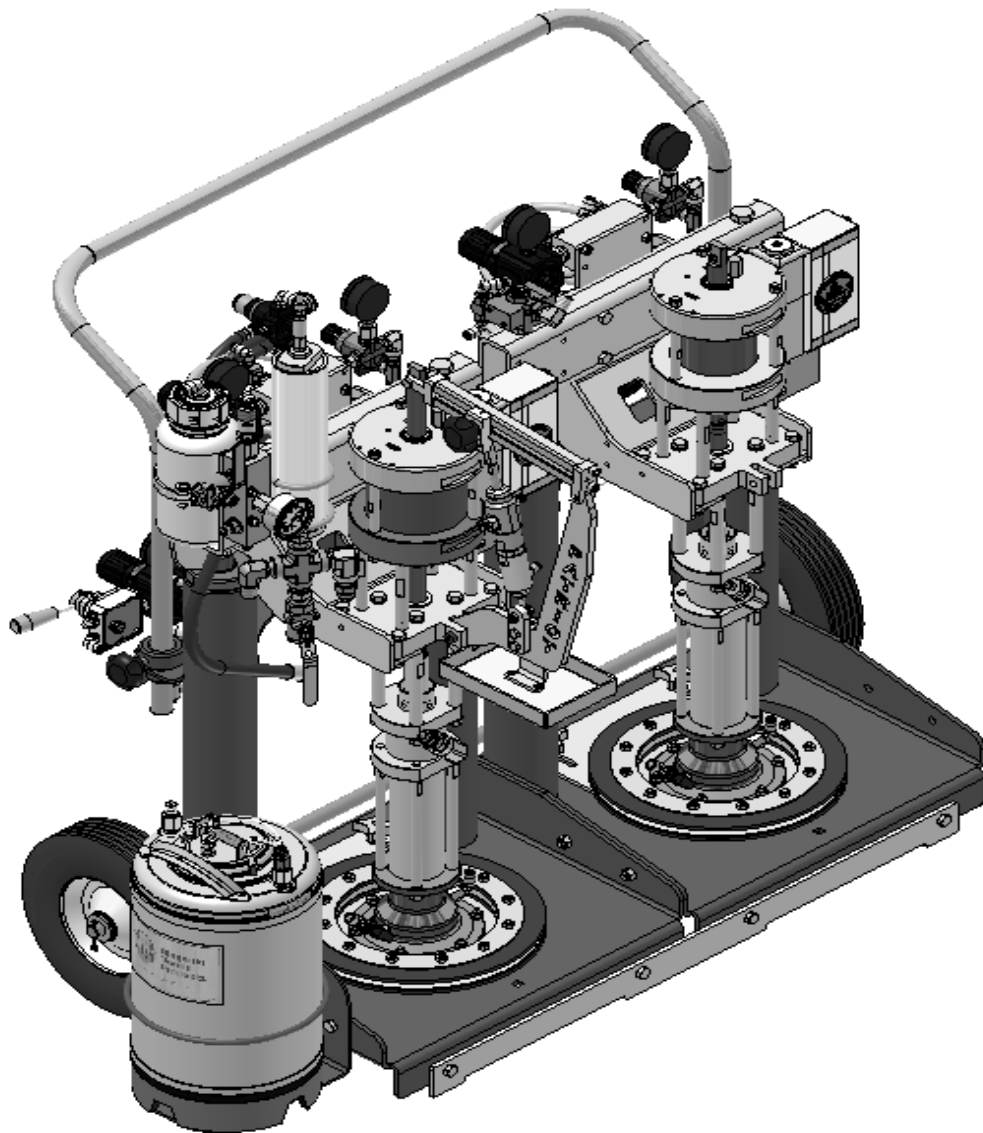


# Patriot Fixed Ratio Adhesive Systems

## Operations Manual

This manual is applicable to the following models:

- IMAP-PAT-CCP-DUO-5
- PAT-10-10-BASIC





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[www.mvpind.com/mvp-international](http://www.mvpind.com/mvp-international)

*Use of this product confirms that Magnum Venus Products, Inc.'s standard terms and conditions of sale apply.*

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# Safety & Warning Information

## Warnings

Due to the vast number of chemicals that could be used and their varying chemical reactions, the buyer and user of this equipment should determine all factors relating to the fluids used, including any of the potential hazards involved. Particular inquiry and investigation should be made into potential dangers relating to toxic fumes, fires, explosions, reaction times, and exposure of human beings to the individual components or their resultant mixtures. MVP assumes no responsibility for loss, damage, expense or claims for bodily injury or property damage, direct or consequential, arising from the use of such chemical components.

The end user is responsible for ensuring that the end product or system complies with all the relevant laws in the country where it is to be used and that all documentation is adhered to.

### **Recommended Occupational Safety & Health Act (OSHA) Documentation:**

- 1910.94                      Pertaining to ventilation
- 1910.106                    Pertaining to flammable liquids
- 1910.107                    Pertaining to spray finishing operations, particularly paragraph (m), Organic Peroxides and Dual Component Coatings

For Additional information, contact the Occupational Safety and Health Administration (OSHA) at <https://www.osha.gov/about.html>.

### **Recommended National Fire Protection Association (NFPA) Documentation:**

- NFPA No.33 Chapter 14              Organic Peroxides and Dual Component Materials
- NFPA No. 63                      Dust Explosion Prevention
- NFPA No. 70                      National Electrical Code
- NFPA No. 77                      Static Electricity
- NFPA No. 91                      Blower and Exhaust System
- NFPA No. 654                      Plastics Industry Dust Hazards

**Fire Extinguisher** – code ABC, rating number 4a60bc using Extinguishing Media –Foam, Carbon Dioxide, Dry Chemical, Water Fog, is recommended for this product and applications.

The following general warnings and guidelines are for the setup, use, grounding, maintenance, and repair of equipment. Additional product-specific warnings may be found throughout this manual as applicable. Please contact your nearest MVP Technical Service Representative if additional information is needed.

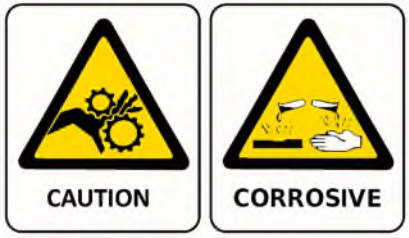
**Safety Precautions**

- Avoid skin contact and inhalation of all chemicals.
- Review Material Safety Data Sheet (MSDS) to promote the safe handling of chemicals in use.
- Restrict the use of all chemicals to designated areas with good ventilation.
- Chemicals are flammable and reactive.
- Noxious fumes released when combusted.
- Operate equipment in a ventilated environment only.
- Uncured liquid resins are highly flammable unless specifically labeled otherwise.
- Cured laminate, accumulations of overspray, and laminate sandings are highly combustible.
- Do not operate or move electrical equipment when flammable fumes are present.
- Ground all equipment.
- If a spark is seen or felt, immediately halt operation. Do not operate the equipment until the issue has been identified and repaired.
- Contaminated catalyst may cause fire or explosion.
- Containers may explode if exposed to fire / heat.
- Use and store chemicals away from heat, flames, and sparks.
- Do not smoke in work areas or near stored chemicals.
- Do not mix Methyl Ethyl Ketone Peroxide (MEKP) with materials other than polyethylene.
- Do not dilute MEKP.
- Keep food and drink away from work area.



**Physical Hazards**

- Never look directly into the spray gun fluid tip. Serious injury or death can result.
- Never aim the spray gun at or near another person. Serious injury or death can result.
- Chemical compounds can be severely irritating to the eyes and skin.
- Inhalation, ingestion, or injection may damage internal organs and lead to pulmonary disorders, cancers, lymphomas, and other diseases or health conditions.
- Other potential health effects include: irritation of the eyes and upper respiratory tract, headache, light-headedness, dizziness, confusion, drowsiness, nausea, vomiting, and occasionally abdominal pain.
- Eye contact: Immediately flush with water for at least 15 minutes and seek immediate medical attention.
- Skin Contact: Immediately wash with soap and water and seek immediate medical attention.
- Inhalation: Move the person to fresh air and seek immediate medical attention.
- Do not remove shields, covers, or safety features on equipment that is in use.
- Never place fingers, hands, or any body part near or directly in front of the spray gun fluid tip. The force of the liquid as it exits the spray tip can shoot liquid through the skin.
- Keep hands and body parts away from any moving equipment or components.
- Do not stand under plunger
- An improperly loaded drum may lead to an imbalance, causing a unit to tip over



**Personal Protective Equipment (PPE)**

- MVP recommends the use of personal safety equipment with all products in our catalog.
- Wear safety goggles, hearing protection, a respirator, and chemical resistant gloves.
- Wear long sleeve shirts or jackets and pants to minimize skin exposure.
- PPE should be worn by operators and service technicians to reduce the risk of injury.



For Additional information, contact the Occupational Safety and Health Administration (OSHA). <https://www.osha.gov/about.html>

## Symbol Definitions



Indicates the risk of contact with chemicals that are hazardous, which may lead to injury or death.



Indicates the risk of contact with voltage / amperage that may lead to serious injury or death.



Indicates that the materials being used are susceptible to combustion.



Indicates the risk of contact with moving components that may lead to serious injury or death.



Indicates that the system or component should be grounded before proceeding with use or repair.



