



VD520-PT Diaphragm Valve Operating Manual

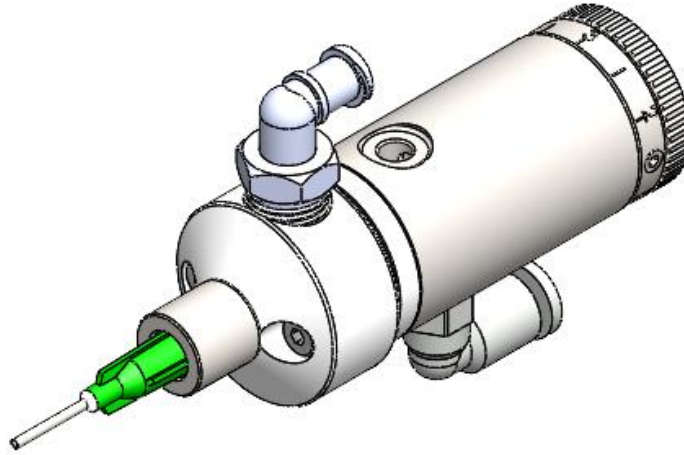
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OVERVIEW



Model VD520-PT Diaphragm Valve

The VD520-PT diaphragm valve is designed for accurately controlling the dispensing of low to medium viscosity materials. Fluid flow rate is precisely controlled through the valve and fine-tuned using the stroke adjustment knob.

The inert diaphragm separates the wetted parts from the moving parts, thus making the valve ideal for dispensing cyanoacrylates and anaerobics.

Stroke Adjustment for precise flow control

Separated wetted parts

Durable, compact size & lightweight design

Seal free design

Accurate & repeatable dispense volumes

Low maintenance, easy to clean design

Fast & clean positive shutoff eliminates dripping

Simple to setup, adjust, and operate

Unrestricted material flow path reduces turbulence and micro bubbles

SPECIFICATION

Item	VD520-PT
Operating Air Pressure	70-100psi (4.8 – 6.9 Bar)
Cycle Rate	Up to 500 cycles / min
Max. Fluid Pressure	70 psi (4.8 Bar)
Fluid Viscosity Range	1 – 60,000 Cps
Max. Flow Rate	60 ml/sec (H2O @ 70psi)
Valve Body Material	SUS303
Diaphragm Material	PTFE
Fluid Body Material	PTFE
Tip Retaining Nut Material	SUS303
Air Input Thread	M5 x 0.8
Fluid Inlet Thread	1/8" NPT
Mounting Hole	M5 x 0.8
Weight	167g (0.37lb)

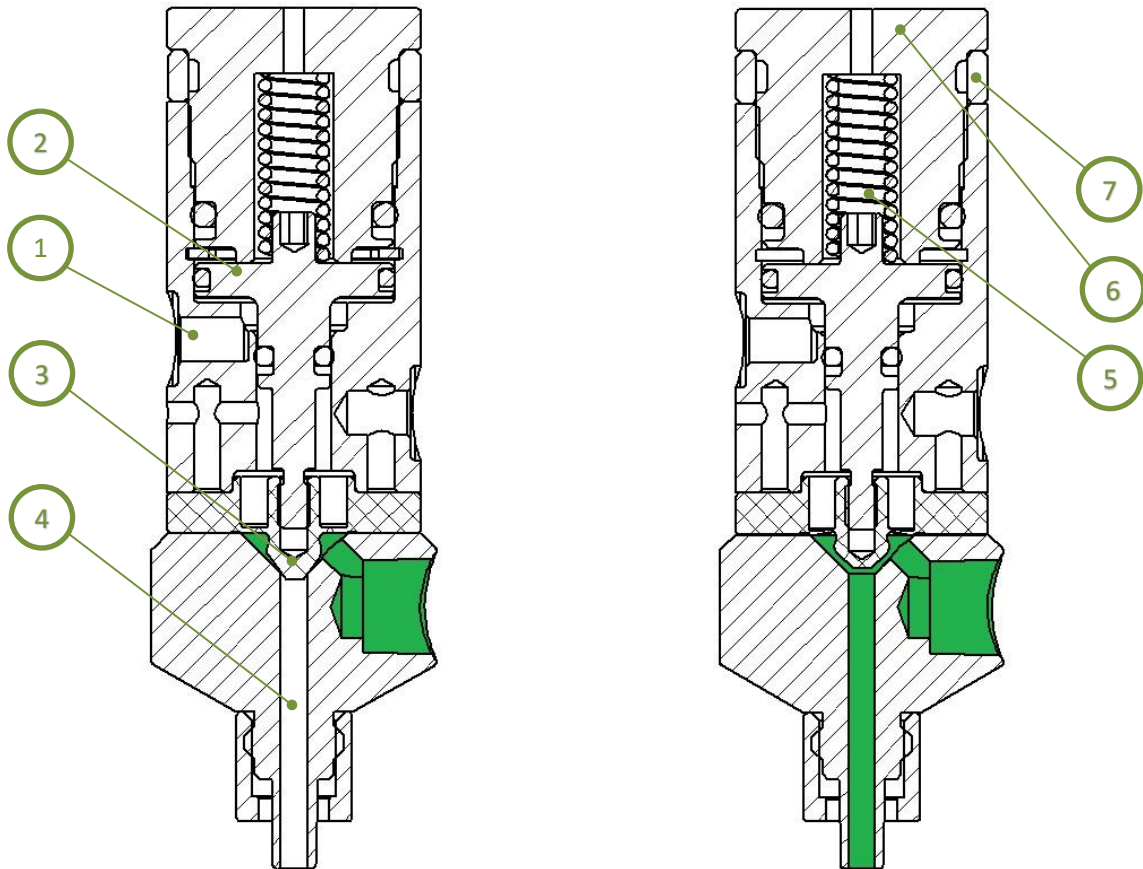
ACCESSORIES

Item	Description	Quantity
562354	Air Inlet Hose Assembly – 6FT	1
562355	Air Inlet Fitting – Elbow 5/32" O.D. Tube x M5 Male	1
561821	Fluid Inlet Fitting – Elbow Female Luer Lock x 1/8" NPT Male	1
560714	Fluid Inlet Fitting – Elbow 1/4" O.D. Tube x 1/8" NPT Male	1
560715	Fluid Inlet Fitting – Straight 1/4" O.D. Tube x 1/8" NPT Male	1
561415-IJ-10FT	PE Tubing 1/4" O.D. x 0.170" I.D. Tubing - Natural	1
QK-NSK	Dispense Tip Sample Kit	1
562356	Hex Key – 2.5mm	1
562357	Hex Key – 1.5mm	1

OPTIONAL ACCESSORIES

Item	Description
562043U	Valve Stand  A blue, L-shaped base with a vertical rod and a horizontal arm, used for holding a valve. The base has the FISNAR logo on it.
562151U	Robot Valve Mounting Bracket Assembly (fasteners included)  A blue, rectangular mounting bracket with multiple holes and a central slot, designed for robot valve mounting.
0401-08-000491	Valve Mounting Bracket (fasteners included)  A blue, L-shaped mounting bracket with two circular holes, used for valve mounting.

