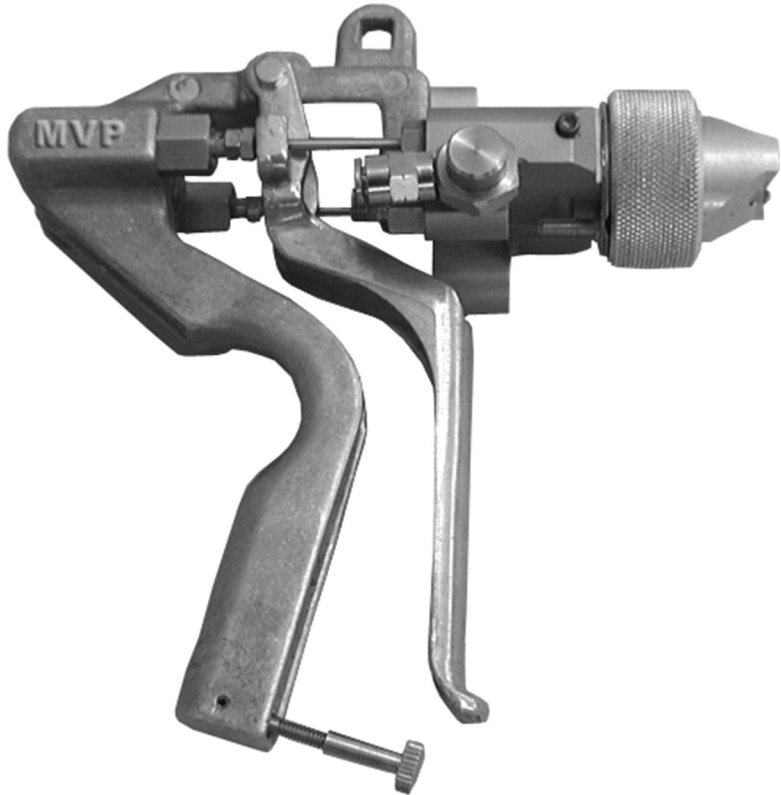


External Mix Gelcoat Gun

Manual

This manual is applicable to the following models:

- EMG-1000
- EMG-1500



Rev. March 2019



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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

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 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 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 least 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 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.

**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 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 External Mix Gelcoat Gun. The following procedures are included:

- Step-by-step assembly and disassembly
- Troubleshooting information



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.

Disassembling Gun



WARNING

Always remove air and fluid pressure before working on the system or disconnecting the gun.

Note *Be careful not to bend the catalyst and resin needles. Bent needles will cause improper operation of the gun.*

Initial Disassembly

1. Remove catalyst, resin, and air pressure from the system.
2. Remove catalyst, resin, and air lines from the gun block assembly.

3. Remove the screw from the trigger stud and remove the stud from the gun handle and trigger.
4. Remove the trigger from the gun assembly.
5. Remove the cap screw located at the back center to remove the gun block assembly from the gun handle assembly.

Disassemble Gun Handle

6. Remove the spring retainers and springs from the handle.
7. If you do not have an EMG-1500 model, skip to step
8. Remove the valve body assembly from the handle.
9. Remove the spring and poppet assembly.
10. Unscrew the retainer from the valve body.
11. Remove the O-ring.

Disassemble Gun Head

12. Remove the retaining ring from the front of the gun.
13. Remove the catalyst tip and nozzle from the front of the gun.
14. If necessary, remove the thread adapter by loosening the two screws.
15. Remove the O-ring from the front of the thread adapter.
16. Remove the needle guide and jam nut from the catalyst piston needle.
17. Pull the catalyst needle from the needle housings.
18. Remove the O-ring from the end of the catalyst needle.
19. Unscrew the catalyst needle housing from the gun head.
20. Remove the catalyst seat and O-ring from the gun block.
21. Unscrew the resin seal housing from the gun head.
22. Remove the needle guide and jam nut from the needle.
23. Unscrew the packing nut from the seal housing.
24. Pull the needle from the seal housing.
25. Remove the packing seal and seal retainer from the seal housing.
26. Unscrew the carbide seat from the gun head using an Allen wrench.
27. Remove the O-ring from the gun block.
28. Remove the catalyst fitting or check valve (as applicable) from the gun block.
29. Remove the material fitting from the gun block.
30. Remove the check valve cap and push fitting from the check valve body.
31. Remove the check valve body assembly from the gun block.

