2:1 5-Gallon Adhesive System

Operations Manual

This manual is applicable to the following models:

- IMA-VLS-524-C1

MAGNUM VENUS PRODUCTS

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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.

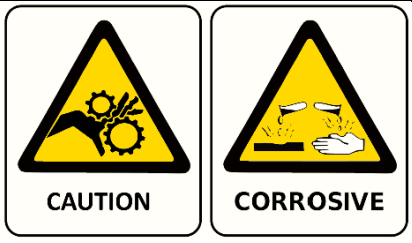
The following general warnings and guidelines are for the setup, use, grounding, maintenance, and repair of equipment. Additional product-specific warnings may be found throughout this manual as applicable. Please contact your nearest MVP Technical Service Representative if additional information is 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 dispense head fluid tip. Serious injury or death can result.
- Never aim the spray dispense head 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 dispense head 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

Resins		
Composite Component	**Organ System Target (Possible Target)**	**Known (Possible) Health Effect**
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)
Reinforcing materials		
Composite Component	**Organ System Target (Possible Target)**	**Known (Possible) Health Effect**
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
Hardeners and curing agents		
Composite Component	**Organ System Target (Possible Target)**	**Known (Possible) Health Effect**
Diaminodiphenylsulfone	N/A	No known effects with workplace exposure
Methylenedianiline	Liver, skin	Hepatotoxicity, suspect human carcinogen
Other aromatic amines		
Composite Component	**Organ System Target (Possible Target)**	**Known (Possible) Health Effect**
Meta-phenylenediamine (MPDA)	Liver, skin (kidney, bladder)	Hepatitis, contact dermatitis (kidney and bladder cancer)
Aliphatic andcyclo-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 dispense heads, tanks, etc.). An explosion could cause serious injury, death, and/or substantial property damage. Cleaning agents, coatings, paints, etc. may contain Halogenated Hyrdrocarbon 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 Hyrdocarbon (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 dispense head, 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 bedispense head 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 dispense head, 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, over-sprayed 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 dispense head several times daily for catalyst and resin packing or valve leaks. REPAIR ALL LEAKS IMMEDIATELY.
2.	Never leave the dispense head 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 orsuspected.
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 dispense head 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 DISPENSE HEAD SPRAY TIP OR POINT THE DISPENSE HEAD AT OR NEAR ANOTHER PERSON OR AN ANIMAL.

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.

<u>WARNING</u>

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 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 should be 1 meg ohm (10^6 ohms) or less.

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 2:1 5-Gallon Adhesive System. 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 2:1 Adhesive System consists of multiple components. Each component has its own detailed manual and drawings. For complete repair and maintenance instructions, refer to the appropriate manuals.

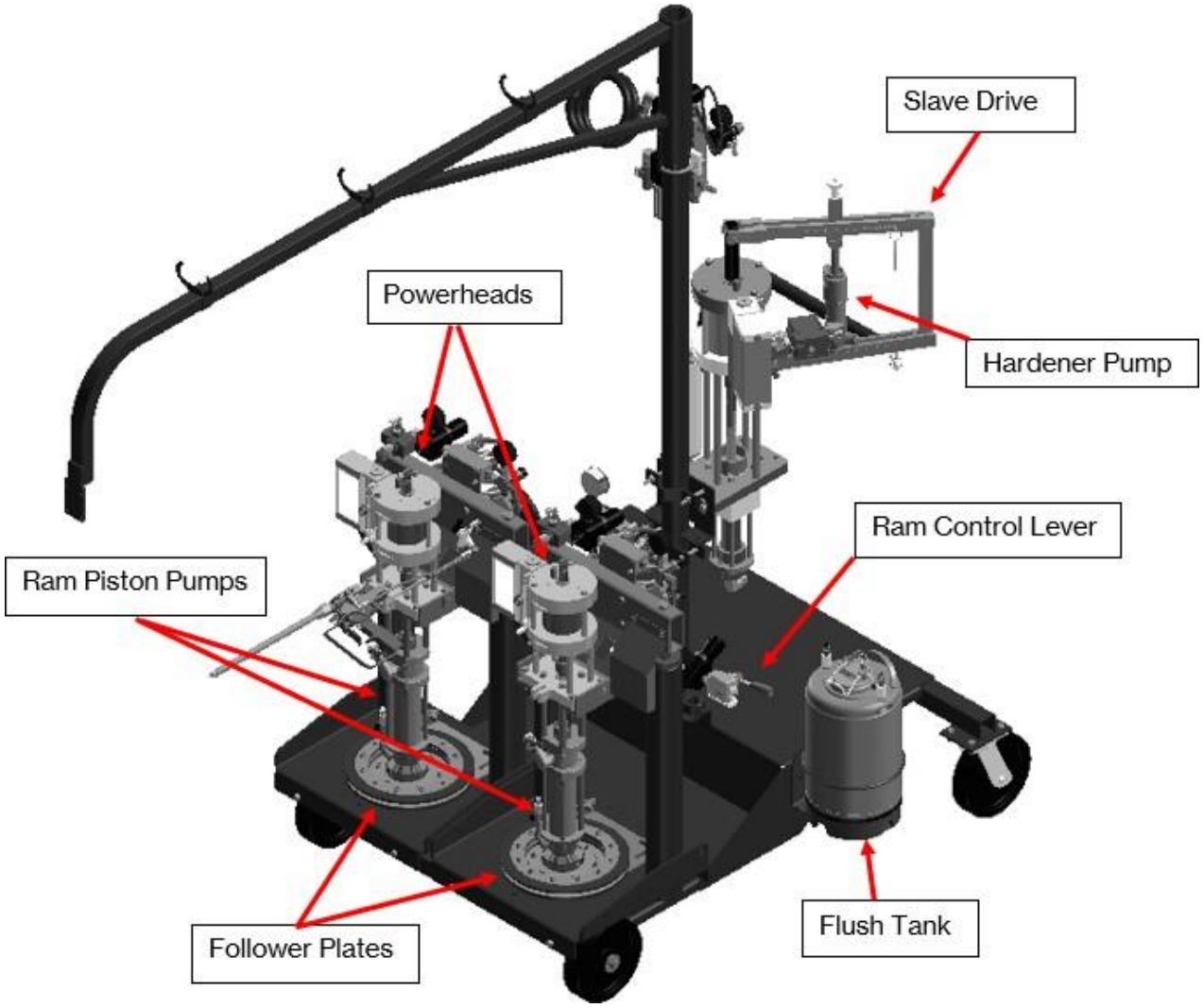
❑ PATRIOT TRANSFER PUMP ASSEMBLY	(PAT-CCP-TRAN)
o CHOP CHECK FLUID SECTIONS	(PAT-LS-CP-0590-SS)
o POWERHEAD	(PAT-PH-3250)
❑ METERING PUMP ASSEMBLY (HARDENER)	(VHPC-1200-ADH)
❑ METERING PUMP ASSEMBLY (ADHESIVE)	
o FLUID SECTION	VLS-2400-1UB
o POWERHEAD	VPH-5000-P
o SLAVE DRIVE	VLS-7100
❑ DISPENSE HEAD	CPD-6000-2