Indicates the use of lit cigarettes or cigars is prohibited, because the materials being used are susceptible to combustion.



Indicates that the materials and/or the process being performed can lead to ignition and explosion.



A recommendation for the use of Personal Protective Equipment (PPE) before using or repairing the product.

## Polymer Matrix Materials: Advanced Composites

Potential health hazards associated with the use of advanced composites can be controlled through the implementation of an effective industrial hygiene and safety program.

[https://www.osha.gov/dts/osta/otm/otm\\_iii/otm\\_iii\\_1.html#t\\_iii:1\\_1](https://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_1.html#t_iii:1_1)

<b>Resins</b>		
<b>Composite Component</b>	<b>Organ System Target (Possible Target)</b>	<b>Known (Possible) Health Effect</b>
Epoxy resins	Skin, lungs, eyes	Contact and allergic dermatitis, conjunctivitis
Polyurethane resins	Lungs, skin, eyes	Respiratory sensitization, contact dermatitis, conjunctivitis
Phenol formaldehyde	Skin, lungs, eyes	As above (potential carcinogen)
Bismaleimides (BMI)	Skin, lungs, eyes	As above (potential carcinogen)
Polyamides	Skin, lungs, eyes	As above (potential carcinogen)
<b>Reinforcing materials</b>		
<b>Composite Component</b>	<b>Organ System Target (Possible Target)</b>	<b>Known (Possible) Health Effect</b>
Aramid fibers	Skin (lungs)	Skin and respiratory irritation, contact dermatitis (chronic interstitial lung disease)
Carbon/graphite fibers	Skin (lungs)	As noted for aramid fibers
Glass fibers (continuous filament)	Skin (lungs)	As noted for aramid fibers
<b>Hardeners and curing agents</b>		
<b>Composite Component</b>	<b>Organ System Target (Possible Target)</b>	<b>Known (Possible) Health Effect</b>
Diaminodiphenylsulfone	N/A	No known effects with workplace exposure
Methylenedianiline	Liver, skin	Hepatotoxicity, suspect human carcinogen
<b>Other aromatic amines</b>		
<b>Composite Component</b>	<b>Organ System Target (Possible Target)</b>	<b>Known (Possible) Health Effect</b>
Meta-phenylenediamine (MPDA)	Liver, skin (kidney, bladder)	Hepatitis, contact dermatitis (kidney and bladder cancer)
Aliphatic and cyclo-aliphatic amines	Eyes, skin	Severe irritation, contact dermatitis
Polyaminoamide	Eyes, skin	Irritation (sensitization)
Anhydride	Eyes, lungs, skin	Severe eye and skin irritation, respiratory sensitization, contact dermatitis



## Catalyst - Methyl Ethyl Ketone Peroxide (MEKP)

MEKP is among the more hazardous materials found in commercial channels. The safe handling of the “unstable (reactive)” chemicals presents a definite challenge to the plastics industry. The highly reactive property which makes MEKP valuable to the plastics industry in producing the curing reaction of polyester resins also produces the hazards which require great care and caution in its storage, transportation, handling, processing and disposal. MEKP is a single chemical. Various polymeric forms may exist which are more or less hazardous with respect to each other. These differences may arise not only from different molecular structures (all are, nevertheless, called “MEKP”) and from possible trace impurities left from the manufacture of the chemicals, but may also arise by contamination of MEKP with other materials in its storage or use. Even a small amount of contamination with acetone, for instance, may produce an extremely shock-sensitive and explosive compound.



### **WARNING**

***Contamination with promoters, materials containing promoters (such as laminate sandings), or with any readily oxidizing material (such as brass or iron) will cause exothermic redox reactions which can be explosive in nature. Heat applied to MEKP or heat buildup from contamination reactions can cause the material to reach its Self-Accelerating Decomposition Temperature (SADT).***

Researchers have reported measuring pressure rates-of-rise well over 100,000 psi per second when certain MEKP's reach their SADT. For comparison, the highest-pressure rate-of-rise listed in NFPA Bulletin NO.68, “Explosion Venting”, is 12,000 psi per second for an explosion of 12% acetylene and air. The maximum value listed for a hydrogen explosion is 10,000 psi per second. Some forms of MEKP, if allowed to reach their SADT, will burst even an open topped container. This suggests that it is not possible to design a relief valve to vent this order of magnitude of pressure rate-of-rise. The user should be aware that any closed container, be it a pressure vessel, surge chamber, or pressure accumulator, could explode under certain conditions. There is no engineering substitute for care by the user in handling organic peroxide catalysts. If, at any time, the pressure relieve valve on top of the catalyst tank should vent, the area should be evacuated at once and the fire department called. The venting could be the first indication of a heat, and therefore, pressure build-up that could eventually lead to an explosion. Moreover, if a catalyst tank is sufficiently full when the pressure relief valve vents, some catalyst may spray out, which could cause eye injury. For this reason, and many others, anyone whose job puts them in an area where this vented spray might go, should always wear full eye protection even when laminating operations are not taking place.

Safety in handling MEKP depends to a great extent on employee education, proper safety instructions, and safe use of the chemicals and equipment. Workers should be thoroughly informed of the hazards that may result from improper handling of MEKP, especially regarding contamination, heat, friction and impact. They should be thoroughly instructed regarding the proper action to be taken in the storage, use, and disposal of MEKP and other hazardous materials used in the laminating operation. In addition, users should make every effort to:

- Store MEKP in a cool, dry place in original containers away from direct sunlight and away from other chemicals.
- Keep MEKP away from heat, sparks, and open flames.
- Prevent contamination or MEKP with other materials, including polyester over spray and sandings, polymerization accelerators and promoters, brass, aluminum, and non-stainless steels.

- Never add MEKP to anything that is hot, since explosive decomposition may result.
- Avoid contact with skin, eyes, and clothing. Protective equipment should be worn at all times. During clean-up of spilled MEKP, personal safety equipment, gloves, and eye protection must be worn. Firefighting equipment should be at hand and ready.
- Avoid spillage, which can heat up to the point of self-ignition.
- Repair any leaks discovered in the catalyst system immediately, and clean-up the leaked catalyst at once in accordance with the catalyst manufacturer's instructions.
- Use only original equipment or equivalent parts from Magnum Venus Products in the catalyst system (i.e.: hoses, fitting, etc.) because a dangerous chemical reaction may result between substituted parts and MEKP.
- Catalyst accumulated from the purging of hoses or the measurement of fluid output deliveries should never be returned to the supply tank, such catalyst should be diluted with copious quantities of clean water and disposed of in accordance with the catalyst manufacturer's instructions.

The extent to which the user is successful in accomplishing these ends and any additional recommendations by the catalyst manufacturer determines largely the safety that will be present in his operation.

## Clean-Up Solvents and Resin Diluents



### **WARNING**

***A hazardous situation may be present in your pressurized fluid system! Hydro carbon solvents can cause an explosion when used with aluminum or galvanized components in a closed (pressurized) fluid system (pump, heaters, filters, valves, spray guns, tanks, etc.). An explosion could cause serious injury, death, and/or substantial property damage. Cleaning agents, coatings, paints, etc. may contain Halogenated Hydrocarbon solvents. Some Magnum Venus Products spray equipment includes aluminum or galvanized components and will be affected by Halogenated Hydrocarbon solvents.***

There are three key elements to the Halogenated Hydrocarbon (HHC) solvent hazard.

- |    |   |  |
|----|---|--|
| 1. | The presence of HHC solvents.               | 1,1,1 – Trichloroethane and Methylene Chloride are the most common of these solvents. However, other HHC solvents are suspect if used; either as part of paint or adhesives formulation, or for clean-up flushing.   |
| 2. | Aluminum or Galvanized Parts.               | Most handling equipment contains these elements. In contact with these metals, HHC solvents could generate a corrosive reaction of a catalytic nature.   |
| 3. | Equipment capable of withstanding pressure. | When HHC solvent contact aluminum or galvanized parts inside a closed container such as a pump, spray gun, or fluid handling system, the chemical reaction can, over time, result in a build-up of heat and pressure, which can reach explosive proportions. When all three elements are present, the result can be an extremely violent explosion. The reaction can be sustained with very little aluminum or galvanized metal; any amount of aluminum is too much. |

- The reaction is unpredictable. Prior use of an HHC solvent without incident (corrosion or explosion) does NOT mean that such use is safe. These solvents can be dangerous alone (as a clean-up or flushing agent) or when used as a component or a coating material. There is no known inhibitor that is effective under all circumstances. Mixing HHC solvents with other materials or solvents such as MEKP, alcohol, or toluene may render the inhibitors ineffective.
- The use of reclaimed solvents is particularly hazardous. Reclaimers may not add any inhibitors. The possible presence of water in reclaimed solvents could also feed the reaction.
- Anodized or other oxide coatings cannot be relied upon to prevent the explosive reaction. Such coatings can be worn, cracked, scratched, or too thin to prevent contact. There is no known way to make oxide coatings or to employ aluminum alloys to safely prevent the chemical reaction under all circumstances.
- Several solvent suppliers have recently begun promoting HHC solvents for use in coating systems. The increasing use of HHC solvents is increasing the risk. Because of their exemption from many state implementation plans as Volatile Organic Compounds (VOCs), their low flammability hazard, and their not being classified as toxic or carcinogenic substances, HHC solvents are very desirable in many respects.



