



INNOVATION. **PRECISION.** EXCELLENCE.



MR1
Owner's Manual
Revision B

Precision Valve & Automation
6 Corporate Drive
Halfmoon, NY 12065





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1. Introduction

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

If any questions or problems arise, contact PVA's Technical Support department.

1.1 PVA Contact Information

Main Office

PVA

6 Corporate Drive

Halfmoon, NY 12065

Tel +1-518-371-2684

Fax +1-518-371-2688

Website: <http://www.pva.net>

Email: info@pva.net

Technical Support

Tel +1-844-734-0209

Email: cs@pva.net

1.2 Document History

Revision	Revision Date	Reason for Changes
REV B	June 2021	Spare Parts Update
REV A	March 2020	Initial Release

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

1.3 Safety

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



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



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



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



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



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



Shear hazard from moving parts. Avoid contact.



Do not remove protective guarding.



In situations where inattention could cause either personal injury or damage to equipment, a warning notice is used.



Do not smoke near the machine. Always have a fire extinguisher available for emergency use.



Before performing any repairs or maintenance to the system, turn off power and lock out the power disconnect switch.



Warning notices are used to emphasize that hazardous voltages, current, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use. Only qualified personnel should enter areas designated with this symbol.



Laser light source present. Do not stare directly into the beam. Do not use in the presence of highly reflective surfaces



Pinch hazard from moving parts. Avoid contact.



Hot surface. Avoid contact.



Warning, Ultraviolet (UV) light hazard. Do not look directly at the UV light source.

1.4 Theory of Operation

The MR1 is a servo-controlled piston dispenser for processing single component materials.

1.5 Personal Protective Equipment

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

1.6 Waste Disposal

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

1.7 Necessary Tools

PVA offers tools and cleaning accessories to maintain the MR1.

Part Number	Description
02506	Hook and Pick Set
	Soft-jaw Pliers and/or Vice
	Lubrication Fluid
	Silicone Grease
	2.5 mm and 3 mm T-handle or Hex Key
	90° Snap Ring Pliers

Table 1: MR1 Tool Kit

1.8 Spare Parts Kit

Part Number	Description
612-12676-1	Soft Seals (Does not include diaphragm)
614-15553-1	Diaphragm

Table 2: Spare Parts Kit

2. Setup

Before you operate the MR1 metered piston dispenser, read and understand this manual. This information is for safety and correct operation of the pump. This manual provides the information needed to operate, repair, and troubleshoot.

2.1 Overview

The MR2 metered piston dispenser is constructed from three main components.

- The upper section of the pump is called the metering body; it houses the carbide cylinder and piston.
- On the front of the metering body is the oil window and fluid distribution block which are used to ensure the pistons function smoothly.
- The lower section of the pump is called the metering sleeve which is covered by the air body that controls the flow of dispensed material.

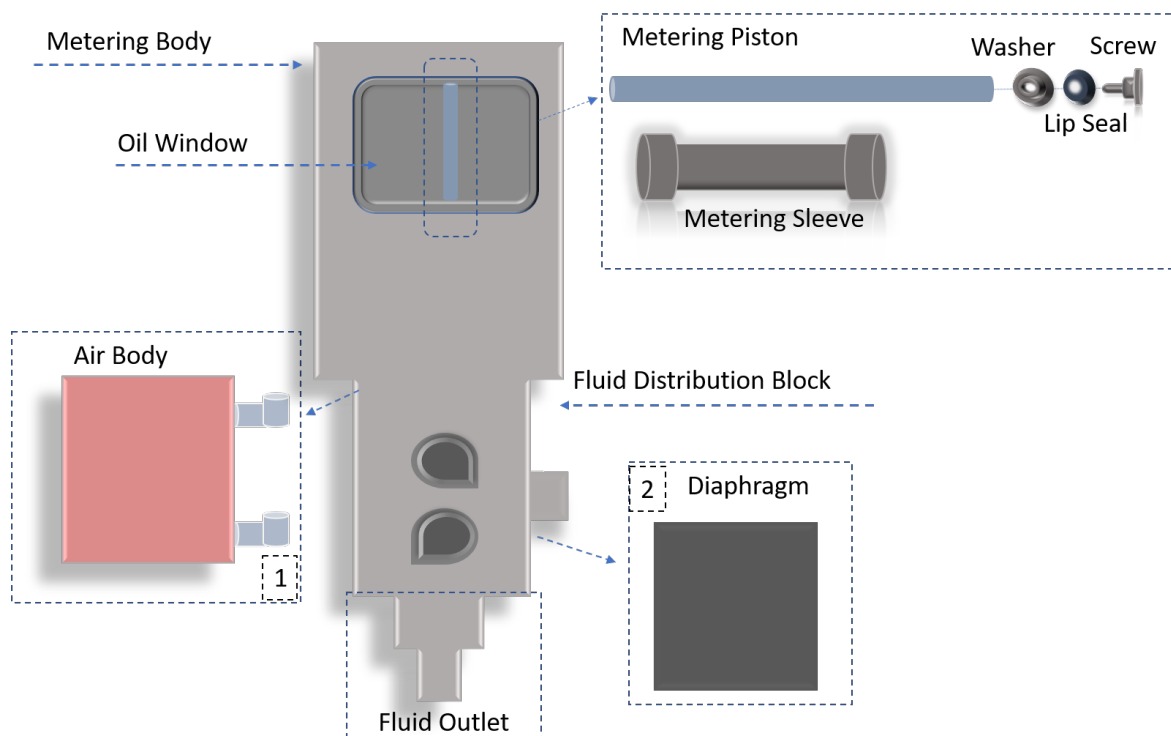


Figure 1: MR1 Overview

3. Operation

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

3.1 Bleed the Pump

1. To bleed the MR1, move the pump over a purge cup.
2. Dispense all the way until the piston reaches its full travel. Repeat as many times as necessary to get all air out of the system.