VALVE OPERATION



Valve Closed

Valve Open

The VD520-PT is a normally closed diaphragm valve. When air pressure (70psi minimum) is applied into the air input (1), the piston (2) is forced upwards. This causes the sealing surface of the diaphragm (3) to lift upwards and allow fluid material to flow through and out of the fluid outlet of the valve (4).

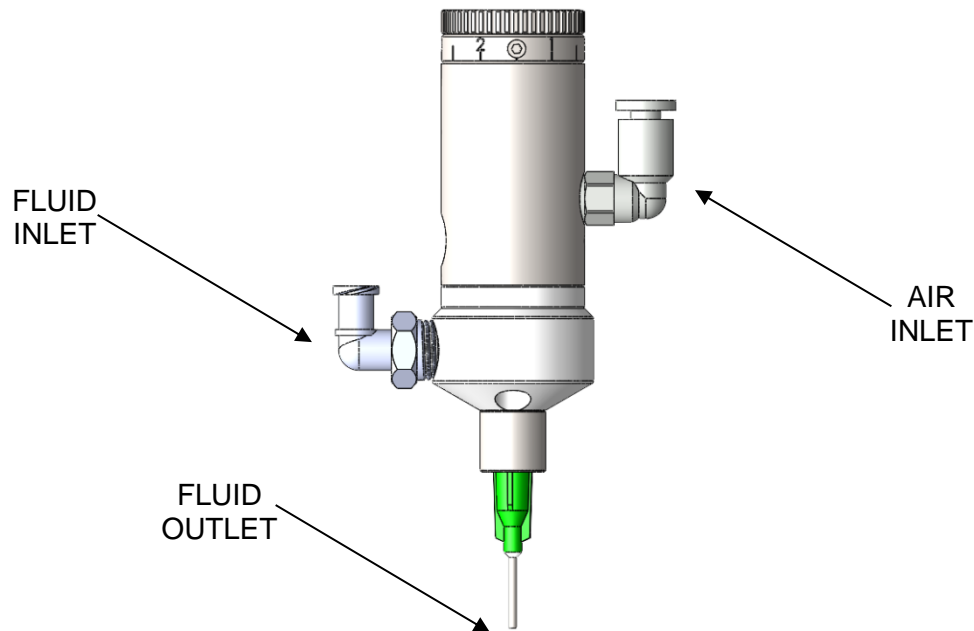
When the air pressure is removed from the air input (1), the piston (2) is forced downwards by the spring (5), which allows the sealing surface of the diaphragm to return quickly to its closed state for immediate shut-off of fluid material flow.

The amount of fluid material dispensed from the valve is based on the below attributes of the dispense system,


- Valve open time - Fluid Viscosity - Fluid Pressure - Diaphragm Stroke - Tip Size

The valve can be calibrated by rotating the stroke adjustment knob (6) clockwise to its fully closed position. Then loosen the set-screw on the reference ring (7) and align its "0" mark with the reference mark on the valve body. Tighten the set-screw back in place to complete the calibration process.

