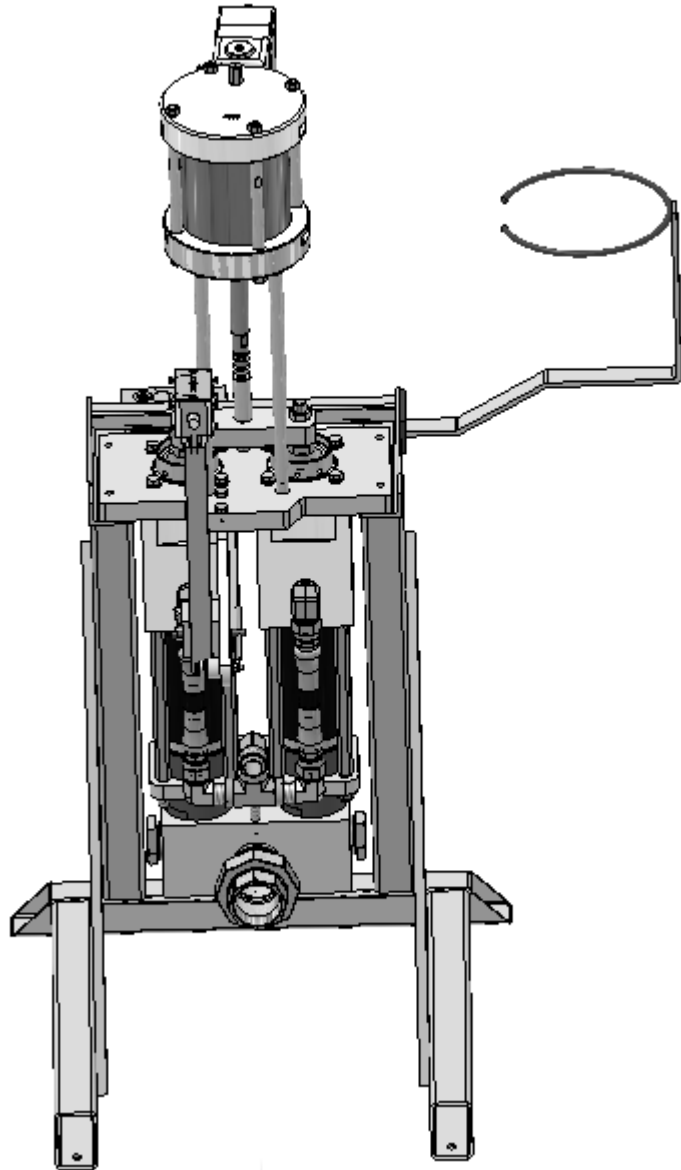


# Duo HV Infusion Unit

## Operations Manual

This manual is applicable to the following models:

- DHV-51000
- DHV-51000-M





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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)

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 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 No.77 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 Duo HV Infusion Unit. 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 Duo HV Infusion Unit consists of multiple components. Each component has its own detailed manual and drawings. For complete repair and maintenance instructions, refer to the appropriate manuals.

- ☐ DUAL HIGH-VOLUME RESIN PUMP FLUID SECTIONS (HVLS-1000-DHV)
- ☐ 5" POWERSLIDE POWERHEAD (VPH-5000)
- ☐ C32 HIGH RANGE CATALYST PUMP ASSEMBLY (VHPC-3200-C-UPS)
- ☐ HIGH VOLUME PRO GUN ASSEMBLY (58100-1)
- ☐ AUTO-LEVEL CONTROL BOX (70053-1)

## 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.

## Overview of Controls

### Air Manifold

The main air manifold controls consist of the following regulators and gauges:

Air Manifold Controls	
Description	Function
Pump Pressure Gauge and Regulator	Controls and monitors the main air pressure to the resin pump air motor
Flush Pressure Gauge and Regulator	Controls and monitors the air pressure to the flush tank. Normally set to 50 – 60 psi (3.5 – 4 bar)
Priming Button	Allows the pump to operate without the gun by sending an air signal to the pump control valve, which allows control of air to powerhead
Main Air Inlet Valve	Used to turn air supply to the unit on and off and to release air pressure in the unit <b>Note</b> <i>Open or close the main air ball valve in one full stroke; if partially opened, air will leak from the exhaust port on the valve.</i>

