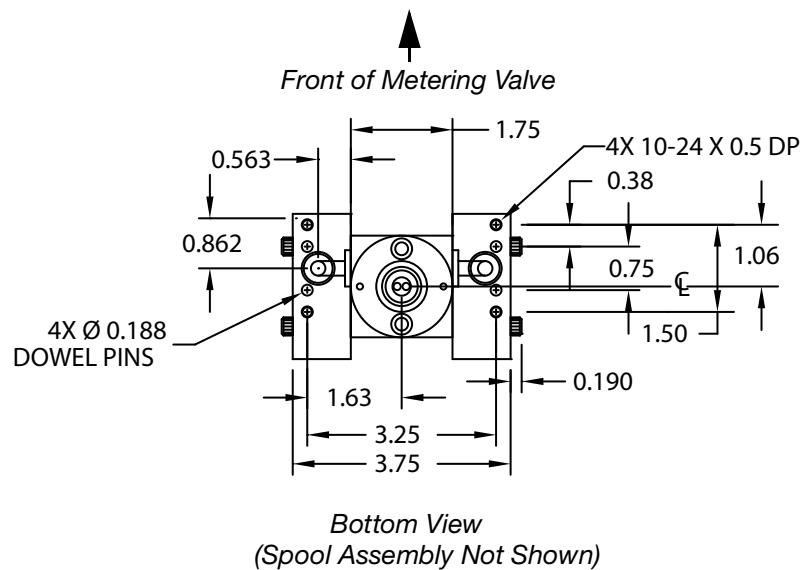


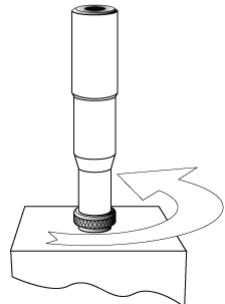
FIG. 7

# Adjusting the Shot Size

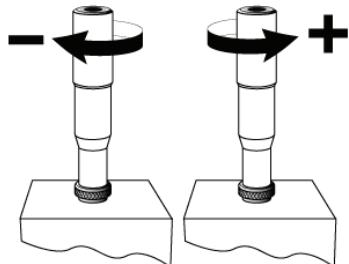


Follow these instructions to adjust the shot size of your machine. Repeat this procedure every time an adjustment is required.

1. Set Pump Mode switch to EXTEND. The metering rods will extend down and stop.
2. Rotate the shot size locking ring counter-clockwise to loosen.

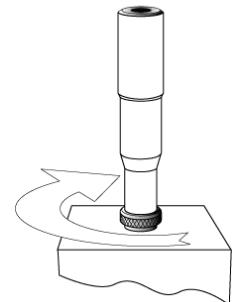


3. Rotate the shot size adjuster to adjust shot size.



4. Turn the Pump Mode switch to SHOT. The drive piston and metering rods will retract.

5. Rotate the shot size locking ring clockwise to tighten.



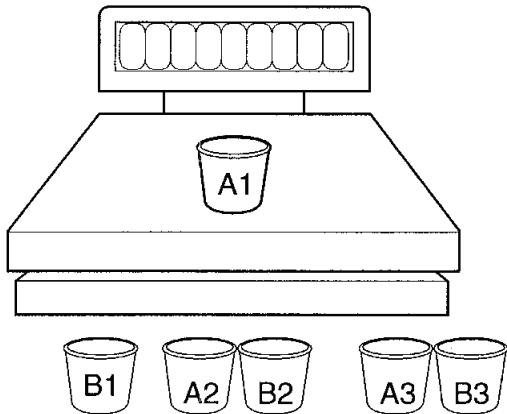
6. Dispense into waste container to test shot size.
7. Repeat until desired shot size is achieved.

# Ratio Check

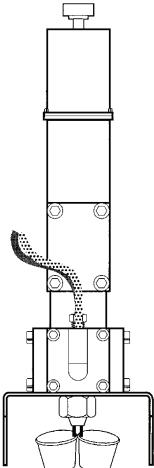


Perform ratio check procedure at startup and after rebuild.

1. Weigh six small cups and label as indicated. Record weights.



2. Remove mixer.
3. Install the ratio check nozzle.
4. Dispense into a waste container to prime the ratio check nozzle.
5. Place cups as indicated under ratio check nozzle and cycle machine once.



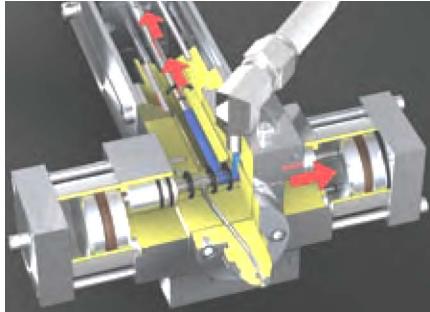
6. Repeat until all three sets of cups have been used.
7. Re-weigh all six cups and record weights.

8. Subtract weight of empty cups from weight of filled cups to get material weights.
9. Complete ratio calculations.

# Operation

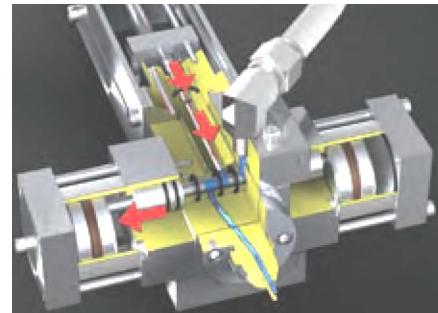
## Sequence of Operation

### Step 1: Reload



- Spools shift to the right.
- Material feed inlets are opened
- Materials are transferred into the metering chambers by a pressurized feed system
- Outlet ports are blocked
- Metering rods are retracted to a precise position determining the volume of each material

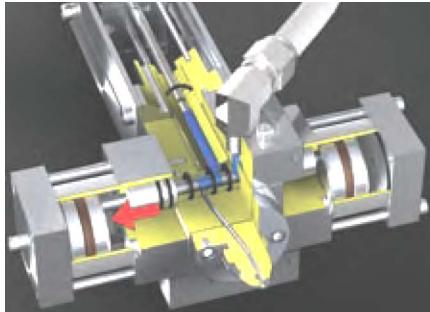
### Step 3: Dispense



- Metering rods extend
- A and B materials are simultaneously dispensed from the metering chamber into the disposable mixer.
- A and B materials are dispensed at the predetermined volume ratio.

Upon completion of the dispense stroke, the metering rod and spool assemblies shift back to the reload position.

### Step 2: Shift

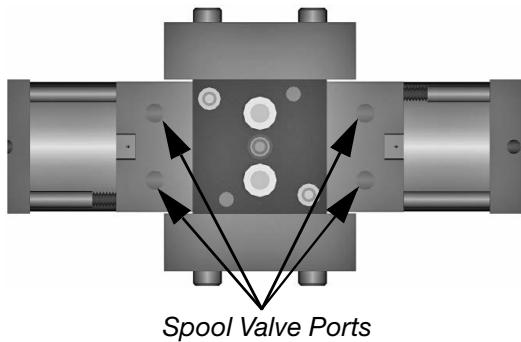


- The balanced spool assemblies shift to the dispense position
- Material path to the mixer inlet is opened
- Material feed inlet ports are blocked
- Metering rods remain in the retracted position

# Startup

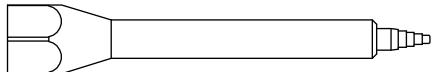


1. Fill the spool valve ports with compatible lubricant. Consult with your material supplier to select an acceptable lubricant. Regularly verify that lubricant is present.