Air Requirements

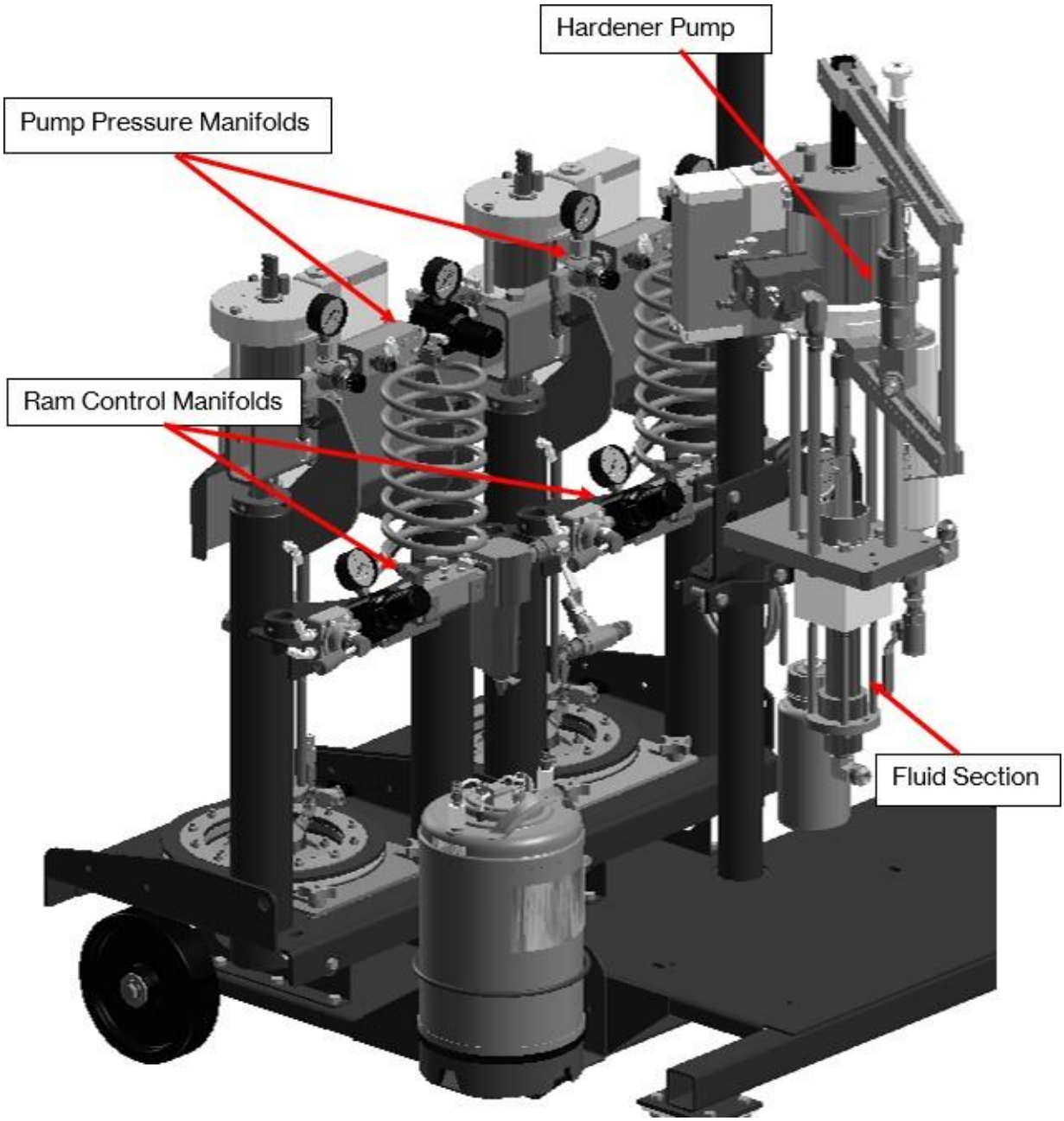
1. The system requires a supply of clean, dry, and oil-free air (30 cfm) and at least 100 psi (7 bar).
2. The unit requires a ½ inch (12 - 13 mm) inside diameter air hose minimum (use caution when using quick disconnects; they may restrict airflow).

Unit Overview

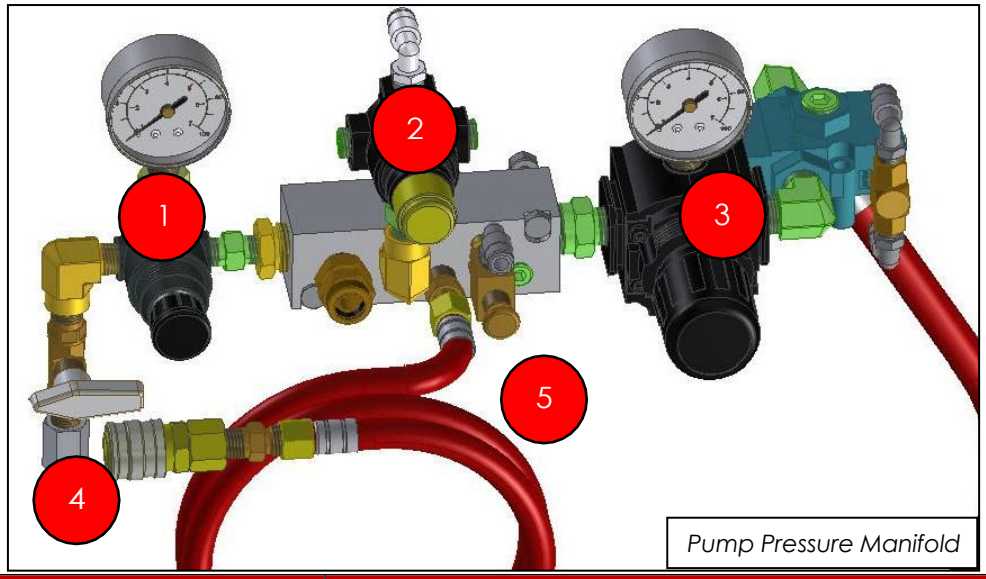
The following drawings identify the main components operators need to know for proper operation for the unit.



Unit Overview, continued

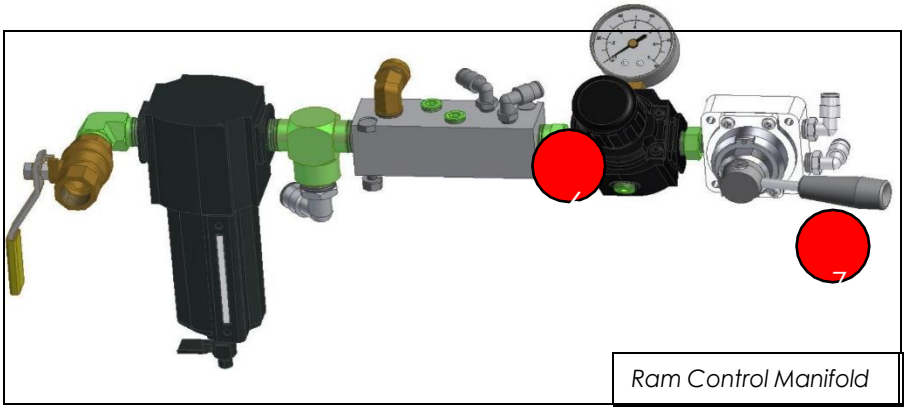


Overview of Controls



Pump Pressure Manifold

#	Control	Function
1	Ram Extraction Gauge and Regulator	Used to set and monitor the air pressure being used to push the ram piston out of the material. Air is injected between the piston and material to push the pail down and piston up and out of the pail
2	Air Purge Regulator	Regulates pressure used during air purge
3	Pump Regulator and Gauge	Used to regulate the pressure to the adhesive pump powerhead and thus fluid pressure
4	Ram Extraction On/Off Valve	Turns the air pressure on or off for ram extraction
5	Priming Button	Used to activate the pump without pulling the dispense head trigger
6	Ram Pressure Gauge and Regulator	Used to set and monitor the air pressure for the ram pistons – pressure pushing the piston down/up
7	Ram Directional Control Lever	Applies the pressure to remove or push the piston into or out of the material



Ram Control Manifold

Note ***There are controls for both Adhesive and Activator pumps.***

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).

1. Unpack the unit and inspect for damage.
2. Install the flush tank in the flush tank bracket.
3. Unpack the dispense head and hose set and inspect for damage.
4. On the ram adhesive unit, check and adjust the ram lower limit by adjusting the bracket to adjust the ram stop position.
    - To set the low-level limit, loosen the bolt holding the shaft collar in place.
    - Slide the shaft collar to the desired position on the post and tighten the bolt back down.