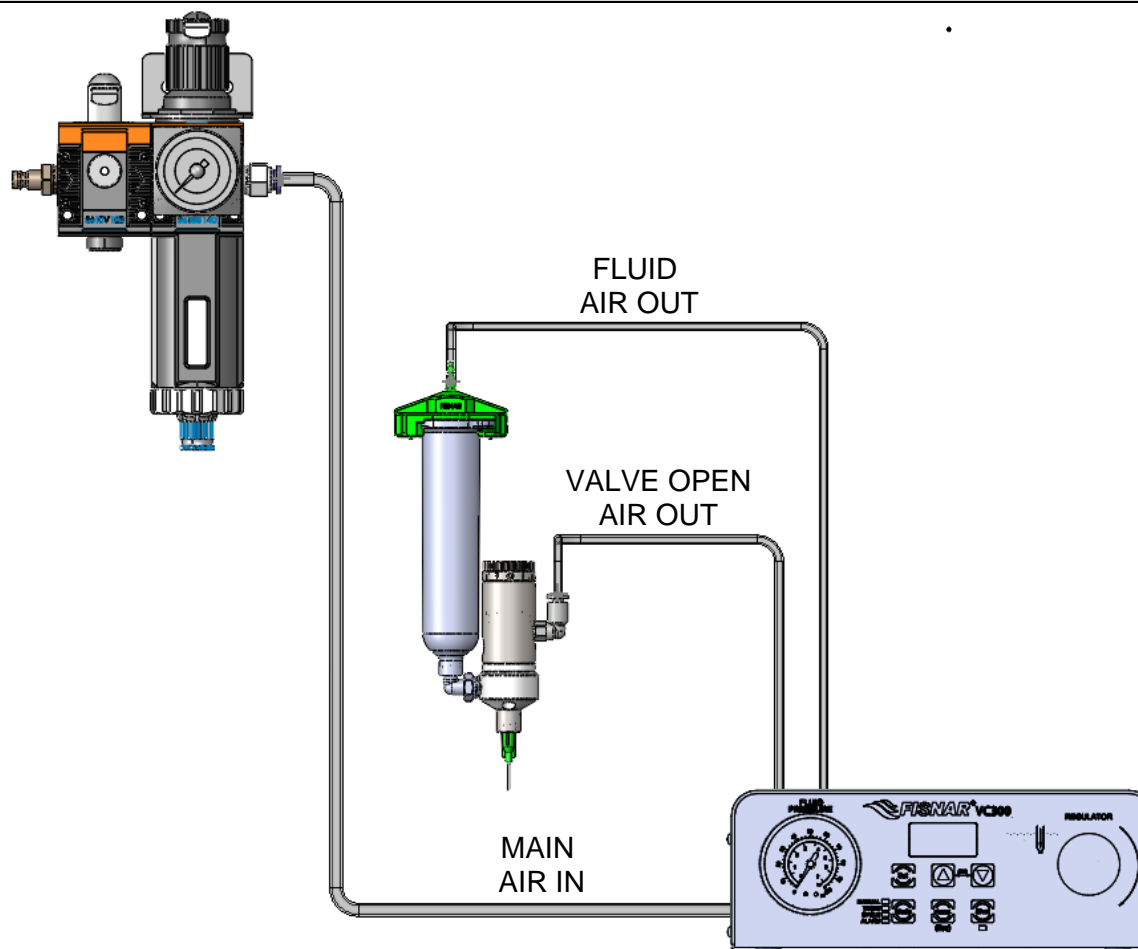
DISPENSE SETUP



1.	Connect 5/32" OD air hose (#562354) between the operating air inlet fitting of the valve and the "Valve Open Air Out" port on the VC300 valve controller.
2.	<p>Connect a length 1/4" OD pneumatic tubing between the "Fluid Air Out" port on the back of the machine and the air inlet port of the connected fluid feed system to be pressurized.</p> <p>If a Fisnar QuantX syringe barrel is being used as the fluid feed system to the valve, then a standard Fisnar syringe barrel adapter head assembly can be used as the compressed air connection between the syringe barrel and "Fluid Air Out" port on the back of the machine.</p>
3.	<p>Connect 1/4" OD fluid tubing (#5601415-IJ-10FT) between the fluid outlet of the fluid feed system and the fluid inlet fitting on the valve, using one of the provided compression fittings (#560714 or #560715).</p> <p>If a Fisnar QuantX syringe barrel is being used as the fluid feed system to the dispense valve, then an 1/8" luer lock elbow fitting (#561821) can be used to connect the syringe barrel directly to the valve.</p>
4.	Switch on the VC300 valve controller and set the machine in "MANUAL" mode.

5.	Gradually apply air pressure (80 psi) to the “Main Air In” port on the back of the machine.
6.	Slowly increase the fluid pressure by rotating the pressure regulator clockwise on the front of the VC300 valve controller. (Do not exceed a max pressure of 70psi 4.8 Bar)
7.	Rotate the stroke control knob clockwise until it can no longer be rotated any further. Then rotate the stroke control knob counterclockwise by 1/4 of a turn (90°). The fluid flow rate through the valve is controlled by the amount the stroke control knob is rotated counterclockwise from its fully closed position.
8.	<p>Press and hold the shot button on the front panel of the VC300 valve controller until fluid begins to dispense out of the fluid outlet of the valve. When fluid is consistently flowing out of the fluid outlet of the valve and no bubbles/air-pockets are observed, release the shot button.</p> <p>If no fluid is dispensed out of the valve after approx. 1 minute, release the shot button. The below steps can then be carried out, and the valve actuated again.</p> <ol style="list-style-type: none"> Rotate the stroke control knob counterclockwise by ¼ of a turn (90°). Increase fluid pressure. <p>If fluid is still not dispensed out of the valve, please contact your sales representative.</p>
9.	<p>Attach a suitable dispense tip to the dispense valve.</p> <p>Note:- A low gauge number (larger I.D.) dispense tip will dispense a larger diameter dot or bead width. A high gauge number (smaller I.D.) dispense tip will dispense a smaller diameter dot or bead width.</p>
10.	<p>Use the below parameters to achieve the necessary settings for the dispensing application.</p> <ol style="list-style-type: none"> Adjust the fluid pressure of the fluid feed system to achieve the required flow rate. Adjust the stroke control knob on the valve to achieve the required flow rate. Adjust the dispense time on the VC300 valve controller to set the required dispense volume / time. Adjust the dispense tip size to assist in fine tuning the dispense dot or bead size.
	<p><i>Do not overtighten the stroke control knob beyond its closed position. Doing so may cause irreversible damage to the diaphragm and fluid to drool from the dispense tip.</i></p> <p><i>Do not rotate the stroke control knob counterclockwise more than two turns from its closed position. Doing so may cause the diaphragm to open due to high fluid pressure and fluid to dispense out of the valve continuously.</i></p> <p><i>Please refer to the valve controller and fluid feed system operating manuals, to fully understand safety and operation guidelines of the complete dispense system.</i></p>

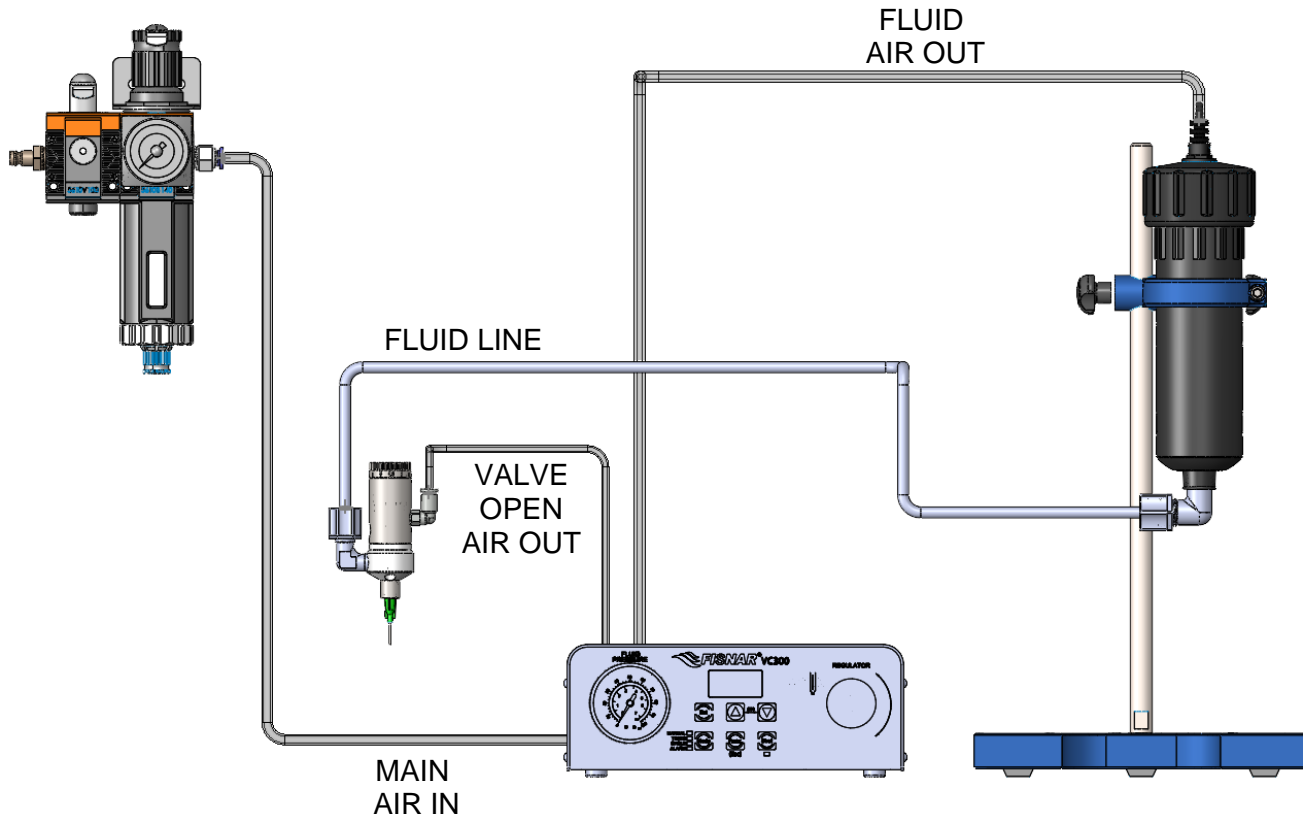
Example 1



SYSTEM PARTS		
Item	Description	Quantity
VD520-PT	Diaphragm Valve	1
VC300	Valve Controller	1
560567M	Air Filter Regulator	1
562354	Air Inlet Hose Assembly – 6FT	1
561821	Fluid Inlet Fitting – Female Luer Lock x 1/8” NPT	1
8001004	QuantX 30cc Syringe Barrel - Clear	1
8001009	QuantX 30/55cc Piston - Green	1
8001021	QuantX 30/55cc Adapter Head Assy – 6ft (1.8m)	1

