

PD44

313876P

Metering Valves and Feed Systems

EN

Meter, mix, and dispense system for precise two-component micro-dispensing of sealants and adhesives.

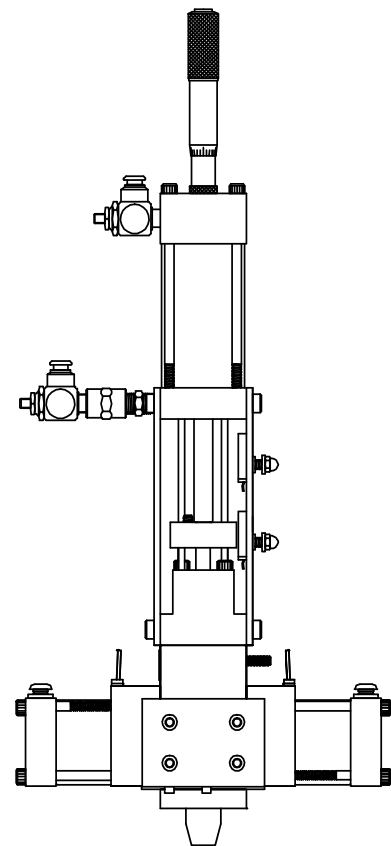
Not approved for use in European explosive atmosphere locations.



Important Safety Instructions

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

See page 3 for model information, including maximum working pressure and approvals. See page 7 for product configuration information.



*Micrometer PD44 Metering Valve shown,
Feed Systems not shown*

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Related Manuals

Manuals are available at www.graco.com

Component manuals in U.S. English.

PD44 Manuals	
Part	Description
313877	PD44 Control Box Setup - Operation
3A0987	PD44 Parts
Feed System Manuals	
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





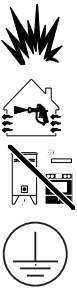
Models






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)		CE Approved
			Metal Sleeves	Plastic Sleeves	
Micrometer	2000 (14, 138)	100 (0.7, 7)	1200 (8, 83)	400 (2.8, 28)	✓
Motor Driven	2000 (14, 138)	100 (0.7, 7)	1200 (8, 83)	400 (2.8, 28)	✓

* If a custom PD44 is ordered, it will not be CE approved unless otherwise noted.






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.

 WARNING	
	<p>SKIN INJECTION HAZARD</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. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> • Do not point gun at anyone or at any part of the body. • Do not put your hand over the dispense outlet. • Do not stop or deflect leaks with your hand, body, glove, or rag. • Follow Pressure Relief Procedure in this manual, when you stop dispensing and before cleaning, checking, or servicing equipment.
	<p>TOXIC FLUID OR FUMES HAZARD</p> <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"> • Read MSDS's to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines. • Always wear impervious gloves when spraying or cleaning equipment. • If this equipment is used with isocyanate material, see additional information on isocyanates in Isocyanate Conditions Section of this manual.
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <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"> • Protective eyewear • Clothing and respirator as recommended by the fluid and solvent manufacturer • Gloves • Hearing protection
	<p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Use equipment only in well ventilated area. • Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc). • Keep work area free of debris, including solvent, rags and gasoline. • Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present. • Ground all equipment in the work area. See Grounding instructions. • Use only grounded hoses. • If there is static sparking or you feel a shock, stop operation immediately. Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area.

 WARNING	
	<p>ELECTRIC SHOCK HAZARD</p> <p>This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> • Turn off and disconnect power cord before servicing equipment. • Use only grounded electrical outlets. • Use only 3-wire extension cords. • Ensure ground prongs are intact on power and extension cords. • Do not expose to rain. Store indoors.
	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • Do not operate the unit when fatigued or under the influence of drugs or alcohol. • Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See Technical Data in all equipment manuals. • Do not leave the work area while equipment is energized or under pressure. Turn off all equipment and follow the Pressure Relief Procedure in this manual when equipment is not in use. • Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. • Do not alter or modify equipment. • Use equipment only for its intended purpose. Call your distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
	<p>MOVING PARTS HAZARD</p> <p>Moving parts can pinch or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> • Keep clear of moving parts. • Do not operate equipment with protective guards or covers removed. • Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure in this manual. Disconnect power or air supply.
	<p>PLASTIC PARTS CLEANING SOLVENT HAZARD</p> <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 Technical Data in this and all other equipment instruction manuals. Read fluid and solvent manufacturer's warnings.</p>

Isocyanate Conditions

						
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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

						
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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 206994. 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, never interchange component A (isocyanate) and component B (resin) parts.

Foam Resins with 245 fa 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.

Product Configurator

This system can be ordered with many different options as shown in the configurator below.

PD44 C - A - BCD - EFG - H - I - J - K - L - M - NO - P - Q - RS - T - U - V - W - X

Seal Lubricant
 Bench Stand
 Vacuum Pump(s)
 Low Volume Feed Options
 Low Volume Feed Hose
 Low Volume Feed
 High Volume Feed Options
 High Volume Feed Hose
 High Volume Feed
 Power Cord
 Controls
 Mixer
 Outlet Nose
 Low Volume Spool
 High Volume Spool
 Low Volume Rod Material, Size
 High Volume Rod Material, Size
 Base Unit
 Configurator Series Level

The following table applies to the PD44 configurations and indicates all of the options available for each letter shown above.

Code A	Part	Base Unit
A	964000	Micrometer PD44
C	964002	Motor Driven PD44
Code B	Part	High Volume Rod Material
NOTE: See code CD for last two digits of part number		
A	9641__	Hardened Steel
B	9642__	Stainless Steel, UHMW
C	9643__	Tungsten Carbide, UHMW
Code CD	Part	High Volume Rod Size
NOTE: See code B for first four digits of part number		
01	__01	1.25 mm rod diameter
02	__02	1.38 mm rod diameter
03	__03	1.50 mm rod diameter
04	__04	1.63 mm rod diameter
05	__05	1.75 mm rod diameter
06	__06	2.00 mm rod diameter
07	__07	2.13 mm rod diameter
08	__08	2.25 mm rod diameter
09	__09	2.38 mm rod diameter
10	__10	2.50 mm rod diameter
11	__11	2.63 mm rod diameter
12	__12	2.75 mm rod diameter
13	__13	3.00 mm rod diameter
14	__14	3.13 mm rod diameter
15	__15	3.25 mm rod diameter
16	__16	3.38 mm rod diameter
17	__17	3.50 mm rod diameter
18	__18	3.63 mm rod diameter
19	__19	3.75 mm rod diameter

20	__20	4.00 mm rod diameter
21	__21	4.25 mm rod diameter
22	__22	4.50 mm rod diameter
23	__23	4.63 mm rod diameter
24	__24	4.75 mm rod diameter
25	__25	4.88 mm rod diameter
26	__26	5.00 mm rod diameter
27	__27	5.13 mm rod diameter
28	__28	5.25 mm rod diameter
29	__29	5.50 mm rod diameter
30	__30	5.75 mm rod diameter
31	__31	6.00 mm rod diameter
32	__32	6.13 mm rod diameter
33	__33	6.25 mm rod diameter
34	__34	6.38 mm rod diameter
35	__35	6.50 mm rod diameter
36	__36	6.63 mm rod diameter
37	__37	6.75 mm rod diameter
38	__38	7.00 mm rod diameter
39	__39	7.25 mm rod diameter
40	__40	7.50 mm rod diameter
41	__41	7.63 mm rod diameter
42	__42	7.75 mm rod diameter
43	__43	7.88 mm rod diameter
44	__44	8.00 mm rod diameter

Code E	Part	Low Volume Rod Material
NOTE: See code FG for last two digits of part number		
A	9641__	Hardened Steel
B	9642__	Stainless Steel, UHMW
C	9643__	Tungsten Carbide, UHMW
Code FG	Part	Low Volume Rod Size
NOTE: See code E for first four digits of part number		
01	__01	1.25 mm rod diameter
02	__02	1.38 mm rod diameter
03	__03	1.50 mm rod diameter
04	__04	1.63 mm rod diameter
05	__05	1.75 mm rod diameter
06	__06	2.00 mm rod diameter
07	__07	2.13 mm rod diameter
08	__08	2.25 mm rod diameter
09	__09	2.38 mm rod diameter
10	__10	2.50 mm rod diameter
11	__11	2.63 mm rod diameter
12	__12	2.75 mm rod diameter
13	__13	3.00 mm rod diameter
14	__14	3.13 mm rod diameter
15	__15	3.25 mm rod diameter
16	__16	3.38 mm rod diameter
17	__17	3.50 mm rod diameter
18	__18	3.63 mm rod diameter
19	__19	3.75 mm rod diameter
20	__20	4.00 mm rod diameter
21	__21	4.25 mm rod diameter
22	__22	4.50 mm rod diameter
23	__23	4.63 mm rod diameter
24	__24	4.75 mm rod diameter
25	__25	4.88 mm rod diameter
26	__26	5.00 mm rod diameter
27	__27	5.13 mm rod diameter
28	__28	5.25 mm rod diameter
29	__29	5.50 mm rod diameter
30	__30	5.75 mm rod diameter
31	__31	6.00 mm rod diameter
32	__32	6.13 mm rod diameter
33	__33	6.25 mm rod diameter
34	__34	6.38 mm rod diameter
35	__35	6.50 mm rod diameter
36	__36	6.63 mm rod diameter
37	__37	6.75 mm rod diameter
38	__38	7.00 mm rod diameter
39	__39	7.25 mm rod diameter
40	__40	7.50 mm rod diameter
41	__41	7.63 mm rod diameter
42	__42	7.75 mm rod diameter
43	__43	7.88 mm rod diameter
44	__44	8.00 mm rod diameter

Code H	Part	High Volume Spool
1	964003	High viscosity, HS
2	964004	High viscosity, Stainless Steel/UHMWPE
3	964005	High viscosity, TC/UHMWPE
4	964006	Low viscosity, Stainless Steel
Code I	Part	Low Volume Spool
1	964011	High viscosity, HS
2	964012	High viscosity, Stainless Steel/UHMWPE
3	964013	High viscosity, TC/UHMWPE
4	964014	Low viscosity, Stainless Steel
Code J	Part	Outlet Nose
1	964020	Luer lock, equal ports, no check valves
2	964021	Luer lock, equal ports, dual check valves
3	964022	Equal ports, 7/8-9, no check valves
4	964023	Large and small ports, 7/8-9, no check valves
5	964024	Large and small ports, 7/8-9, single check valve
6	964025	Dual small ports, 7/8-9, no check valves
7	964026	Dual small ports, 7/8-9 dual check valves
Code K	Part	Mixer
1	964027	1/8-24 Luer Lock inlet and outlet, 0.5 cc
2	964028	3/16-32 bell mouth inlet, luer lock outlet, 2.0 cc
3	964029	1/4-24 bell mouth inlet, luer lock outlet, 4.0 cc
4	964030	1/4-32 bell mouth inlet, luer lock outlet, 5.5 cc
5	964031	1/4-48 bell mouth inlet, luer lock outlet, 8.0 cc
6	964032	3/16-32 bell mouth inlet, tapered outlet, 1.5 cc
7	964033	1/4-24 bell mouth inlet, tapered outlet, 3.5 cc
8	964034	3/16-24 bell mouth inlet, tapered outlet, 1.0 cc
Code L	Part	Controls
1	964035	Pneumatic, micrometer, wire harness only
5	25U070	Pneumatic, micrometer, HMI control, low level, high level, I/O package
B	964045	Motor driven, I/O, wire harness only
D	--	No Controls - use only with UniXact motion table
E	25C687	No Controls with pressure transducer block. Use only with UniXact motion table