### Other System Controls

Other Controls	
Description	Function
Catalyst Pump Drive Adjustment	Sets the desired catalyst percentage (catalyst to resin ratio)
Catalyst Pressure Dump Valve	Located on the catalyst manifold; releases catalyst pressure to prevent an overpressure situation
Auto-level Toggle Switch	Turns the auto-level control box on or off. The auto-level controls the pump and gun depending on the level of resin in relation to the auto-level sensor tube
Manual On/Off Switch	Turns the pump and gun on or off when the auto-level is not active

## Assembling the Unit

### Supplies Needed

#### Lubrication

Throughout this manual directions are given for lubricating various parts. There are four types of lubricant used:

1. If the part contacts resin, use MVP Red Grease (6706-2-1).
2. If the part is located where it will contact air, use Lubriplate® (08465).
3. For the oil reservoir of the fluid sections, use Throat Seal Oil (TSL-3200).
4. For gun repair and maintenance, use Gun Oil (6706-3-1).



## Other Items

- Solvent for cleaning
- A small chip/paint brush for cleaning
- Sealable container for the solvent large enough for cleaning the gun and pump parts
- Medium thread locker (removable Loctite® 243 or equivalent)
- Spare mixer element (162A623)
- Flush container and waste resin container
- Small containers and clock or stop watch for gel test

## Installation and Setup

5. Unpack the unit and components and inspect for damage; report any damage or missing items.
6. Mount the gun assembly as required.
7. Install the catalyst jug into the jug bracket.
8. Connect the relief valve tube on the catalyst manifold to a port in the top of the catalyst jug.
9. Connect the tube from the catalyst recirculation valve on the catalyst manifold to a port in the top of the catalyst jug.
10. Connect the feed tube from the catalyst jug outlet to the catalyst pump inlet.
11. Connect the catalyst hose from the catalyst pump to the catalyst manifold.
12. Connect the air hose to the powerhead and air supply to the shift block.
13. Install the flush tank into the bracket and connect the air supply from the regulator on the air manifold to the port marked AIR on the flush tank.
14. Attach gun and hose set to their respective connections:
  - Resin hose to pump outlet
  - Catalyst hose to catalyst manifold
  - Flush tube to SOLVENT port on the flush tank
  - Gun control lines
15. Double check all hose fittings and connections are tight.

**Note**      ***Tight connections and fittings will prevent catalyst, resin, or solvent from leaking.***



## Testing Unit Operation

1. Connect the air supply to the unit.
2. Turn all regulators counterclockwise to zero.
3. Fill the oil reservoir / packing nut on the fluid sections  $\frac{3}{4}$  full of throat seal oil (TSL).

4. Snug the packing nut tight, but do not overtighten.
5. Open the main air valve and check for air leaks.
6. Turn the auto-level to **Off** to place the unit in manual mode.
7. Turn the Manual On/Off switch to the **On** position, then slowly turn up the pump pressure until the pump moves slowly and evenly.
8. Turn the Manual On/Off switch to **Off**.
9. Snug the packing nuts on the gun block tighter.
10. Repeat steps 7 - 9 several times.
11. With the manual switch in the **Off** position, turn the auto-level to the **On** position (the pump should begin to cycle again).
12. Using your finger, plug the auto-level sensor tube and make sure the pump stops.

**Note**      ***It is easier to adjust and properly set up the auto-level before the unit is primed with resin and catalyst.***

13. Turn the auto-level to the **Off** position.
14. Turn the pump regulator all the way counterclockwise back to zero.

## Adjusting the Auto-Level

1. Pour a small container of resin (no catalyst), deep enough to achieve the desired depth of the bubbler/sensor tube.
2. With the Manual On/Off switch in the **Off** position, turn the auto-level to the **On** position.
3. Slowly increase the pump pressure until the pump is moving slowly and evenly.
4. Place the bubbler tube into the container of resin until the pump and gun turn off.
5. Note the depth of the bubbler tube in the resin.
6. Move the bubbler tube up and down in the container of resin, noting where the pump and gun turn on and off.
7. If adjustment is needed to achieve the desired depth, open the auto-level control box and adjust the two flow control adjustments (time delay and air flow volume/depth).

**Note**      ***Small adjustments to the flow controls can have large impact, so only turn the flow control knobs a small amount and test again. For more detailed information, see the “Auto-Level Control Manual”.***

## Priming the Unit

### Prime Solvent

1. Open the flush tank lid and fill  $\frac{3}{4}$  full.
2. Install lid on tank and close the relief valve located on top of the lid.

3. Set the flush tank pressure at 50 – 60 psi (3.5 – 4 bar).
4. Check for leaks and repair as necessary.
5. Place a container under the front of the gun and press the flush button on the side of the gun to test the flush system.