Disassemble Check Valve Body

32. Using a wrench or vice, hold the hex of the check valve stem and use a flat head screwdriver to remove the check valve nut.
33. Remove the check valve stem and check valve spring from the check valve body.

Reassemble Check Valve Body

34. Replace the O-ring on the check valve stem.
35. Install the check valve stem into the front of the check valve body.
36. Install the check valve spring into the back of the check valve body.
37. Hold the hex of the check valve stem with your finger and use a flat head screwdriver to install the check valve nut onto the end of the check valve stem.
38. Using a wrench or vise, hold the hex of the check valve stem and use a flat head screwdriver to just tighten the check valve nut.

Disassemble Check Valve

39. Remove spring housing from the O-ring housing.
40. Remove the spring and piston.
41. Remove the O-ring and replace as necessary.

Reassemble Check Valve

42. Install an O-ring into the O-ring housing.
43. Install the spring and piston into the spring housing
44. Thread the spring housing into the O-ring housing.

Assembling Gun

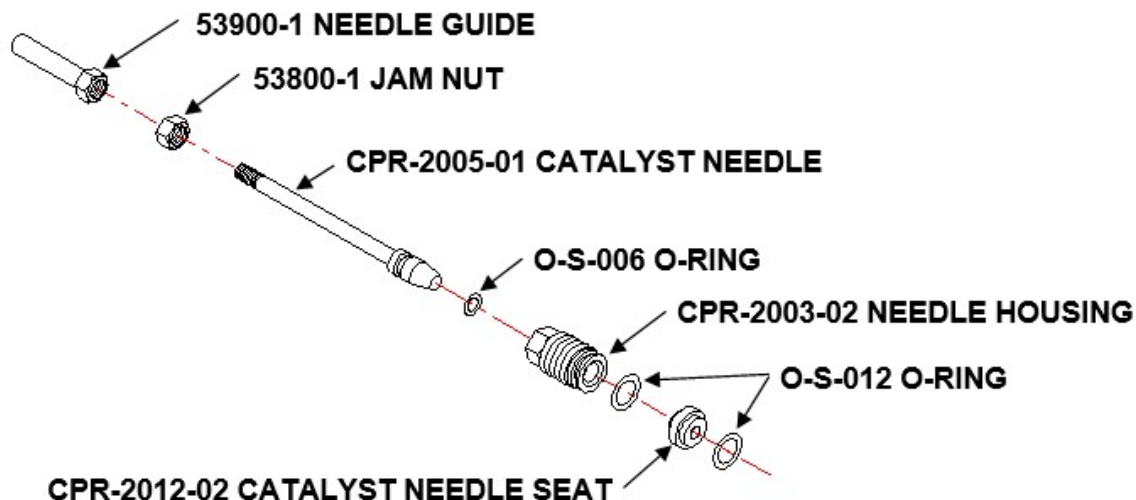
Reassemble Gun Handle

1. Apply lubricant to springs and insert into the gun handle.
2. Thread the spring retainers over the springs into the gun handle.
3. If you do not have an EMG-1500 model, skip to step
4. Slide the spring onto the end of the poppet assembly.
5. Insert the poppet assembly into the valve body.
6. Slide the O-ring over the poppet assembly and retain with the packing retainer.
7. Screw the assembled valve body into the gun handle.