Code M	Part	Power Cord
1	121055	120 VAC, North American cord set
2	121054	250 VAC, 1 phase, no plug
3	121056	10 amp, 250 volt, continental Europe
4	121057	10 amp, 250 volt, United Kingdom and Ireland
5	121058	10 amp, 250 volt, Israel
6	124864	10 amp, 250 volt, Australia
7	124861	10 amp, 250 volt, Italy
8	124863	10 amp, 250 volt, Switzerland
9	124862	10 amp, 250 volt, Denmark
A	121060	10 amp, 250 volt, India
N	--	None
Code NO	Part	High Volume Feed
01	964050	20 oz cartridge feed with mounting post
02	25T473	1 gallon pail Ram and transfer pump
03	964052	5 gallon pail cover with diaphragm pump
04	964053	5 gallon pail cover diaphragm pump and agitator
05	964054	5 gallon pail cover and 5:1 transfer pump
06	964055	5 gallon pail cover, 1:1 pump with dip tube for moisture sensitive materials
07	964056	5 gallon single post Ram with 11:1 pump, mild steel
08	964057	5 gallon single post Ram with 11:1 pump, stainless steel
NN	--	None
Code P	Part	High Volume Feed Hose
1	964082	1/2 in. x 8 ft PTFE and stainless steel hose, stainless steel fittings
3	964084	1/2 in. x 10 ft PTFE and stainless steel hose, stainless steel fittings
5	964086	1/2 in. x 15 ft PTFE and stainless steel hose, stainless steel fittings
N	--	None
Code Q	Part	High Volume Feed
C	964090	Low level sensor 11:1 Ram only
N	--	None

Code RS	Part	Low Volume Feed
01	964050	20 oz cartridge feed with mounting post
02	25T473	1 gallon pail Ram and transfer pump
03	964052	5 gallon pail cover with diaphragm pump
04	964053	5 gallon pail cover diaphragm pump and agitator
05	964054	5 gallon pail cover and 5:1 transfer pump
06	964055	5 gallon pail cover, 1:1 pump with dip tube for moisture sensitive materials
07	964056	5 gallon single post Ram with 11:1 pump, mild steel
08	964057	5 gallon single post Ram with 11:1 pump, stainless steel
NN	--	None
Code T	Part	Low Volume Feed Hose
1	964082	1/2 in. x 8 ft PTFE and stainless steel hose, stainless steel fittings
3	964084	1/2 in. x 10 ft PTFE and stainless steel hose, stainless steel fittings
5	964086	1/2 in. x 15 ft PTFE and stainless steel hose, stainless steel fittings
7	--	None
Code U	Part	Low Volume Feed
C	964090	Low level sensor 11:1 Ram only
N	--	None
Code V	Part	Vacuum Pump(s)
N	--	None
Code W	Part	Bench Stand
A	964095	Adjustable height bench stand
N	--	None
Code X	Part	Seal Lubricant
T	206994	Fluid, TSL, 8 ounce bottle

Accessories

Mixer Kits with Shroud

Part	Description
964034	Mixer, Kit, 3/16 in. (4.8mm) x 24, 10 taper tip mixers with shroud
964032	Mixer, Kit, 3/16 in. (4.8mm) x 32, 10 taper tip mixers with shroud
964028	Mixer, Kit, 3/16 in. (4.8mm) x 32, 10 Luer Lock tip mixers with shroud/sleeve
964033	Mixer, Kit, 1/4 in. (6.5mm) x 24, 10 taper tip mixers with shroud
964029	Mixer, Kit, 1/4 in. (6.5mm) x 24, 10 Luer Lock tip mixers with shroud/sleeve
964030	Mixer, Kit, 1/4 in. (6.5mm) x 32, 10 Luer Lock tip mixers with shroud/sleeve
964031	Mixer, Kit, 1/4 in. (6.5mm) x 48, 10 Luer Lock tip mixers with shroud/sleeve

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
16D978	Mixer, 3/16 in. (4.8mm) x 24 taper tip, 50 Pack
16D979	Mixer, 3/16 in. (4.8mm) x 24 taper tip, 250 Pack
LC0077	Mixer, 3/16 in. (4.8mm) x 32 taper tip, 50 Pack
LC0084	Mixer, 3/16 in. (4.8mm) x 32 taper tip, 250 Pack
LC0082	Mixer, 3/16 in. (4.8mm) x 32 Luer Lock tip, 50 Pack
LC0089	Mixer, 3/16 in. (4.8mm) x 32 Luer Lock tip, 250 Pack
LC0078	Mixer, 1/4 in. (6.5mm) x 24 taper tip mixer, 50 Pack
LC0085	Mixer, 1/4 in. (6.5mm) x 24 taper tip mixer, 250 Pack
LC0083	Mixer, 1/4 in. (6.5mm) x 24 Luer Lock tip, 50 Pack

Part	Description
LC0090	Mixer, 1/4 in. (6.5mm) x 24 Luer Lock tip, 250 Pack
16D968	Mixer, 1/4 in. (6.5mm) x 32 Luer Lock tip, 50 Pack
16D969	Mixer, 1/4 in. (6.5mm) x 32 Luer Lock tip, 250 Pack
16D970	Mixer, 1/4 in. (6.5mm) x 48 Luer Lock tip, 50 Pack
16D973	Mixer, 1/4 in. (6.5mm) x 48 Luer Lock 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

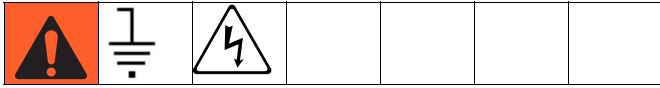
Part	Description
16B286	Seal, Posipack, 4.50, ZAP
16B287	Seal, Posipack, 4.63, ZAP
16B288	Seal, Posipack, 4.75, ZAP
16B289	Seal, Posipack, 4.88, ZAP
16B290	Seal, Posipack, 5.00, ZAP
16B291	Seal, Posipack, 5.13, ZAP
16B292	Seal, Posipack, 5.25, ZAP
16B293	Seal, Posipack, 5.50, ZAP
16B294	Seal, Posipack, 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

Part	Description
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

Grounding



This product must be grounded. In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current.

Metering valve: attach ground wire from grounding lug to true earth ground. See **Component Identification** starting on page 13.

Fluid hoses: use only electrically conductive hoses.

Feed system components: attach ground wire from grounding lug to true earth ground. See feed system manual for grounding points. See **Related Manuals** on page 3.

Fluid supply container: follow 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 nonconductive surface, such as paper or cardboard, which interrupts grounding continuity.

Overview

This plural component meter, mix, and dispense device accurately meters liquid and semi-paste materials.

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

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

The complete system is enclosed. Mixing of the two materials takes place only in the mixer at the final stage of metering valve operation. See **Sequence of Operation** on page 23.

Component Identification

Typical System Configurations

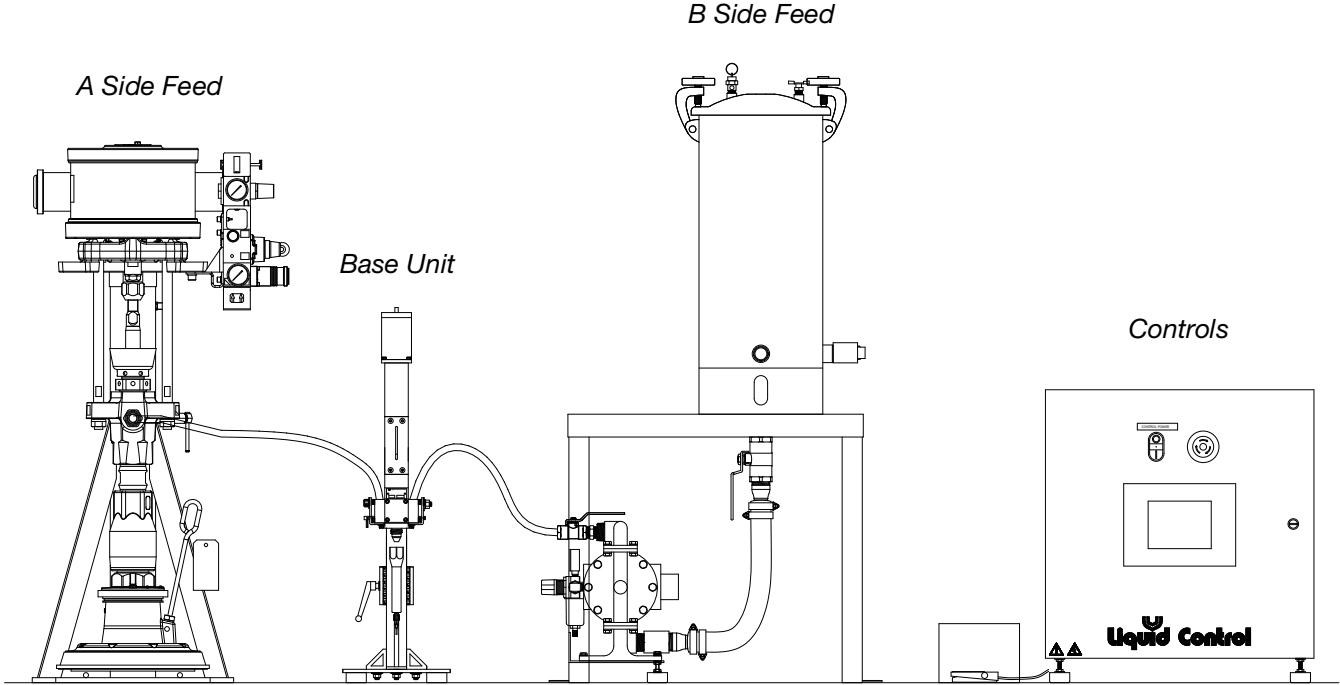
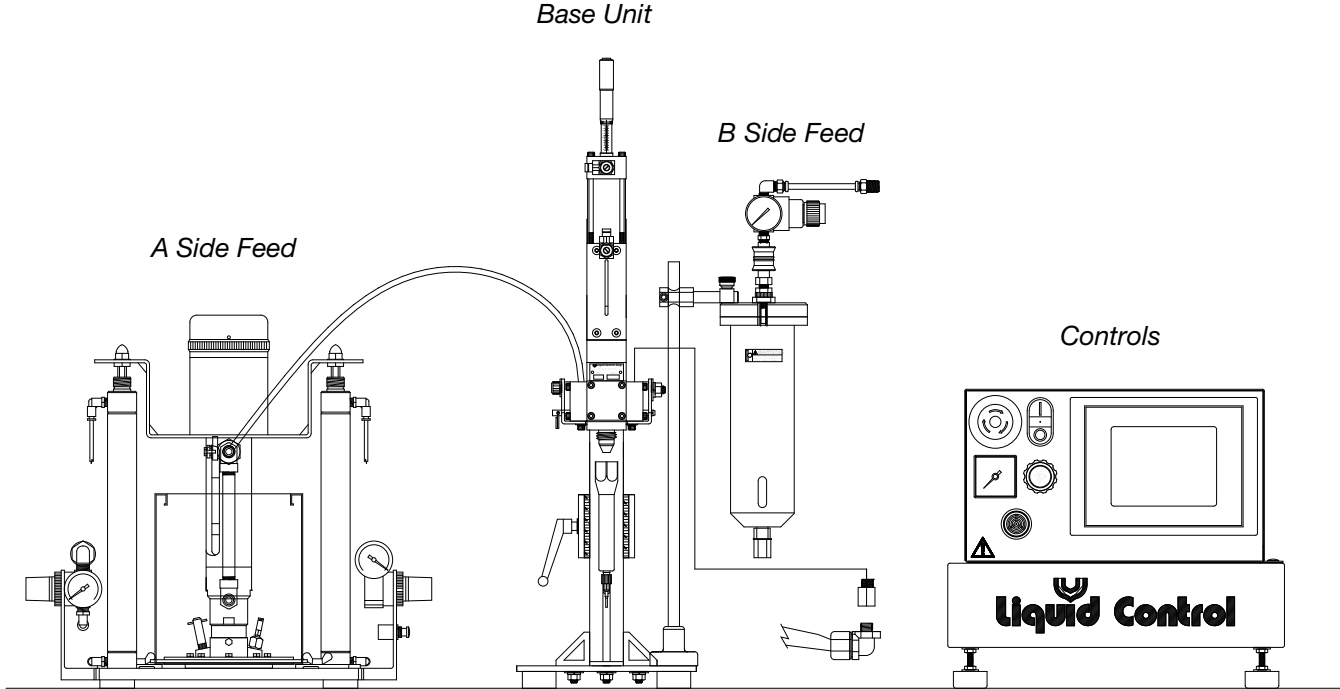