**WARNING**

***Do not use Halogenated Hydrocarbon (HHC) solvents in pressurized fluid systems having aluminum or galvanized wetted parts.***

***Magnum Venus Products is aware of NO stabilizers available to prevent HHC solvents from reaction under all conditions with aluminum components in closed fluid systems. HHC solvents are dangerous when used with aluminum components in a closed fluid system.***

- Consult your material supplier to determine whether your solvent or coating contains Halogenated Hydrocarbon solvents.
- Magnum Venus Products recommends that you contact your solvent supplier regarding the best non-flammable clean-up solvent with the heat toxicity for your application.
- If, however, you find it necessary to use flammable solvents, they must be kept in approved, electrically grounded containers.
- Bulk solvent should be stored in a well-ventilated, separate building, 50 feet away from your main plant.
- You should only allow enough solvent for one day's use in your laminating area.
- NO SMOKING signs must be posted and observed in all areas of storage or where solvents and other flammable materials are used.
- Adequate ventilation (as covered in OSHA Section 1910.94 and NFPA No.91) is important wherever solvents are stored or used, to minimize, confine and exhaust the solvent vapors.
- Solvents should be handled in accordance with OSHA Section 1910.106 and 1910.107.

## Catalyst Diluents

Magnum Venus Products spray-up and gel-coat systems currently produced are designed so that catalyst diluents are not required. Magnum Venus Products therefore recommends that diluents not be used to avoid possible contamination which could lead to an explosion due to the handling and mixing of MEKP and diluents. In addition, it eliminates any problems from the diluent being contaminated through rust particles in drums, poor quality control on the part of the diluents suppliers, or any other reason. If diluents are absolutely required, contact your catalyst supplier and follow his instructions explicitly. Preferably the supplier should premix the catalyst to prevent possible “on the job” contamination while mixing.



### **WARNING**

***If diluents are not used, remember that catalyst spillage and gun, hose, and packing leaks are potentially more hazardous since each drop contains a higher concentration of catalyst and will therefore react more quickly with overspray and the leak.***

## Cured Laminate, Overspray and Laminate Sandings Accumulation

- Remove all accumulations of overspray, Fiberglass Reinforced Plastic (FRP) sandings, etc. from the building as they occur. If this waste is allowed to build up, spillage of catalyst is more likely to start a fire; in addition, the fire would burn hotter and longer.
- Floor coverings, if used, should be non-combustible.
- Spilled or leaked catalyst may cause a fire if it comes in contact with an FRP product, oversprayed chop or resin, FRP sandings or any other material with MEKP.

To prevent spillage and leakage, you should:

- |  |   |
|--|---|
| 1. Maintain your Magnum Venus Products System.   | Check the gun several times daily for catalyst and resin packing or valve leaks. REPAIR ALL LEAKS IMMEDIATELY.  |
| 2. Never leave the gun hanging over or lying inside the mold.  | A catalyst leak in this situation would certainly damage the part, possibly the mold, and may cause a fire.   |
| 3. Inspect resin and catalyst hoses daily for wear or stress at the entry and exits of the boom sections and at the hose and fittings. | Replace if wear or weakness is evident or suspected.  |
| 4. Arrange the hoses and fiberglass roving guides so that the fiberglass strands DO NOT rub against any of the hoses at any point.     | If allowed to rub, the hose will be cut through, causing a hazardous leakage of material which could increase the danger of fire. Also, the material may spew onto personnel in the area. |

## Toxicity of Chemicals

- Magnum Venus Products recommends that you consult OSHA Sections 1910.94, 1910.106, 1910.107 and NFPA No.33, Chapter 14, and NFPA No.91.
- Contact your chemical supplier(s) and determine the toxicity of the various chemicals used as well as the best methods to prevent injury, irritation and danger to personnel.
- Also determine the best methods of first aid treatment for each chemical used in your plant.

## Equipment Safety

Magnum Venus Products suggest that personal safety equipment such as EYE GOGGLES, GLOVES, EAR PROTECTION, and RESPIRATORS be worn when servicing or operating this equipment. Ear protection should be worn when operating a fiberglass chopper to protect against hearing loss since noise levels can be as high as 116 dB (decibels). This equipment should only be operated or serviced by technically trained personnel!



### CAUTION

***Never place fingers, hands, or any body part near or directly in front of the spray gun fluid tip. The force of the liquid as it exits the spray tip can cause serious injury by shooting liquid through the skin. NEVER LOOK DIRECTLY INTO THE GUN SPRAY TIP OR POINT THE GUN AT OR NEAR ANOTHER PERSON.***



### DANGER

***Contaminated catalyst may cause fire or explosion. Before working on the catalyst pump or catalyst accumulator, wash hands and tools thoroughly. Be sure work area is free from dirt, grease, or resin. Clean catalyst system components with clean water daily.***



### DANGER

***Eye, skin, and respiration hazard. The catalyst MEKP may cause blindness, skin irritation, or breathing difficulty. Keep hands away from face. Keep food and drink away from work area.***

## Treatment of Chemical Injuries



### CAUTION

***Refer to your catalyst manufacturer's safety information regarding the safe handling and storage of catalyst. Wear appropriate safety equipment as recommended.***

Great care should be used in handling the chemicals (resins, catalyst and solvents) used in polyester systems. Such chemicals should be treated as if they hurt your skin and eyes and as if they are poison to your body. For this reason, Magnum Venus Products recommends the use of protective clothing and eye wear in using polyester systems. However, users should be prepared in the event of such an injury.

**Precautions include:**

1. Know precisely what chemicals you are using and obtain information from your chemical supplier on what to do in the event the chemical gets onto your skin or into the eyes, or if swallowed.
2. Keep this information together and easily available so that it may be used by those administering first aid or treating the injured person.
3. Be sure the information from your chemical supplier includes instructions on how to treat any toxic effects the chemicals have.



**WARNING**

***Contact your doctor immediately in the event of an injury. If the product's MSDS includes first aid instructions, administer first aid immediately after contacting a doctor.***

Fast treatment of the outer skin and eyes that contact chemicals generally includes immediate and thorough washing of the exposed skin and immediate and continuous flushing of the eyes with lots of clean water for at least 15 minutes or more. These general instructions of first aid treatment may be incorrect for some chemicals; you must know the chemicals and treatment before an accident occurs. Treatment for swallowing a chemical frequently depends upon the nature of the chemical.

## Emergency Stop Procedure

In an emergency, follow these steps to stop a UPS System:

1. The ball valve located where the air enters the power head of the resin pump, should be moved to the "OFF" or closed position.

**Note**      ***The "open" or "on" position is when the ball valve handle is parallel (in line) with the ball valve body. The "closed" or "off" position is when the ball valve handle is perpendicular (across) the ball valve body.***

2. Turn all system regulators to the "OFF" position (counter-clockwise) position.
3. Verify / secure the catalyst relief line, located on the catalyst relief valve.
4. Verify / secure the resin return line, located on the resin filter.
5. Place a container under the resin pump ball valve to catch ejected resin.
6. Locate the ball valve on the resin pump.
7. Rotate the ball valve 90 degrees to the "On" or open position.

## Grounding

Grounding an object means providing an adequate path for the flow of the electrical charge from the object to the ground. An adequate path is one that permits charge to flow from the object fast enough that it will not accumulate to the extent that a spark can be formed. It is not possible to define exactly what will be an adequate path under all conditions since it depends on many variables. In any event, the grounding means should have the lowest possible electrical resistance.

Grounding straps should be installed on all loose conductive objects in the spraying area. This includes material containers and equipment. Magnum Venus Products recommends grounding straps be made of AWG No.18 stranded wire as a minimum and the larger wire be used where possible. NFPA Bulletin No77 states that the electrical resistance of such a leakage path may be as low as 1 meg ohm (10 ohms) but that resistance as high as 10,000 meg ohms will produce an adequate leakage path in some cases.



**CAUTION**

***Whenever flammable or combustible liquids are transferred from one container to another, or from one container to the equipment, both containers or container and equipment shall be effectively bonded and grounded to dissipate static electricity. For further information, see National Fire Protection Association (NFPA) 77, titled “Recommended Practice on Static Electrical”. Refer especially to section 7-7 titled “Spray Application of Flammable and Combustible Materials”.***

## Introduction

This manual provides information for the operation, maintenance, and simple repair of the MVP Patriot Fixed Ratio Adhesive Systems. The following procedures are included:

- Step-by-step assembly and disassembly
- Installation, start-up, and shut-down instructions
- Step-by-step operation instructions



Please read this manual carefully and retain for future reference. Follow the steps in the order given, otherwise you may damage the equipment or injure yourself.

## Component Assemblies

MVP's Patriot Fixed Ratio Adhesive Systems consists of multiple components. Each component has its own detailed manual and drawings. For complete repair and maintenance instructions, refer to the appropriate manuals.

- PATRIOT SS CHOP CHECK FLUID SECTION MANUAL
- PATRIOT POWER HEAD MANUAL
- PATRIOT METERING PUMP MANUAL
- CLASSIC 1:1 PRO GUN MANUAL
- PRESSURE LIMIT VALVE PLV-1000 MANUAL

## Air Requirements

1. The system requires a supply of air (30 cfm) and at least 100 psi (7 bar).
2. The unit requires a ½ inch (12 - 13 mm) inside diameter air hose minimum (use caution when using quick disconnects; they may restrict air flow).
3. Preferably the air will be clean, dry, and oil free.