Assemble Gun Head

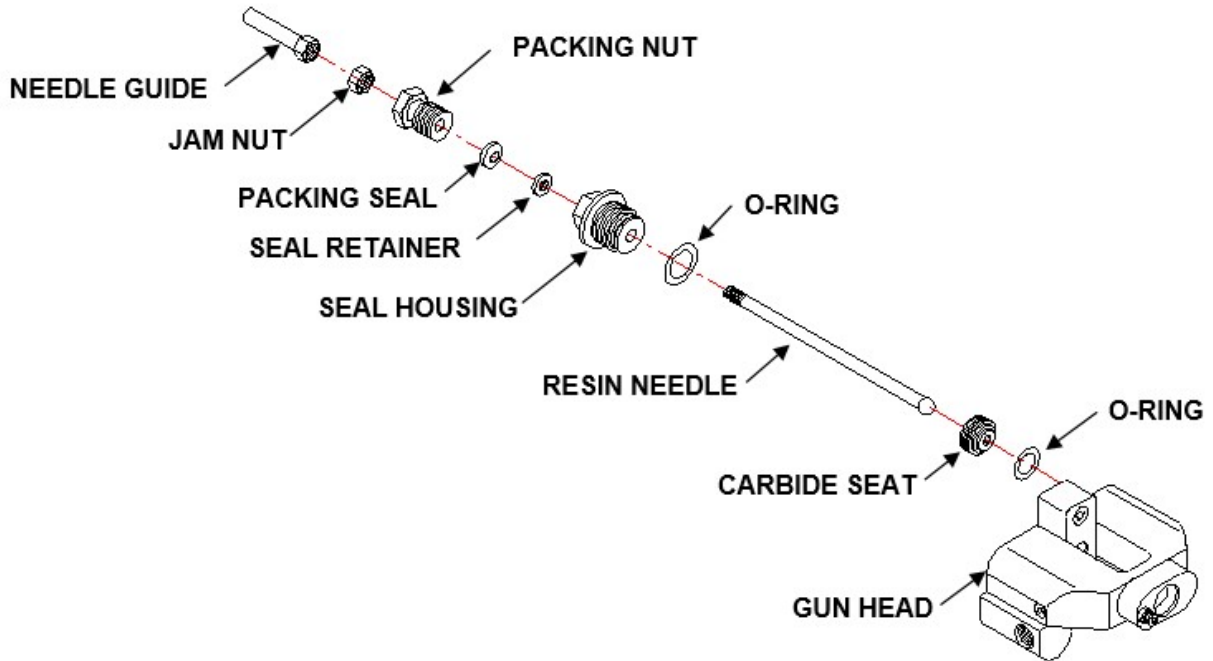
1. Install a new O-ring onto the check valve assembly and thread it into the catalyst fitting position.

2. Place a new O-ring on the resin fitting and install into the gun block.
3. Install a new O-ring into the catalyst needle seat area of the gun head.
4. Install the new catalyst needle seat onto the end of the catalyst needle housing.
5. Install a new O-ring on the catalyst needle housing and thread into the gun block.
6. Thread the jam nut then the needle guide onto the catalyst needle end.
7. Install a new O-ring onto the catalyst piston needle.
8. Insert the catalyst piston needle into the catalyst needle housing.



Note *Be careful not to bend the catalyst needle while performing the remaining assembly procedure.*

1. Install a new O-ring into the resin needle seat area of the gun head.
2. Firmly thread the carbide seat into the gun head.
3. Install a new O-ring on seal housing and lightly grease the threads.



4. Install the resin needle through the seal housing.
5. Slide the seal retainer then the packing seal over the resin needle.
6. Slide packing nut over the resin needle and thread into the seal housing until just over finger tight – do not overtighten.
7. Thread the jam nut then needle guide onto the resin needle end.
8. Thread the seal housing and resin needle assembly into the gun head.

Reattach Gun Block to Gun Handle

9. Attach the gun head assembly to the gun handle using a cap screw.
10. Slide the trigger into place against the needles and line up the holes with the handle.
11. Push the trigger stud through both the trigger and the gun handle and retain with the screw.

Adjusting and Starting Up

1. Make sure the trigger and trigger bar are not worn, loose, or damaged before adjusting gun or needle guides.
2. Adjust the resin needle guide and jam nut so they will open just before the catalyst needle (never catalyst first).

Note *How much you open the resin needle before you open the catalyst needle will depend on the resin viscosity and may have to be changed as the resin temperature changes.*

3. Test the gun by putting 100 psi (7 bar) of air to the catalyst and resin fittings and submerging the gun in water.

Troubleshooting

Catalyst Problems		
Symptom	Possible Cause	Remedy
Catalyst leaking around needle (inside packing nut)	O-ring on needle worn or damaged	Replace O-ring
	Excessive pressure in catalyst system	Relieve catalyst pressure from system
	Catalyst needle bent	Replace needle
Catalyst leaking around needle housing	O-ring on needle housing worn or damaged	Replace O-ring
Catalyst leaking from the front of gun	Catalyst piston needle worn or damaged	Replace needle
	Catalyst seat worn or damaged	Replace catalyst seat
	O-ring under catalyst seat worn or damaged	Replace O-ring
	Damaged or weak return spring	Replace as needed
	Excessive pressure in catalyst system	Relieve pressure in catalyst system
	Catalyst needle bent	Replace needle
No catalyst from gun	Trigger is not connecting with catalyst needle	Adjust trigger
	Blockage in gun block	Disassemble and clean the gun block
	Catalyst pump not operating properly	Refer to catalyst pump manual to adjust pump as needed
Catalyst leaking from around the catalyst air in the check valve body	Check valve body loose	Lightly tighten check valve body into gun block
	O-ring on check valve worn or damaged	Replace O-ring
Catalyst leaking between check valve and gun block	O-ring on check valve worn or damaged	Replace O-ring
Catalyst leaking from around catalyst air in check valve cap	Check valve cap loose	Lightly tighten cap
	O-ring in check valve cap worn or damaged	Replace O-ring
	O-ring on check valve stem worn or damaged	