## Prime Catalyst to Gun

6. Remove the mixer element and turbulent mixer from the mix chamber.
7. Tighten the catalyst packing nut  $\frac{1}{8}$  to  $\frac{1}{4}$  turn to snug packing.
8. Fill the catalyst jug at least  $\frac{3}{4}$  full, then purge the air out of the catalyst feed line by slightly tilting the catalyst jug toward the outlet fitting.
9. Open the recirculation valve on the catalyst manifold.
10. Remove the pivot pin for the catalyst drive linkage.
11. Using the catalyst drive, hand prime catalyst back to the jug through the recirculation valve until there is no air in the return tube.
12. Close the recirculation valve on the catalyst manifold.
13. Open the gun by turning the Manual On/Off switch to the **On** position.
14. Place an appropriate container under the mix chamber on the front of the gun.
15. Remove the pivot pin from the catalyst drive linkage and use the catalyst drive to hand prime catalyst out of the gun until a steady flow is achieved.
16. Flush the mix chamber clean.

**Note**      ***Do not reinstall the pivot pin or open the catalyst recirculation valve at this time to prevent over pressurizing the catalyst system.***

## Prime Resin to Gun

17. Check and fill the oil reservoirs  $\frac{3}{4}$  full with TSL oil.
18. Connect the resin supply to the resin pump inlet.
19. Turn the Manual On/Off switch to the **On** position, then slowly increase pump regulator pressure until the pump is running at a slow but steady rate.
20. Allow the pump to run until a steady stream of resin is being dispensed.
21. Close the gun and flush the mix chamber clean.

## Set the Resin Pump Packing

22. Press and hold the priming button while slowly increasing pump pressure to 100 psi (7 bar).
23. Allow the unit to set under static load for 15 to 30 minutes to seat the resin pump packing set.
24. Turn the pump regulator to zero.

## Perform Gel Test

25. Install the turbulent mixer and mixer element to the front of the gun.
26. Place a suitable container in front of the gun.
27. Open the gun by turning the Manual On/Off switch to the **On** position.
28. Slowly increase the pump pressure to the desired flow rate.
29. While the pump is dispensing resin, place a small container under the resin flow to capture approximately 100 grams.
30. Take notes of the time it takes to capture the correct amount.
31. Properly flush the gun mix chamber clean.
32. Document the test information, including:
  - Gel time
  - Resin temperature
  - Air temperature
  - Catalyst percentage
  - Resin and catalyst types
  - Any other relevant information

## Performing Daily Tasks

### Daily Start Up



#### CAUTION

***Put on respirator as specified for spray painting. Wear all protective clothing recommended by your materials manufacturer(s), including eye protection and PVC gloves.***

1. Check all hoses for damage and replace as needed.
2. Check all material supplies and fill or replace as needed.
3. Close the flush tank relief valve.
4. Open the recirculation valve on the catalyst manifold.
5. Open the main air inlet valve on the manifold.
6. Manually pump the catalyst pump with the catalyst drive until the stream returning to the catalyst jug is air free.
7. Close the recirculation valve on the catalyst manifold.
8. Manually pump the catalyst pump with the slave arm drive, bringing catalyst pressure to operating pressure of approximately 100 – 200 psi.

9. Check the resin pump pressure; if needed, press and hold the priming button while slowly turning up the pressure to the desired setting.
10. Replace the pivot pin into the catalyst pump drive.
11. Insert the distribution ring into the mix chamber locating rim.
12. Place the mix housing seal into the mix chamber locating rim.
13. Insert the catalyst injector and injector seal into the aperture in the distribution ring and the spring into the gun block.
14. Place the mix chamber and catalyst injector onto the front of the gun and secure with two screws.
15. Apply a small amount of red grease to the threads of the mix chamber.
16. Install the turbulent mixer into the mix chamber and the mixer assembly onto the mix chamber.

## Daily Shut Down

17. Properly flush the gun and mixer assembly with solvent.
18. Turn off the main air ball valve at the air manifold.
19. Release the flush tank pressure by lifting the relief ring.
20. Remove and inspect the mixer assembly, then clean with solvent or replace as needed.
21. Remove the mix housing and clean as needed.
22. Check the catalyst injector and seals for proper operation.
23. Wipe the gun block face with a clean rag.
24. Check the weep holes on the top of the gun block for leaking material and tighten the packing nuts as needed.
25. If the gun is not mounted, hang the gun with the gun block exit holes facing downward.