**FIG. 8: Top View of Metering Valve with Top Section Removed**

2. Perform **Ratio Check**, page 16.
3. Install mixer and shroud.



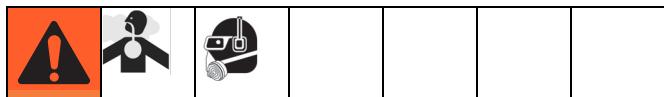
4. Pressurize the A and B material feed systems connected to the metering valve to prime the system. See page 3 for maximum inlet feed pressures.

5. Dispense several full stroke shots until material is air-free and has good shut-off at the nose.

**NOTE:** Very viscous, compressible materials may continue to drool after system is primed. Reduce flow rate as required to produce air-free dispense.

**NOTE:** Very thin materials may require tilting the valve greater than 45 degrees and dispensing shots until material is air-free. Remove oil from cups before proceeding.

# Pressure Relief Procedure



1. Retract the metering rods.
2. Close both the A side and B side fluid shut-off valves.
3. Remove static mixer.
4. Dispense 5 shots. Shots should be at least 75% of the full stroke.
5. Extend the metering rods into the tubes. If Graco controls are provided with the system, see the PD44 Controls manual. See **Related Manuals** on page 2.
6. Close the incoming air shut-off/bleed valve that supplies air to the metering valve.
7. Close the incoming air shut-off/bleed valve that supplies the A feed system. Repeat for the B side feed system. Refer to feed system manual for pressure relief procedure. See **Related Manuals** on page 2.

# Shutdown



1. Perform **Pressure Relief Procedure**.
2. Inspect the metering rods for material buildup. Clean as necessary.
3. Lubricate the spool valve ports with compatible lubricant such as mesamoll or silicone oil.
4. Install storage cap on outlet nose.

# Maintenance



Perform the following procedures once a shift or as required.

**NOTE:** If material is leaking, see **Troubleshooting** on page 22.

## Material Reservoirs

Check material levels and refill as necessary. Ensure that the material reservoirs are vented properly. (Dry Air, Nitrogen, etc.)

## Air Dryer

Check the condition of the desiccant air dryer.

## Spool Valve Ports

Fill with compatible lubricant such as mesamoll or silicone oil. See FIG. 8 on page 18.

## Ratio Check

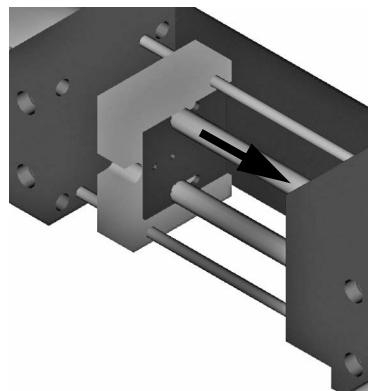
See **Ratio Check** on page 16.

# Metering Rod Alignment

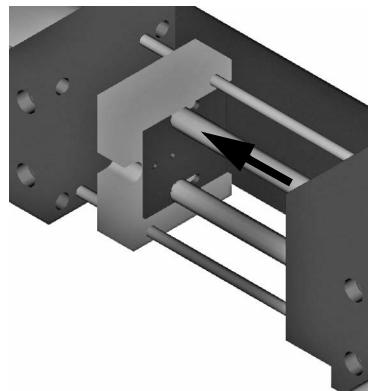


Metering rod alignment must be completed whenever the metering rods are removed from the valve.

1. Disconnect the main air supply and bleed air from the machine by pushing the tube on the bottom of regulator.
2. Place the oil cup-retaining block on the valve and evenly tighten the screws.
3. Manually extend the metering rods fully.



4. Slide the metering rod retainer on the connecting block.
5. Manually retract the metering rods. Ensure that they are firmly in place by physically checking.



6. Turn the valve sideways and use the guide rods to ensure that the metering rod assemblies are in line with the guide rod.

# Troubleshooting

						
Perform <b>Pressure Relief Procedure</b> before performing any troubleshooting procedure.						

Problem	Cause	Solution
Metering valve stalling and no material being dispensed despite adequate input pressure	Blocked mixer	Check mixer for cured material, replace mixer as required
	Flow control valve closed	Open
Metering valve not discharging normal or full volume	Low material level in reservoirs	Fill material reservoirs and prime the machine
	Air in material tanks	Fill reservoirs and prime machine
Material leaks past spool valves	Spool valve worn or damaged	Replace the spool valve and sleeve
Improper material mixing	Mixer not clean or free	Remove and replace the mixer
Material leaks around mixer while dispensing	Cured material in mixer	Check mixer for cured material, replace mixer

## Schematics

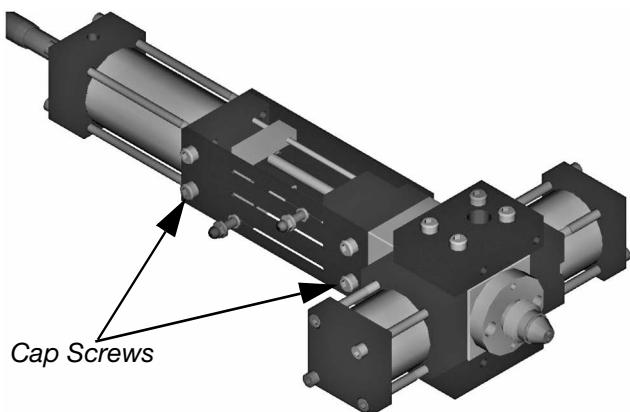
The schematics will be included in the assembly drawings manual.

# Rebuild

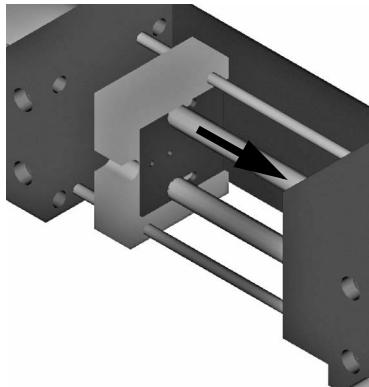
## Wetted Section Disassembly



1. Perform **Pressure Relief Procedure**, page 19.
2. Mark and disconnect all material feed lines and pneumatic lines. Remove the metering valve from mounts.
3. Remove the four cap screws to remove the rear tie plate.



4. Manually move the connecting block down so that rods are in the extended position.



5. Loosen set screws on top of the connecting block.
6. Slide the metering rod retaining plate until the larger hole position is in-line with the metering rod. See FIG. 9 in the following step.

7. Once the metering rod plate is in position, manually move connecting block up. Rods will remain in position and connecting block is separated from rods.