Resin Problems		
Symptom	Possible Cause	Remedy
Resin leaking around needle inside needle housing	Resin needle bent	Replace needle
	Packing nut loose	Lightly tighten packing nut
	Packing seal worn or damaged	Replace packing seal

Resin Problems		
Symptom	Possible Cause	Remedy
Resin leaking around needle housing	O-ring on needle housing worn or damaged	Replace O-ring
Resin leaking from front of gun	Piston needle worn or damaged	Replace piston needle as needed
	Carbide seat worn or damaged	Replace carbide seat as needed
	O-ring under the carbide seat worn or damaged	Replace O-ring as needed
	Damaged or weak return spring	Adjust spring and replace as needed
	Excessive pressure in resin system	Relieve system pressure
No resin coming from gun	Trigger is not pulling resin needle back/open	Adjust trigger as needed
	Gun block obstructed	Clear any blockages from the gun block
	Resin pump malfunctioning	Check resin pump for proper operation
Resin leaking between fitting and gun block	O-ring on fitting worn or damaged	Replace O-ring

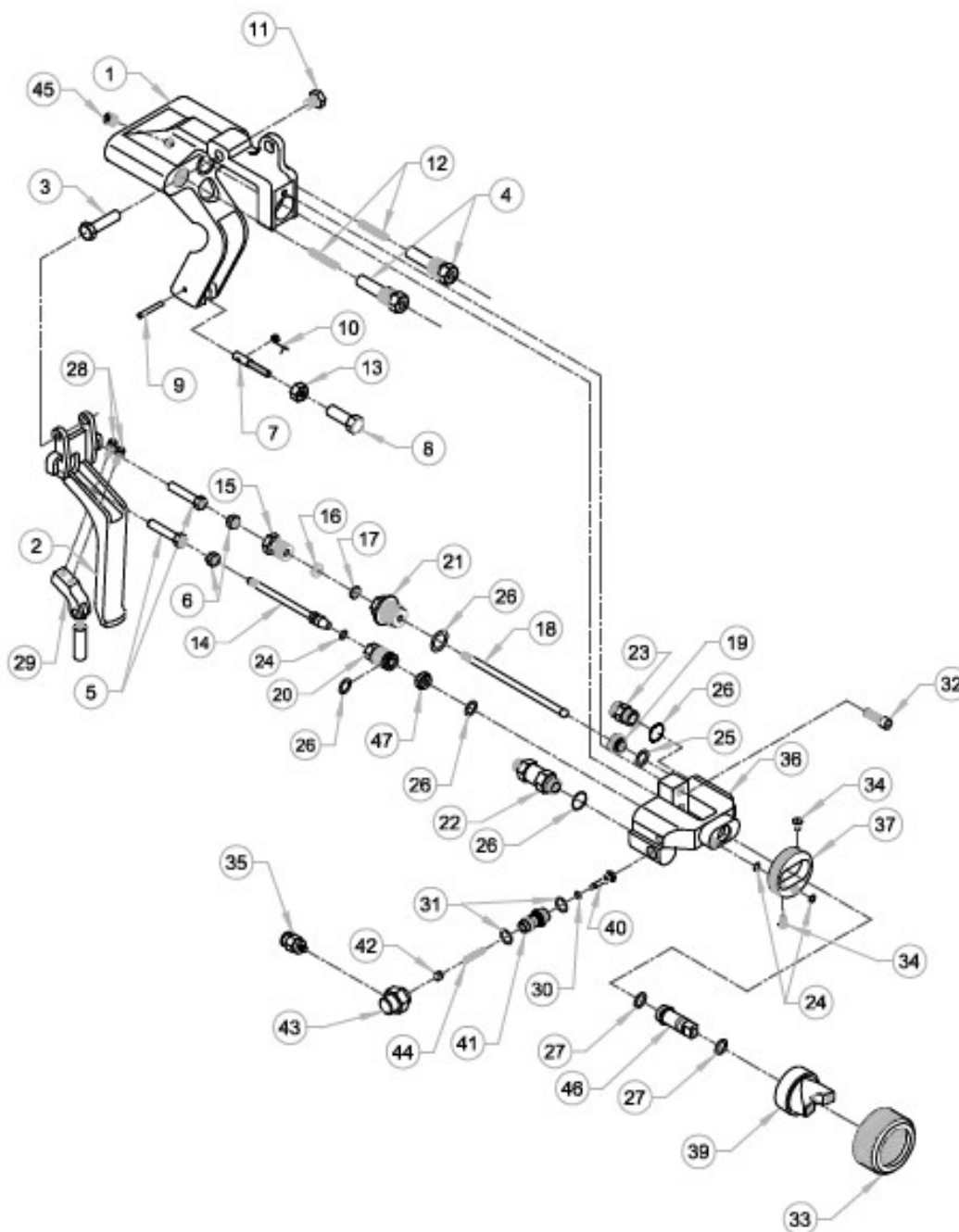
General Problems		
Symptom	Possible Cause	Remedy
Air leaking from around poppet needle (EMG-1500)	Poppet needle retainer loose	Tighten poppet valve body Note Do not overtighten; this will make the poppet needle move slowly or not at all
	O-ring worn or damaged	Replace O-ring
Air leaking from around poppet valve body (EMG-1500)	Poppet valve body loose	Tighten valve body into the gun handle
Air leaking from fitting on handle	Retainer too tight or holding valve open	Adjust retainer
	Needle worn or damaged	Replace needle as needed
	Poppet valve body seat area worn or damaged	Inspect and replace parts as needed
Material leaking from around nozzle or nozzle retaining ring	Retaining ring loose	Tighten retaining ring Note Do not overtighten or you may damage the turbulent mixer
	O-rings on studs worn or damaged	Replace O-ring(s)
	O-rings on nozzle worn or damaged	
Trigger action stiff or hard	Trigger damaged	Inspect and replace parts as needed
	Trigger stud and screw damaged or dry	Remove and lubricate trigger stud and screw; replace as needed
	Needle guide and springs damaged	Remove and lubricate needle guides and springs; replace as needed