3.2 Shutdown

Refer to the workcell manual for information on how to shut down the workcell.

1. Reduce the air pressure in the system to zero.
2. Bleed the pressure out of the pump and install the nightcap. Make sure to wipe off any excess material before screwing on nightcap.

3.3 Remove the Pump

1. Before you remove the MR1 from the material supply system, use the purge button to dispense until the piston is all the way down.
2. Engage the workcell Emergency Stop button and turn the air pressure to 0 psi.

WARNING: MR1 maximum air pressure is 75 psi. Do not overpressure the air system.

3. Remove the air lines, fluid lines, and motor cables.
4. To remove the pump, use a 4 mm hex wrench to remove the four mounting bolts.

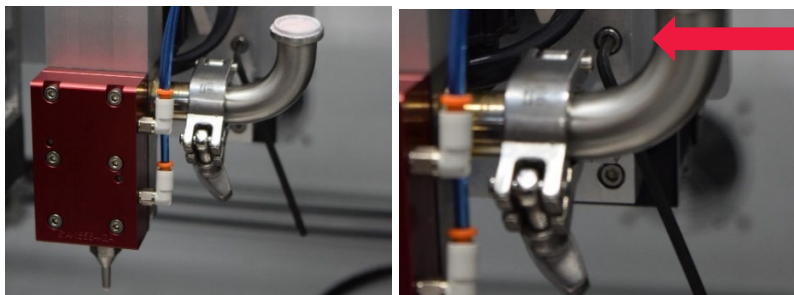


Figure 2: Remove Mounting Bolts

WARNING: Keep the MR1 upright until all fluid is removed from the oil window or oil will spill from the oil window. See Figure 17: Oil Window.

5. To remove the fluid section from the drive assembly, remove the airlines.
6. Use a 3 mm hex wrench to remove the four shoulder bolts from the fluid assembly mount plate.
7. Use a 3 mm hex wrench to remove the four socket head bolts from the fluid assembly mount plate.