Dispense System Configuration

Example 2

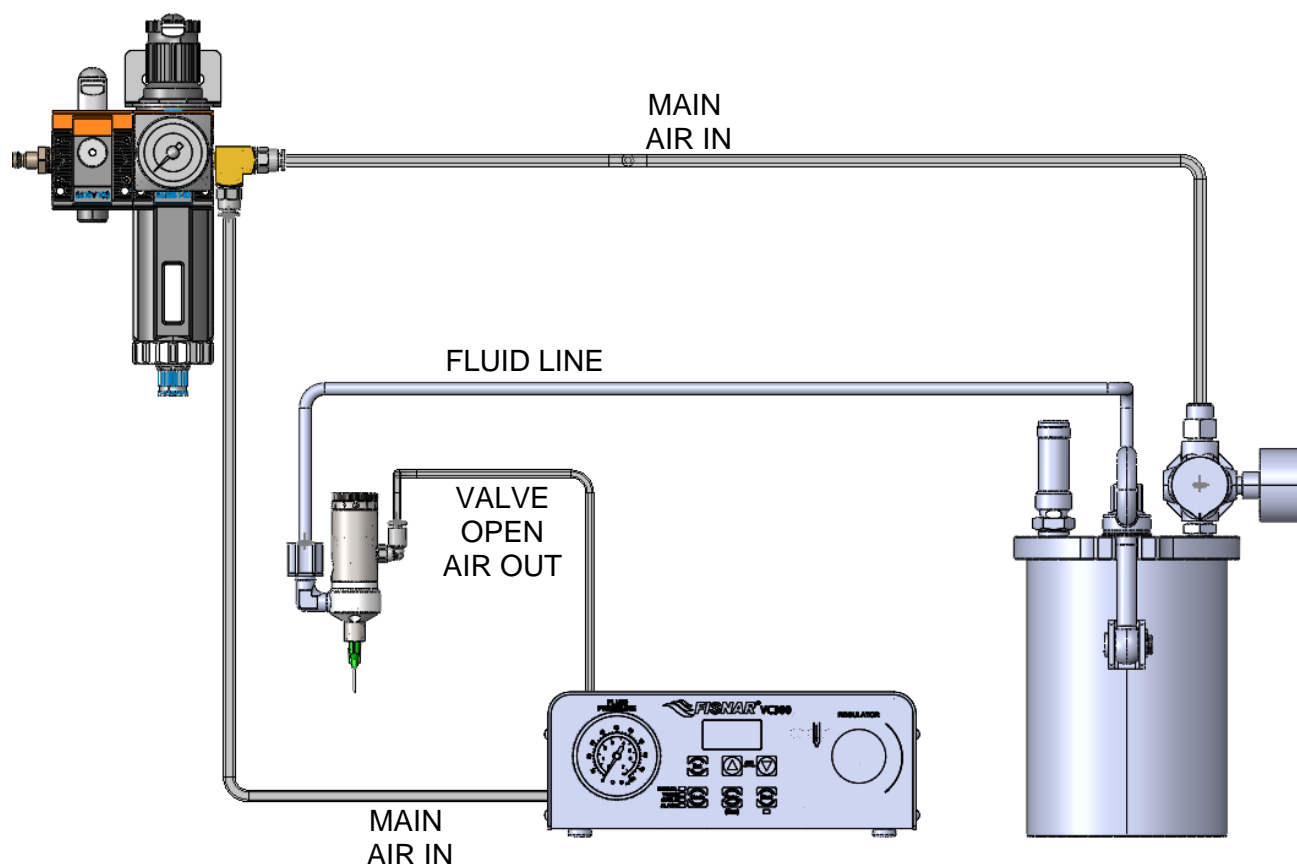


SYSTEM PARTS

Item	Description	Quantity
VD520-PT	Diaphragm Valve	1
VC300	Valve Controller	1
560567M	Air Filter Regulator	1
562354	Air Inlet Hose Assembly – 6FT	1
5801380-KIT	6oz Cartridge Retainer Assembly	1
560535-NU	Cartridge Retainer Stand	1
561415-IJ-10FT	1/4" OD PE Tubing Natural – 10FT	1
560714	Fitting – Elbow 1/4" O.D. Tube x 1/8" NPT Male	1
560748	Fitting – Elbow 1/4" O.D. Tube x 1/4" NPT Male	1