General Problems		
Symptom	Possible Cause	Remedy
	Spring retainer worn or damaged	Replace parts as needed
	Needles or needle housings dirty	Check needles and needle housings for hardened or sticky material and remove as needed

Parts Drawings

The following drawings are included for reference:

Parts	
Part Number	Description
EMG-1000-X	EXTERNAL MIX GELCOAT GUN ASSEMBLIES
EMG-1500-X	EXTERNAL MIX GELCOAT GUN WITH SIGNAL
EMG-1097-01	CHECK VALVE ASSEMBLY
EMG-1097-01-03J	CHECK VALVE ASSEMBLY – 3J FITTING



MAGNUM VENUS PLASTECH

External Gelcoat Gun Assy	EMG-1000
External Gelcoat Gun Assy	EMG-1000-FIT
External Gelcoat Gun Assy (International)	EMG-1000-INT
External Gelcoat Gun Assy (International)	EMG-1000-FIT-INT

REV. D - ITEM 26, WAS F-MS-832-06 01/30/06 BT2
 E = INVERTED ITEM 10 ON DRAWING, MOVE ITEM 48 TO PARTS LIST 03/02/09 BT2
 F = REMOVE ITEM 48 10/16/09 BT2
 G = ADDED O-S-009A NOTE TO SEAL KIT 02/15/10 BT2

Common Parts for the Assy of;
 External Gelcoat Gun Assy EMG-1000
 External Gelcoat Gun Assy EMG-1000-FIT
 External Gelcoat Gun Assy EMG-1000-INT
 External Gelcoat Gun Assy EMG-1000-FIT-INT

PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
1	54350-EMG	1	GUN HANDLE
2	MAX-2040	1	TRIGGER
3	54630-1	1	TRIGGER STUD
4	54000-1	2	SPRING RETAINER
5	53900-1	2	NEEDLE GUIDE
6	53800-1	2	JAM NUT
7	56190-1	1	TRIGGER LOCK SCREW
8	56100-1	1	TRIGGER LOCK NUT
9	02883-8	1	TRIGGER LOCK PIN
10	04420-1	1	TRIGGER LOCK SPRING
11	00145	1	TRIGGER STUD SCREW
12	04039-1	2	SPRING
13	F-IN-1024	1	TRIGGER LOCK JAM NUT
14	CPR-2005-01	1	PISTON NEEDLE
15	MG-1022	1	PACKING NUT
* 16	MAX-2008	1	PACKING SEAL
17	MAX-2009	1	SEAL RETAINER
18	MAX-2010-01	1	NEEDLE
19	MAX-2011-01	1	CARBIDE SEAT
20	CPR-2003-02	1	CATALYST NEEDLE HOUSING
21	MAX-2013	1	SEAL HOUSING
23	55500-1	1	MATERIAL FITTING
* 24	O-S-006	3	O-RING
* 25	O-T-010	1	O-RING
* 26	O-S-012	5	O-RING
* 27	O-E-012	2	O-RING
28	F-MS-832-04	2	MACHINE SCREW
29	CPR-2060-01	1	TRIGGER STOP
* 30	O-S-007	1	O-RING
* 31	O-S-3-904	2	O-RING
32	F-CS-04C-12	1	SCREW
33	VPA-1003	1	RETAINING RING
34	F-BHCS-832-08	2	BUTTON HEAD SCREW
35	06977	1	1/4 X 10-32 PUSH FITTING
36	EMG-1001-01	1	GUN BLOCK
37	EMG-1002-01	1	THREAD ADAPTER ASSY
40	EMG-1007	1	CHECK VALVE STEM
41	EMG-1008	1	CHECK VALVE BODY
42	EMG-1009	1	CHECK VALVE NUT
43	EMG-1010	1	CHECK VALVE CAP
44	EMG-1011	1	CHECK VALVE SPRING
45	PF-AP-02	1	ALLEN PLUG
* 47	CPR-2012-02	1	CATALYST NEEDLE SEAT

REPAIR KITS

PART NO.	DESCRIPTION
EMG-1000-SK	SEAL KIT

SEAL KIT INCLUDES O-S-009A, WHICH IS PART OF 22 OR 22A

External Gelcoat Gun Assy EMG-1000

ITEM	PART NO.	QTY	DESCRIPTION
22	EMG-1097-01	1	CHECK VALVE ASSY
39	EMG-35402	1	CATALYST TIP
46	UCT-521	1	SPRAY TIP

External Gelcoat Gun Assy EMG-1000-FIT

ITEM	PART NO.	QTY	DESCRIPTION
22	EMG-1097-01	1	CHECK VALVE ASSY
39A	EMG-35402-FIT	1	CATALYST TIP
46A	UGT-2220	1	SPRAY TIP