FIG. 1

Typical Feed System Components

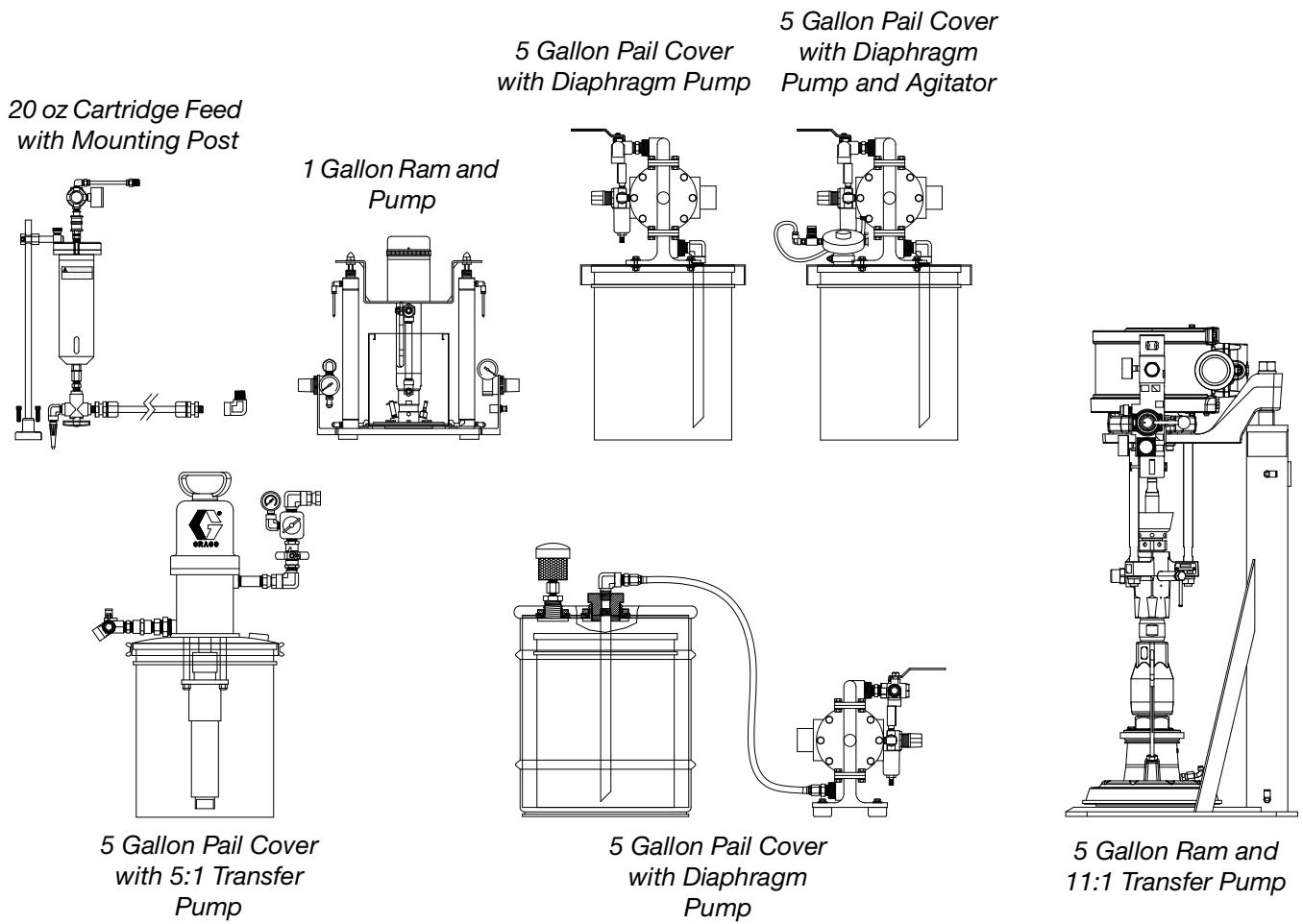
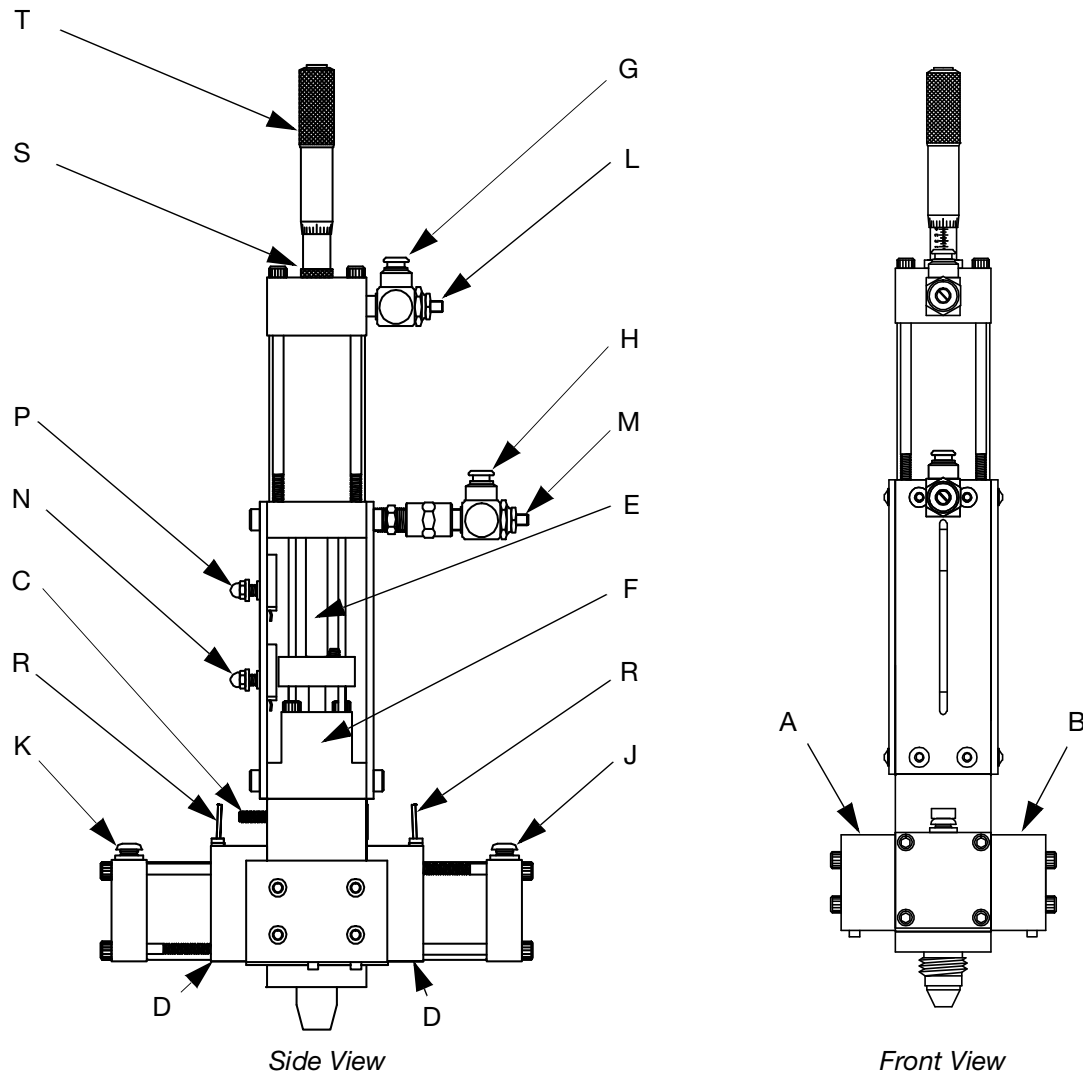


FIG. 2

Micrometer PD44 Metering Valve

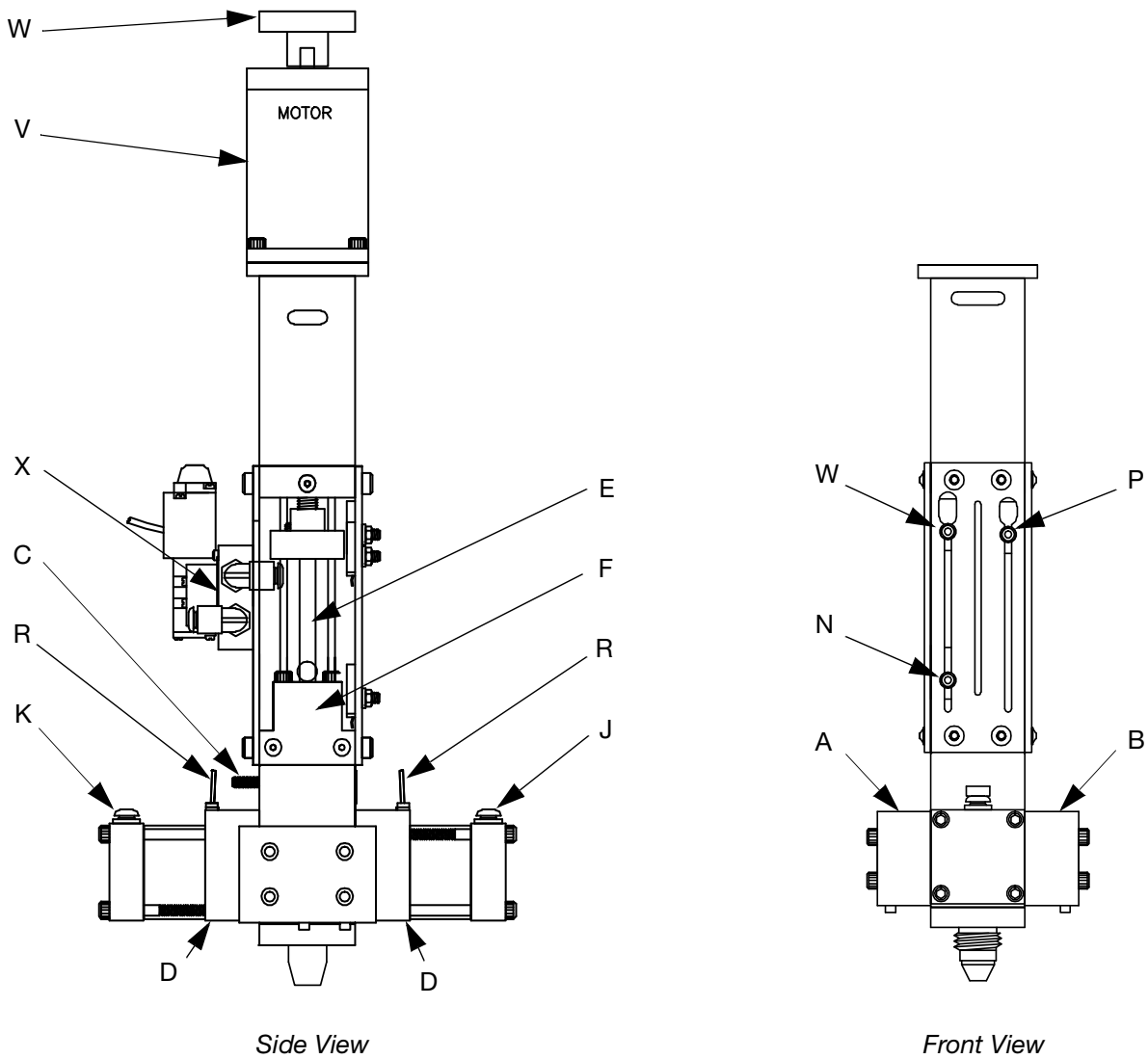


Key:

- | | | | |
|---|----------------------------|---|----------------------------------|
| A | A Material Inlet (1/4 NPT) | L | Extend Air Flow Adjustment Knob |
| B | B Material Inlet (1/4 NPT) | M | Retract Air Flow Adjustment Knob |
| C | Grounding Lug | N | Retract Proximity Switch |
| D | Spool Assemblies | P | Extend Proximity Switch |
| E | Metering Rods | R | Spool Valve Proximity 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. 3

Motor Driven PD44 Metering Valve

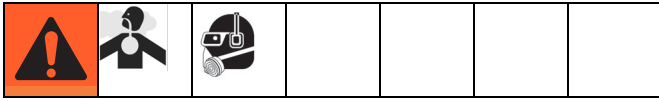


Key:

- | | | | |
|---|---------------------------------|---|--|
| A | A Material Inlet (1/4 NPT) | M | Retract Air Flow Adjustment Knob |
| B | B Material Inlet (1/4 NPT) | N | Over-travel Proximity Switch |
| C | Grounding Lug | P | Home Proximity Switch |
| D | Spool Assemblies | R | Spool Valve Proximity Switch |
| E | Metering Rods | V | Optional Motor (provided with configured controls) |
| F | Oil Cup Retaining Block | W | Over-travel Proximity Switch |
| J | Dispense Air Inlet | X | Main Air Inlet (on far side of valve as shown) |
| K | Reload Air Inlet | | |
| L | Extend Air Flow Adjustment Knob | | |

FIG. 4

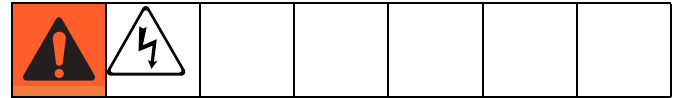
Setup



NOTE: See **Typical Installation** diagram.