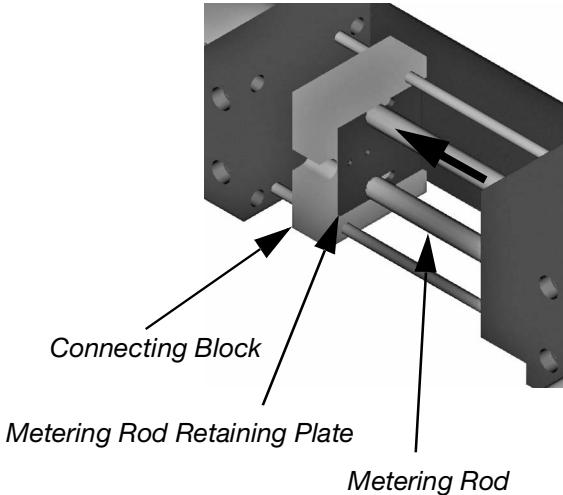
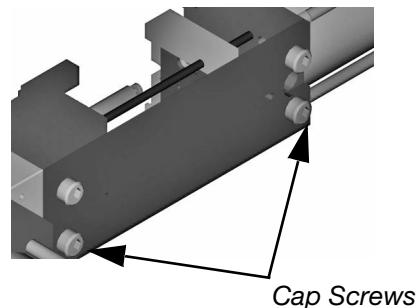


FIG. 9

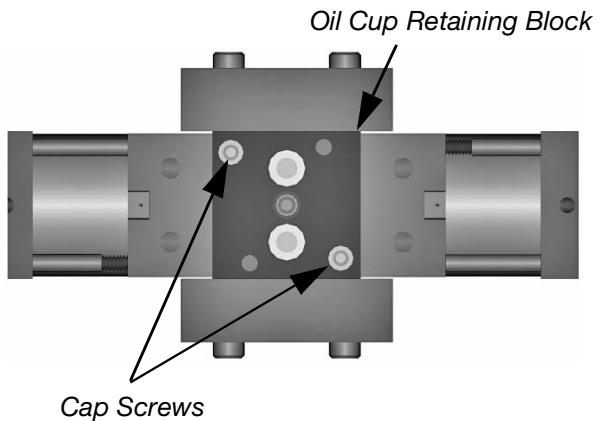
8. Once the metering rods are disconnected from the retaining plate, remove the four cap screws from the front tie plate.



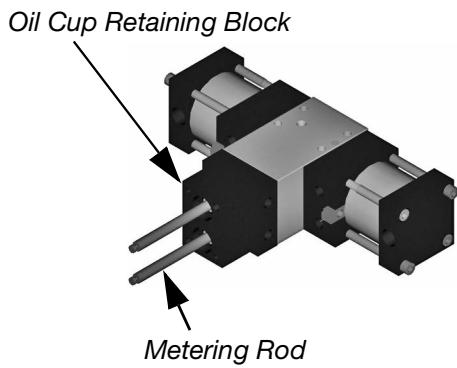
9. Separate the drive cylinder and the valve guides from the oil cup retaining block.

Rebuild

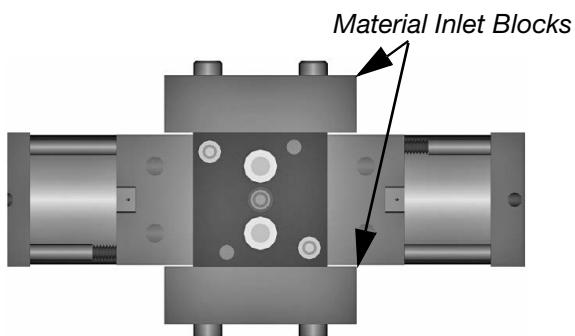
10. Remove the four cap screws located at the top of the oil cup retaining block.



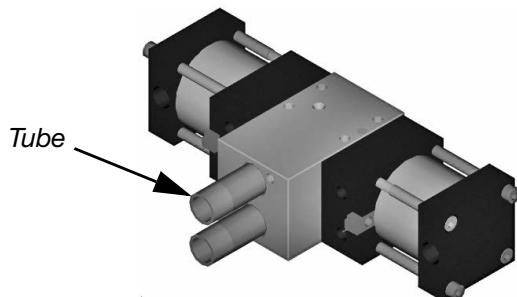
11. Remove the metering rods and oil cup retaining block.



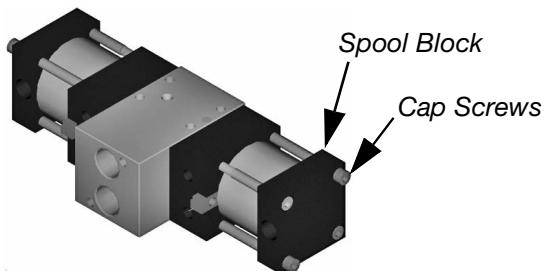
12. Remove the eight cap screws attaching the material inlet blocks. Remove the material inlet blocks.



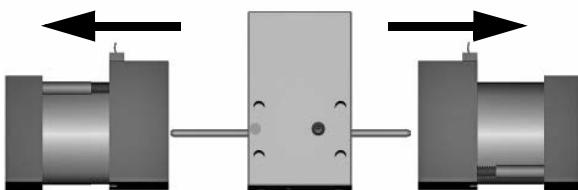
13. Remove the two metering rods and tubes. Always keep rods and tubes together as they are a matched set.



14. Remove the protruding cap screws on the each spool block.



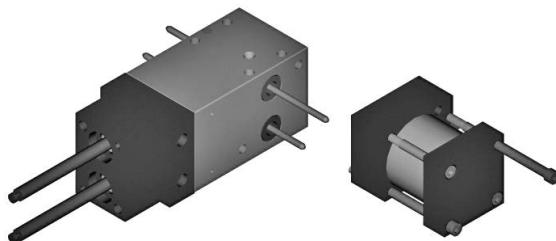
15. Remove the two pneumatic spools.



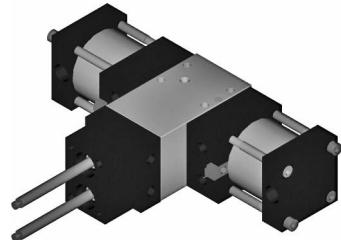
## Wetted Section Reassembly



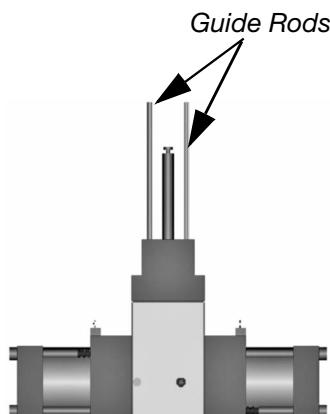
1. Install the pneumatic spool rod drive. Torque fasteners to 67-70 in-lb (7.5-7.9 N•m).



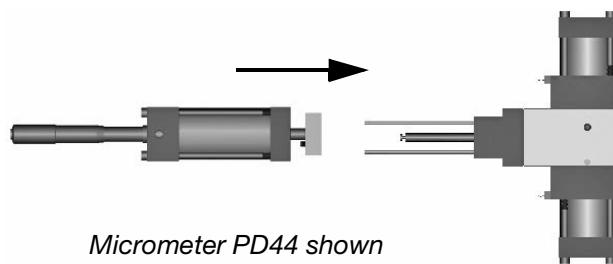
2. Repeat for other side.