Dispense System Configuration

Example 3

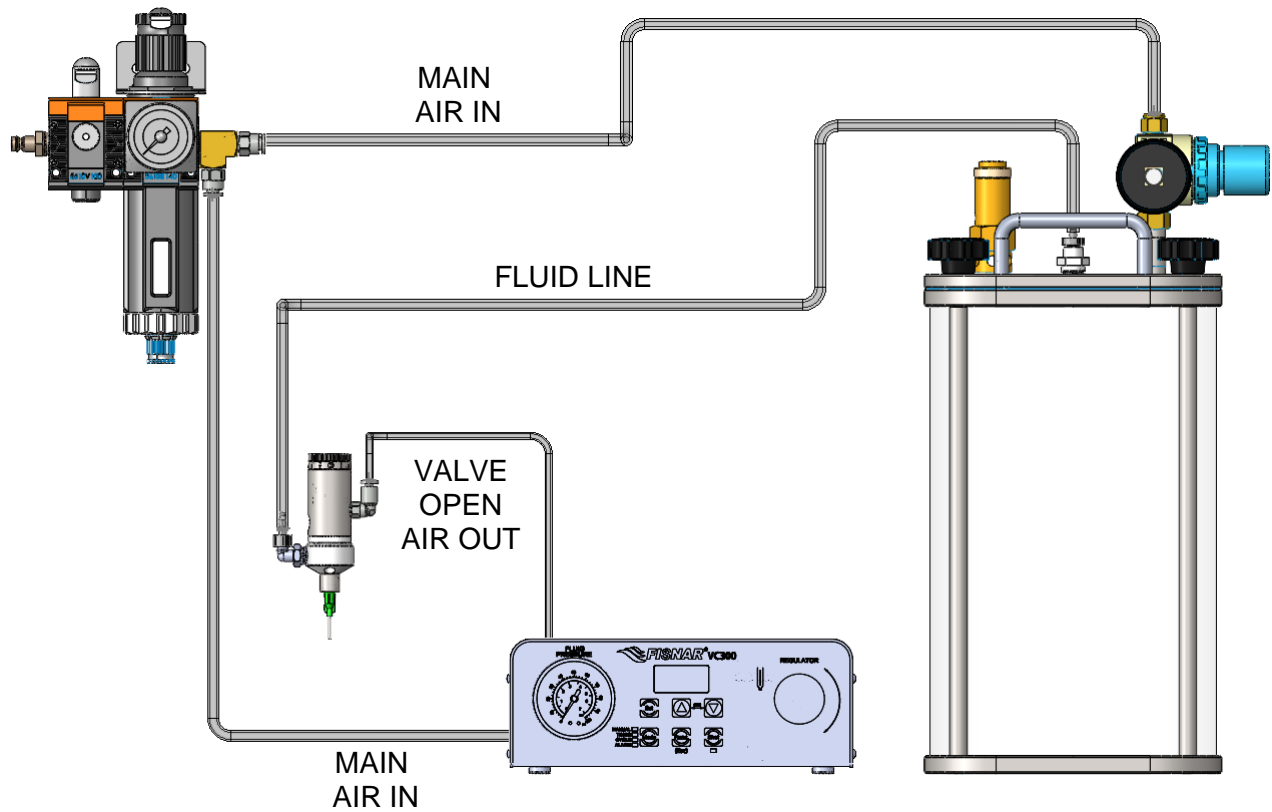


SYSTEM PARTS

Item	Description	Quantity
VD520-PT	Diaphragm Valve	1
VC300	Valve Controller	1
560567M	Air Filter Regulator	1
562354	Air Inlet Hose Assembly – 6FT	1
FPT800SS	8 Liter SS Fluid Reservoir – 0-100psi	1
561415-IJ-10FT	1/4" OD PE Tubing Natural – 10FT	1
560714	Fitting – Elbow 1/4" O.D. Tube x 1/8" NPT Male	1

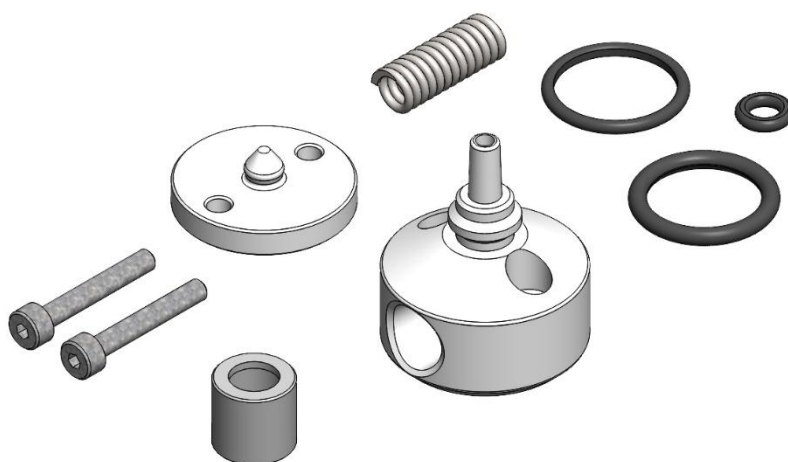
Dispense System Configuration

Example 4



SYSTEM PARTS






Item	Description	Quantity
VD520-PT	Diaphragm Valve	1
VC300	Valve Controller	1
560567M	Air Filter Regulator	1
562354	Air Inlet Hose Assembly – 6FT	1
PP450-GL	4.5 Liter Clear View Fluid Reservoir – 0-60psi	1
561821	Fluid Inlet Fitting – Female Luer Lock x 1/8" NPT	1
580047A-10-36	0.10" I.D. PE Fluid Line Clear – 36"	1

REPAIR KIT**VD520PT-RK****INCLUDED PARTS**










Item	Description	Quantity
VD520-1-PT	Fluid Body	1
VD520-4	Tip Retaining Nut	1
VD520-5-PT	Diaphragm	1
VD520-8	O-Ring	1
VD520-9	O-Ring	1
VD520-10	Spring	1
VD520-11	O-Ring	1
VD520-12	Socket Screw	2

OPTIONAL TUBING & FITTINGS

Hose




	Item Number	Description	Material / Color
	5801060-10FT	1/4" O.D. x 0.160" I.D. Tubing	Polyurethane / Clear
	560743-10FT	1/4" O.D. x 0.170" I.D. Tubing	Polyethylene / Black
	560722-10FT	1/4" O.D. x 0.188" I.D. Tubing	PTFE / Natural
	561416-10FT	3/8" O.D. x 1/4" I.D. Tubing	Polyethylene / Natural
	560744-10FT	3/8" O.D. x 1/4" I.D. Tubing	Polyethylene / Black

Fittings


	560714-BLACK	1/4" O.D. Tube x 1/8" NPT Elbow Compression Fitting	Polypropylene / Black
	560715-BLACK	1/4" O.D. Tube x 1/8" NPT Straight Compression Fitting	Polypropylene / Black
	561821-BLACK	Female Luer Lock x 1/8" NPT Elbow Fitting	Polypropylene / Black
	7610	3/8" O.D. Tube x 1/8" NPT Straight Compression Fitting	Nylon / Natural
	7610BP	3/8" O.D. Tube x 1/8" NPT Straight Compression Fitting	Polypropylene / Black
	561085	Female Luer Lock x 5/32" I.D. Straight Barb Fitting	Polypropylene / Natural
	561086	Male Luer Lock x 5/32" I.D. Straight Barb Fitting	Polypropylene / Natural
	561085N-BLACK	Female Luer Lock x 5/32" I.D. Straight Barb Fitting	Nylon / Black
	561086N-BLACK	Male Luer Lock x 5/32" I.D. Straight Barb Fitting	Nylon / Black