# Unit Overview

Below helps identify the main components and controls the operator needs to know for proper operation for the unit.

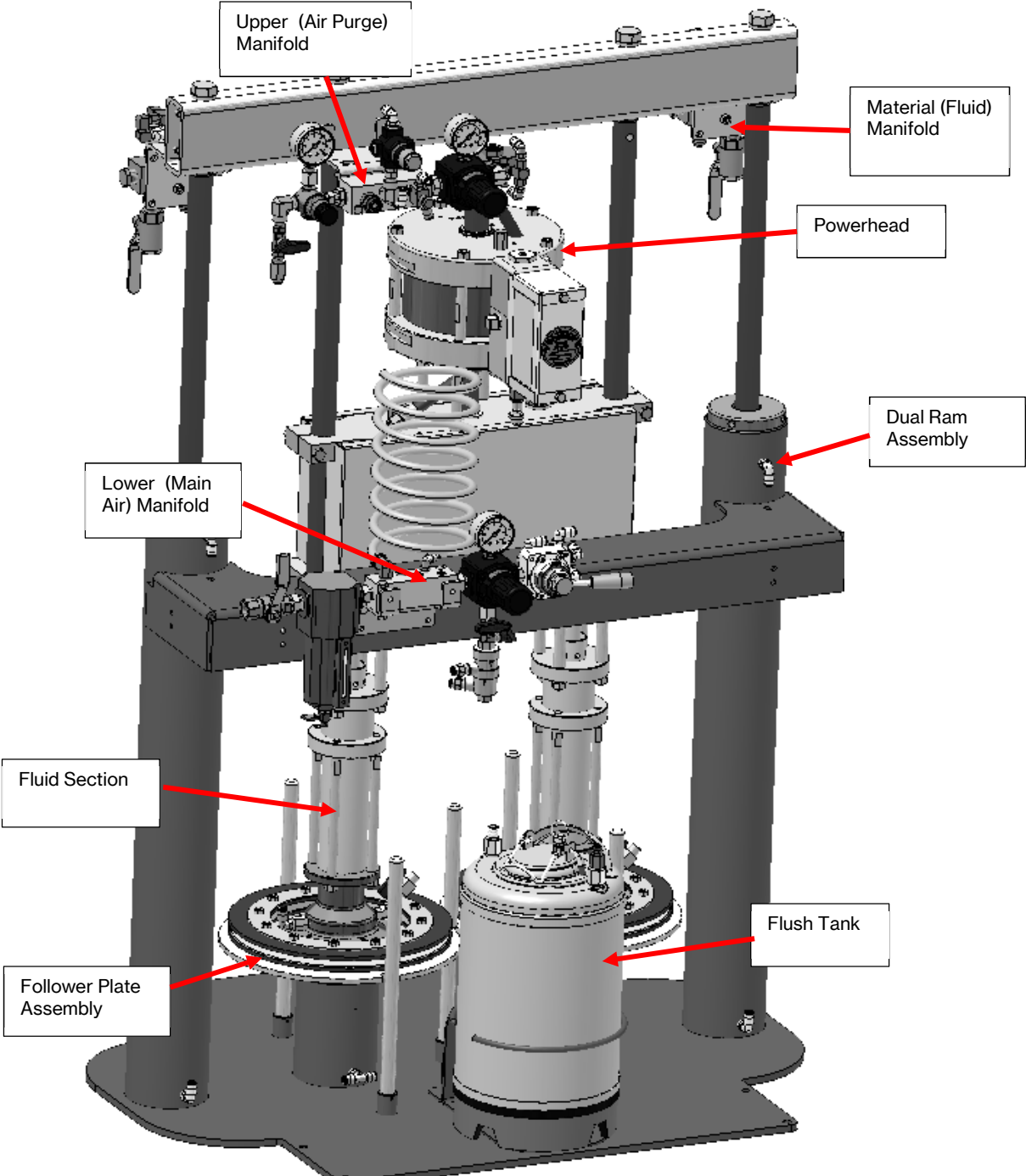


Figure 1. Patriot 1:1 5-Gallon Adhesive Unit



# Unit Overview

Below helps identify the main components and controls the operator needs to know for proper operation for the 10:1 ratio, 5-gallon system.

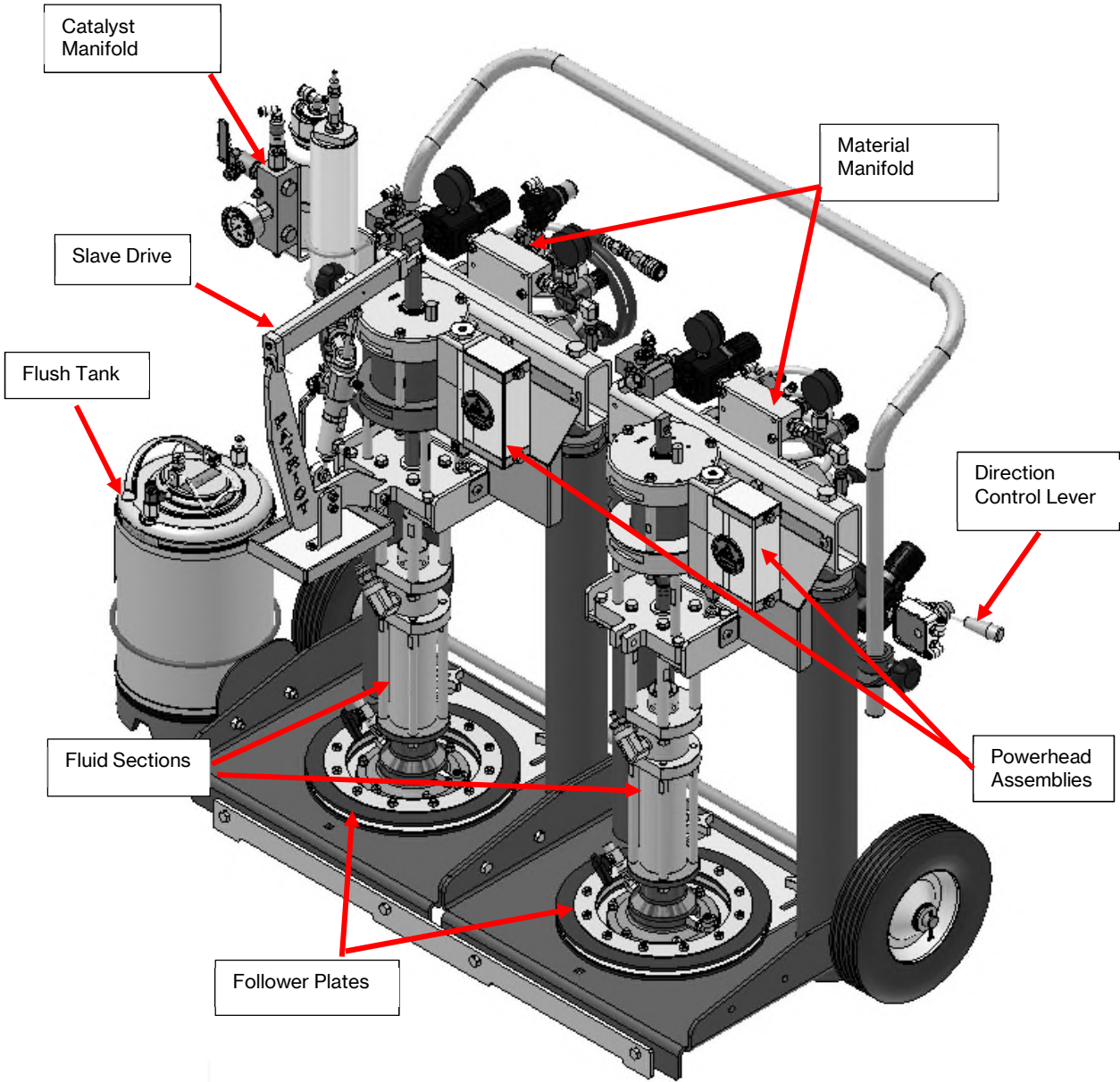


Figure 2. Patriot 10:1 5-Gallon Adhesive Unit

## Unit Overview

Below helps identify the main components and controls the operator needs to know for proper operation for the 10:1 ratio, 55-gallon (low flow) system.