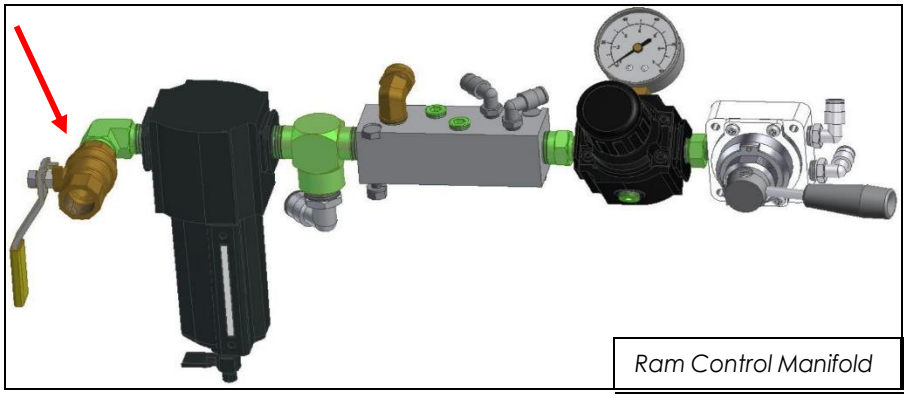
Connect Hoses

1. Attach the yellow flush tube (solvent to dispense head) to the SOLVENT outlet of the flush tank.
2. Attach ¼ inch poly tube from the air manifold to the flush tank regulator.
3. Connect the air purge supply to the air purge regulator on the air manifold.
4. Connect the resin hoses from the dispense head to the outlet port on the material manifolds.

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

5. Connect the green signal line from the dispense head to the pressure valve on the material manifold.
6. Connect the dispense head air supply from the back of the dispense head handle to the air manifold.
7. Install the proper fitting into the main air supply ball valve and connect air supply.

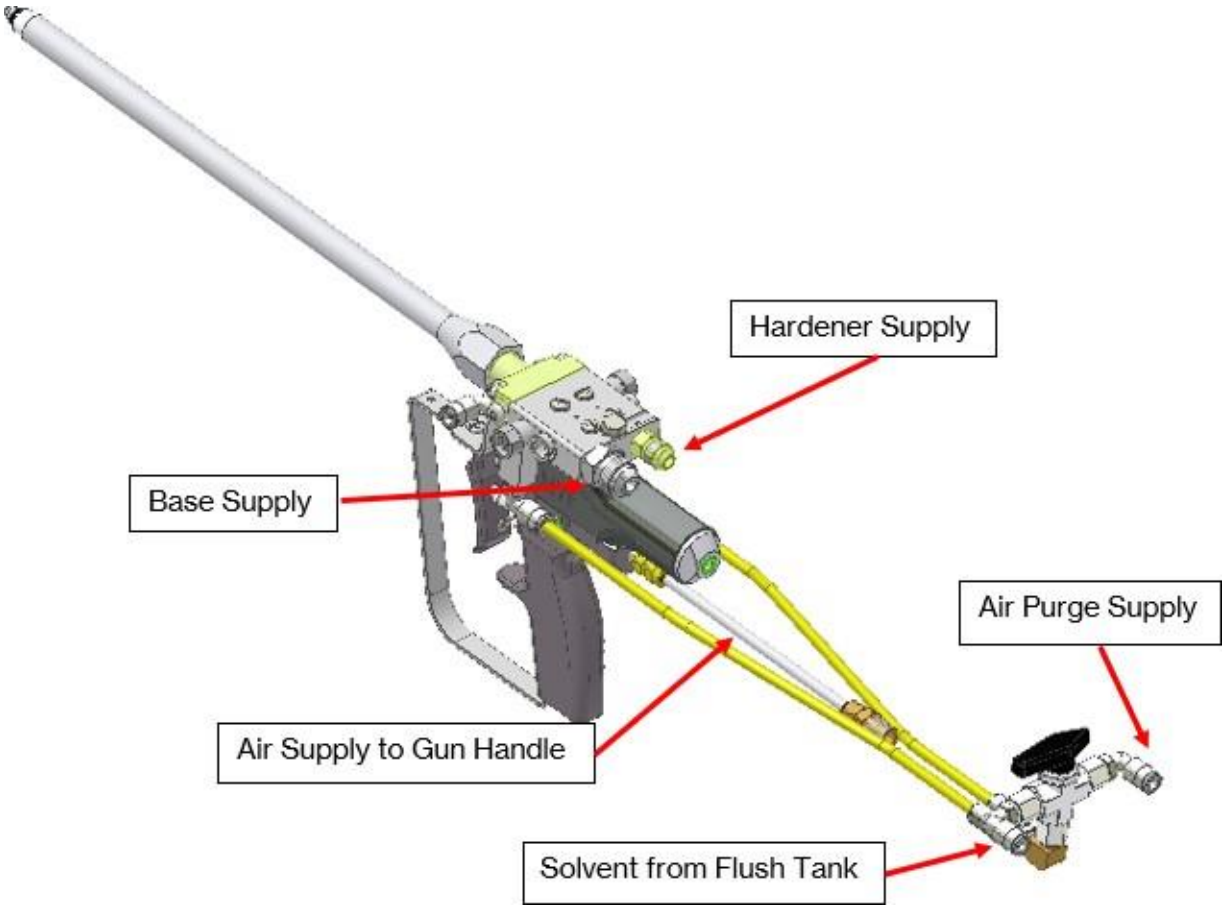
Note ***The ball valve comes with a ½ inch NPT female port. MVP does not recommend the use of quick disconnects because they may restrict airflow.***



Ram Control Manifold

Dispense Head Connections

8. Connect the dispense head hose set and 3-way valve.



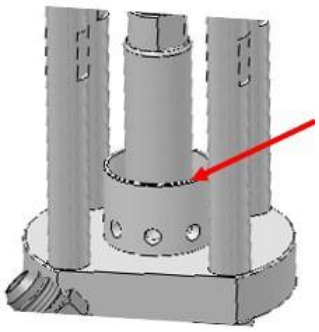
Priming the Unit

Prime Air and Solvent

1. Close the main air inlet valves on the manifolds.
2. Turn all regulators counterclockwise to full off and close all ball valves.
3. Turn air regulators on rams to full off.
4. Make sure each ram control lever is in the neutral (center) position.
5. Open the main air feed ball valve and listen for air leaks.

Note ***The ball valve has a safety relief post that will leak air until the valve is fully opened or closed.***

6. Secure all fittings and correct leaks if found.
7. Fill flush tank at least ¾ full with appropriate cleaning agent.
8. Close the relief valve on top of the flush tank.
9. Slowly turn up regulator pressure to flush tank.
10. Secure solvent leaks, if any.
11. Bring solvent pump pressure up to between 35 and 40 psi (2.2 and 2.8 bar) on regulator gauge or 50 psi (3.5 bar) on flush tank.
12. Wait for solvent pump to stall or stop.
13. Turn the selector switch on the dispense head hose set to the flush side and press the button on the dispense head block to test the flush system.
14. Turn the selector switch to the other side for air purge and press the button on the dispense head block to test the air purge of the flush system.



Prime Adhesive and Activator

15. Fill pump packing nut solvent cups with ISO oil or equivalent.
16. Turn the ram direction control lever to the up position.
17. Slowly increase the ram pressure to 30 psi (2 bar).
18. As ram begins to lift, check for hoses kinking or catching.
19. Allow ram to rise to the fully raised position to allow clearance for the container of material.
20. Remove the container cover and plastic cover from activator.

Note ***If the material container has a plastic liner it is helpful to fold the liner over and tape it to the outside of the container so it will not slide into the container and bunch up.***

21. Use the plastic piston boot provided as a template to make more for future applications.
22. Place a plastic piston boot over the center of the container.