OPTIONAL TUBING & FITTINGS

Fluid Manifolds

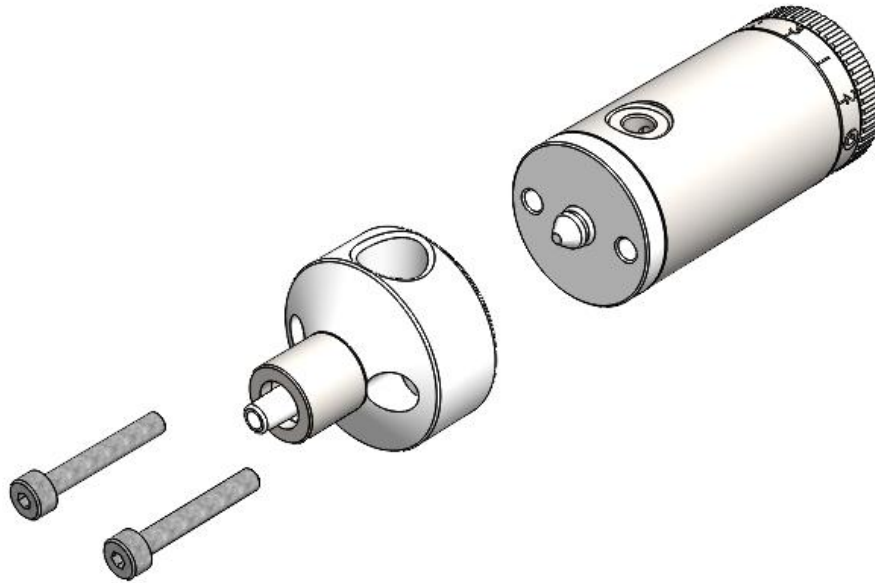
	Item Number	Description	Material / Color
	560542-1/4	4 Port Fluid Manifold 1/4" O.D. Tube	Acetal / Black
	560542-3/8	4 Port Fluid Manifold 3/8" O.D. Tube	Acetal / Black
	560542LL	4 Port Fluid Manifold Luer Lock	Acetal / Black

Air Manifold

	560057	4 Port Air Manifold 1/4" O.D. Tube	Aluminum / Blue
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MAINTENANCE

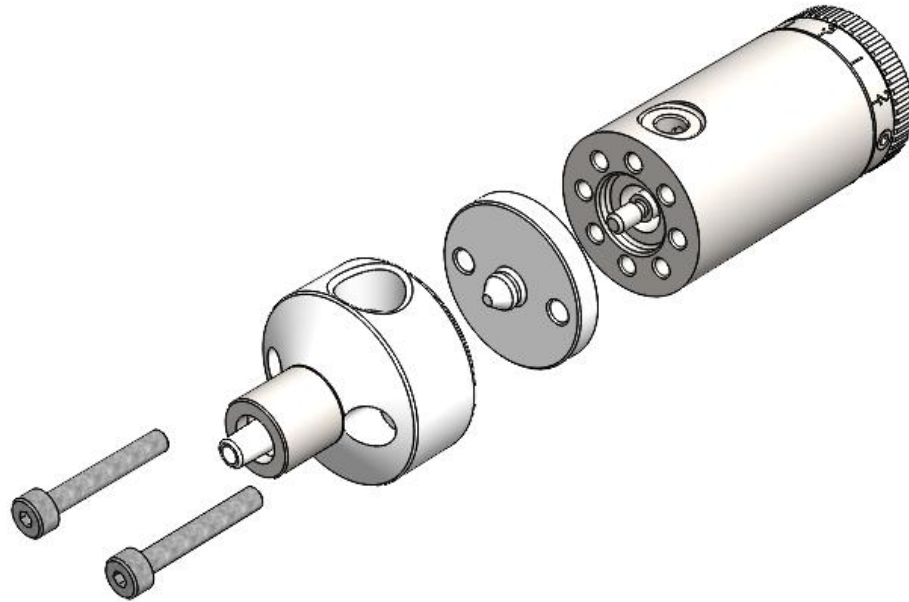
Fluid Body Servicing



1. Use a 2.5mm hex key to remove the two socket screws.
2. Attach and align the fixing holes of the new fluid body to the holes on the diaphragm and air cylinder body.
3. Re-insert the two socket screws and tighten to the below specification.
 VD520-PT (PTFE fluid body / PTFE Diaphragm) = 0.5 Nm / 0.37 ft-lb