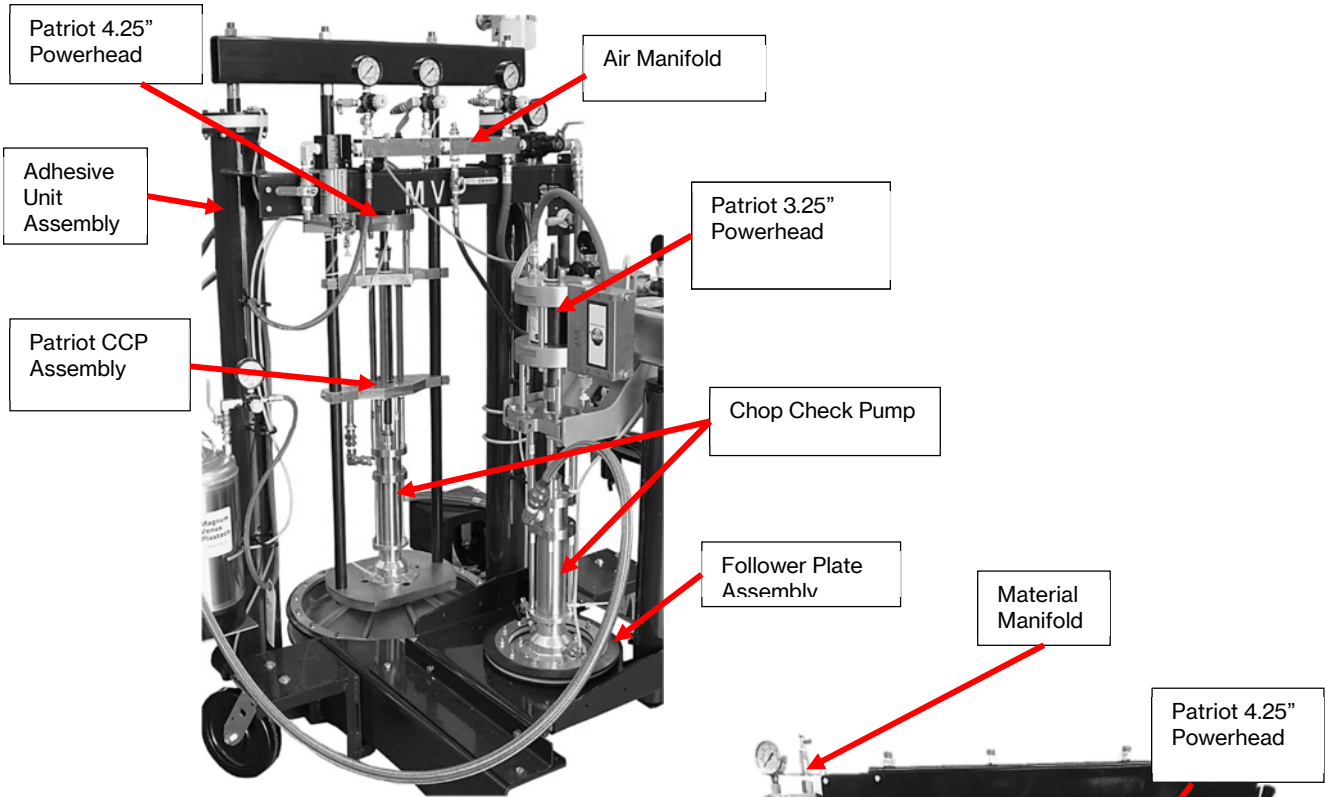


Figure 4. Patriot 10:1 Low-Flow Adhesive, Front View

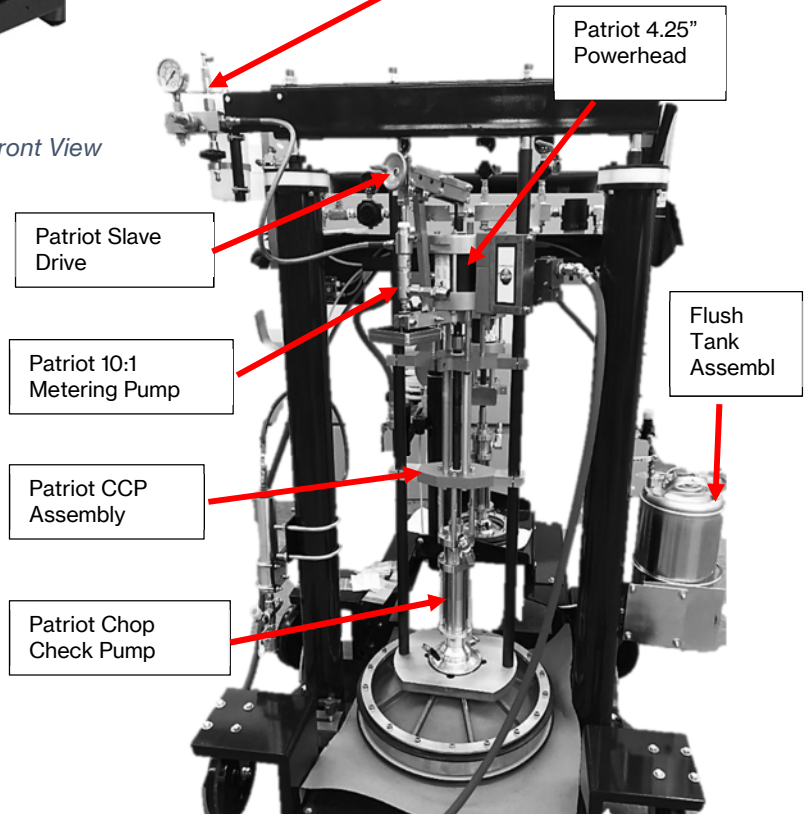
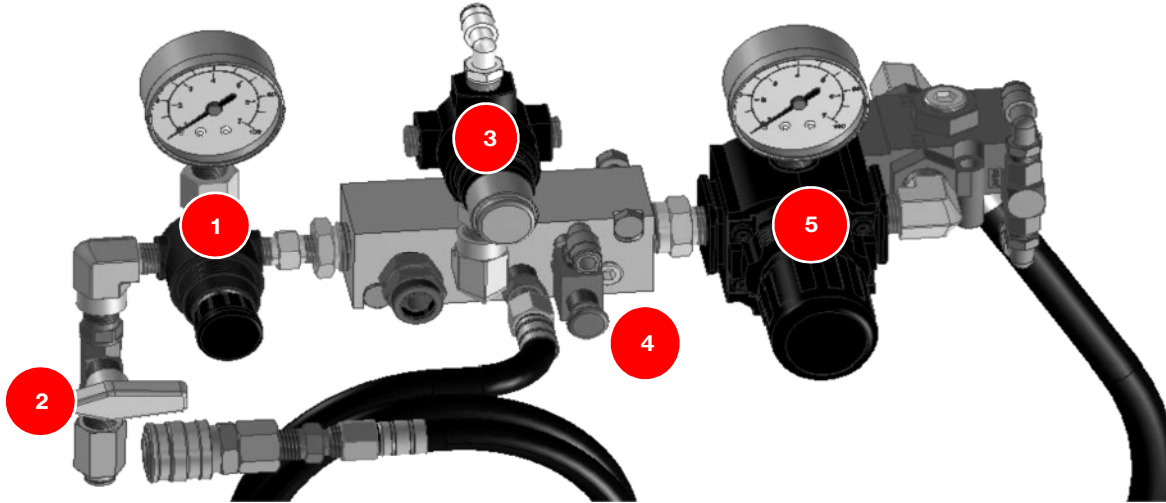


Figure 4. Patriot 10:1 Low-Flow Adhesive, Rear View

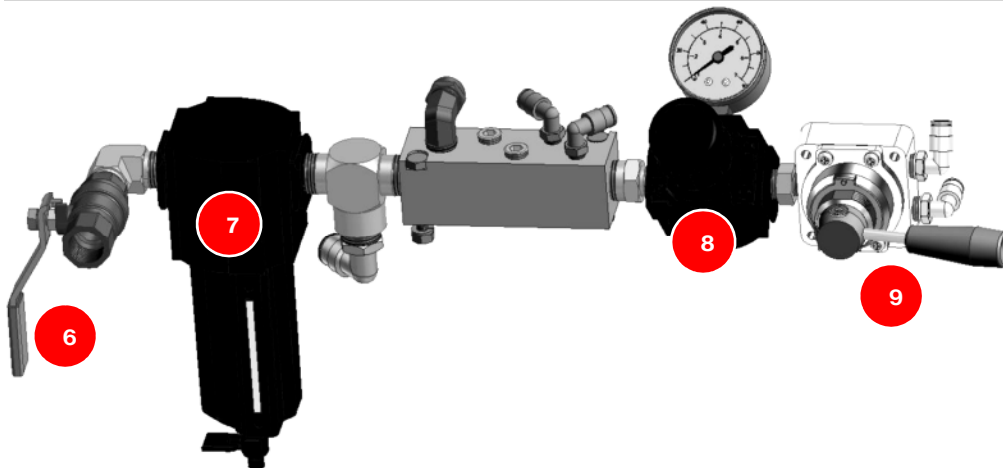
## Overview of Controls

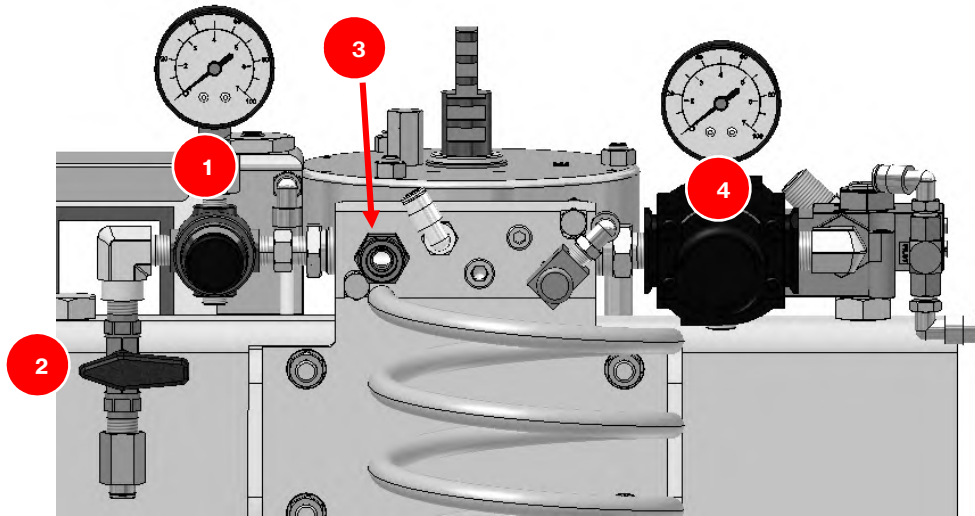
Following is a brief description of the main controls and their function. All controls shown. Some configurations will not include some manifolds pictured.