1. Perform Setup procedure for feed system components. See feed system manuals. See **Related Manuals** on page 3.
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 13.

4. **On the Motor Driven PD44**, if a non-Graco motor is used, install the motor onto the metering valve. See **Motor Mounting Diagram**, page 19.



5. **On the Motor Driven PD44**, connect the required electrical power to the metering valve. See **Motor Specifications**, page 38.
6. Connect chemical lines from feed system to metering valve material inlets (1/4 NPT). See **Component Identification** starting on page 13.

Typical Installation

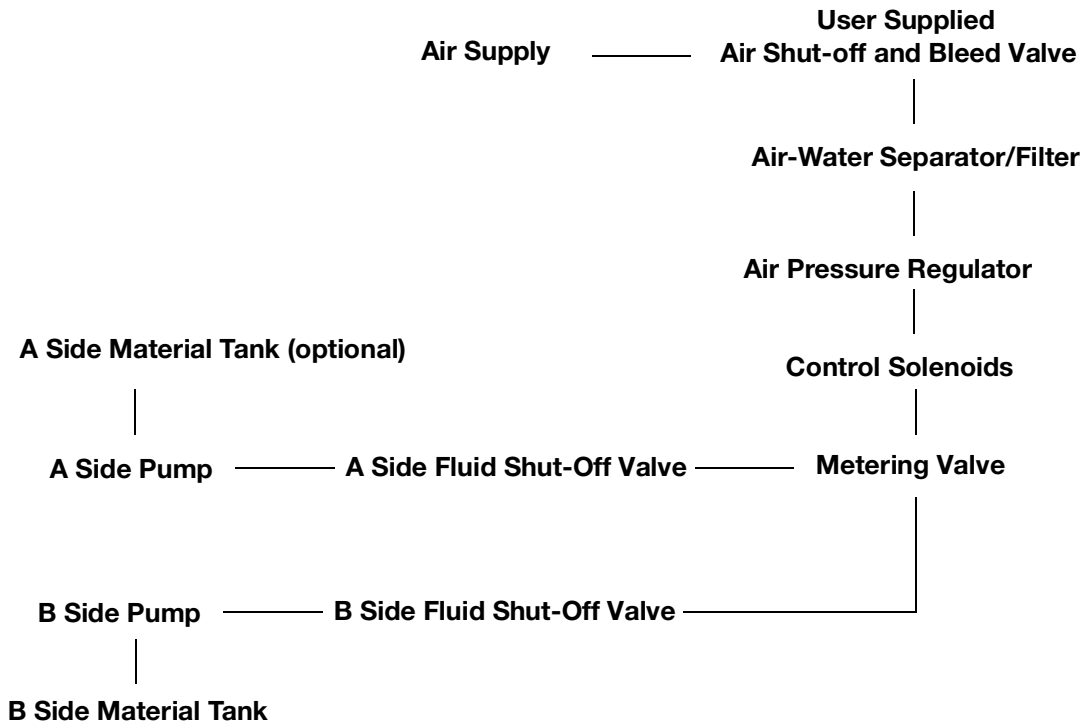
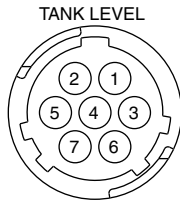


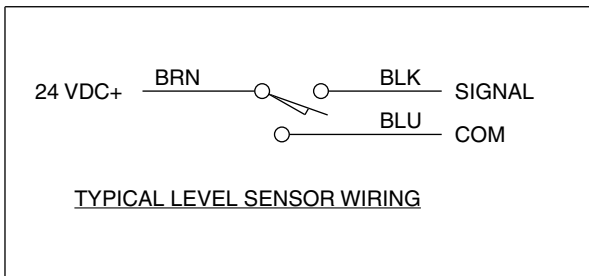
FIG. 5

Tank Level Sensor Wiring Schematic



PIN NUMBER	PIN USAGE	USAGE
1	BROWN	HIGH
2	BLACK	HIGH
3	BLUE	HIGH
4	BROWN	LOW
5	BLACK	LOW
6	BLUE	LOW
7	BLUE	LOW

JUMPER PIN 6 AND 7



Valve Mounting Diagram

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

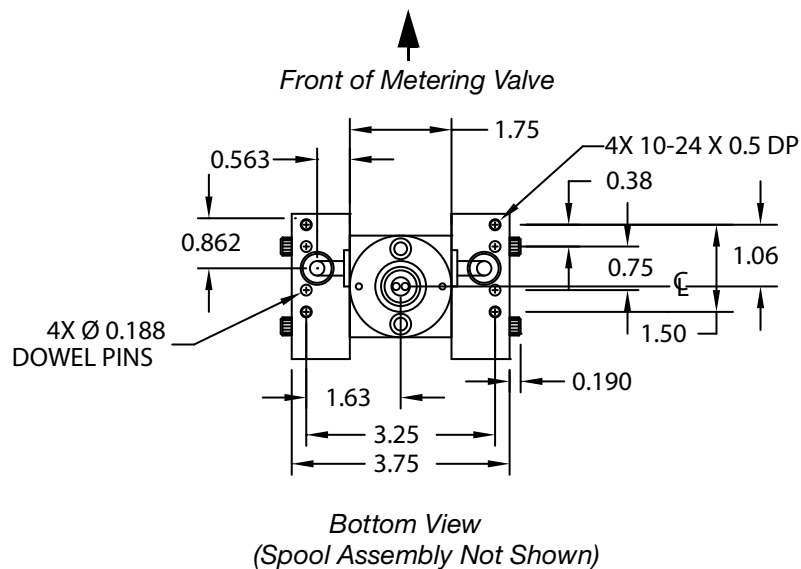
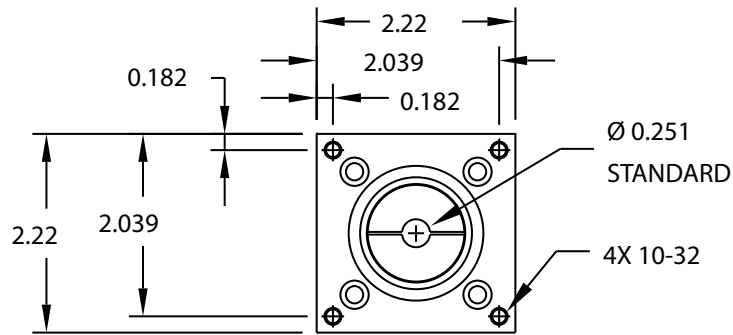


FIG. 6

Motor Mounting Diagram

If using a non-Graco motor with the Motor Driven PD44, use the following diagram to install the non-Graco motor onto the Motor Driven PD44 metering valve. See **Motor Specifications**, page 38.

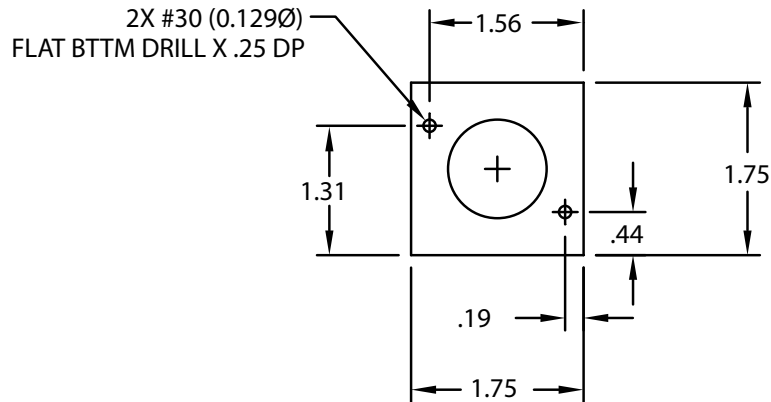


Top View of Drive Assembly

FIG. 7

Custom Drive Mounting Diagram

If using a non-Graco lead screw or housing, use the following diagram to ensure that the guide rods will align properly with the custom housing.



Bottom View of Lead Screw Housing

FIG. 8

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.

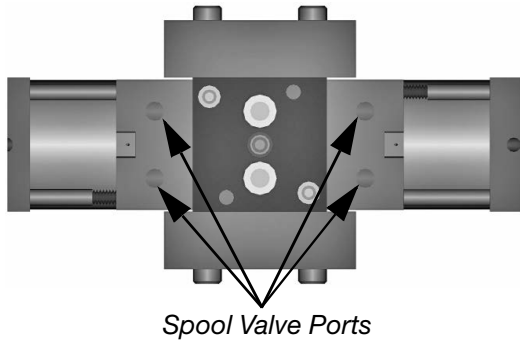


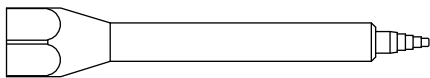
FIG. 9: Top View of Metering Valve with Top Section Removed

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.

2. Perform **Ratio Check**, page 22.
3. Install mixer and shroud.



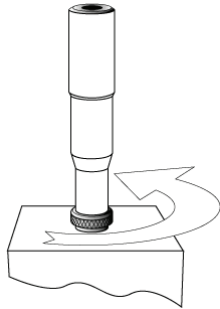
4. Pressurize the A and B material feed systems connected to the metering valve to prime the system. See page 3 for maximum inlet feed pressures.

Adjusting the Shot Size

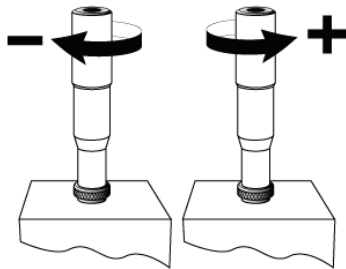
Micrometer PD44 Only



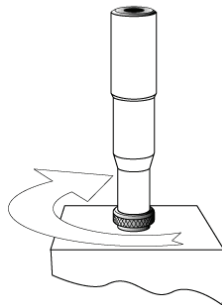
1. Rotate the shot size locking ring counterclockwise to loosen.



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

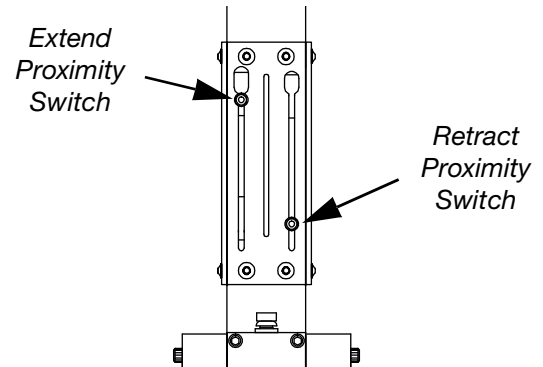


3. Rotate the shot size locking ring clockwise to tighten.



4. Dispense into waste container to test shot size.
5. Repeat until desired shot size is achieved.

6. If LED on the extend proximity switch is not illuminated, slide the proximity switch until the LED on the proximity switch is illuminated.



NOTE: The retract proximity switch (PX-RET) is factory preset and does not need to be adjusted. If the lower proximity switch is changed from the factory setting, see the assembly drawings for more information on readjustment. This switch is marked with a RET tag on the wire.