MAINTENANCE

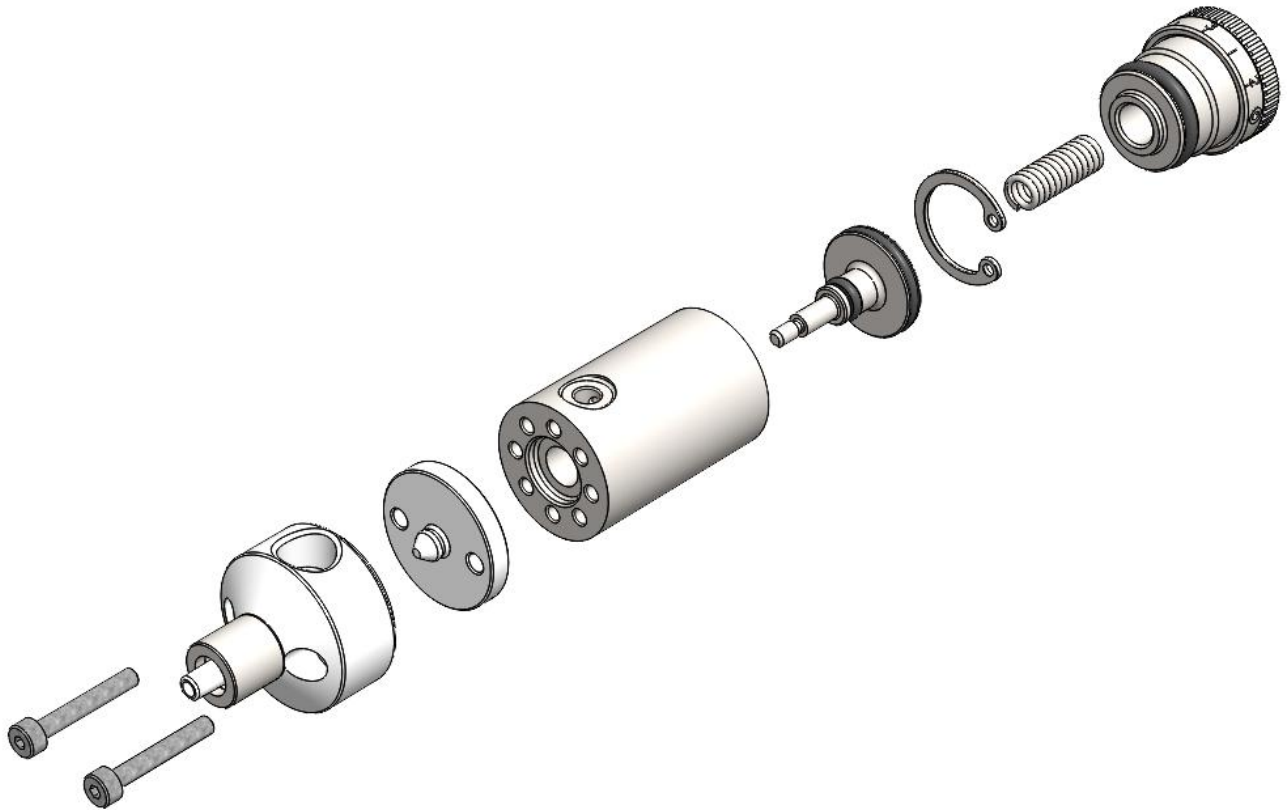
Diaphragm Servicing



1.	Rotate the stroke control knob one full turn counterclockwise from its fully closed position.
2.	Use a 2.5mm hex key to remove the two socket screws.
3.	Remove the diaphragm from the piston by rotating it counterclockwise by hand.
4.	install the new diaphragm onto the piston by rotating it clockwise by hand, until the surface of the diaphragm is in full contact with the surface of the air cylinder body.
5.	Align the fixing holes of the fluid body, diaphragm and air cylinder body.
6.	Re-insert the two socket screws and tighten to the below specification. VD520-PT (PTFE fluid body / PTFE Diaphragm) = 0.55 N*m / 0.4 ft*lb
7.	Rotate the stroke control knob clockwise until the closed position is reached. Then rotate counterclockwise to set the desired stroke / flow rate.

MAINTENANCE

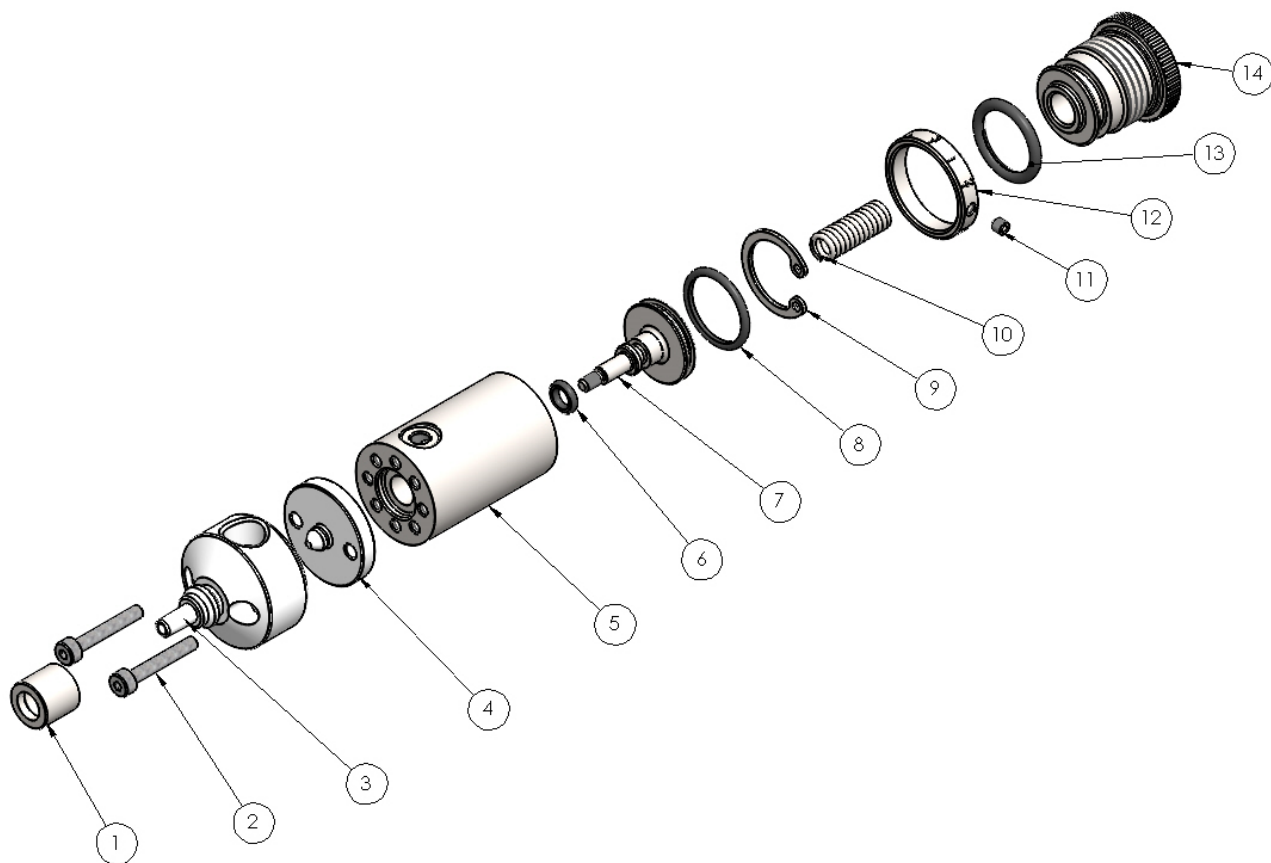
Piston O-Ring Servicing



1. Use a 2.5mm hex key to remove the two socket screws.
2. Remove the diaphragm from the piston by rotating it counterclockwise by hand.
3. Remove the stroke control knob and spring from the air cylinder body by rotating it counterclockwise by hand.
4. Use circlip pliers to remove the internal circlip from the air cylinder body.
5. Use needle nose pliers to clamp onto the back of the piston and then pull the piston out of the air cylinder body.
6. Remove the two O-Rings on the piston.