### Air Manifold Controls

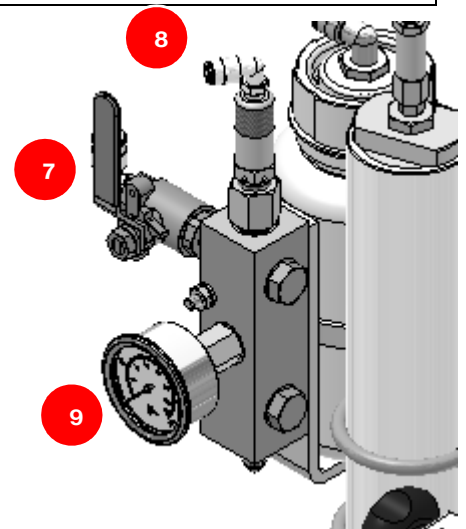
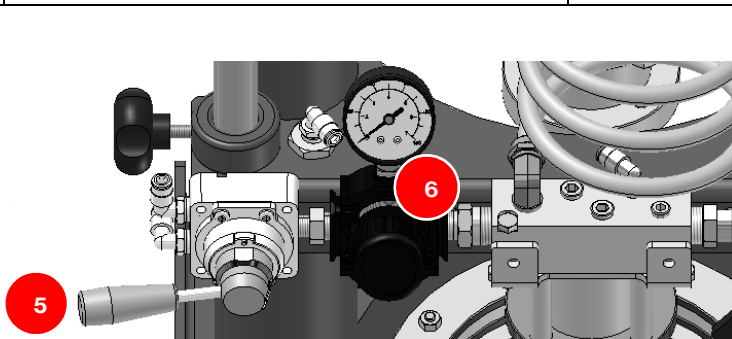
No.	Description	Function
1	Adhesive Ram Extraction Gauge & Regulator	Sets and monitors the air pressure to push the piston out of the pail of material
2	Adhesive Ram Extraction On/Off Valve	Turns the air pressure for ram extraction on or off
3	Air Purge Regulator	Controls the pressure for air purge
4	Priming Button	Activates the pump without pulling the gun trigger
5	Adhesive Pump Gauge & Regulator	Sets and monitors the pressure to the adhesive pump powerhead (fluid pressure)
6	Main Air Supply Ball Valve	Turns the air supply to the unit on or off
7	Air Filter and Water Trap	Filters air supply to the unit
8	Adhesive Ram Gauge & Regulator	Sets and monitors the pressure for the ram pistons
9	Adhesive Ram Directional Control	Applies the pressure to push the piston into the adhesive material (down) or remove it (up)





**Air Manifold Controls**

No.	Description	Function
1	Activator Ram Extraction Gauge & Regulator	Sets and monitors the air pressure to push the piston out of the pail of activator
2	Activator Ram Extraction On/Off Valve	Turns the air pressure for ram extraction on or off
3	Priming Button	Activates the pump without pulling the gun trigger
4	Activator Pump Gauge & Regulator	Sets and monitors the pressure to the activator pump powerhead (fluid pressure)
5	Activator Ram Direction Control	Applies the pressure to push the piston into the activator material (down) or remove it (up)
6	Activator Ram Pressure Gauge & Regulator	Sets and monitors the air pressure for the ram pistons for the activator pump
7	Activator Pressure Relief Valve	Releases the activator pressure to allow maintenance
8	Activator Overpressure Valve	Operates in an overpressure situation
9	Activator Pressure Gauge	Monitor pressure to activator material manifold



# Getting Started



## CAUTION

***Always wear proper safety equipment (glasses, gloves, respirator, etc.) when working with dispensing equipment and before startup of the unit. Refer to and follow the requirements of the Material Safety Data Sheets (MSDS) supplied by your material manufacturer(s).***

## Assemble the Unit

1. Unpack the unit and inspect for damage.
2. Install the flush tank in the flush tank bracket.
3. Unpack the gun and hose set and inspect for damage.

## Connect Hoses

4. Attach the yellow flush tube from the gun to the outlet marked SOLVENT on the flush tank.
5. Attach ¼ poly tube from the air manifold to the flush tank regulator.
6. Connect the air purge supply to the air purge regulator on the air manifold.
7. Attach the activator feed hose from the activator slave pump to the activator ram pump, if applicable.

**Note**      ***Use caution installing the activator hose. Stainless-steel hoses kink easily when not under pressure.***

8. Connect the resin hoses from the gun to the outlet port on the material manifolds.

**Note**      ***The resin hoses are color coded to match the fluid section and material manifold.***

9. Connect the green signal line from the gun to the pressure valve on the material manifold.
10. Connect the gun air supply from the back of the gun handle to the air manifold.
11. Install the proper fitting into the main air supply ball valve and connect the air supply.

**Note**      ***The ball valve comes with a ½ inch NPT female port. Use caution when using quick disconnects; they may restrict air flow.***

## Inspect the Unit

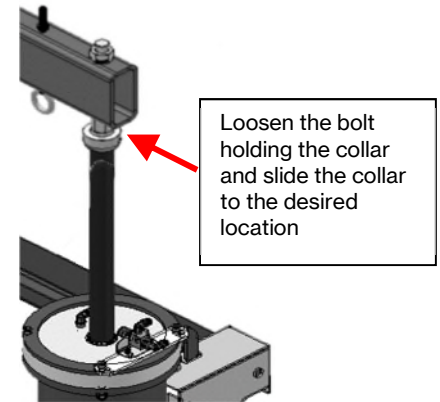
12. Check all hoses for wear or damage and replace as needed.
13. Check to make sure you have appropriate quantities of material to complete the job; refill or replace as needed.
14. Repair or replace any damaged items.

15. Make sure all fluid connections are tight.
16. Adjust the pump packing nuts (solvent cups) until they are just ¼ turn over hand-tight.

**Note**     ***If the packing nuts are too tight, the pump will bind and shudder at low pressures. They will need to be retightened periodically when material appears in the bottom of the cup.***

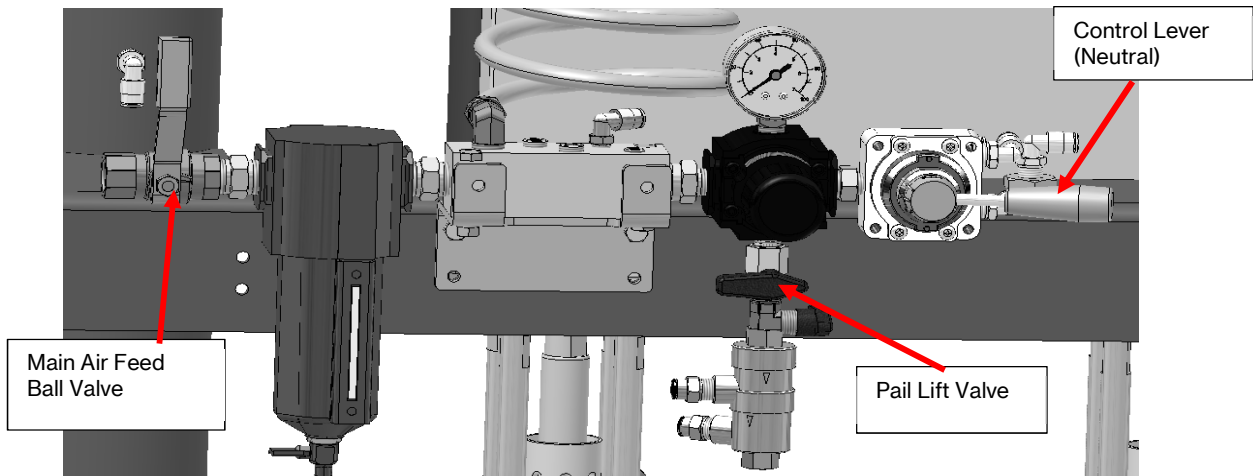
## Adjust the Low-Level Limit

17. On the ram adhesive unit, check the ram lower limit.
18. To set the limit, loosen the bolt holding the shaft collar in place.
19. Slide the shaft collar to the desired position on the post and retighten the bolt.



## Priming the Unit

1. Close the main air inlet valve on the main air manifold.
2. Connect ½ inch air supply to the air manifold.
3. Turn all regulators counterclockwise to full off and close all ball valves.
4. Make sure the ram/air lift control levers are in the center (neutral) position.