Motor Driven PD44

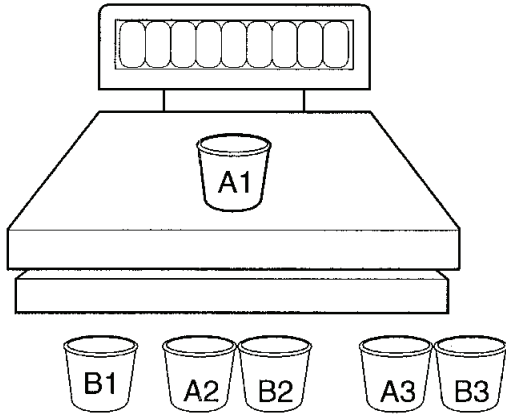
On Motor Driven PD44s, the shot size is controlled by the PD44 Control Box. See the PD44 Control Box manual. See **Related Manuals** on page 3.

Ratio Check



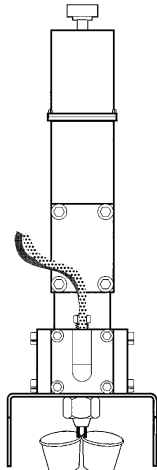
Perform ratio check procedure at startup and after rebuild.

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



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

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.



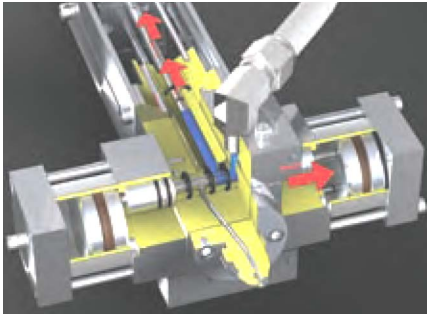
6. Repeat until all three sets of cups have been used.
7. Re-weigh all six cups and record weights.

Operation

The operation of the PD44 metering valve is controlled by an external source. If a PD44 Control Box was purchased, see the PD44 Control Box manual for operation instructions. See **Related Manuals** on page 3.

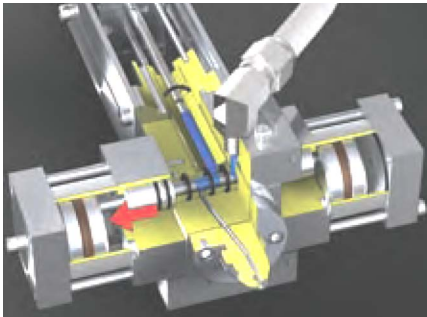
Sequence of Operation

Step 1: Reload



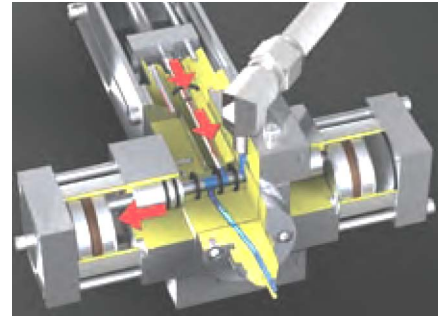
- Spools shift to the right
- Material feed inlets are opened
- Materials are transferred into the metering chambers by a pressurized feed system
- Outlet ports are blocked
- Metering rods are retracted to a precise position determining the volume of each material

Step 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

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.

Pressure Relief Procedure



1. Retract the metering rods. See the PD44 Control Box manual. See **Related Manuals** on page 3.
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 3.
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 3.

Shutdown



1. Perform **Pressure Relief Procedure**.
2. Inspect the metering rods for material buildup. Clean as necessary.
3. Install storage cap on outlet nose.

Maintenance



Perform the following procedures once a shift.

NOTE: If material is leaking, see **Troubleshooting** on page 25.

Material Reservoirs

Check material levels and refill as necessary. Ensure that the material reservoirs are properly vented.

Air Dryer

Check the condition of the desiccant air dryer. Replace as necessary.




Spool Valve Ports

Fill with compatible lubricant such as TSL. See FIG. 9 on page 20.

Ratio Check

See **Ratio Check** on page 22.

Troubleshooting

						
Perform Pressure Relief Procedure 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

For standard machines, the schematics will be included in the PD44 Parts manual. See **Related Manuals** on page 3.

For custom machines, the schematics will be included in the assembly drawings manual.

Rebuild

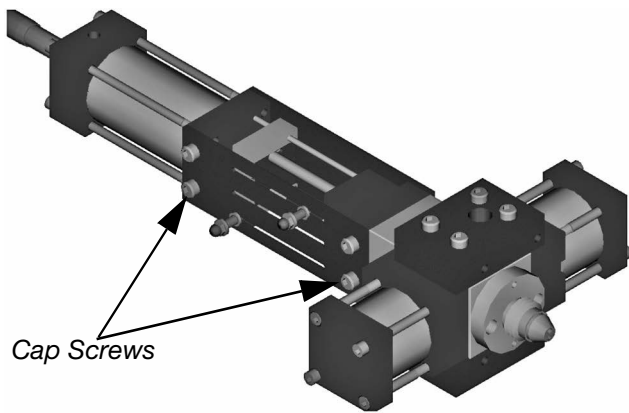
Wetted Section Disassembly



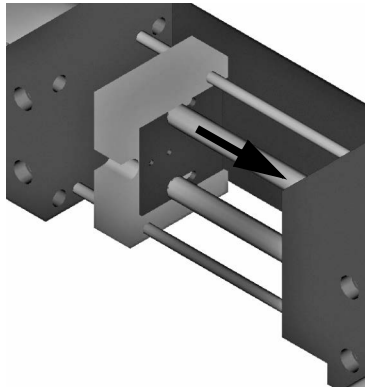
1. Perform **Pressure Relief Procedure**, page 24.
2. **On Motor Driven PD44s**, remove electrical power.
3. Mark and disconnect all material feed lines, pneumatic lines, and proximity switch wiring. Remove the metering valve from mounts.

NOTE: On Micrometer and Motor Driven PD44s, the rear tie plate is the tie plate with the proximity switches.

4. Remove the four cap screws to remove the rear tie plate.



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



6. Loosen set screws on top of the connecting block.

7. Slide the metering rod retaining plate until the larger hole position is in-line with the metering rod. See FIG. 10 in the following step.
8. 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.

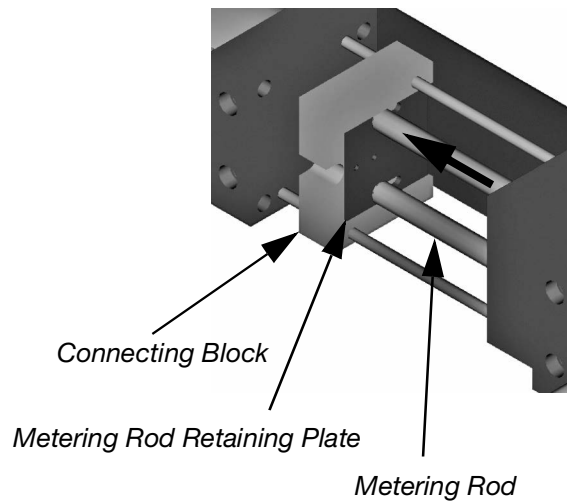
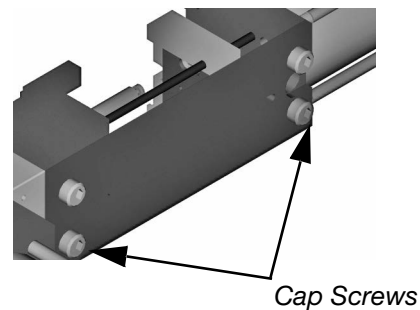


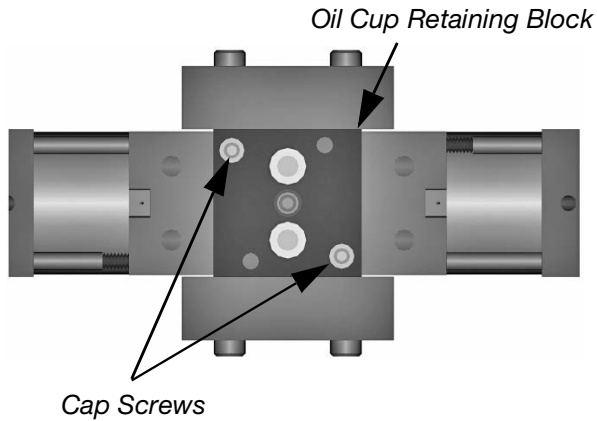
FIG. 10

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



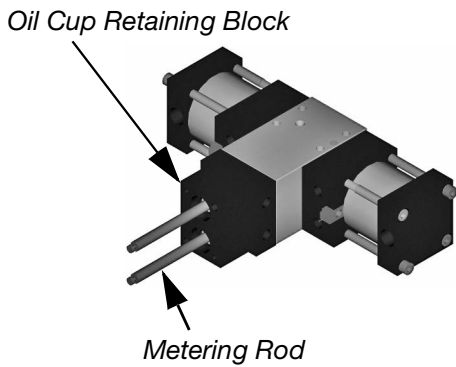
10. Separate the drive cylinder and the valve guides from the oil cup retaining block.

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

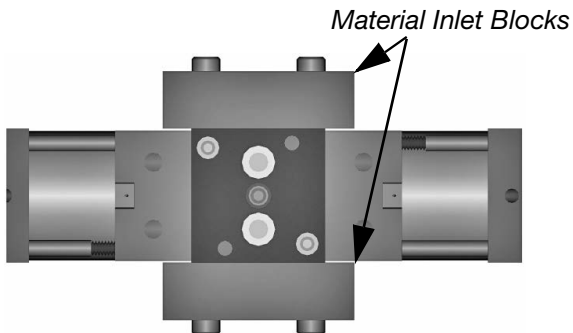


12. Remove the metering rods and oil cup retaining block.

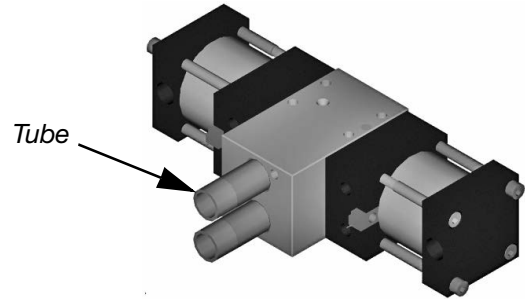
NOTE: The metering rods and the tubes (tubes will be removed in step 14) are a matched set. Make note where each metering rod was located to ensure that the rods will be matched accordingly with the respective tube.



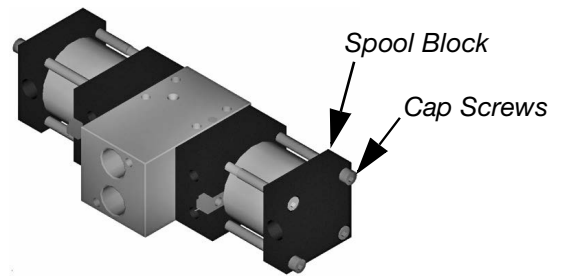
13. Remove the eight cap screws attaching the material inlet blocks. Remove the material inlet blocks.



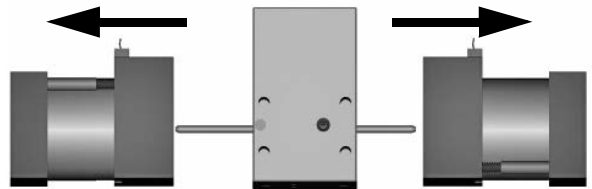
14. Remove the two tubes. Always keep rods and tubes together as they are a matched set.



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



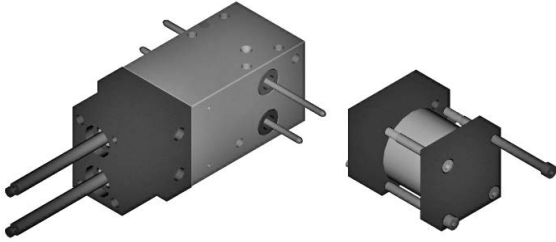
16. Remove the two pneumatic spools.