23. Slide the container into position under the ram.
24. Make sure the opening in the piston boot is lined up with the intake of the pump.
25. Open the vent on the top of the follower plate and place a small waste container underneath.
26. Slowly turn the ram direction control lever to the down position.
27. As the ram begins to move down, check for alignment of the piston and boot as it enters the container and reposition accordingly.
28. Allow piston to continue down until it stops; you should hear and feel air venting out of the valve as the piston lowers.
29. Once piston and pump are down, turn the ram pressure up to 60 psi (4 bar) to allow additional venting.
30. Once air venting has stopped or material begins to flow, close the vent valve.
31. Leave the direction control lever in the down position.
32. Repeat steps 22 - 31 for the adhesive side.
33. Remove the mixer assembly from the front of the dispense head, if already installed.
34. Position the dispense head over an appropriate wasted container and pull the trigger, then lock in the ON position until the lines are primed.
35. At the main metering pump, slowly increase the pump pressure.
36. As the pump begins to stroke, check for leaks on all hose connections and secure as needed.
37. Allow the pump to run until there is a steady flow of air-free material.
38. Close the dispense head trigger.
39. Position the outlet of the dispense head over a flush container.
40. Turn the air purge/solvent selector to the air purge position and press the flush buttons.

Note ***A sudden purge of material is likely and could splash. Use caution.***

41. Allow air to flow for 3-4 seconds.
42. Turn the selector switch to the solvent position and press the flush buttons.
43. Hold the flush buttons for 3-4 seconds to solvent purge.
44. Repeat air and solvent purge several times as needed.

Mixing and Dispensing

1. Apply lubricant to the threads of the static mixer and attach to the dispense head.
2. Trim the end of the disposable mixer to the desired diameter.
3. Push the priming button on the adhesive pump air manifold while slowly adjusting the pump to the desired pressure.
4. When the pump comes to a stop, release the priming button.
5. Push the priming button on the activator pump 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.***

6. Pull the trigger on the dispense head and allow mixed material to flow out of the mixer into a waste container for 4-5 seconds.
7. Begin dispensing a bead of material and check for mix by reviewing uniformity of color.

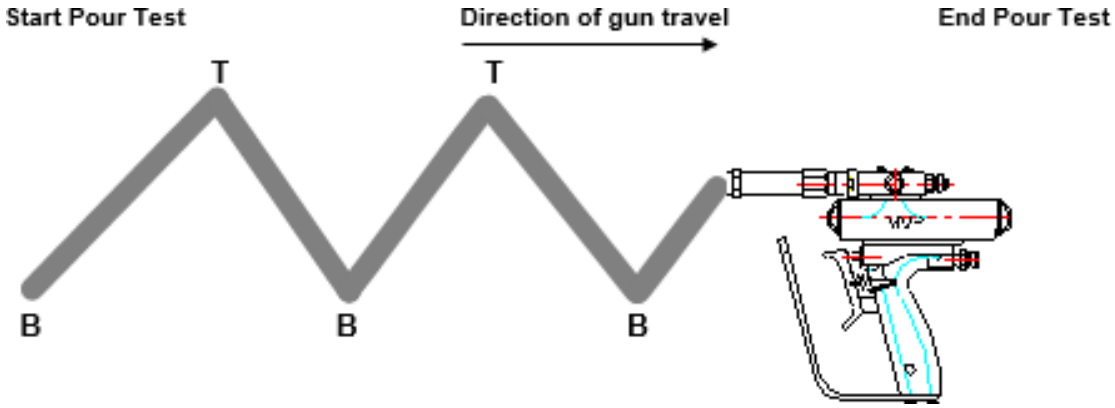
Pour Testing

The same process and results that are used for testing the spray can be used for testing a pour system by pouring a bead of material in an up and down zig-zag pattern and observing the results.

1. Lay out a sheet of test material on a flat surface.

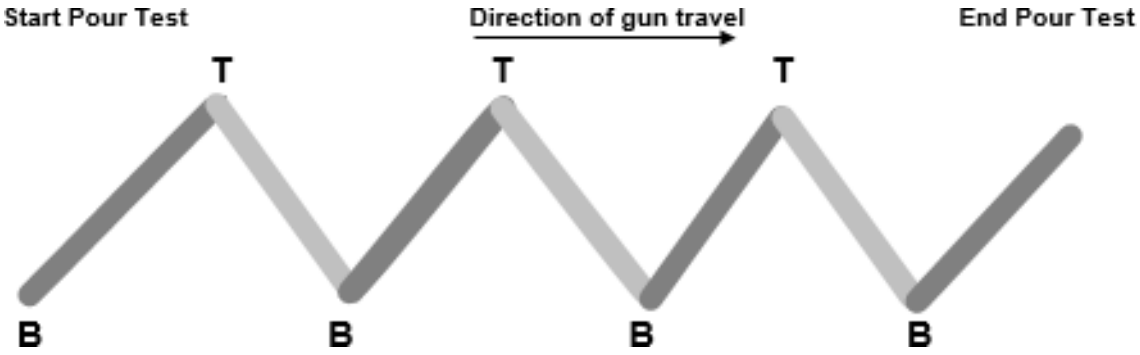
Note ***The temperature of the surface can affect the reaction time of many chemicals and cause changes in cure time. Take this into account during testing.***

2. Pull the trigger and begin pouring material along the test strip from left to right in a zig-zag pattern.



3. When you hear the pump reverse direction, reverse direction of the zig-zag and mark the spot on the test strip to indicate whether the pump was at the top of bottom of the stroke.
4. Continue pouring for four or five cycles, marking each time the pump gets to the top or bottom.
5. Use a tongue depressor to test several areas of the strip; top of stroke, bottom of stroke, and mid stroke in several places.
6. Repeat throughout the material hardening time to find out if some areas are hardening faster than others.
7. Make written notes to show what happened during the cure time, paying particular attention to areas that harden faster or slower than others.

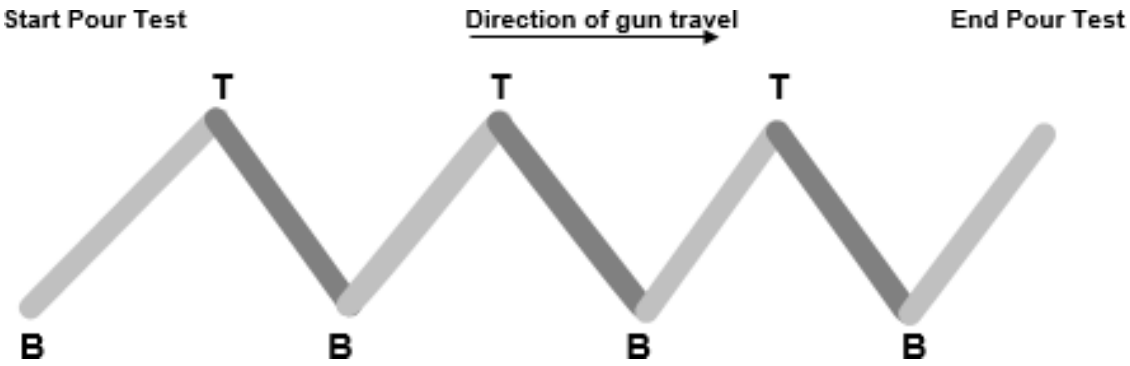
Interpreting Pour Test Results



Result 1

Material delivered on the catalyst pump down stroke (from the top to the bottom) is not curing or slow cure.