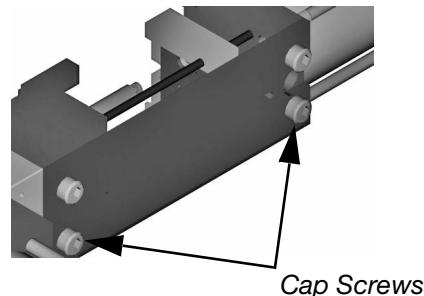
3. Install guide rods. Refer to **Wetted Section Rebuild** on page 27 for details on spool valve and metering rod assembly.



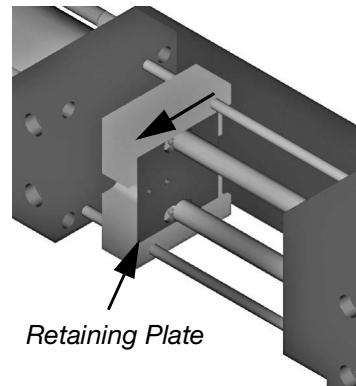
4. Install drive assembly to the guides.



5. Attach the front plate to the serial number side of the metering body.
6. Ensure the air inlet ports are pointed towards the front plate.
7. Install the cap head screws to the back plate.

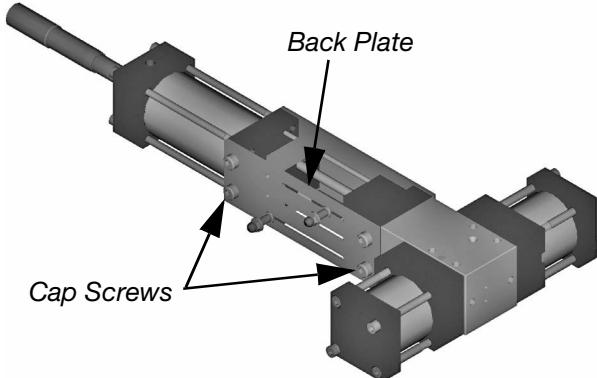


8. Slide connecting block down until rod heads are inserted into retaining plate keyway.
9. Slide the metering rod retaining plate to the locked position.

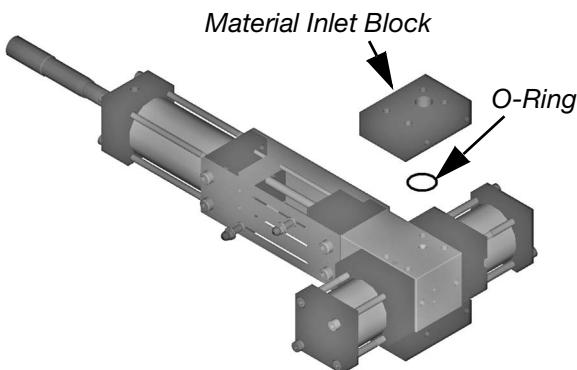


10. Tighten set screw located on top of connecting block until it contacts the top of the metering rod head. Evenly torque the A and B set screws to 4-8 in-lb (0.45-0.9 N•m).

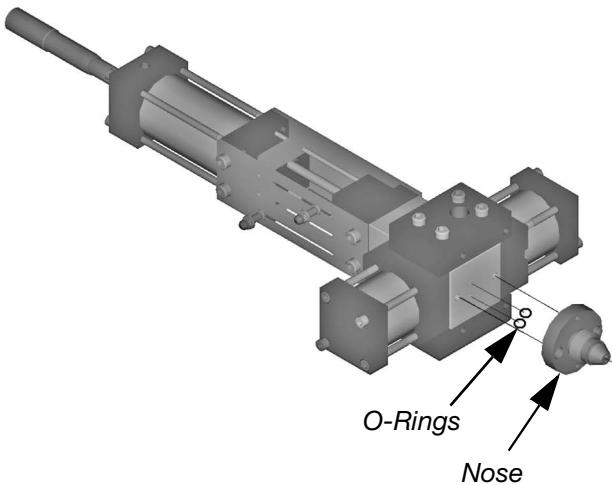
11. Manually move connecting block up and down to insure rods are properly installed.
12. Install the back plate and cap screws.



13. Install material inlet blocks with new o-rings.

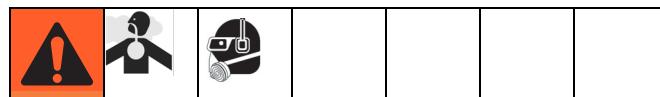


14. Install material nose assembly with new o-rings.

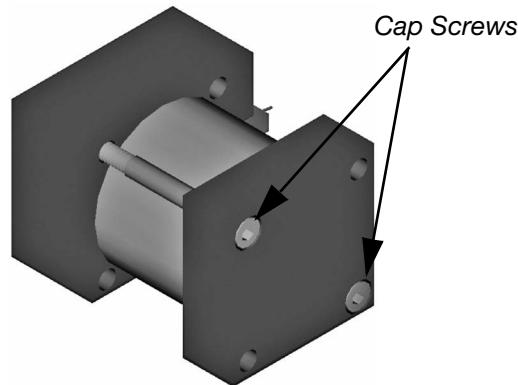


15. Attach material line and pneumatic line.
16. Perform **Startup** procedure, page 18.

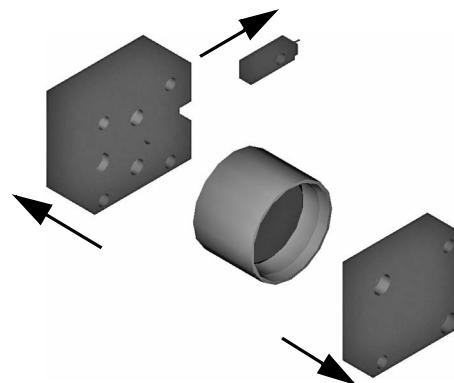
## Spool Valve Rebuild



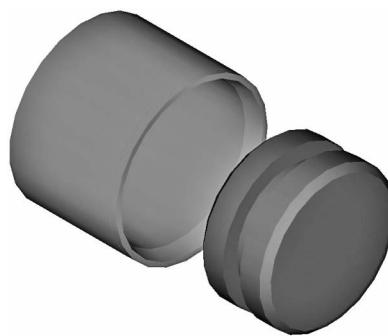
1. Perform **Wetted Section Disassembly**, page 23.
2. Remove the two cap screws.