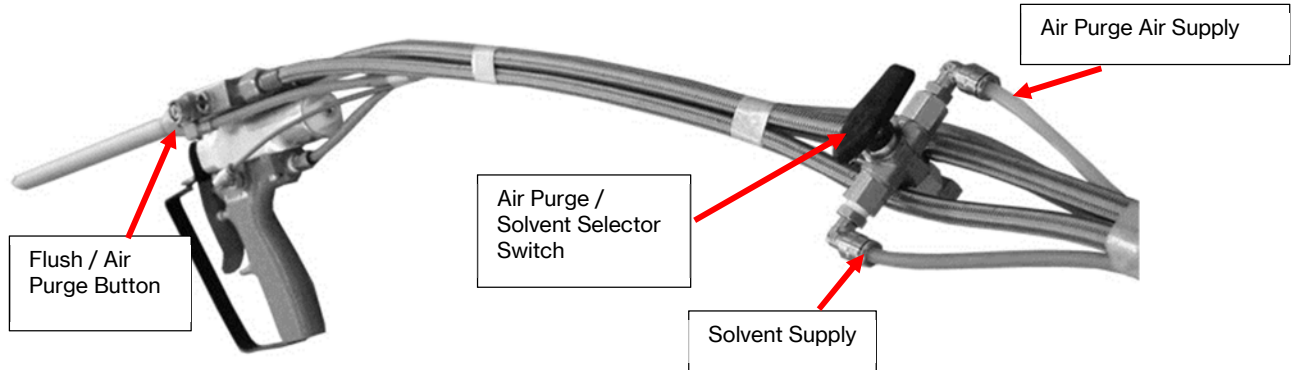


5. Close the pail lift control valve located below the airlift regulator.
6. Open the main air feed ball valve and listen for air leaks.

**Note**     ***The main ball valve has a safety relief port that will leak air unless the valve is fully open or closed.***

7. Secure all fittings and correct any leaks found.
8. Fill the flush tank at least ¾ full with appropriate solvent.
9. Close the relief valve on top of the flush tank.
10. Open the ball valve and slowly turn up regulator pressure to the solvent pump until the pump begins stroking.

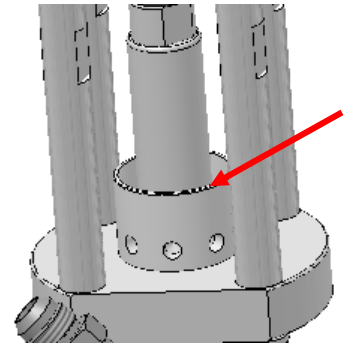
11. Slowly turn up the regulator on the flush tank to between 50 and 60 psi (3.5 to 4 bar).
12. Secure any solvent leaks, if found.
13. Turn the Air Purge/Solvent Selector switch on the gun hose set to the solvent side.
14. Test the flush system by pressing the flush buttons on the gun block.



15. Turn the Air Purge/Solvent Selector switch to the air purge side.
16. Test air purge the flush system by pressing the flush buttons on the gun block.
17. Use the packing tool to tighten both packing nuts on the side of the gun block.
18. Trigger the gun 4 to 5 times and tighten the packing nuts again, then repeat this step 2 to 3 times.

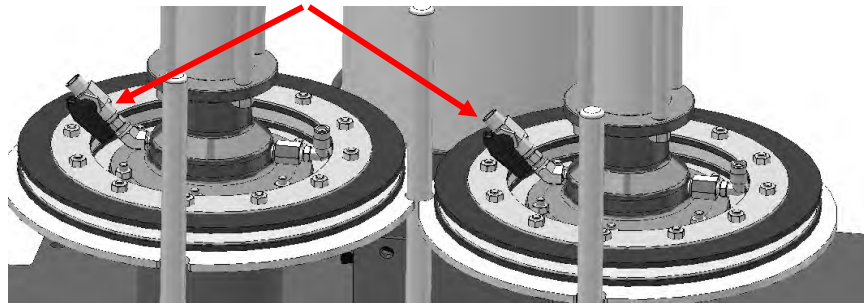
## Prime Adhesive and Activator

19. Using some Polyethylene plastic, cut out two circles approximately 26 – 28 inches in diameter with a circular hole in the center approximately 6 inches in diameter.
20. Secure the plastic boots to the ram pistons to keep the piston seals clean and protect them from the materials.
21. Fill the adhesive and catalyst pump solvent cups with ISO oil.
22. Open the ball valve on the regulator for the airlift cylinder.



**Note**      ***Do not install static mixer to gun at this time.***

23. Move the ram control lever to the up position.
24. Slowly increase the air pressure on the air lift regulator to between 15 and 20 psi (1 to 1.4 bar).
25. While the barrel piston is going up, check that hoses are moving freely and not kinking.
26. Allow the ram to rise to the fully raised position to allow clearance for the material containers.
27. Slide appropriate drums or pails of material onto the unit and center to the barrel pistons.
28. Open the bleed ball valve located at the top of each barrel piston to allow air trapped between the piston and the material to escape.



29. Move the control lever on the main air manifold to the down position to lower the barrel piston into the drum/pail.
30. Slowly open the lift valve to raise the material containers as needed to compensate for any difference in material levels.

**Note**      ***Allow time for air to be pushed out of the bleed off valve at the top of the barrel piston.***

31. Once the barrel piston has come to a complete stop and a small amount of material starts to come out of the bleed off valve, close the bleed ball valves.
32. Remove the mixer assembly from the front of the gun if it is still attached.
33. Position the gun over an appropriate waste container to allow priming of the lines.
34. Pull the gun trigger and lock into the on position.
35. Slowly turn up the pump pressure.
36. As the pump begins to stroke, check for leaks on all hose connections and secure as needed.
37. Allow pump to continue operating until there is a steady, air-free flow of adhesive and activator.
38. Close the gun trigger.
39. Position the outlet of the gun over a flush container.
40. Turn the Air Purge/Solvent Selector switch to the air purge position, then press the flush buttons.



**CAUTION**

***A sudden purge of material from the dispensing head is likely and could splash. Follow all material safety guidelines outlined in your manufacturer's MSDS for all compounds in use.***

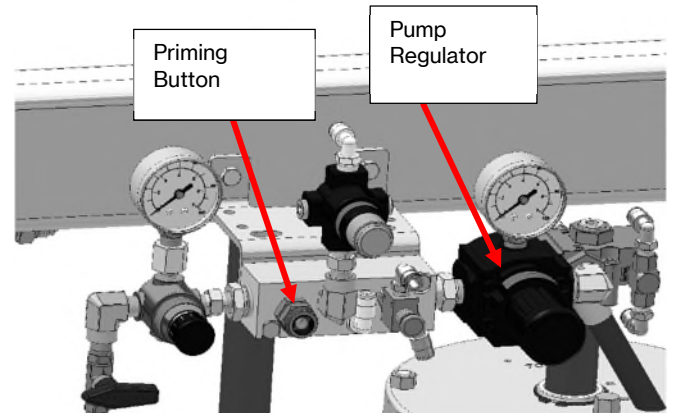
41. Allow air to flow for 3 – 4 seconds.
42. Turn the Air Purge/Solvent Selector to the solvent position.
43. Press the flush buttons for 3 – 4 seconds to solvent purge (again watch for splashing).
44. Repeat steps [40](#) - [43](#) several times to properly flush the system.



## Mixing and Dispensing

1. Apply lubricant to the static mixer threads and attach to the gun.
2. Trim the end of the disposable mixer to the desired diameter.
3. To build fluid pressure on the pump, push the priming button on the upper air manifold while slowly adjusting the pump to the desired pressure.

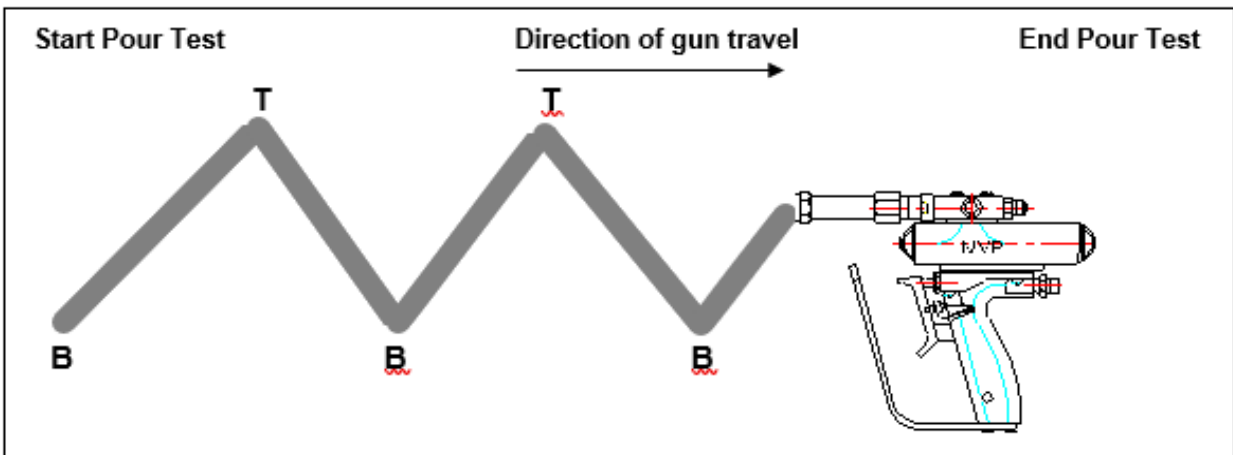
**Note** *The activator pump should be set to a pressure that will properly feed the activator metering pump. Too much pressure can cause inaccurate metering.*



4. When pump comes to a stop, release the priming button.
5. Pull the trigger on the gun and allow mixed material to flow out of the mixer into an appropriate container for 4 – 5 seconds.