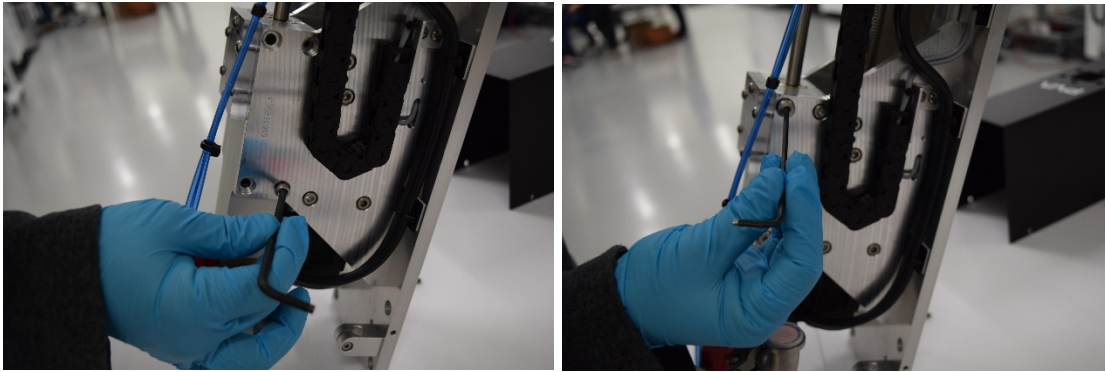


Figure 3: Shoulder and Socket Bolts

8. Separate the pump from the drive assembly mount.

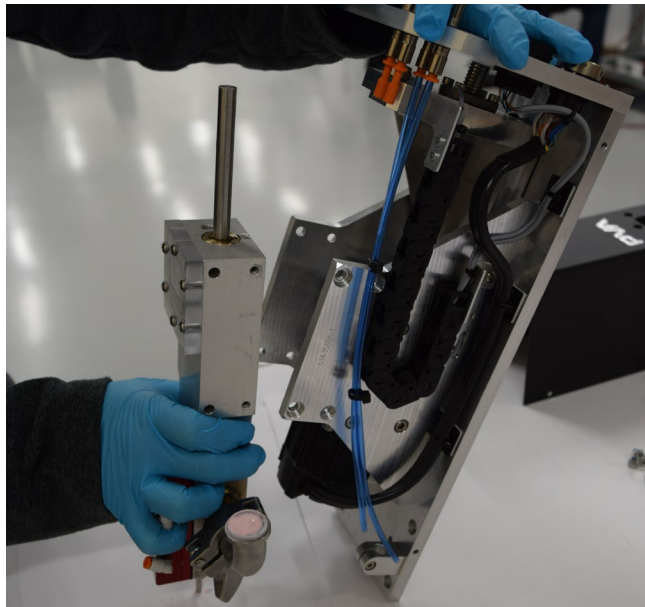


Figure 4: Remove Pump from Drive Assembly

9. Remove the breather vent from the metering body and remove the lubrication fluid from the oil window.

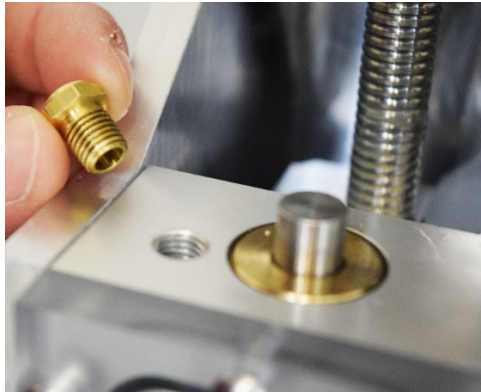


Figure 5: Breather Vent

3.4 Disassembly

1. Turn the wing screw counterclockwise to loosen it. Remove the clamp and fitting. Do not lose the clamp adaptor seals.

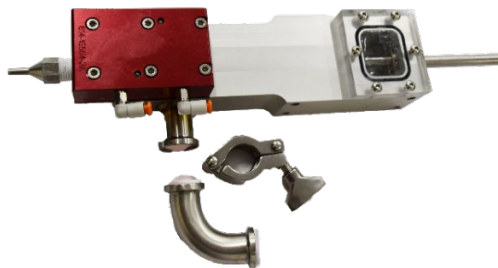


Figure 6: Clamp and Sanitary Fitting Removed

2. Use a 3 mm hex wrench to remove the six socket head bolts from the air section.

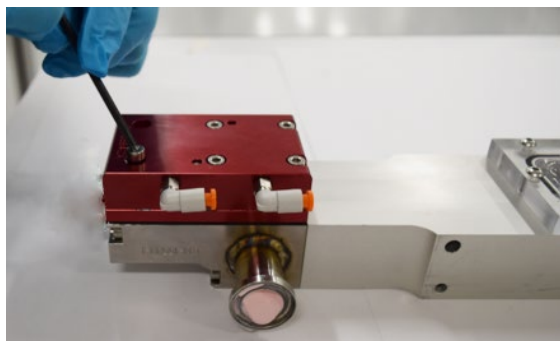


Figure 7: Remove Bolts from Air Section

3. Remove the air section from the fluid section.

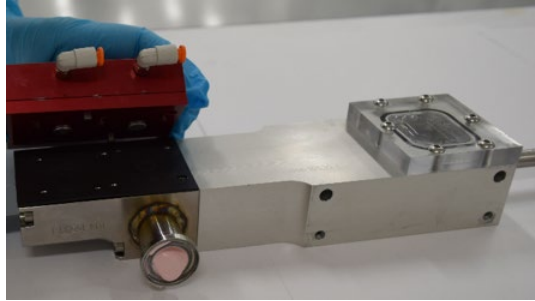


Figure 8: Remove Air Section from Fluid Section

4. The gasket is the black mat under the air body. Remove the gasket and clean it.

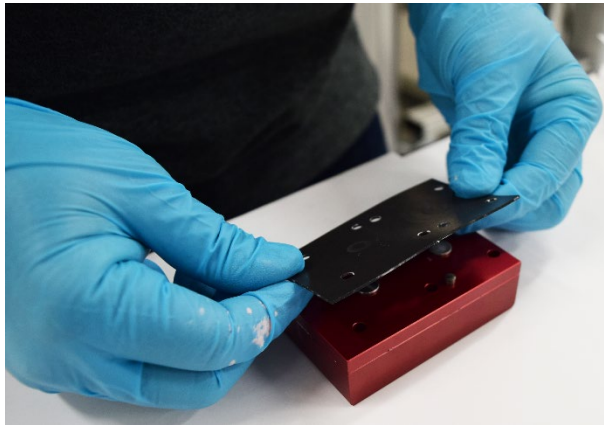


Figure 9: Remove Gasket

5. Examine the gasket for any cracks or signs of wear on the side that faces the metering sleeve. If the gasket is worn, replace it. DO NOT flip the gasket over, or you can damage the pump.



Figure 10: Worn Pump Gasket

6. If there is any material inside the pump, push the metering piston all the way down to remove it.
7. Use a 3 mm hex wrench to remove the four socket head bolts from the fluid distribution block.

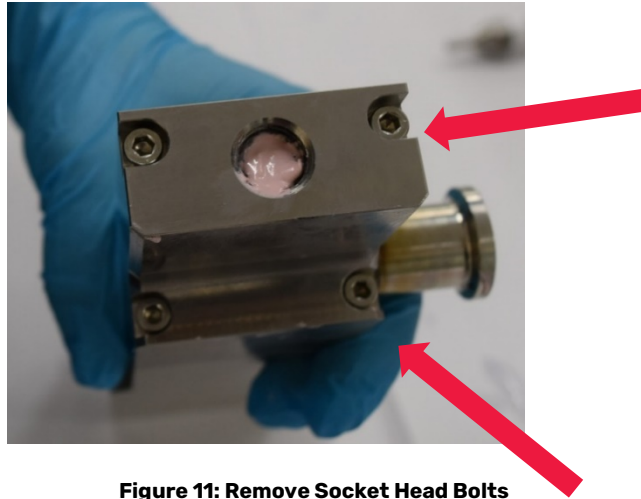


Figure 11: Remove Socket Head Bolts

8. Pull the fluid distribution block out of the metering body.



Figure 12: Separate Fluid Distribution Block from Metering Body

9. Pull the metering sleeve out of the metering body to remove it.



Figure 13: Remove Metering Sleeve from Metering Body

10. Remove the metering piston from the metering sleeve.



Figure 14: Remove Metering Piston from Metering Sleeve

11. Place an adjustable wrench on the flat part of the metering piston.



Figure 15: Adjustable Wrench on Flats

12. Use a flathead screwdriver to turn the screw counterclockwise and remove the lip seal screw.



Figure 16: Remove Lip Seal Screw

13. Separate the metering piston, washer, lip seal, and screw.



Figure 17: Lip Seal Screw, Teflon Washer, Metering Piston Disassembled

14. Use a 2.5 mm hex wrench to remove the six button head screws from oil window. Clean any remaining oil or material from the oil window.