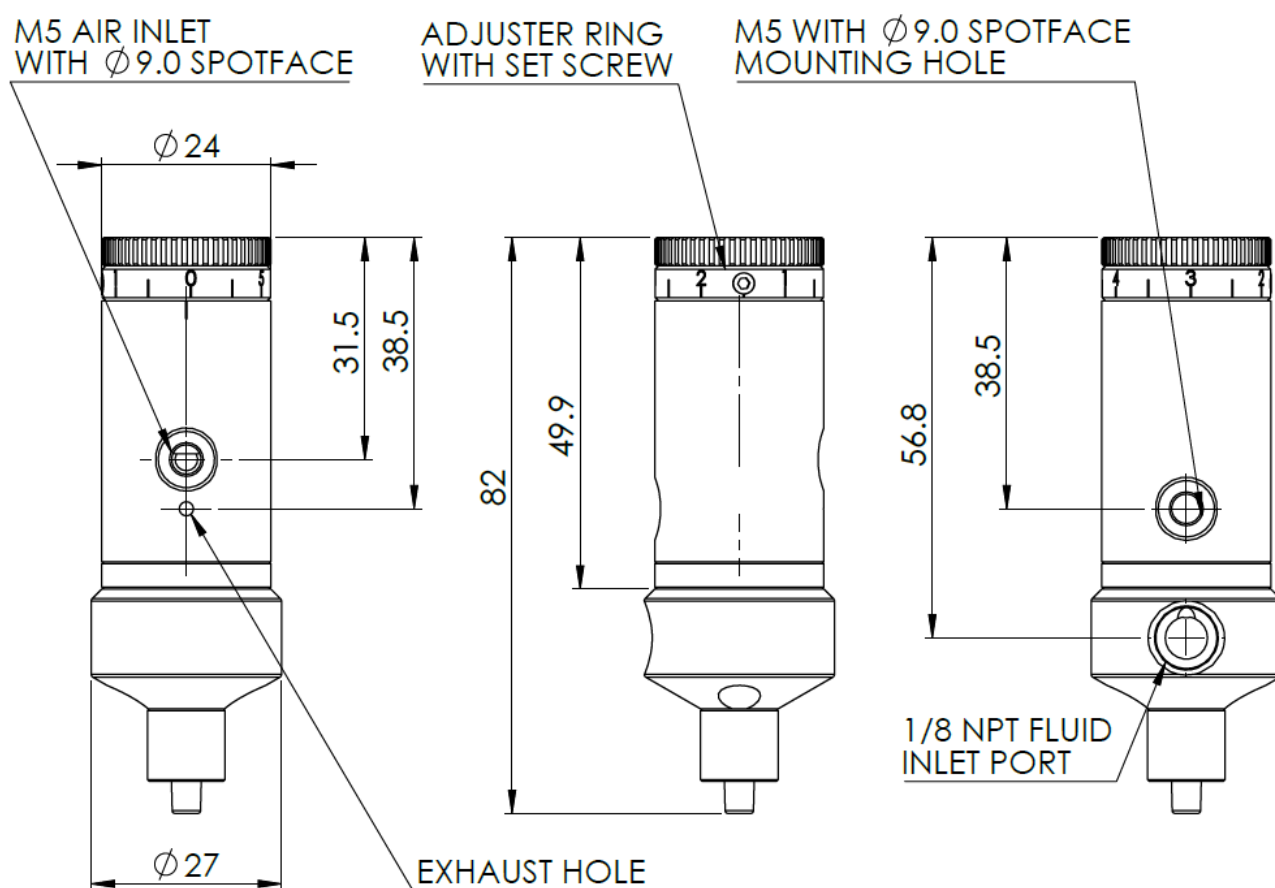
7.	Lubricate the new O-Rings with a mineral based oil and then assemble onto the piston.
8.	Reinsert the piston into the air cylinder body by hand, ensuring it is pushed to the very bottom.
9.	Use circlip pliers to install the internal circlip into the groove inside the air cylinder body.
10.	Insert the spring into the air cylinder body. The spring should be positioned so that the end of the piston sits inside the spring.
11.	Install the stroke control knob onto the air cylinder body. Rotate the stroke control knob one full turn back from its fully closed position
12.	install the diaphragm onto the piston by rotating it clockwise by hand, until the surface of the diaphragm is in full contact with the surface of the air cylinder body.
13.	Align the fixing holes of the fluid body, diaphragm and air cylinder body.
14.	Re-insert the two socket screws and tighten to the below specification. VD520-PT (PTFE fluid body / PTFE Diaphragm) = 0.5 Nm / 0.37 ft-lb
15.	Rotate the stroke control knob clockwise until the closed position is reached. Then rotate counterclockwise to set the desired stroke / flow rate.

SPARE PARTS LIST – VD520-PT



Ref.	Item Number	Description
1*	VD520-4	Tip Retaining Nut (SS 303) – Plastic Hub Tips
	VD520-4MT	Tip Retaining Nut (SS303) – Metal Hub Tips (Optional Part)
2	VD520-12	Socket Screw (SS)
3	VD520-1-PTFE	Fluid Body (PTFE)
4	VD520-5-PTFE	Diaphragm (PTFE)
5	VD520-2	Air cylinder body (SS 303)
6	VD520-8	O-Ring (NBR)
7	VD520-6	Piston (SS 303)
8	VD520-9	O-Ring (NBR)
9	VD520-16	Internal Circlip (SS)
10	VD520-10	Spring (SS 303)
11	VD520-15	Set Screw (SS)
12	VD520-13	Stroke Reference Ring (SS 303)
13	VD520-11	O-Ring (Silicone)
14	VD520-3	Stroke Control Knob (SS 303)

TECHNICAL DRAWING



TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
No Fluid Flow	<ul style="list-style-type: none"> - Fluid pressure too low - Actuating air input pressure too low - Dispense tip blocked - Fluid cured inside fluid body - Stroke adjustment knob closed too much 	<ul style="list-style-type: none"> - Increase fluid pressure - Check actuating air pressure is greater than 70psi - Replace dispense tip - Clean/Replace fluid body - Rotate stroke adjust knob counterclockwise
Fluid Drools after valve closes but then stops	<ul style="list-style-type: none"> - Air trapped inside dispense tip or fluid body 	<ul style="list-style-type: none"> - Purge valve
Fluid Drips Continuously	<ul style="list-style-type: none"> - Fluid pressure too high - Sealing edge of diaphragm or fluid body is worn/damaged - Stroke adjustment knob opened too much - Valve reassembled incorrectly. 	<ul style="list-style-type: none"> - Decrease fluid pressure to below 70psi - Replace diaphragm and/or fluid body - Check stroke adjustment knob is not opened by more than two turns from fully closed - Check and follow maintenance procedure correctly.
Fluid Leaking between fluid body and diaphragm	<ul style="list-style-type: none"> - Surface face of diaphragm or fluid body is damaged 	<ul style="list-style-type: none"> - Replace diaphragm and/or fluid body
Fluid leaking out of the exhaust hole	<ul style="list-style-type: none"> - Diaphragm has split 	<ul style="list-style-type: none"> - Replace diaphragm
Valve actuates slowly	<ul style="list-style-type: none"> - Actuating air input pressure too low - Piston O-Ring is worn 	<ul style="list-style-type: none"> - Check actuating air input pressure is greater than 70psi and there are no restrictions/blockages in the pneumatic tubing. - Lubricate and/or replace piston O-ring

NOTES

LIMITED WARRANTY

Manufacturer warrants this product to the original purchaser for a period of one (1) year from the date of purchase to be free from defects in material and workmanship, but not against damages caused by misuse, negligence, accident, faulty installation, abrasion, corrosion or by not operating in accordance with factory recommendations and instructions. Manufacturer will repair or replace (at factory's option), free of charge, any component of the equipment thus found to be defective, upon prepaid return of the equipment to the factory during the warranty period of the equipment. In no event shall any liability or obligation of Manufacturer arising from this warranty exceed the purchase price of the equipment. **This warranty is valid only when 5 micron filtered air is used.** The manufacturer's written liability, as stated herein, cannot be altered or enlarged except by a written statement signed by an officer of the company. In no event shall manufacturer be liable for consequential or incidental damages. A return authorization is required prior to shipping a defective machine to the factory.

Manufacturer reserves the right to make engineering or product modifications without notice.



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