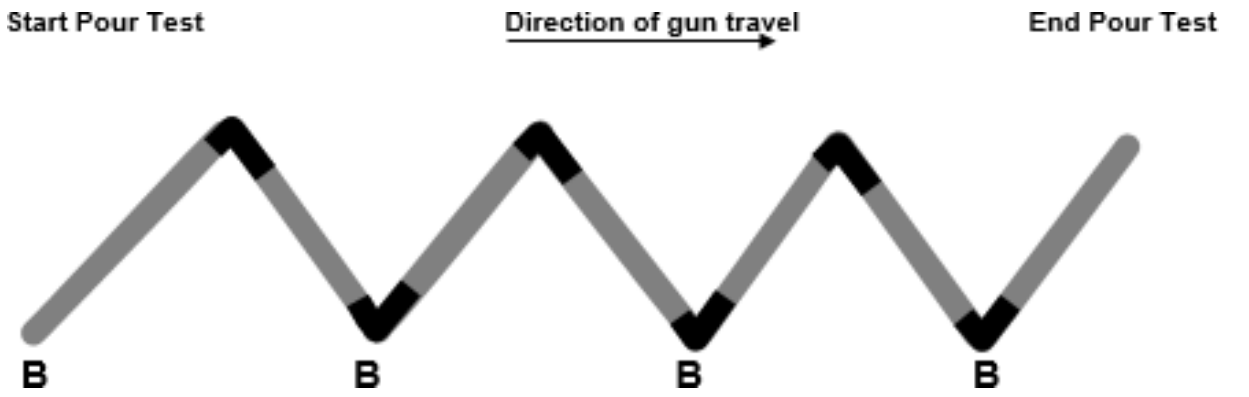
Indicates:	No catalyst is being delivered on the down stroke.
Cause(s):	Worn or damaged inlet body.
	Worn or damaged inlet body ball.
	Worn or damaged inlet body O-ring.
Solution(s):	Replace worn or damaged parts.



Result 2

Material delivered on the catalyst pump up stroke (from the bottom to the top) is not curing or slow cure.

Indicates:	No catalyst is being delivered on the up stroke.
Cause(s):	Worn or damaged catalyst piston seal.
	Damaged catalyst pump cylinder.
	Worn or damaged piston body ball.
	Damaged piston body ball seat.
Solution(s):	Replace worn or damaged parts.



Result 3

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 strokes.

Indicates:	Low or no catalyst at the top and bottom of the pump stroke.
Cause(s):	There is no or improper accumulation effect in the catalyst system. ***Note This is normally only a problem at high pressures.***
Solution(s):	Check to be sure you are using the proper catalyst hose, with or without core.
	Install a catalyst accumulator, if needed.
	Check for a restriction in the catalyst system.

Result 4

Material delivered at the top and bottom of the stroke is hot (curing very rapidly). Also, thin areas of material might be noticeable compared to the volume delivered in the middle of the stroke.

Indicates:	Low resin at the top and bottom of the pump stroke.
Cause(s):	There is no or improper accumulator effect in the resin system.
Solution(s):	Clear resin accumulator of hard material or blockage.
	Clean resin accumulator and filter and reinstall.
	Install the correct accumulator, if needed.
	Lower resin pump pressure.

Flushing and Shutting Down

When finished with dispensing, it is necessary to flush and clean the mixer and block.

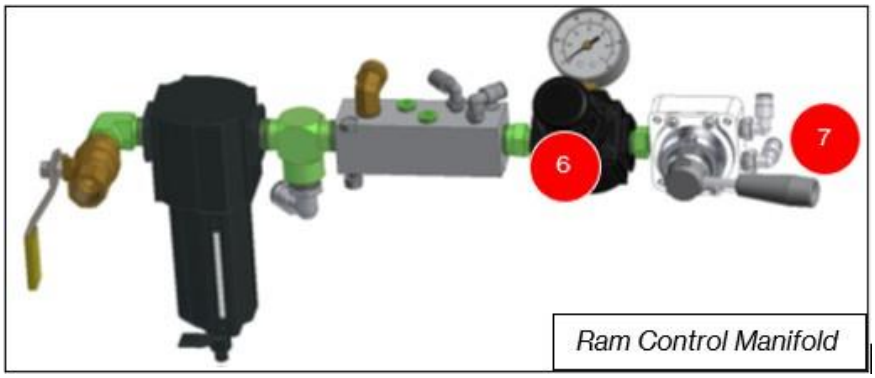
1. Trigger the dispense head momentarily to allow the pump shafts to run to the fully lowered position.
2. Release the dispense head trigger.
3. Position the outlet of the mixer over an appropriate waste container.
4. Turn the air purge/selector switch to the air purge position then press the flush buttons.

Note ***A sudden purge of material is likely and could splash. Use caution.***

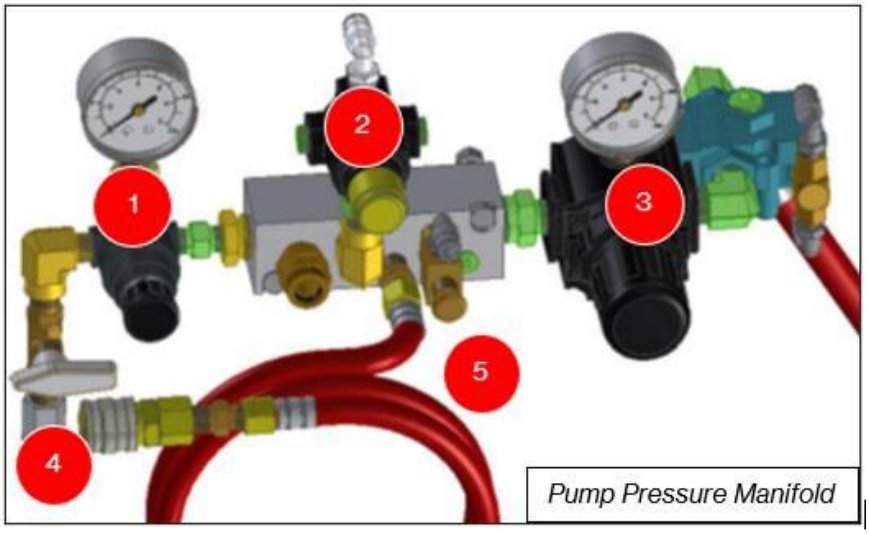
5. Allow the air to flow for 3-4 seconds.
6. Turn the selector switch to the solvent side and press the flush buttons.
7. Hold the flush buttons and solvent purge for 3-4 seconds.
8. Repeat both air and solvent purge several times as needed.
9. Remove the mix housing from the dispense head and thoroughly clean.
10. If you are using a disposable mixer assembly, check for blockages or hardened material build up inside the mixer tube and replace as necessary.
11. Turn the main air supply off to the system.
12. Relieve the air pressure from the flush tank by lifting the relief valve ring on top of the flush tank.
13. Hang the dispense head so the front points downward.

Changing an Empty Pail

1. Move the Ram Directional Control Lever (7) to the neutral (center) position.



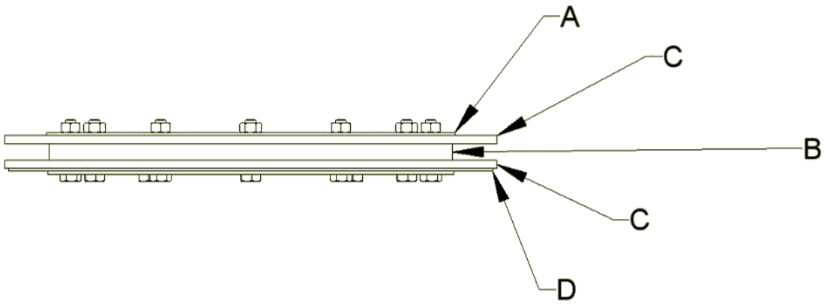
2. Open the Ram Extraction ball valve (4) connected to the ram extraction air regulator.



3. Slowly turn up the Ram Extraction Regulator (1) to 25 psi (1.7 bar).
4. Move the Ram Directional Control Lever (7) to the up position.
5. Adjust the air lift pressure regulator (6) to 20 psi (1.4 bar).
6. Open and close the ram control lever intermittently to raise the follower plate and pump out of the pail, holding the container down if it begins to lift.

Note ***It may be necessary to adjust both the ram and follower pressures to facilitate removal.***

7. After the pump and follower are removed, inspect, seal, and properly dispose of the protector gasket.
8. Clean any buildup of material off the follower gasket and follower plate.
9. Inspect the piston seals.
10. If replacement seals are needed, refer to the following table.