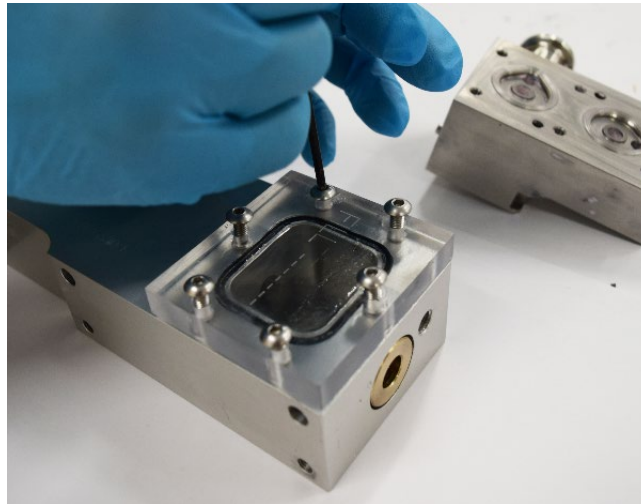


Figure 18: Oil Window

15. Clean all of the necessary parts.

Note: If threads are not cleaned properly, the fittings will bind. Ensure that threads are clean before proceeding with assembly.

Note: Do not leave material on any of the pump components.

3.5 Assembly Instructions

1. Put the pump gasket on the air section.

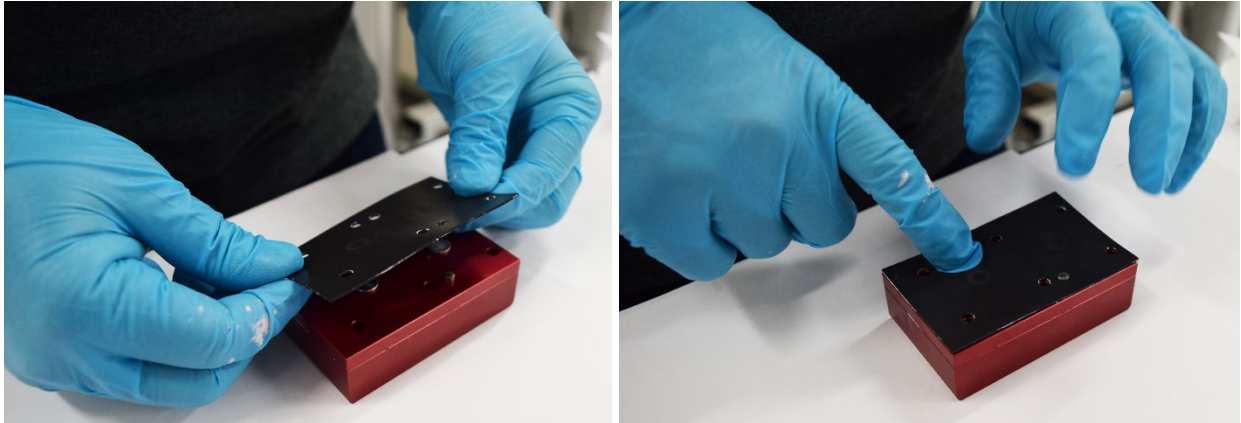


Figure 19: Place Pump Gasket on Air Section

2. Place the air section on the fluid section. Make sure that the air ports and fluid inlet are on the same side.

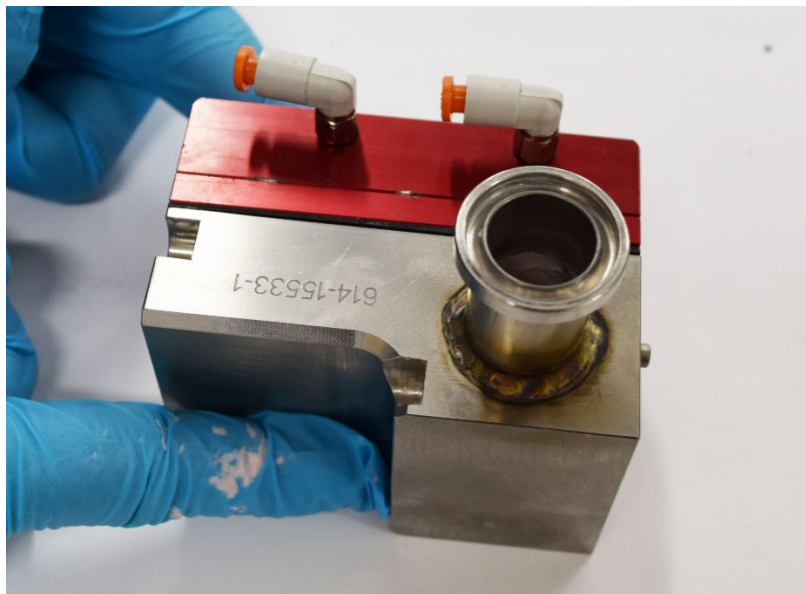


Figure 20: Align Air Ports and Fluid Inlets

3. Lay the air and fluid sections flat. Use a 3 mm hex wrench to install the six socket head bolts onto the air section. Tighten the bolts in a cross pattern until tight.