3. Disassemble the spool cylinder.

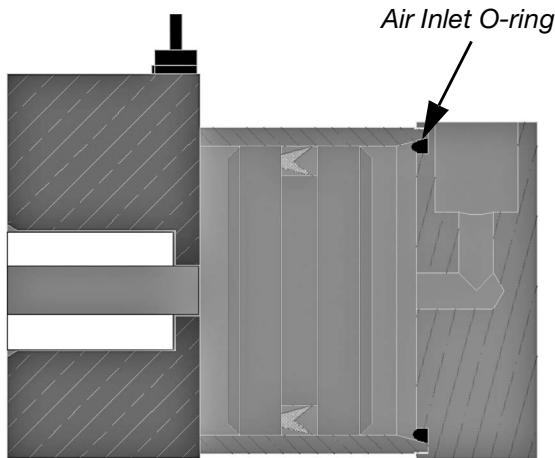


4. Remove the piston from the cylinder.

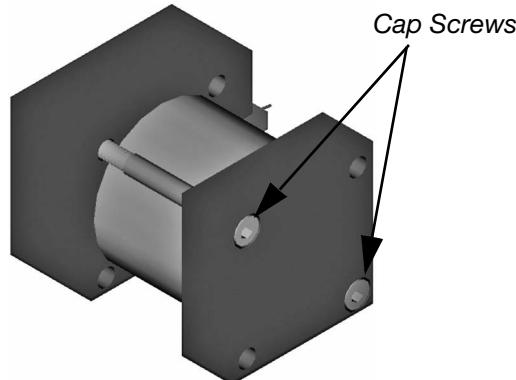


5. Install new u-cup seal on piston.

6. Insert new o-ring into spool air cylinder end cap.
7. Install switch.
8. Apply Krytox or compatible lubricant to cylinder.
9. Insert piston into cylinder with the u-cup lip pointed in the direction of the tapered end of the cylinder. The "U" points toward the air inlet.

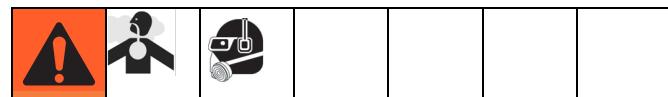


10. Careful not to cut the o-ring, install pneumatic spool blocks.
11. Install the two cap screws.

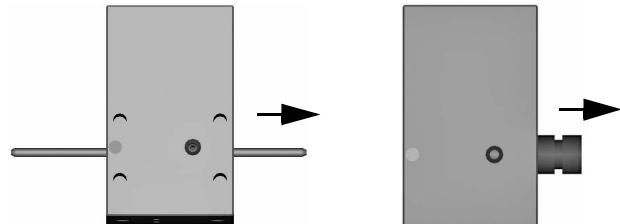


12. Repeat for opposite side pneumatic spool rod drive.

## Wetted Section Rebuild

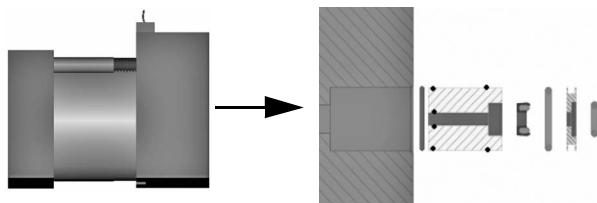


1. Perform **Wetted Section Disassembly**, page 23.
2. Remove spool rods and sleeves from the metering block.

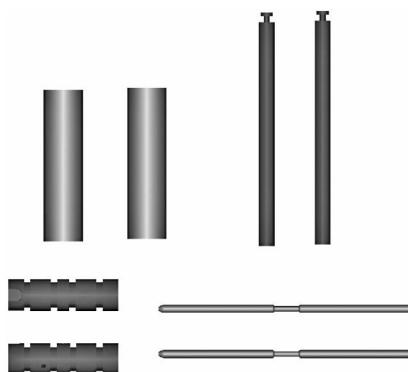


**NOTE:** The spool sleeve can be removed by sliding the sleeve in the direction of the identification marking.

3. Remove the pneumatic drive spool bearing, seals, and seal retainer for both spools.

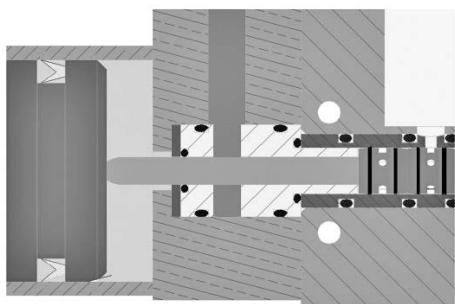


4. Inspect the metering rod and sleeve assemblies and the spool rod and sleeve assemblies for excessive wear. If there are any scratches on the rod that can be felt by a fingernail, replace the rod and sleeve assembly.

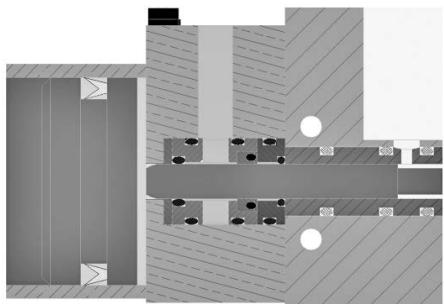


5. Clean all wetted components thoroughly with compatible solvent.

6. For each pneumatic drive spool block, install new zap seals and o-rings onto o-ring retainer.



Low Viscosity Spool



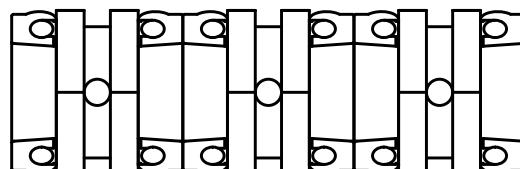
High Viscosity Spool

7. Lubricate o-rings and bearing surfaces with Krytox or compatible lubricant.
8. Re-install the rod bearings, zap seals, and o-rings retainers into each spool block.

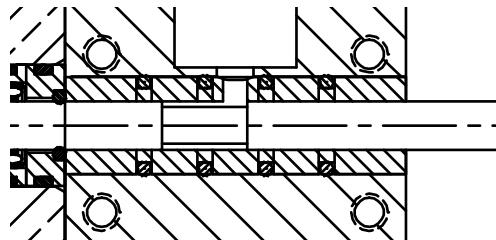
**NOTE:** Typically, the spring in the zap seal and the o-rings in the retainers point toward the metering block which is in the direction of the material.

9. On each spool sleeve, install new zap seal (on low viscosity spool), and o-rings on the outside of the sleeves.
10. Lubricate o-rings and bearing surfaces with Krytox or compatible lubricant.

**NOTE:** Correct orientation of seals shown.

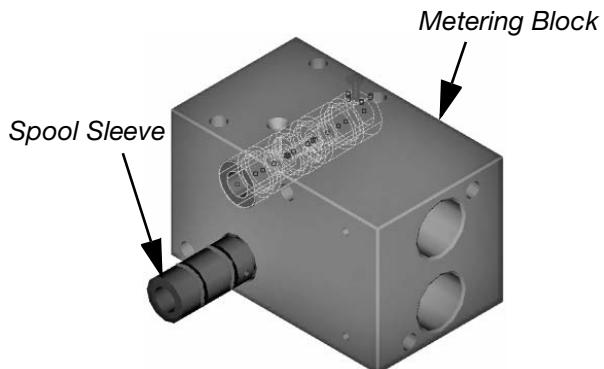


Low Viscosity Spool Sleeve Seals



High Viscosity Spool Sleeve Cutout View

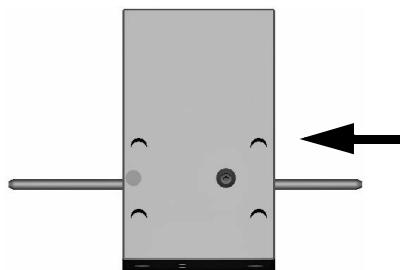
11. Carefully install the spool sleeves into the metering block. Make sure the notched edge will align with the pin in the metering block and not cut the spool sleeve o-rings.