## Testing and Adjusting

1. Lay out a test strip of cardboard, fabric, or plastic.
2. Begin dispensing a bead of material along the test strip and check for mix by reviewing uniformity of color.
3. When you hear the pump reverse direction, mark the spot on the test strip to indicate whether the pump was at the top or bottom of the stroke.
4. Reverse direction and continue pouring the bead in a zig-zag pattern so you can observe how the material is curing at both the top and bottom of the stroke.



## Evaluate and Troubleshoot

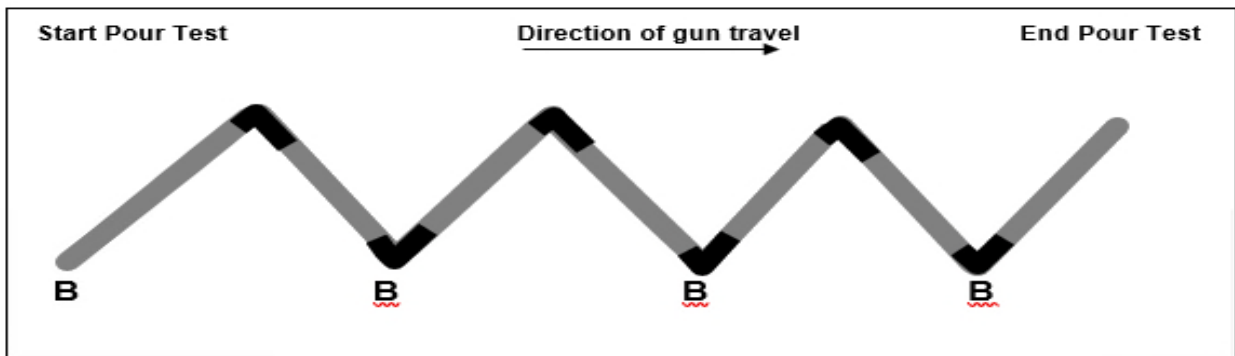
**Note** *Depending on the length of the mixer there may be a delay in the metering issue and where it appears in the pattern.*

- If the bead of material is uniform in color and curing correctly, proceed with dispensing material as needed for your job and skip to shut down instructions.
- If the pour test material does not appear to be curing uniformly, follow the guidelines in the following table to correct the issue:

Pour Test Adjustments			
If you see:	Indicates	Possible Cause	Solution
Material delivered on the activator pump down stroke is not curing or is slow cure. See below.	No or low activator is being delivered on the down stroke.	Worn or damaged intake valve.	Replace worn and damaged parts.
		Worn or damaged lower seat.	Replace worn and damaged parts.
		Dirty or stuck intake valve.	Clean or replace parts as needed.
<b>Example:</b>			
Material delivered on the activator pump up stroke is not curing or is slow cure. See below.	No or low activator is being delivered on the up stroke.	Worn or damaged piston seal.	Replace worn or damaged parts.
		Worn or damaged piston body ball.	Replace worn or damaged parts.
		Damaged piston body ball seat.	Replace worn or damaged parts.
<b>Example:</b>			

Material delivered at the top and bottom of the stroke is not curing or curing slower than the material delivered in the middle of the up and down stroke. See below.	Low or no activator at the top and bottom of the pump stroke.	There is no or improper accumulation effect in the activator system. Normally this is only a problem at high pressures.	Check to be sure you are using the proper activator hose and it is the proper length.
			Check for a restriction in the activator system.
Material delivered at the top and bottom of the stroke is hot (curing very rapidly). Thin areas of material may be noticeable compared to volume in the middle of the stroke. See below.	Low resin at the top and bottom of the pump stroke.	There is no or improper accumulator effect in the adhesive system.	Check to be sure you are using the proper adhesive hose and it is the proper length.
			Check for a restriction in the adhesive system.
Material delivered at the beginning of the down stroke is not curing normally. Also thin areas of material may be noticeable compared to the volume in the middle of the stroke. See below.	Low material delivery at the beginning of the pump stroke. Which pump depends on if it is curing slower or faster. Slow cure indicates less activator; fast cure means less adhesive.	The pump fluid section is not being filled correctly.	Increase ram/air lift pressure slightly until the issue goes away.
			Check that priming piston, priming seal, and relief washer are functioning correctly.

**Example:**



## Changing Empty Containers

**Note** *Some units includes a 3-way limit switch to detect when a drum/pail is empty. If either supply runs out and the switch engages, both pumps shut down.*

1. Close the gun and turn the air control lever to the center (neutral) position.
2. Open the ball valve connected to the ram extraction gauge and regulator.
3. Slowly turn up the ram extraction regulator to 25 psi (1.7 bar).

4. Turn the air lift control lever to the up position.
5. Adjust the air lift pressure regulator to 20 psi (1.4 bar).
6. Open and close the air lift lever intermittently to raise the follower and pump out of the container, holding down the container if it begins to lift.

**Note**      ***It may be necessary to adjust both the air lift and ram extraction pressures to facilitate removal without lifting the drum/pail.***

7. After pump and follower are removed, inspect, seal, and dispose of the plastic boot.
8. Clean any build-up of material from the follower gasket and follower plate.
9. Replace empty drum/pails with full containers and return to the instructions for Priming the Unit.

## **Performing Daily Tasks**

### Daily Start Up

1. Check all components and materials and refill or replace as needed.
2. Close the relief valve on the flush tank lid.
3. Open the main air supply lockout ball valve to pressurize the system.
4. Bleed off any water and check the system for leaks or damage; repair or replace items as needed.
5. Check that air lift and pump are set to the appropriate pressure.
6. Apply a small amount of red grease to the threads of the mix chamber.
7. Reassemble and attach the mixer assembly.
8. Check flush system for proper operation.
9. The system is ready for use.

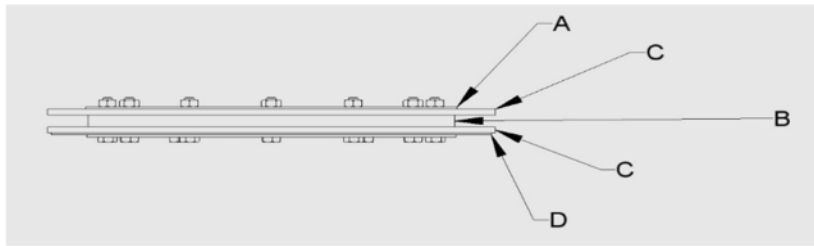
### Daily Shut Down

10. Drain water trap filter.
11. Thoroughly flush and clean the mixer and mix chamber.
12. Remove the mixer from the mix chamber.
13. Close the main air lockout ball valve to relieve pressure from the system.
14. Lift the relief valve on the flush tank lid to release flush tank pressure.

# Optional Components

## Piston Seal Options

Upper Plate (A)	Spacer Plate (B)	Seal (C)	Wiper (D)
PAT-RA-5020 (9.5" OD)	PAT-RA-5019 (9.5" OD)	PAT-RA-5015 EPDM (3/16 x 11-7/16 OD)	PAT-RA-5018 UHMW (.06 x 11-1/4 OD)
PAT-RA-5020 (9.5" OD)	PAT-RA-5019 (9.5" OD)	PAT-RA-5015-L Leather (3/16 x 11-7/16 OD)	PAT-RA-5018 UHMW (.06 x 11-1/4 OD)
PAT-RA-5020 (9.5" OD)	PAT-RA-5019 (9.5" OD)	PAT-RA-5030 EPDM (3/16 x 11.61 OD)	PAT-RA-5032 EPDM (3/16 x 11.42 OD)
PAT-RA-5035 (10.34" OD)	PAT-RA-5036 (10.34" OD)	PAT-RA-5040 EPDM (3/16 x 12.28 OD)	PAT-RA-5042 UHMW (.04 x 12.17 OD)



## Hoses

Unit Hoses	
Part Number	Description
HCSS-044J4J-5	Activator Whip Hose
HCSS-0606J-20	Activator Supply Hose
PF-HN-04J-06J-SS	SS Nipple
HCSS-088J8J-5	Adhesive Whip Hose
HCSS-1212J12J-20	Adhesive Supply Hose
PF-HN-12J-08J-SS	SS Nipple

## Robotic Applications

If this unit is to be used in a robotic application, the following items are recommended to all the robot/PLC to control the unit properly:

- Use the Automatic Pro Gun (CPD-6000-A).
- Add the Robotic Flush Isolation Valve (RFIV-1000) to help prevent solvent from getting into the air system.
- Use the Digital Proportional Regulator (E-PRG-101: 0 to 10 volt) to allow the robot to control the air pressure to the pump to help regulate the pump output if needed.

## Optional Mixers

The following disposable mixers are available for the unit to be used depending on your application:

Disposable Mixers		
Mixer	Use with Mixer Housing	Use with Retaining Nut
MPD-1099 Disposable Mixer	CPD-6017 Mixer Housing	MPD-1098
CPD-6018 Disposable Mixer	CPD-6017 Mixer Housing	165-37N
07550 Disposable Mixer	04409 Mixer Housing	165-37N
6323 Disposable Mixer	04409 Mixer Housing	165-37N
07551 Disposable Mixer	07555 Mixer Housing	165-36N