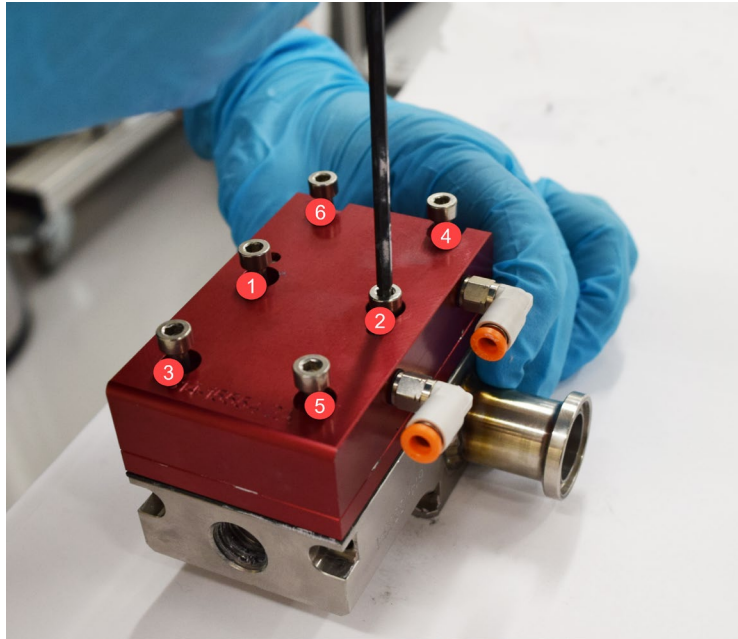


Figure 21: Install Socket Head Bolts on Air Section

4. Apply silicone grease to the O-ring side of the lip seal.
5. Install the lip seal on the screw.
6. Install washer on top of the lip seal. Apply pressure to push on the washer until it is fully engaged. You will hear a small “click”.
7. Install the screw onto the metering piston. Tighten the screw until it is fully engaged.

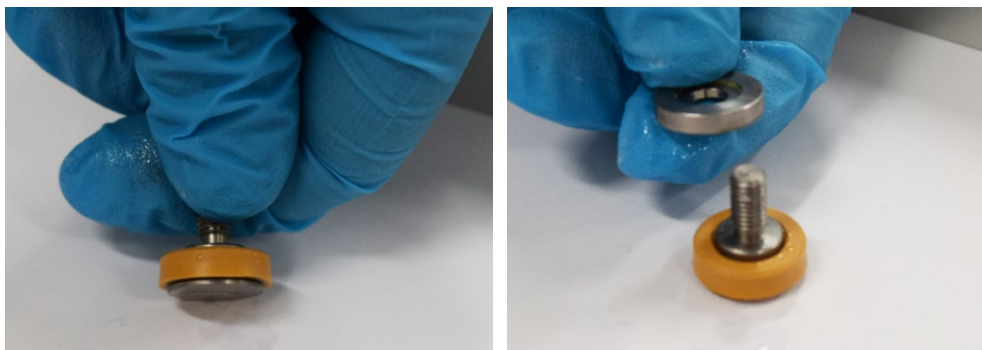


Figure 22: Install Lip Seal, Washer, Screw

8. Apply silicone grease to the O-rings and install one in each end of the metering sleeve.



Figure 23: Metering Sleeve with O-rings Installed

9. Carefully install the metering sleeve into the metering body.

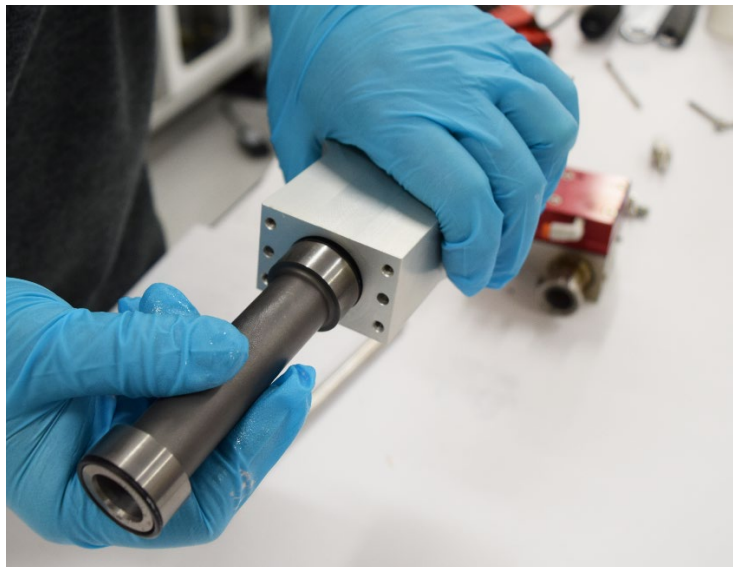


Figure 24: Install Metering Sleeve into Metering Body

10. Install the metering piston into the metering sleeve.



Figure 25: Install Metering Piston

11. Push the metering piston through the metering body with your finger. The end of the piston will come through the top of the metering body.