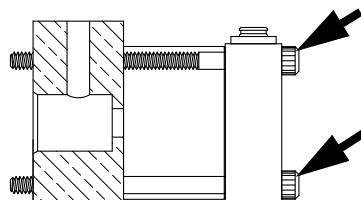
Spool Sleeve Notch



12. Apply Krytox to spool rod then carefully install the spool rod into the spool sleeve (inside the metering block). Make sure not to cut the spool sleeve zap seals (on low viscosity spools).



13. Torque bolts 67-70 in-lb (7.6-7.9 N·m)



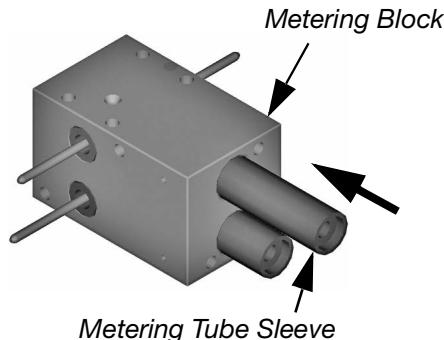
14. Install new zap seal in the metering tube sleeve with the spring facing down or toward the material pressure side of the sleeve.

**NOTE:** Seals are individually packaged with part number and size. Verify rod nominal size matches seal prior to installation.

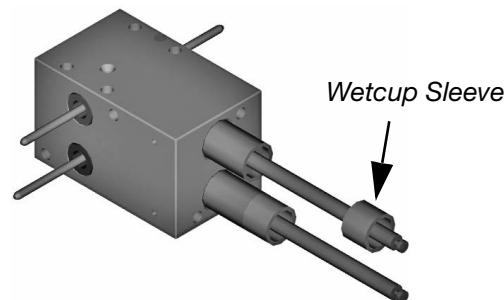


15. Install the metering sleeve PTFE seal in the metering block. Replace the metering sleeve PTFE seal with a new one every rebuild.

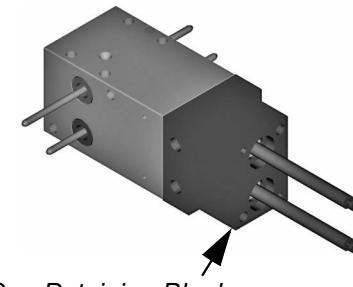
16. Install metering tube sleeve into the metering block.



17. Install the wetcup sleeve onto the metering sleeve.



18. Install the oil cup retaining block. Torque to 77 in-lb (8.7 N·m).



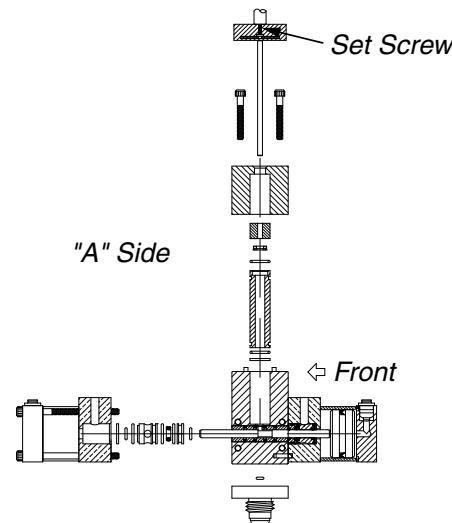
19. Apply Krytox grease to chamfer of metering rod.

20. Carefully insert metering rod through bearing, seal, and metering tube. Make sure not to cut the metering sleeve zap seals.

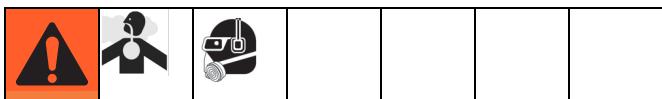
21. Move connecting block to extended position.

22. Move slide plate to capture the metering rods.

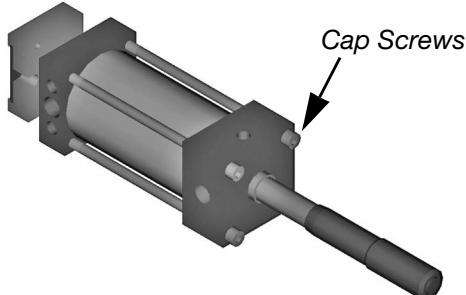
23. Install the set screw until it contacts the top of the metering rod. Torque set screw to 4-8 in-lb (0.45-0.90 N·m).



## Micrometer Drive Rebuild



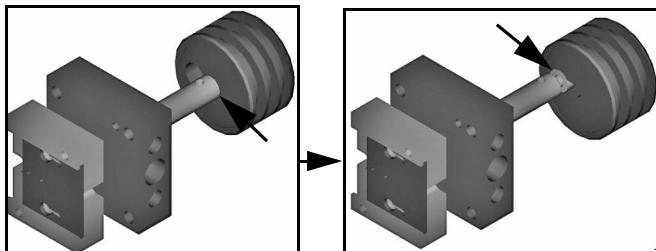
1. Perform **Wetted Section Disassembly**, page 23.
2. Remove the four cap screws located at the top of the pneumatic drive assembly.



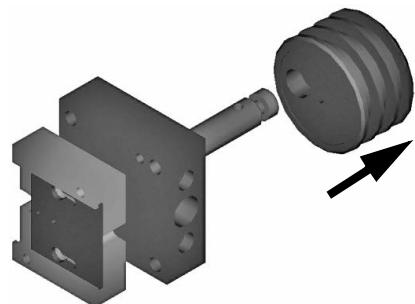
3. Remove the drive top cap.



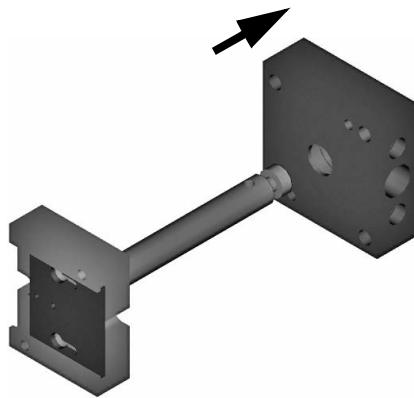
4. Slide the drive rod into the open slot.