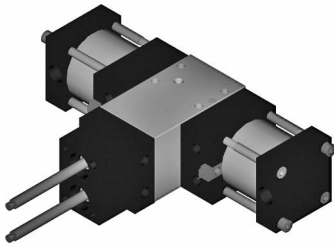
Wetted Section Reassembly



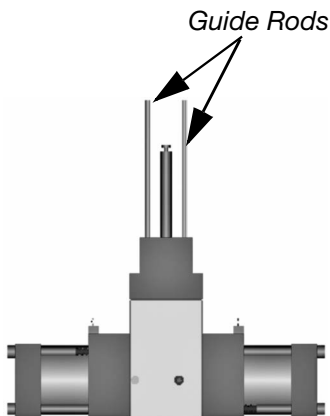
1. Install the pneumatic spool rod drive. Torque fasteners to 22-26 in-lb (2.5-2.9 N•m) using purple thread sealant.



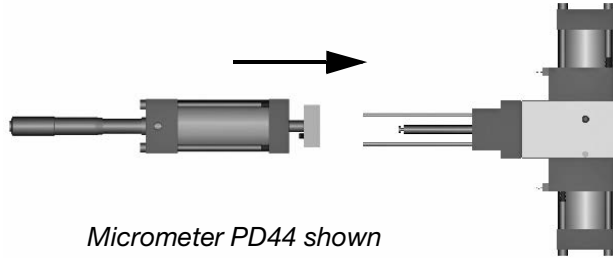
2. Repeat for other side.



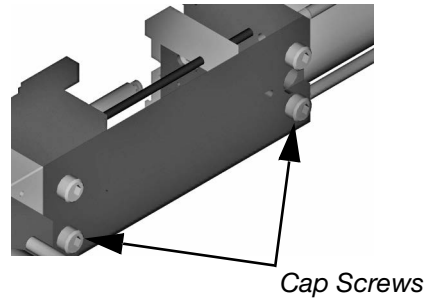
3. Install guide rods. Refer to **Wetted Section Rebuild** on page 30 for details on spool valve and metering rod assembly.



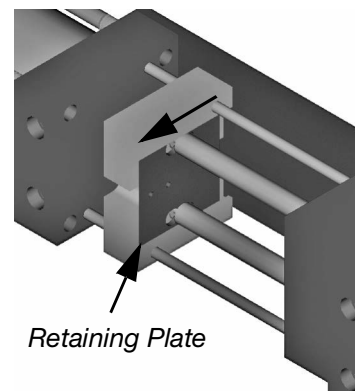
4. Install drive assembly to the guides.



5. Attach the front plate to the serial number side of the metering body.
6. **On Micrometer PD44s**, ensure the air inlet ports are pointed towards the front plate.
7. Install the cap head screws to the back plate.

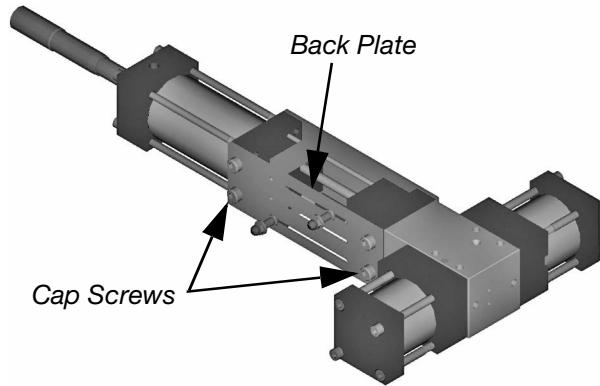


8. Slide connecting block down until rod heads are inserted into retaining plate keyway.
9. Slide the metering rod retaining plate to the locked position.

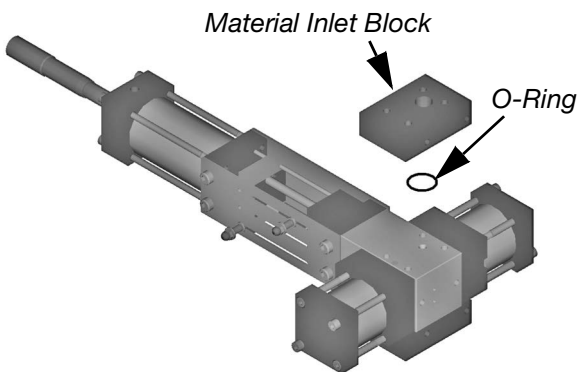


10. Tighten set screw located on top of connecting block until it contacts the top of the metering rod head. Evenly torque the A and B set screws to 4-8 in-lb (0.45-0.9 N•m).

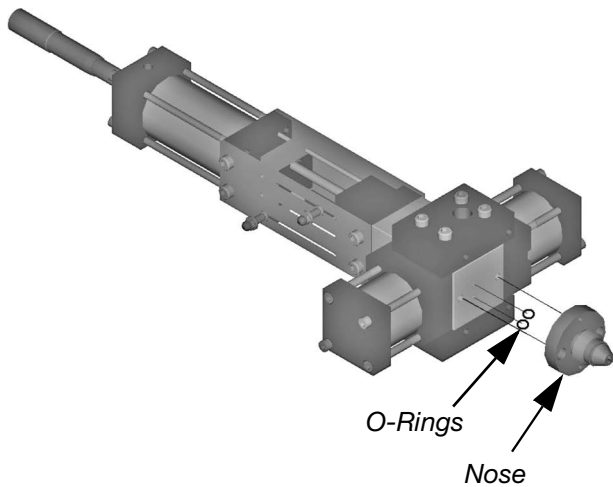
11. Manually move connecting block up and down to insure rods are properly installed.
12. Install the back plate and cap screws.



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



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

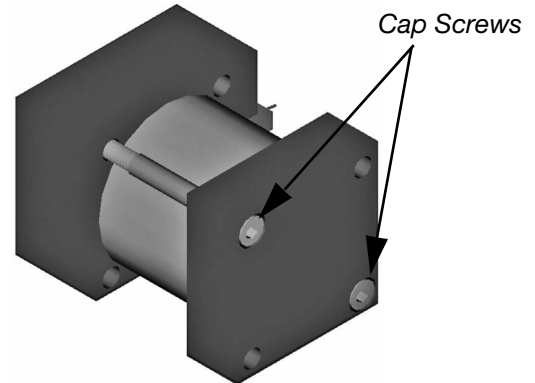


15. Attach material line, pneumatic line, and electrical harness.
16. Perform **Startup** procedure, page 20.

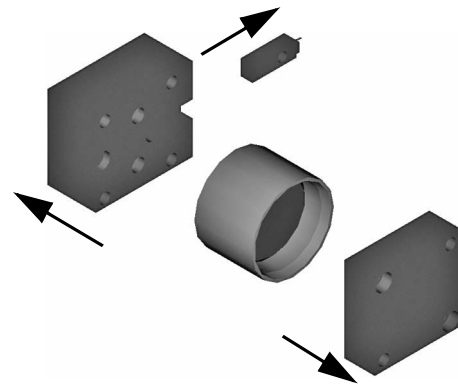
Spool Valve Rebuild



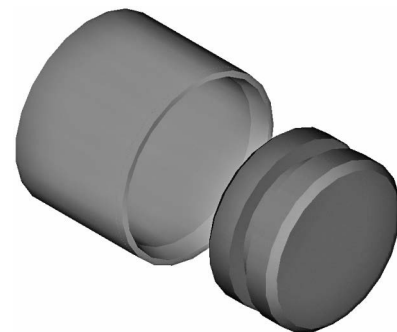
1. Perform **Wetted Section Disassembly**, page 26.
2. Remove the two cap screws.



3. Disassemble the spool cylinder.

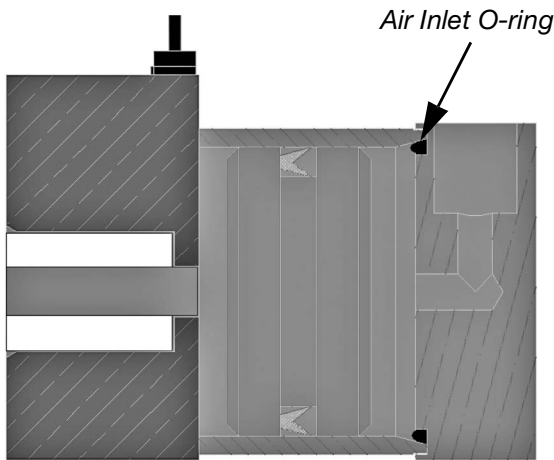


4. Remove the piston from the cylinder.

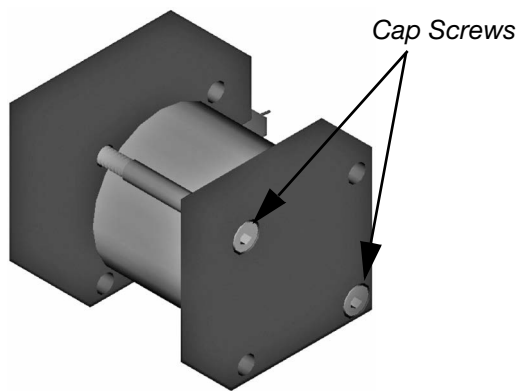


5. Install new u-cup seal on piston.

6. Insert new o-ring into spool air cylinder end cap.
7. Install proximity switch using purple thread sealant.
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.

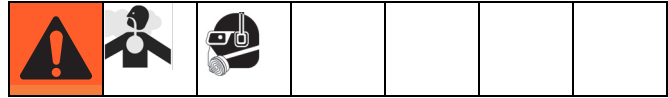


10. Careful not to cut the o-ring, install pneumatic spool blocks.
11. Install the two cap screws using purple thread sealant. Torque to 22-26 in/lbs (2.5-2.9 N•m)..

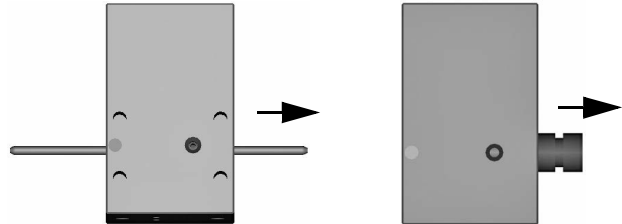


12. Repeat for opposite side pneumatic spool rod drive.

Wetted Section Rebuild

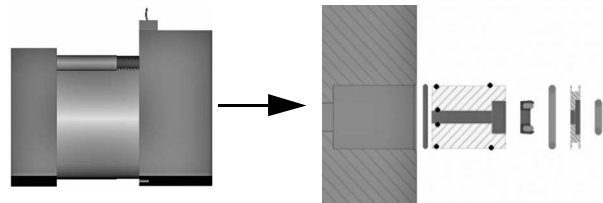


1. Perform **Wetted Section Disassembly**, page 26.
2. Remove spool rods and sleeves from the metering block.

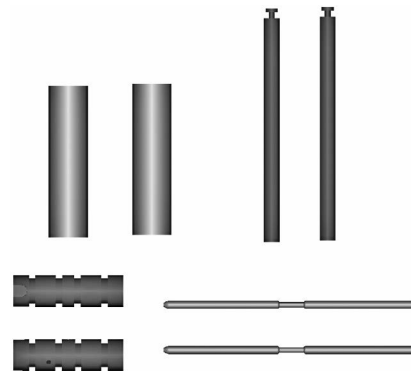


NOTE: The spool sleeve can be removed by sliding the sleeve in the direction of the identification marking.

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

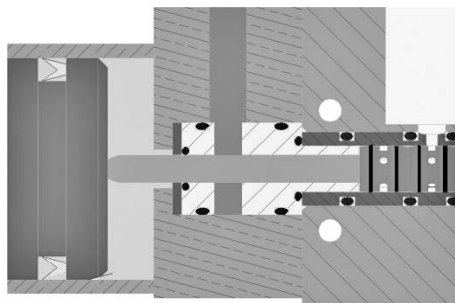


4. Inspect the metering rod and sleeve assemblies and the spool rod and sleeve assemblies for excessive wear. If there are any scratches on the rod that can be felt by a fingernail, replace the rod and sleeve assembly.