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 (290.5mm)	**PAT-RA-5018** UHMW .06 x 11-1/4"OD (285.8mm)
" "	" "	**PAT-RA-5015-L** LEATHER 3/16 x 11-7/16" OD (290.5mm)	" "
" "	" "	**PAT-RA-5030** EPDM 3/16 x 11.61" OD (295mm)	**PAT-RA-5032** EPDM 3/16 x 11.42" OD (290mm)
PAT-RA-5035 (10.34" OD)	**PAT-RA-5036** (10.34" OD)	**PAT-RA-5040** EPDM 3/16 x 12.28" OD (312mm)	**PAT-RA-5042** UHMW .04 x 12.17" OD (309mm)
" "	" "	**PAT-RA-5050** EPDM 3/16 x 13" OD (330.2mm)	**PAT-RA-5052** UHMW .04 x 12.82 OD (325.6mm)

11. Replace the empty container with a full one and return to the Priming the Unit directions before dispensing.

Performing Daily Tasks

Daily Startup

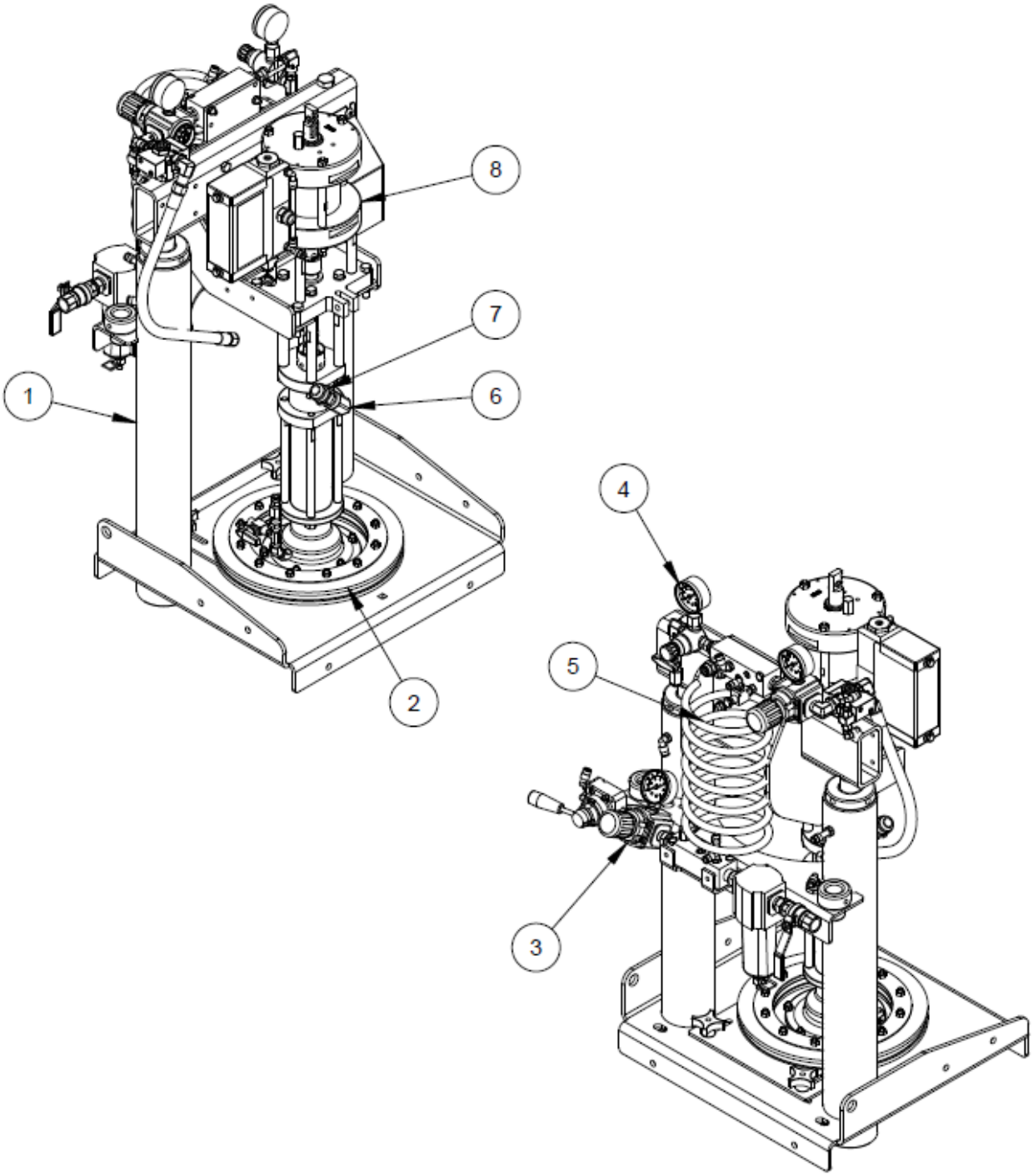
1. Check and refill all components and materials.
2. Close the relief valve on the flush tank lid.
3. Open the main air supply lockout ball valve to pressurize the system.
4. Bleed off any water.
5. Check the system for leaks and damage, replace or repair items as needed.
6. Verify the adhesive and activator pump pressure settings are accurate. Adjust as needed.
7. Verify the main metering pump ratio is set correctly.
8. Apply a small amount of lubricant to the threads of the mix chamber.
9. Reassemble and attach the mixer assembly.
10. Check the flush system for proper operation.

    The system if ready for use.