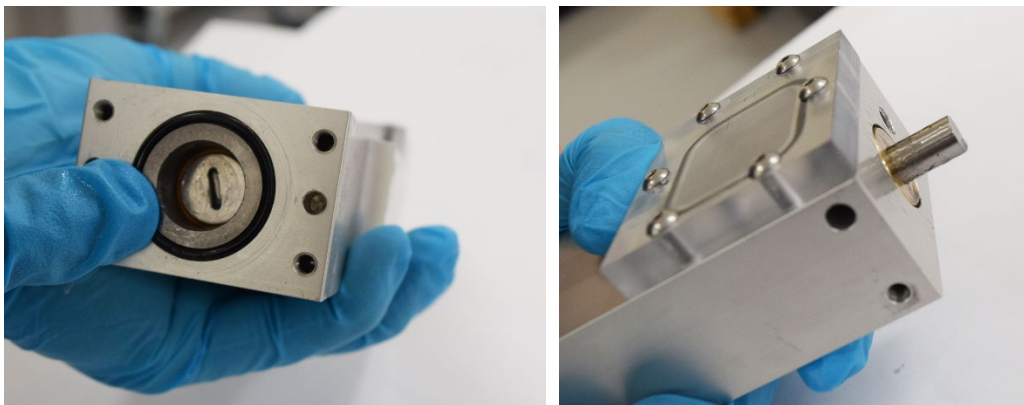


Figure 26: Install Metering Piston

12. Align the air and fluid body pins with the metering body.
13. Install two M4x80 bolts on top of the air fluid distribution body and two M4x40 bolts on the bottom.