5. Slide the pneumatic drive piston off the drive rod.



6. Slide the air cylinder mounting block off the drive rod.



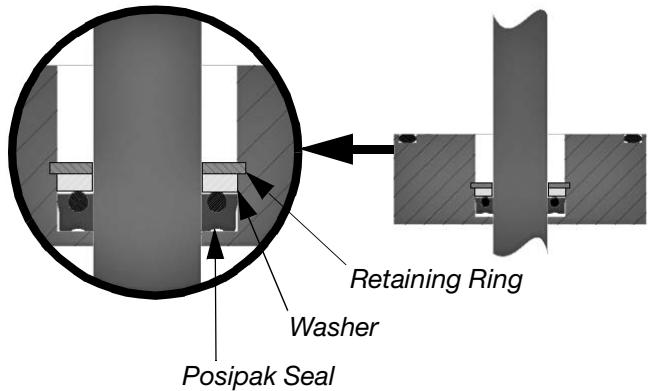
7. Install new seals on the drive piston. Make sure the lip of the seal points toward the pressure side of the drive. See the following illustration and the assembly drawings for more information.



8. Remove retaining ring, washer, and posipak seal from the air cylinder mounting block.

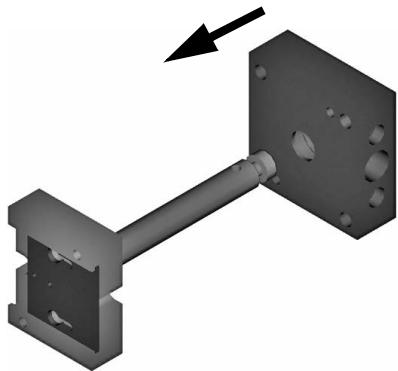


9. Install new posipak seal with the o-ring pointed towards the drive piston, then install washer and retaining ring.

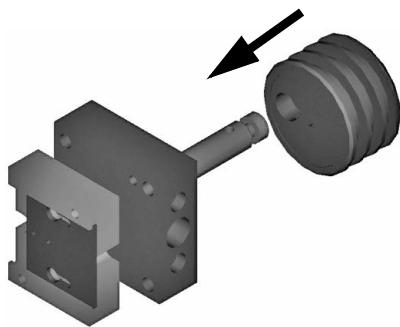


10. Apply Krytox or compatible lubricant to drive rod.

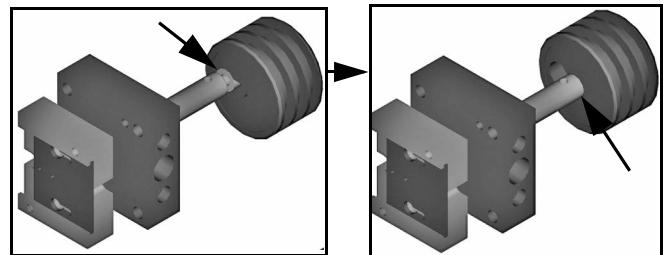
11. Careful not to cut the posipak seal, install drive rod into the block.



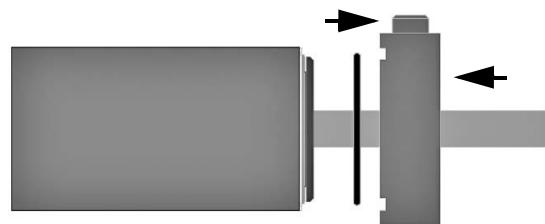
12. Install the drive rod into the piston.



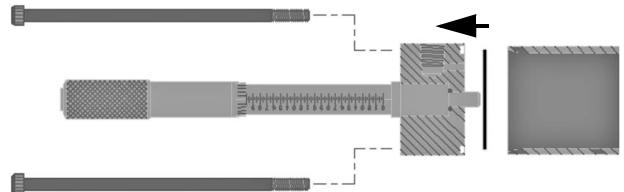
13. Slide the drive rod into the closed slot in the piston.



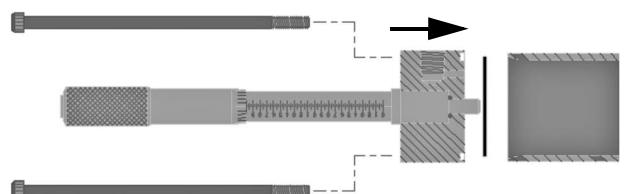
14. Install the cylinder o-ring then, careful not to cut the piston seal, install the drive rod into the block.



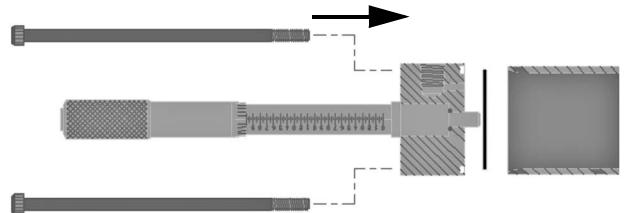
15. Install the upper cylinder o-ring.



16. Install top cap block to cylinder.



17. Install drive housing bolts to the cylinder mounting block.



# Accessories

## Mixer Packs

Part	Description
964027	Mixer, 1/8 in. (3.2mm) x 24 Luer Lock inlet/tip, 10 Pack
16D962	Mixer, 1/8 in. (3.2mm) x 24 Luer Lock inlet/tip, 50 Pack
16D963	Mixer, 1/8 in. (3.2mm) x 24 Luer Lock inlet/tip, 250 Pack

## O-Rings and Seals

Part	Description
24E247	Kit, O-ring, chemical resistant, PD44
24E248	Kit, Seal, Spool, H.V., PD44
24E249	Kit, Seal, Spool, L.V., PD44
16B265	Seal, Posipack, 1.25, ZAP
16B266	Seal, Posipack, 1.38, ZAP
16B267	Seal, Posipack, 1.50, ZAP
16B268	Seal, Posipack, 1.63, ZAP
16B269	Seal, Posipack, 1.75, ZAP
16B270	Seal, Posipack, 2.00, ZAP
16B271	Seal, Posipack, 2.13, ZAP
16B272	Seal, Posipack, 2.25, ZAP
16B273	Seal, Posipack, 2.38, ZAP
16B274	Seal, Posipack, 2.50, ZAP
16B275	Seal, Posipack, 2.63, ZAP
16B276	Seal, Posipack, 2.75, ZAP
16B277	Seal, Posipack, 3.00, ZAP
16B278	Seal, Posipack, 3.13, ZAP
16B279	Seal, Posipack, 3.25, ZAP
16B280	Seal, Posipack, 3.38, ZAP
16B281	Seal, Posipack, 3.50, ZAP
16B282	Seal, Posipack, 3.63, ZAP
16B283	Seal, Posipack, 3.75, ZAP
16B284	Seal, Posipack, 4.00, ZAP
16B285	Seal, Posipack, 4.25, ZAP
16B286	Seal, Posipack, 4.50, ZAP
16B287	Seal, Posipack, 4.63, ZAP
16B288	Seal, Posipack, 4.75, ZAP
16B289	Seal, Posipack, 4.88, ZAP
16B290	Seal, Posipack, 5.00, ZAP

Part	Description
16B291	Seal, Posipack, 5.13, ZAP
16B292	Seal, Posipack, 5.25, ZAP
16B293	Seal, Posipack, 5.50, ZAP
16B294	Seal, Posipack, 5.75, ZAP
16B295	Seal, Posipack, 6.00, ZAP
16B296	Seal, Posipack, 6.13, ZAP
16B297	Seal, Posipack, 6.25, ZAP
16B298	Seal, Posipack, 6.38, ZAP
16B299	Seal, Posipack, 6.50, ZAP
16B300	Seal, Posipack, 6.63, ZAP
16B301	Seal, Posipack, 6.75, ZAP
16B302	Seal, Posipack, 7.00, ZAP
16B303	Seal, Posipack, 7.25, ZAP
16B304	Seal, Posipack, 7.50, ZAP
16B305	Seal, Posipack, 7.63, ZAP
16B306	Seal, Posipack, 7.75, ZAP
16B307	Seal, Posipack, 7.88, ZAP
16B450	Seal, Posipack, 8.00, ZAP