Daily Shutdown

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

System Components



MAGNUM VENUS PRODUCTS

TRANSFER PUMP	PAT-CCP-TRAN

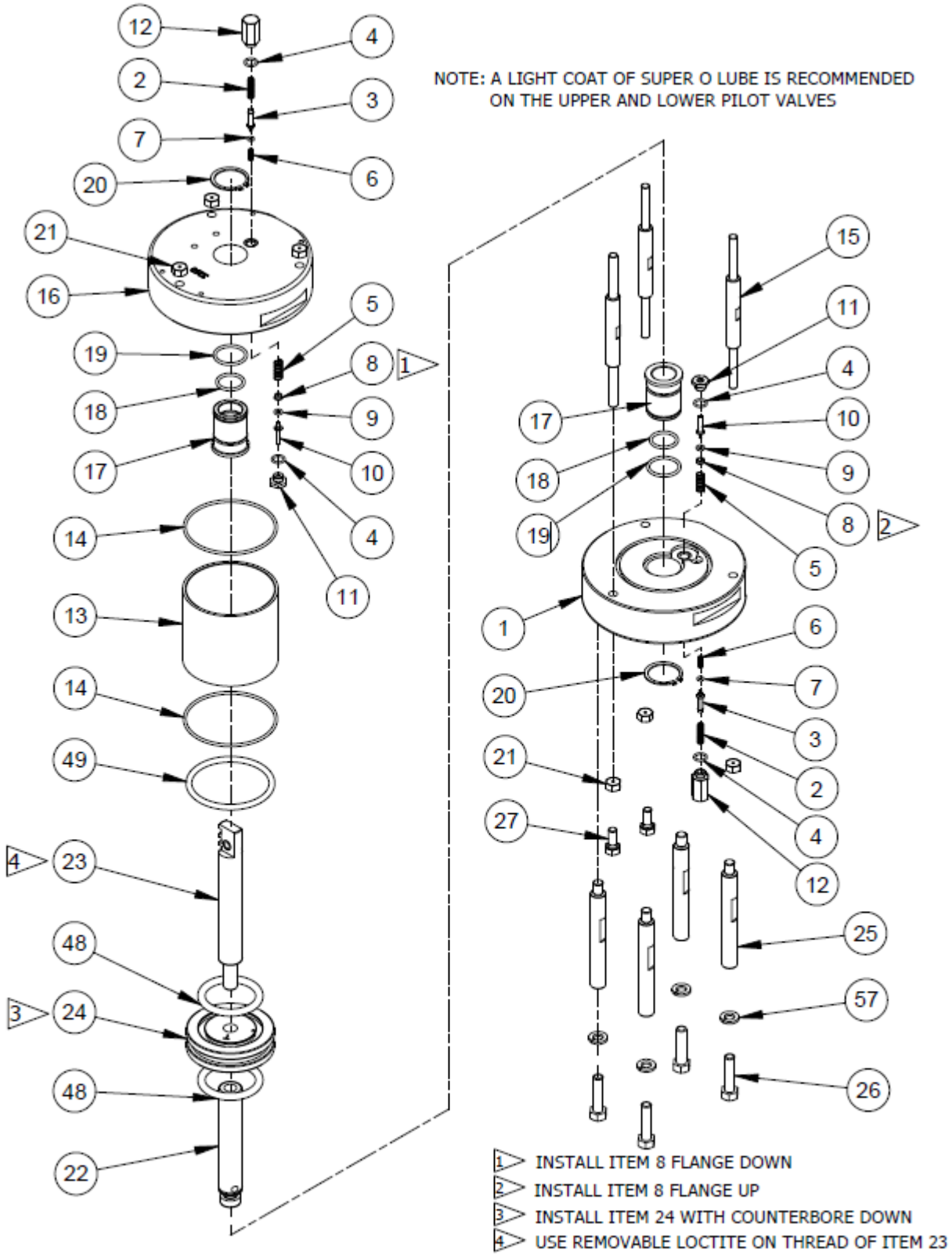
REV:D 02/18/2022 SHEET 1 / 2 6/11/2008

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	PAT-RA-5000	1	RAM ASSEMBLY - MINI CHOPCHECK
2	PAT-RA-5021-EPDM	1	FOLLOWER PLATE ASSEMBLY
3	PAT-MA-14	1	AIR MANIFOLD - LOWER RAM
4	PAT-MA-15	1	AIR MANIFOLD - UPPER RAM
5	01772	12 FT	SELF STORING HOSE
6	PF-SE-08-SS	1	STREET ELBOW
7	PF-HN-08-12J-SS	1	HOSE ADAPTER
8	PAT-CCP-PA-1300-SS	1	PUMP ASSEMBLY