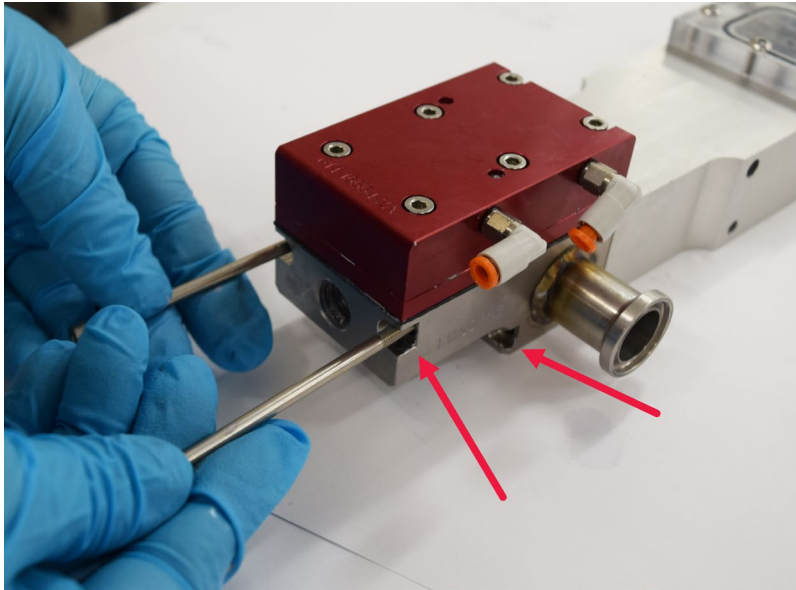


Figure 27: Install M4x80 bolts

14. Use an adjustable wrench install the needle.

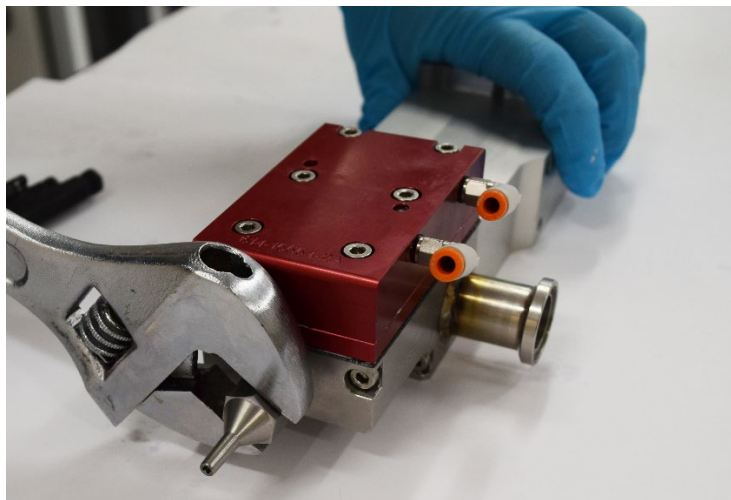


Figure 28: Install Needle

3.5.1 Install Clamp

1. Install any air or material ports.
2. Install the clamp adapter seal.



Figure 29: Clamp Adapter Seal

3. Install the clamp elbow.

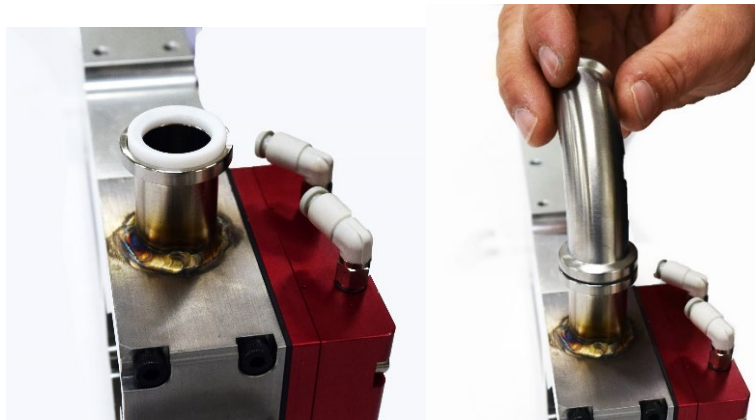


Figure 30: Clamp Elbow Installed

4. Install the clamp. Turn the wing screw until it is tight.



Figure 31: Install the Clamp

5. Install the clamp adapter seal.



Figure 32: Clamp Adapter Seal

6. Install the clamp adapter.
7. Install the clamp. Turn the wing screw until it is tight.

3.5.2 Fill the Fluid Distribution Block

1. To fill the fluid distribution block with lubrication fluid, use an adjustable wrench to remove the breather vent.

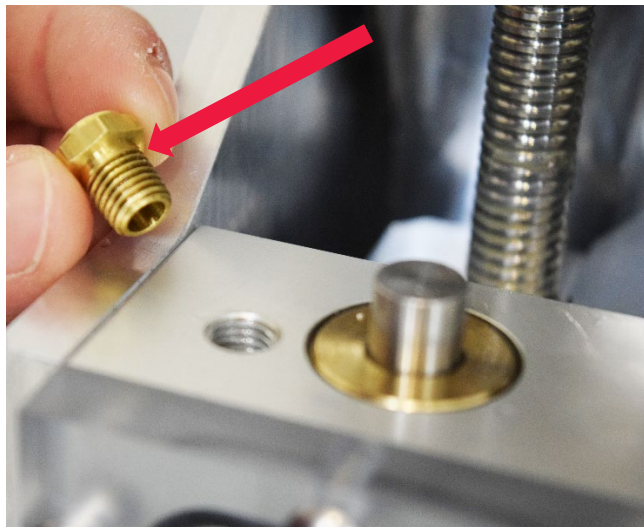


Figure 33: Breather Vent

2. Fill the fluid distribution block with lubrication fluid to the “**Fill**” line on the oil window.



Figure 34: Fill Line

3. Keep the pump upright. Install the breather vent and tighten with an adjustable wrench. Do not overtighten.

3.5.3 Install the MR1

1. Use a 3 mm hex wrench to install the four socket head bolts to the fluid assembly mount plate.

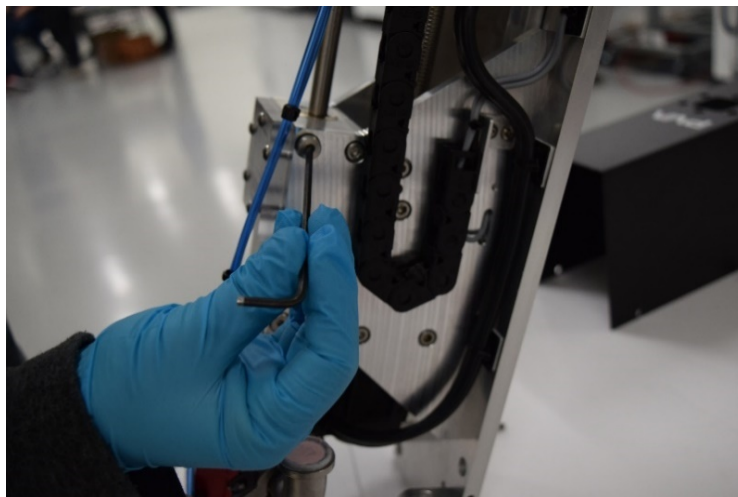


Figure 35: Install Socket Bolts

2. Use a 3 mm hex wrench to install the four shoulder bolts to the fluid assembly mount plate.

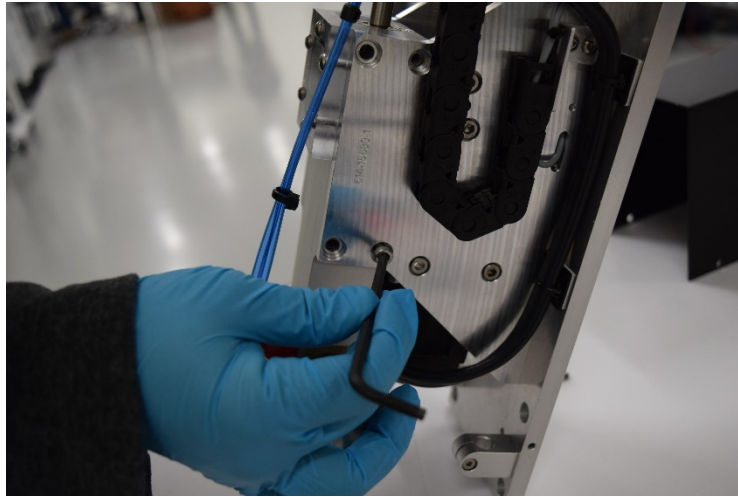


Figure 36: Install Shoulder Bolts

3. Use a 4 mm hex wrench to install the four mounting bolts.

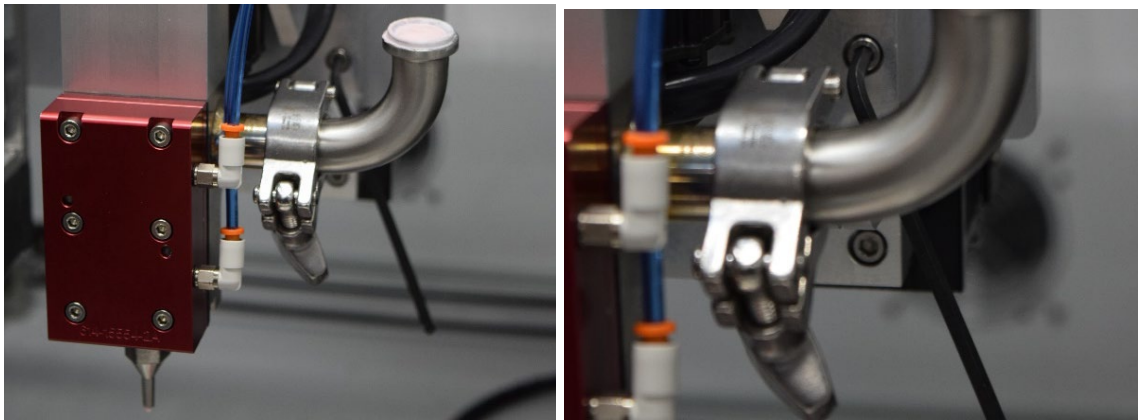


Figure 37: Install Mounting Bolts

4. Install the air lines.

5. Install the cover and install the cover screws.



Figure 38: MR1 with Cover

6. Install the MR1 in the workstation or the workcell, as necessary.



4. Technical Specifications

Weight	Approximately 6.8 kg (15 lbs)
Material inlet	3/4" Sanitary Fitting
Material outlet	1/4" NPT

Table 3: Technical Specifications

5. Troubleshooting

This section is designed to help solve problems before you call PVA. Refer to this section if a mechanical or electrical problem occurs.

Troubleshooting Problem	Possible Cause	Corrective Action
Lubrication fluid is discolored	Opaque fluid is a sign of failed lip seals	Replace the lip seals and the lubrication fluid
The metering piston does not refill	Material pressure is too low Lip seal is damaged	Increase the material pressure Replace the lip seal and replace the lubrication fluid
Material leaks from the pump body	The gasket is damaged	Replace the gasket