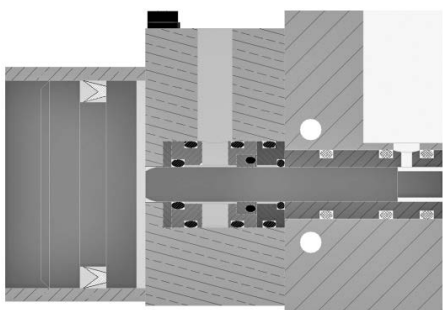


5. Clean all wetted components thoroughly with compatible solvent.

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



Low Viscosity Spool



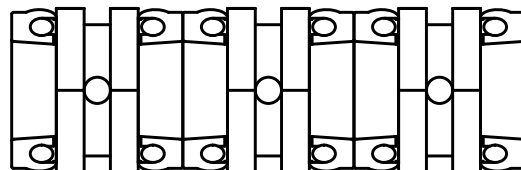
High Viscosity Spool

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

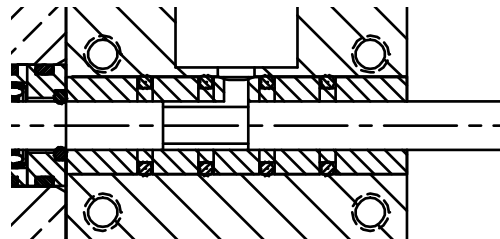
NOTE: Typically, the spring in the zap seal and the o-rings in the retainers point toward the metering block which is in the direction of the material.

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

NOTE: Correct orientation of seals shown.

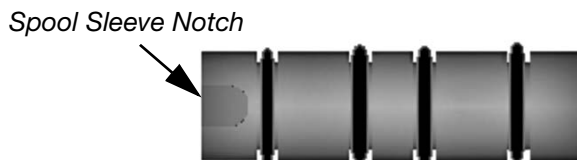
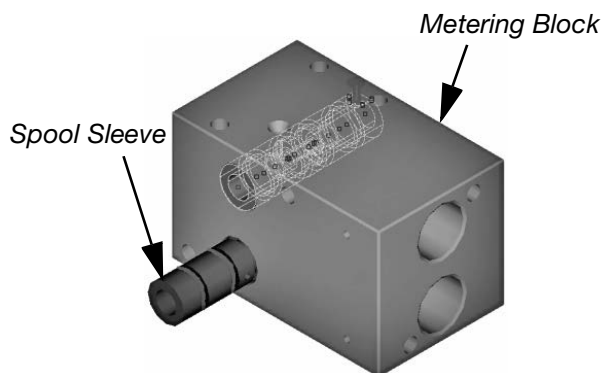


Low Viscosity Spool Sleeve Seals

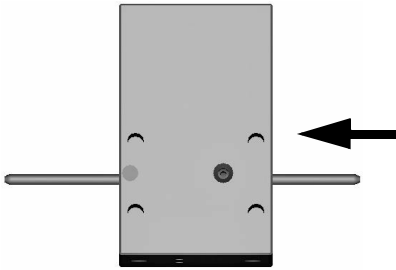


High Viscosity Spool Sleeve Cutout View

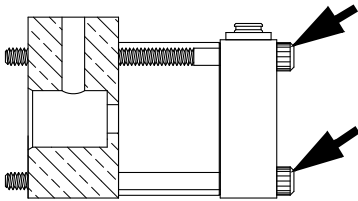
- Carefully install the spool sleeves into the metering block. Make sure the notched edge will align with the pin in the metering block and not cut the spool sleeve o-rings.



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).

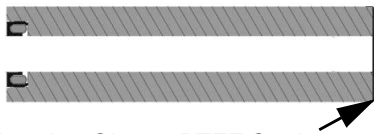


13. Torque fasteners to 22-26 in / lbs (2.5-2.9 N•m) using purple thread sealant.



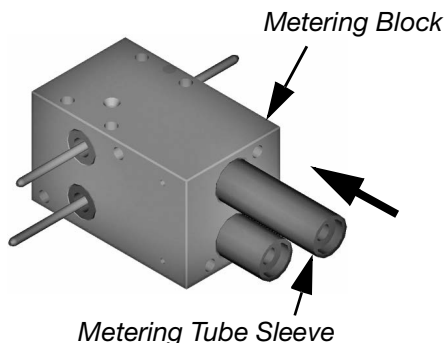
14. Install new zap seal in the metering tube sleeve with the spring facing down or toward the material pressure side of the sleeve.

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

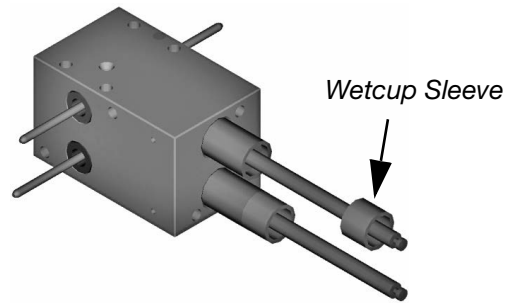


Metering Sleeve PTFE Seal

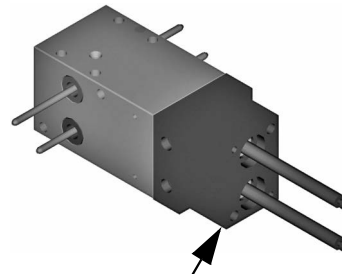
15. Install the metering sleeve PTFE seal in the metering block. Replace the metering sleeve PTFE seal with a new one every rebuild.
16. Install metering tube sleeve into the metering block.



17. Install the wetcup sleeve onto the metering sleeve.

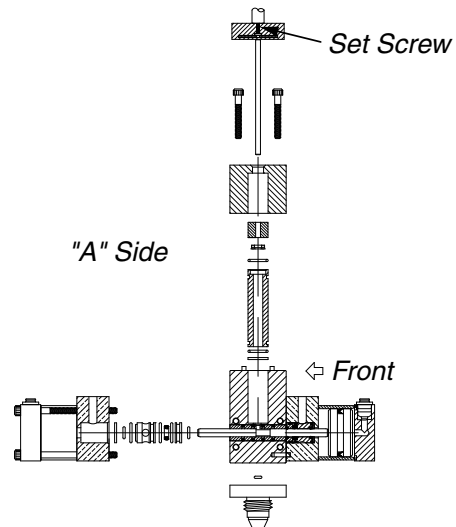


18. Install the oil cup retaining block. Torque to 77 in-lb (8.7 N•m).

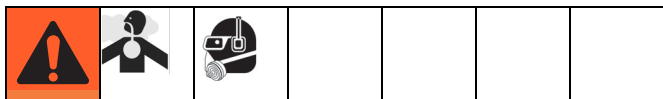


Oil Cup Retaining Block

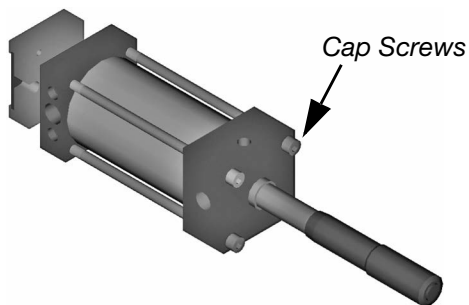
19. Apply Krytox grease to chamfer of metering rod.
20. Carefully insert metering rod through bearing, seal, and metering tube. Make sure not to cut the metering sleeve zap seals.
21. Move connecting block to extended position.
22. Move slide plate to capture the metering rods.
23. Install the set screw until it contacts the top of the metering rod. Torque set screw to 4-8 in-lb (0.45-0.90 N•m).



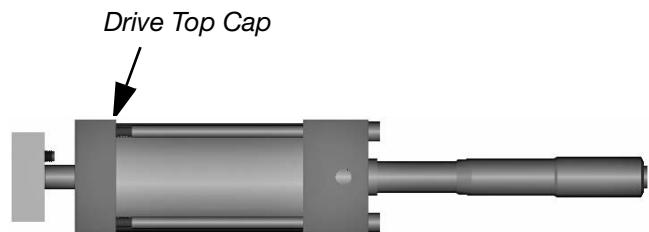
Micrometer Drive Rebuild (Micrometer PD44 Only)



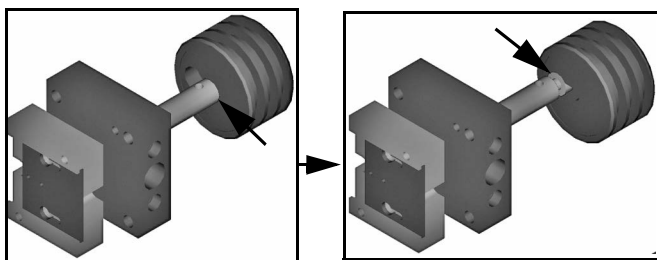
1. Perform **Wetted Section Disassembly**, page 26.
2. Remove the four cap screws located at the top of the pneumatic drive assembly.



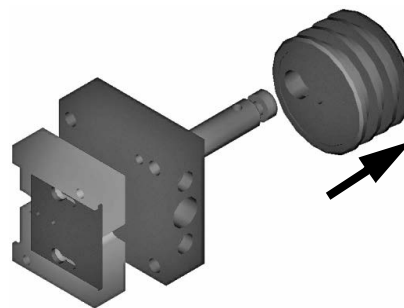
3. Remove the drive top cap.



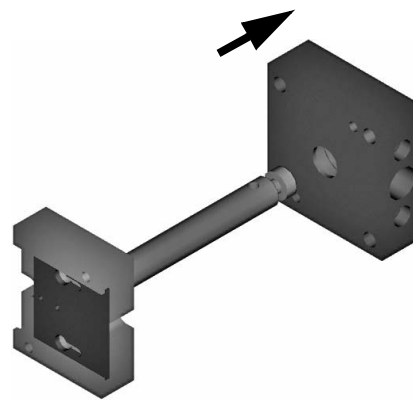
4. Slide the drive rod into the open slot.



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



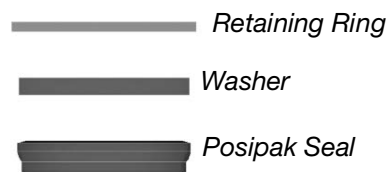
6. Slide the air cylinder mounting block off the drive rod.



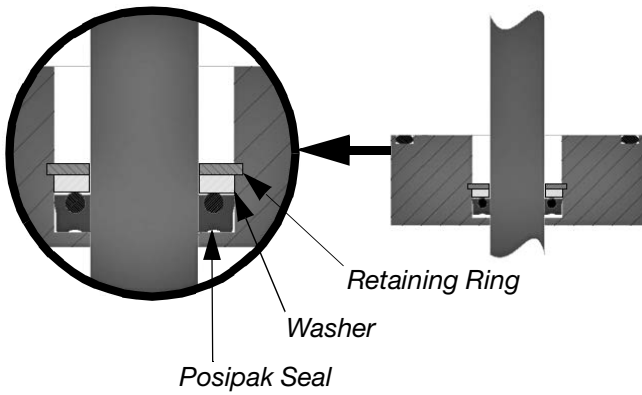
7. Install new seals on the drive piston. Make sure the lip of the seal points toward the pressure side of the drive. See the following illustration and the assembly drawings for more information.



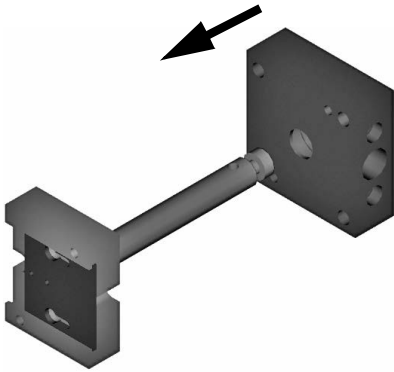
8. Remove retaining ring, washer, and posipak seal from the air cylinder mounting block.



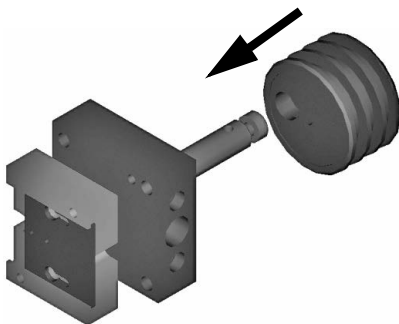
9. Install new posipak seal with the o-ring pointed towards the drive piston, then install washer and retaining ring.