## Needles

Part	Description
E4000025-50	Needle, Luer Lock, Sampler Package (10 each 14 ga x 1/2 in., 16 ga x 1/2 in., 18 ga x 1/2 in., 20 ga x 1/2 in., 22 ga x 1/2 in.)
E4000001-50	Needle, Luer Lock, 14 Gauge x 1/2 in., 50 Pack
E4000004-50	Needle, Luer Lock, 15 Gauge x 1/2 in., 50 Pack
E4000005-50	Needle, Luer Lock, 16 Gauge x 1 in., 50 Pack
E4000006-50	Needle, Luer Lock, 18 Gauge x 1 in., 50 Pack
E4000011-50	Needle, Luer Lock, 22 Gauge x 1/2 in., 50 Pack
E4000014-50	Needle, Luer Lock, 14 Gauge x 1 in., 50 Pack
E4000024-50	Needle, Luer Lock, 23 Gauge x 1/2 in., 50 Pack
E4000088-50	Needle, Luer Lock, 16 Gauge x 1/2 in., 50 Pack

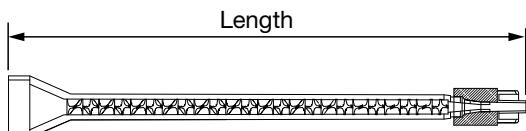
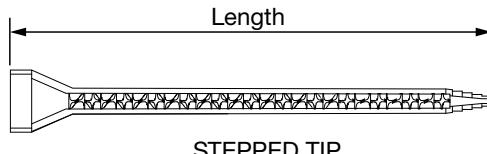
## 7/8-9 Outlet Nose Mixer Packs and Shrouds

All mixers listed here have a bell mouth to mate to the PD44 with 7/8-9 outlet nose, and a stepped outlet tip.

Luer Lock (LLS) mixers listed here have a removable screw on luer adapter installed.

- For example, a 3/16 x 24 mixer and a 3/16 x 24 LLS mixer are the same static mixer, but the LLS mixer has the removable luer adapter installed.
- The luer adapter can be unscrewed to insert the mixer into the shroud, and then reinstalled onto the mixer.

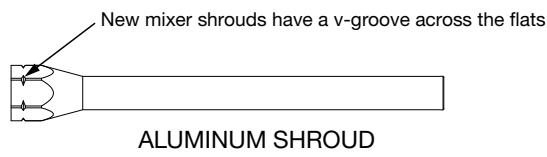
### Mixers



TI02569

### Shroud (Aluminum)

The aluminum shroud has a 7/8-9 thread at the bell end. The aluminum shroud can be used with the mixers listed in the table with or without the luer adapter.



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### Aluminum Shroud Table

Mixer Size	Part Number	Shroud
3/16 x 24	(50 pack) 2001995	2006650
3/16 x 24 LLS	(50 pack) 2001965	
3/16 x 32	(50 pack) 2007610	2006651
3/16 x 32 LLS	(50 pack) 2002032	
1/4 x 24	(50 pack) 2001992 (1000 pack) 2001993	2006652
1/4 x 24 LLS	(50 pack) 2007608	

### Mixer and Shroud Options

The mixer and shroud options listed in the 7/8-9 Outlet Nose Mixer Packs and Shrouds section are the best suited options for use with the PD44. Additional mixer and shroud options (with higher retained volumes) can be found in the MD2 Dispense Valve instruction manual (312185).

Current Mixers		
Mixer Size	Length	Volume
3/16 x 24	5.87 in. (149.1 ml)	2.7 ml
3/16 x 24 LLS	6.38 in. (162.1 ml)	2.8 ml
3/16 x 32	7.44 in. (189.0 mm)	3.7 ml
3/16 x 32 LLS	7.93 in. (201.6 mm)	3.8 ml
1/4 x 24	7.29 in. (185.2 mm)	4.2 ml
1/4 x 24 LLS	7.83 in. (198.9 mm)	4.2 ml

# Technical Data

**NOTE:** See feed system manuals for dimensions, weights, and wetted parts lists for those components. Dimensions, weights, and wetted parts for components not covered in component feed system manuals and for combined assemblies are listed below.

Maximum Ambient Temperature .....	110°F (43°C)
Maximum Operating Temp.....	150°F (65°C)
Maximum Outlet Fluid Working Pressure.....	2000 psi (14 MPa, 138 bar)
Maximum Air Working Pressure.....	100 psi (0.7 MPa, 7 bar)
Maximum Material Inlet Pressure.....	<i>Metal Sleeves:</i> 1200 psi (8 MPa, 83 bar) <i>Plastic Sleeves:</i> 400 psi (2.8 MPa, 28 bar)
Supplied Air Requirements.....	1 to 3 cfm at 80 psi to 100 psi
Ratio Range (depending on metering rods selected).....	1:1 to 25:1
Shot Size Range (depending on metering rods selected)	0.005 cc to 5.0 cc
Maximum Cycle Rate (application dependent) .....	<i>Micrometer PD44:</i> Up to 60 cycles per minute
Dimensions (H x L x W), height to end of material inlet block.....	<i>Micrometer PD44:</i> 17.5 x 4.13 x 7.57 in. (445 x 105 x 192 mm) <i>Mixer:</i> 4 - 14.75 in. (102 - 375 mm)
Weight .....	<i>Graco-supplied Feed System Assemblies</i> (depends on selected options): <i>Smallest:</i> 22.5 x 10 x 4 in. (572 x 254 x 102 mm) <i>Largest:</i> 60 x 28 x 19 in. (1524 x 711 x 483 mm) <i>PD44 Metering Valve:</i> 14 - 15 lb (6.35 - 6.80 kg) <i>Valve stand only:</i> 8 lb (3.6 kg) <i>Feed Systems:</i> 4 - 175 lb (1.8 - 79.4 kg)
Sound Data*.....	<i>PD44 Metering Valve:</i> 76.5 dBA Sound Power Level 92.8 dB Max Sound Pressure <i>Graco-supplied Feed Systems:</i> See <b>Related Manuals</b> , page 2.
Wetted Parts.....	<i>PD44 Metering Valve:</i> Hardened steel, 303/304, 404, UHMWPE, Tungsten, carbide, fluoroelastomer, EPDM, PTFE <i>Graco-supplied Feed System Hoses and Fittings:</i> Mild steel, 303/304, PTFE, buna, polyethylene, polypropylene <i>Graco-supplied Tanks:</i> Polyethylene, 303/304, mild steel

\* Sound data measured per standard ISO 11202 (1993) & ISO3746 (1995).

# Graco Ohio Standard Warranty

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Original instructions. This manual contains English. MM 313904

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