MAGNUM VENUS PRODUCTS

TRANSFER PUMP	PAT-CCP-TRAN

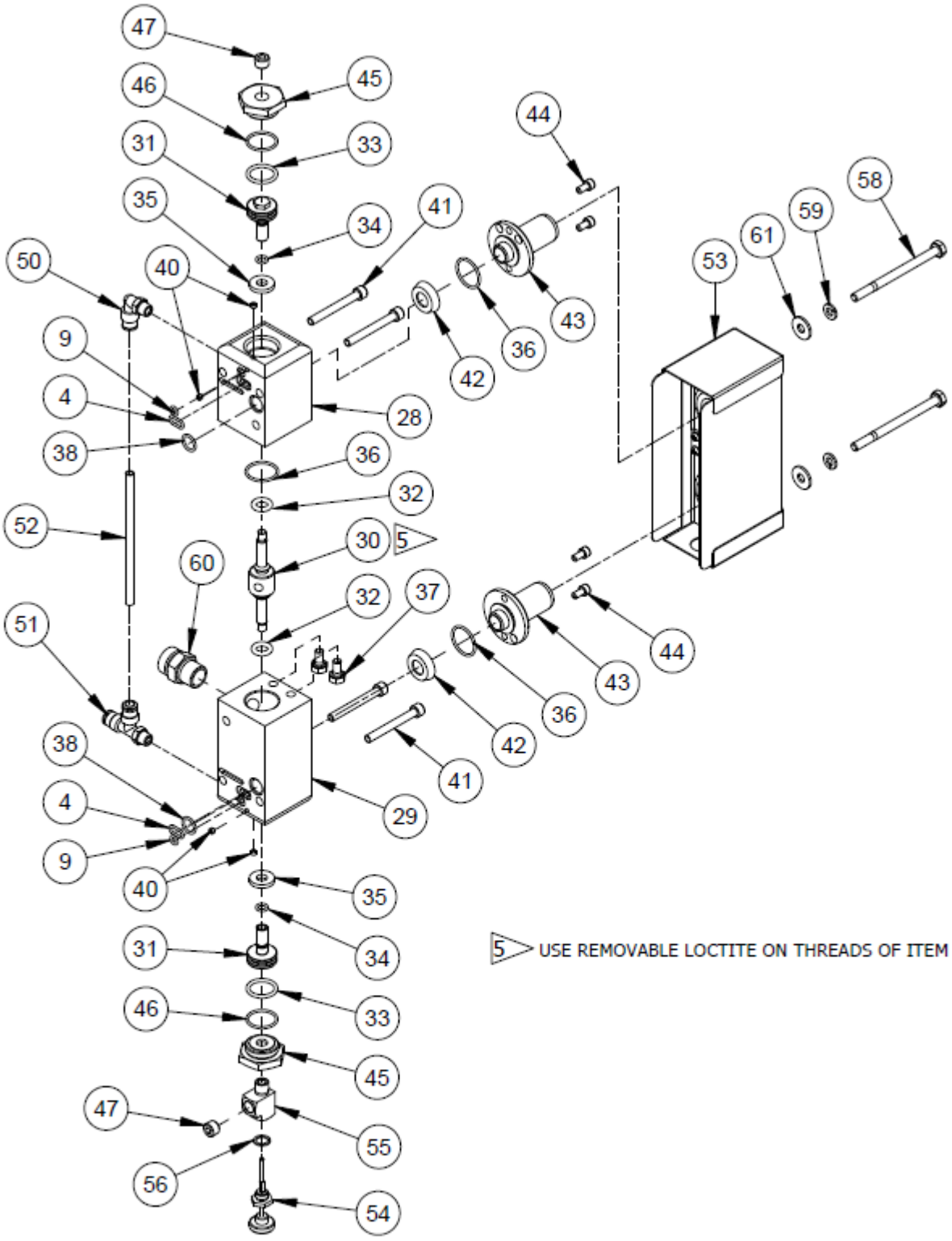
REV:D 02/18/2022 SHEET 2 / 2 6/11/2008



MAGNUM VENUS PRODUCTS

3.25" POWER HEAD	PAT-PH-3250

REV:B 12/30/2021 SHEET 1 / 4 5/30/2007



MAGNUM VENUS PRODUCTS

3.25" POWER HEAD	PAT-PH-3250

REV:B 12/30/2021 SHEET 2 / 4 5/30/2007

	PAT- PH-3250 PARTS LIST			
	ITEM	PART NUMBER	QTY	DESCRIPTION
	1	PAT-PH-3204	1	LOWER END CAP
	2	MPH-2533	2	COMPRESSION SPRING
	3	MPH-2540	2	INLET ROD- PILOT VALVE
*	4	O-B-012	6	O-RING
	5	MPH-2528	2	SPRING
	6	MPH-2526	2	SPRING
*	7	O-U-006	2	O-RING
	8	MPH-2512	2	SEAL GUIDE- PILOT VALVE
*	9	O-B-008	4	O-RING
	10	MPH-2513	2	VALVE STEM- PILOT VALVE
	11	MPH-2511-01	2	STEM SEAL ASSY- PILOT VALVE
	12	MPH-2541	2	SPRING HOUSING- PILOT VALVE
	13	PAT-PH-3203	1	CYLINDER - Ø3-1/4x 2" STROKE
*	14	O-B-152	2	O-RING
	16	PAT-PH-3212	1	UPPER END CAP
	17	VPH-4254	2	BUSHING- 7/8 DIA. PISTON ROD
*	18	O-B-118	2	O-RING
*	19	O-B-121	2	O-RING
	20	MPH-3261	2	SNAP RING - EXTERNAL
	21	F-HN-05F	6	HEX NUT - Inch
	22	PAT-PH-5009	1	LOWER ROD
	23	PAT-PH-5008	1	UPPER ROD ASSY
	24	MPH-3251	1	PISTON - 3-1/4" POWER HEAD
	25	PAT-PH-5011	4	TIE ROD
	26	F-HB-06C-24-GR8	4	HEX BOLT
	27	F-HB-05C-12	2	HEX BOLT - Inch
	28	PAT-PH-3201	1	UPPER VALVE BLOCK
	29	PAT-PH-3202	1	LOWER VALVE BLOCK
	30	PAT-PH-3205	1	VALVE ROD POPPET
	31	MPH-2517	2	VALVE PISTON
*	32	O-U-204-90	2	O-RING
*	33	O-B-116	2	O-RING
*	34	O-D-010-90	2	O-RING
	35	MPH-3262	2	PISTON STOP
*	36	O-B-020	3	O-RING
	37	F-HB-04C-08	2	HEX BOLT - Inch
*	38	O-B-013	2	O-RING
	40	F-SS-832-02-SS	4	SS SET SCREW
	41	F-CS-04C-32-SS	4	CAP SCREW
*	42	MPH-2529	2	DIAPHRAGM
	43	MPH-2522	2	VALVE EXHAUST PORT
	44	F-CS-1024-06-SS	4	CAP SCREW
	45	MPH-2521	2	VALVE END CAP
*	46	O-B-019	2	O-RING
	47	PF-AP-02-SS	2	PIPE PLUG
*	48	O-B-404	2	O-RING
*	49	O-B-336	1	O-RING
	50	MPH-2539	1	MALE ELBOW
	51	MPH-2538	1	MALE POLY TEE FITTING

MAGNUM VENUS PRODUCTS

3.25" POWER HEAD	PAT-PH-3250

REV:B 12/30/2021 SHEET 3 / 4 5/30/2007

PAT- PH-3250 PARTS LIST			
ITEM	PART NUMBER	QTY	DESCRIPTION
52	MS-2052-1	.40 FT	TUBING
53	PAT-PH-3210-01	1	MUFFLER ASSEMBLY
54	MPH-2546-01	1	RESET STEM ASSEMBLY
55	PF-ST-02-BR	1	TEE FITTING
56	MPH-2545	1	SEAL
57	F-SW-06	4	LOCK WASHER
58	F-HB-04C-56-SS	2	HEX BOLT
59	F-SW-04-SS	2	LOCK WASHER
60	PF-HN-06-08S	1	HOSE ADAPTER
61	F-FW-04	2	FLAT WASHER

*ASTERISKS DENOTE PARTS INCLUDED IN PAT-PH-3250-SK SEAL KIT

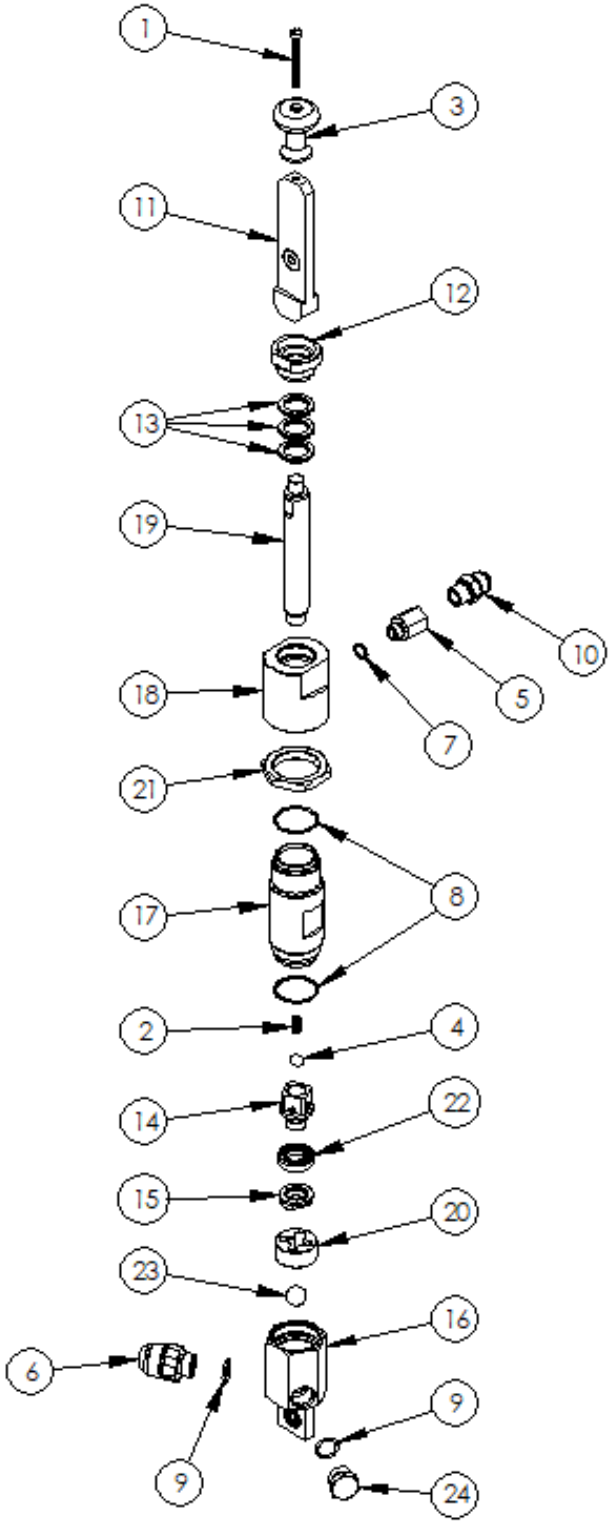
OPTIONAL PARTS AND ASSEMBLIES

PART No.	QTY.	DESCRIPTION
MPH-2542	1	RESET BUTTON ASSEMBLY
PAT-PH-SB	1	SHIFT BLOCK ASSEMBLY

MAGNUM VENUS PRODUCTS

3.25" POWER HEAD	PAT-PH-3250

REV:B 12/30/2021 SHEET 4 / 4 5/30/2007



MAGNUM VENUS PRODUCTS

HARDENER PUMP ASSEMBLY	VHPC-1200-ADH

REV:- SHEET 1 / 2 11/10/2021

	Parts List			
	ITEM	PART NUMBER	QTY	DESCRIPTION
	1	02849-16	1	SLOTTED MACHINE SCREW
	2	04009-1	1	PISTON SPRING - C32
	3	50100-1	1	PRIMING KNOB - CATALYST PUMP
	4	9201-1-14	1	SS BALL
	5	CM-1059	1	FITTING 1/2-20 to 3/8 NPT
	6	HF-08ORB-12J-SS	1	HOSE FITTING
*	7	O-E-013	1	O-RING
*	8	O-E-027	2	O-RING
*	9	O-E-3-908	2	O-RING
	10	PF-HN-06-08J-SS	1	HEX NIPPLE
	11	VHPC-1123-01	1	BUSHING BLOCK ASSEMBLY
	12	VHPC-1207	1	PACKING NUT
*	13	VHPC-1210	3	ROD SEAL ASSY
	14	VHPC-1211	1	PISTON BODY
	15	VHPC-1212	1	SEAL RETAINER
	16	VHPC-1215-B	1	INLET BODY
	17	VHPC-1216	1	CYLINDER
	18	VHPC-1217	1	OUTLET BODY
	19	VHPC-1218	1	PISTON ROD
	20	VHPC-1220	1	BALL CAGE
	21	VHPC-1221	1	LOCK NUT
*	22	VHPC-1222	1	PISTON SEAL ASSY
	23	VHPC-2223	1	5/8 SS BALL
	24	VHPC-2224	1	PLUG

REPAIR KIT

*VHPC-1200-SK (ASTERISKS DENOTE PARTS IN KIT)

MAGNUM VENUS PRODUCTS

HARDENER PUMP ASSEMBLY	VHPC-1200-ADH

REV:- SHEET 2 / 2 11/10/2021

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