The pump does not shut off	The gasket is damaged The piston has material contamination	Replace the gasket Clean the piston
Material contamination	The gasket is damaged	Clean the fluid block, replace the pump gasket, replace the lubrication fluid
The material has air in it	Pump was not correctly purged	Purge the pump until the metering piston reaches its full travel, the machine may error out and all the pump to fully refill

Table 4: Troubleshooting

5.1 Damaged Pump Gasket

If material leaks from between the air body and metering sleeve, on the side of the pump, the pump gasket is worn. To replace the pump gasket, do the steps below:

1. Use a 3 mm hex wrench to remove six socket head bolts from the air section.

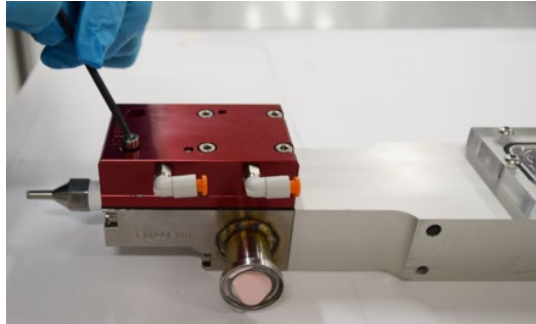


Figure 39: Remove Bolts from Air Section

2. Remove the air section from the fluid section.

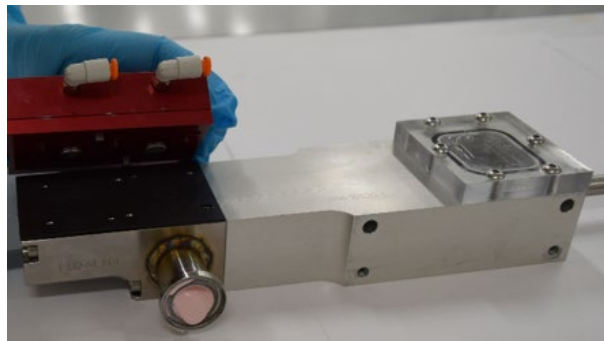


Figure 40: Remove Air Section from Fluid Section

3. The pump gasket is the black mat under the air body. Remove the pump gasket and clean it.

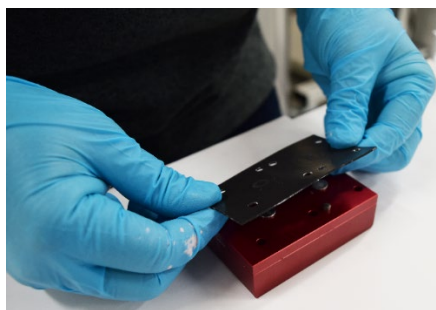


Figure 41: Remove Gasket

4. Examine the pump gasket for any cracks or signs of wear on the side that was facing the metering sleeve. If the pump gasket is worn, it will be necessary to replace. DO NOT flip the pump gasket over or you can damage the pump.



Figure 9: Worn Pump Gasket

5. Install the new pump gasket.
6. Install the air body.
7. Install the six socket head bolts. Tighten them in a cross pattern.
8. Clean all material.

5.2 Calling Technical Support

Technical Support is always available to help. The phone number is **+1 (844) 734-0209** or you can email cs@pva.net to create a support ticket. Before you contact PVA, have the following information:

1. Record all the information on the OIT when the error occurred, include any error messages that may appear.
2. Record the operation in progress when the module had the error (when did it have problems, what was it doing, etc.).
3. If the error was not serious, attempt to repeat the error. If the error does not repeat, the problem may have been operator generated.



6. Notes



7. Warranty

PVA Warranty Policy

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

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

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

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

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

(Retain this for your records)

Product Information:

PRODUCT: _____

SERIAL NUMBER: _____

DATE OF PURCHASE: _____

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