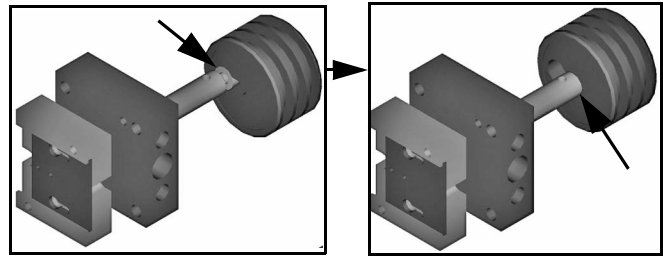
10. Apply Krytox or compatible lubricant to drive rod.
 11. Careful not to cut the posipak seal, install drive rod into the block.



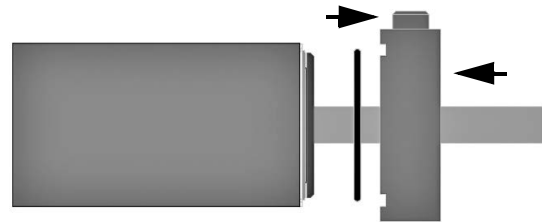
12. Install the drive rod into the piston.



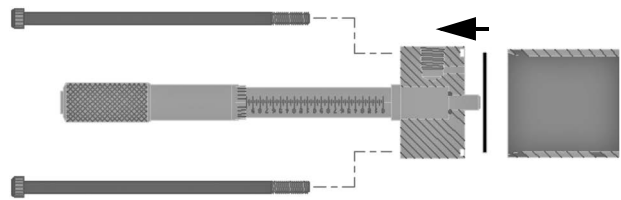
13. Slide the drive rod into the closed slot in the piston.



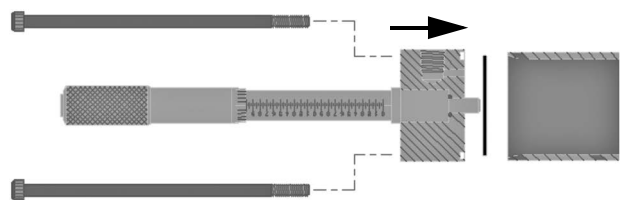
14. Install the cylinder o-ring then, careful not to cut the piston seal, install the drive rod into the block.



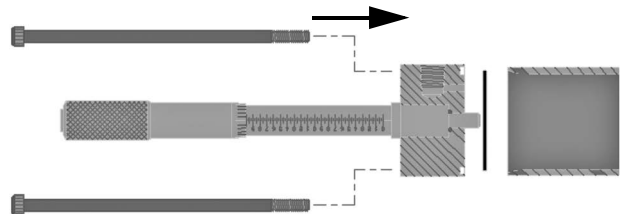
15. Install the upper cylinder o-ring.



16. Install top cap block to cylinder.



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



Electrical Requirements

Electrical requirements for pneumatically driven and stepper driven control boxes can be found in the PD44 Control Box manual. See **Related Manuals**, page 3.

PD44 metering valve only: Wiring harness sensors are 24 VDC normally open PNP. See Fig. 11, or Fig. 12

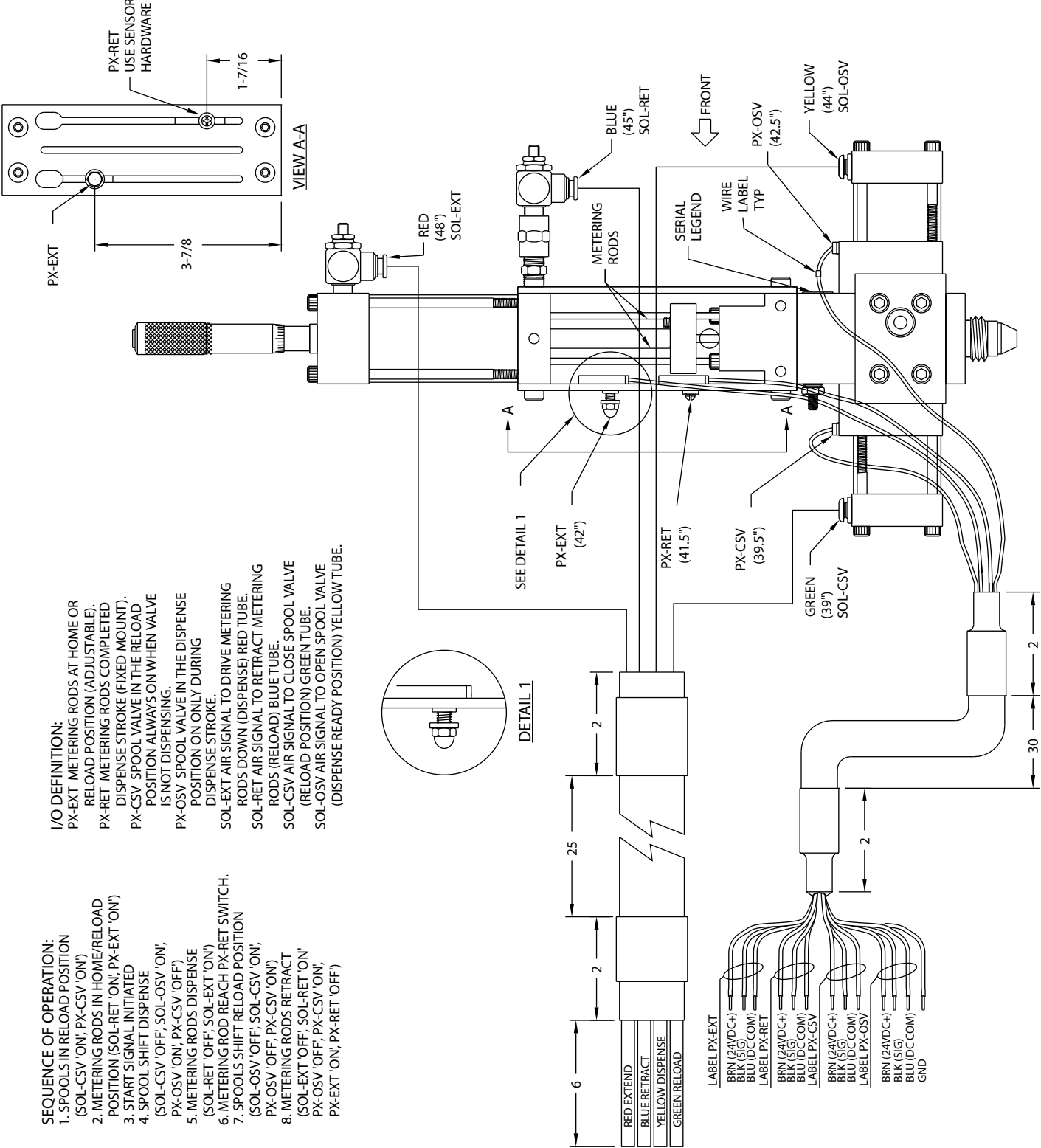


Fig. 11: Micrometer PD44 Metering Valve Electrical Requirements

- NOTES:
 1) SENSORS ARE PNP NORMALLY OPEN
 2) FOR PX-UP AND PX-DOWN, USE SCREW PROVIDED WITH SENSORS
 3) PX-UP AND DOWN TO BE USED FOR OVER TRAVELS

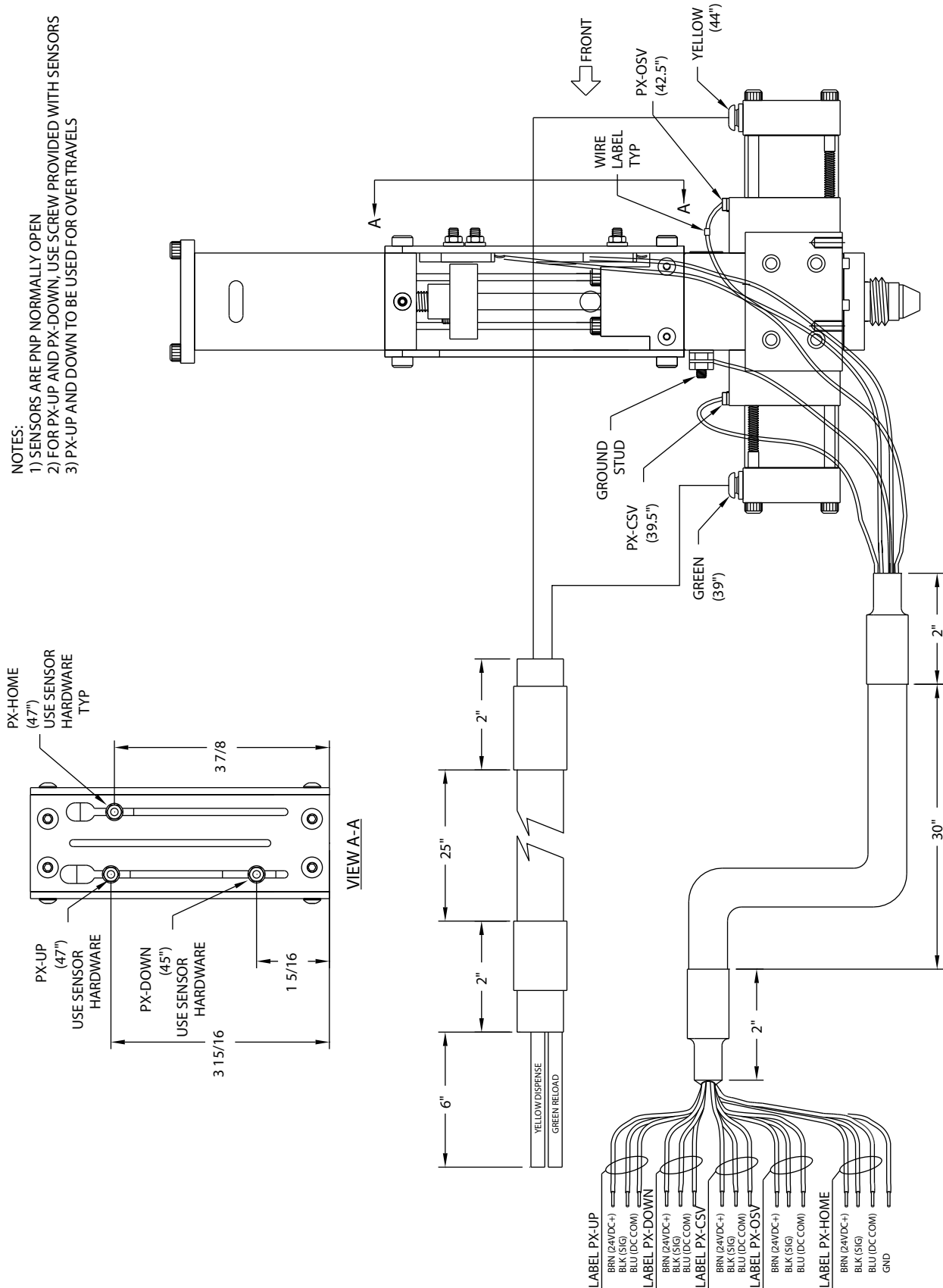


Fig. 12: Motor Driven PD44 Metering Valve Electrical Requirements

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 <i>Motor Driven PD44:</i> Up to 15 cycles per minute (with standard Graco motor)
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>Motor Driven PD44 (with Graco motor):</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) <i>Graco-supplied Feed System Assemblies (depends on selected options):</i> <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)
Weight	<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 Related Manuals , page 3.
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).

Motor Specifications

If a non-Graco motor is used with the Motor Driven PD44 Metering Valve, it must meet the following specifications.

Frame: NEMA 23

Torque at Typical Dispense Speed: 180 oz-in. (11.25 in-lb) at 10 revolutions per second (1/2 in. rod travel per second) or less. Above 10 revolutions per second, the power declines.

Torque at Maximum Speed: 117 oz-in (7.3 in-lb) at 20 revolutions per second (1 in. of rod travel per second).

Motor Face Pilot Boss: 1.5 in. diameter by 0.0625 in. projection from motor face flange.

Shaft Size: 0.25 diameter by 0.75 in. projection from motor face pilot boss to end of shaft.

California Proposition 65

CALIFORNIA RESIDENTS

 **WARNING:** Cancer and reproductive harm – www.P65warnings.ca.gov.

Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

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Original instructions. *This manual contains English. MM 313876*

Graco Headquarters: Minneapolis

International Offices: Belgium, China, Japan, Korea

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Revision P, August 2022