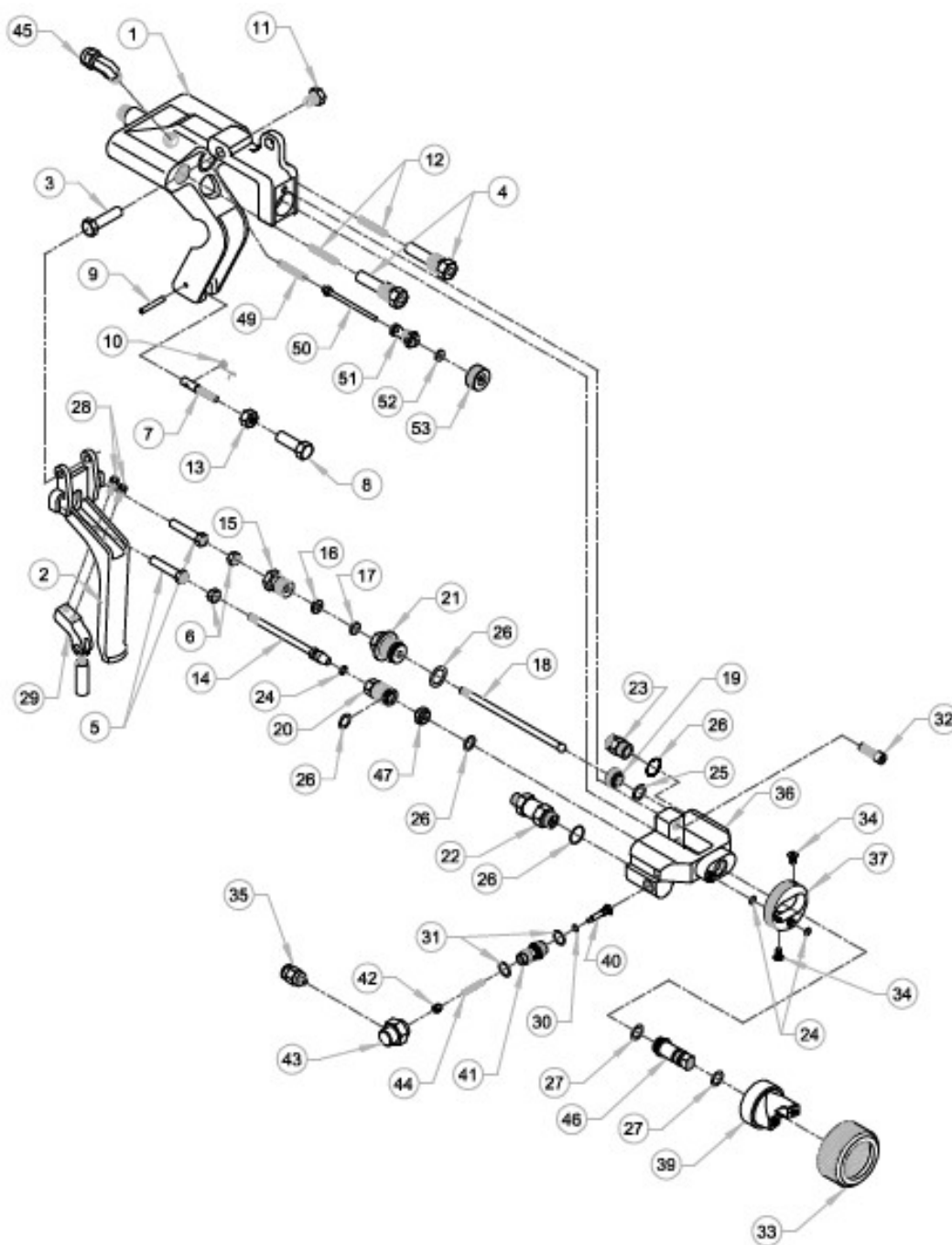
External Gelcoat Gun Assy EMG-1000-INT

ITEM	PART NO.	QTY	DESCRIPTION
22A	EMG-1097-01-03J	1	CHECK VALVE ASSY
39B	EMG-35402-INT	1	CATALYST TIP
46	UCT-521	1	SPRAY TIP

External Gelcoat Gun Assy EMG-1000-FIT-INT

ITEM	PART NO.	QTY	DESCRIPTION
22A	EMG-1097-01-03J	1	CHECK VALVE ASSY
39B	EMG-35402-FIT-INT	1	CATALYST TIP
46A	UGT-2220	1	SPRAY TIP

* ITEMS INCLUDED IN SEAL KIT



MAGNUM VENUS PLASTECH

External Mix Gelcoat Gun W/ Signal
 External Mix Gelcoat Gun W/ Signal
 External Mix Gelcoat Gun W/ Signal
 External Mix Gelcoat Gun W/ Signal

EMG-1500
 EMG-1500-FIT
 EMG-1500-INT
 EMG-1500-FIT-INT

REV. 01/31/07 BT2
 REV. A - INVERTED ITEM 10 ON DRAWING, MOVED ITEM 48 TO PARTS LIST 03/02/09 BT2
 REV. B - REMOVED ITEM 48 10/16/09 BT2
 REV. C - UPDATED KIT TO EMG-1500-SK 02/15/10 BT2

Common Parts for the Assy of;
 External Mix Gelcoat Gun EMG-1500
 External Mix Gelcoat Gun EMG-1500-FIT
 External Mix Gelcoat Gun EMG-1500-INT
 External Mix Gelcoat Gun EMG-1500-FIT-INT

PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
1	54350-3	1	GUN HANDLE
2	MAX-2040	1	TRIGGER
3	54630-1	1	TRIGGER STUD
4	54000-1	2	SPRING RETAINER
5	53900-1	2	NEEDLE GUIDE
6	53800-1	2	JAM NUT
7	56190-1	1	TRIGGER LOCK SCREW
8	56100-1	1	TRIGGER LOCK NUT
9	02883-8	1	TRIGGER LOCK PIN
10	04420-1	1	TRIGGER LOCK SPRING
11	00145	1	TRIGGER STUD SCREW
12	04038-1	2	SPRING
13	F-HN-1024	1	TRIGGER LOCK JAM NUT
14	CPR-2005-01	1	PISTON NEEDLE
15	MG-1022	1	PACKING NUT
* 16	MAX-2008	1	PACKING SEAL
17	MAX-2009	1	SEAL RETAINER
18	MAX-2010-01	1	NEEDLE
19	MAX-2011-01	1	CARBIDE SEAT
20	CPR-2003-02	1	CATALYST NEEDLE HOUSING
21	MAX-2013	1	SEAL HOUSING
23	55500-1	1	MATERIAL FITTING
* 24	O-S-006	3	O-RING
* 25	O-T-010	1	O-RING
* 26	O-S-012	5	O-RING
* 27	O-E-012	2	O-RING
28	F-MS-832-04	2	MACHINE SCREW
29	CPR-2060-01	1	TRIGGER STOP
* 30	O-S-007	1	O-RING
* 31	O-S-3-904	2	O-RING
32	F-CS-04C-12	1	SCREW
33	VPA-1003	1	RETAINING RING
34	F-BHCS-832-06	2	BUTTON HEAD SCREW
35	06977	1	1/4 X 10-32 PUSH FITTING
36	EMG-1001-01	1	GUN BLOCK
37	EMG-1002-01	1	THREAD ADAPTER ASSY
40	EMG-1007	1	CHECK VALVE STEM
41	EMG-1008	1	CHECK VALVE BODY
42	EMG-1009	1	CHECK VALVE NUT
43	EMG-1010	1	CHECK VALVE CAP
44	EMG-1011	1	CHECK VALVE SPRING
45	MPH-2534	1	ELBOW
* 47	CPR-2012-02	1	CATALYST NEEDLE SEAT
49	04070-1	1	SPRING
50	54501-1	1	NEEDLE
51	54440-1	1	VALVE BODY
* 52	O-S-104A	1	O-RING
53	54420-1	1	RETAINER

External Mix Gelcoat Gun EMG-1500-FIT-INT

ITEM	PART NO.	QTY	DESCRIPTION
22A	EMG-1097-01-03J	1	CHECK VALVE ASSY
39B	EMG-35402-FIT-INT	1	CATALYST TIP
46A	UGT-2220	1	SPRAY TIP

REPAIR KITS

PART NO.	DESCRIPTION
* EMG-1500-SK	SEAL KIT
SEAL KIT INCLUDES O-S-009A, WHICH IS PART OF ITEM 22 OR 22A	

External Mix Gelcoat Gun EMG-1500

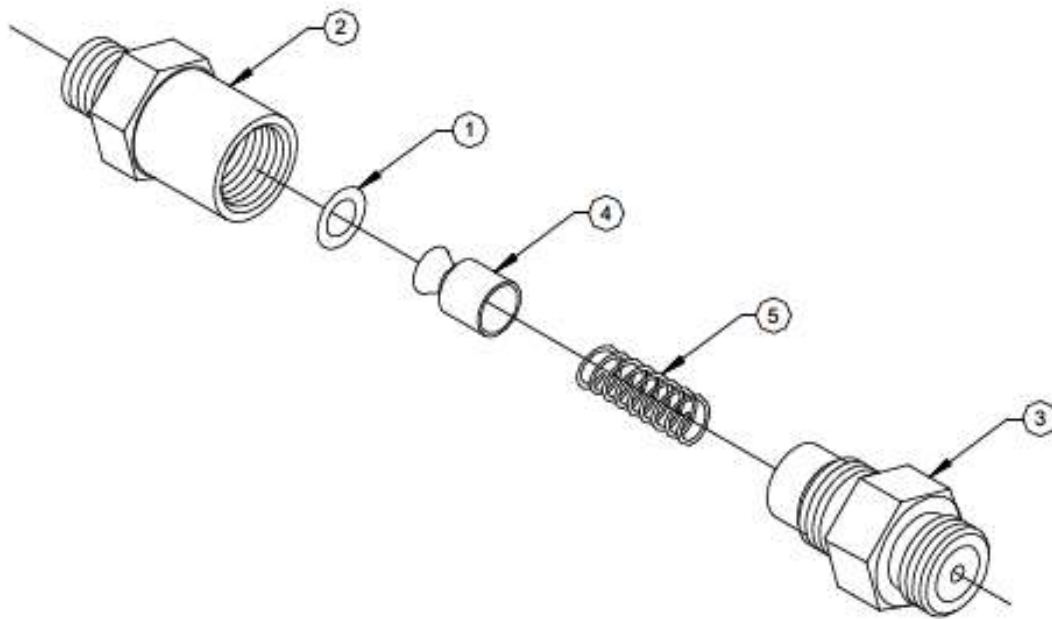
ITEM	PART NO.	QTY	DESCRIPTION
22	EMG-1097-01	1	CHECK VALVE ASSY
39	EMG-35402	1	CATALYST TIP
46	UCT-521	1	SPRAY TIP

External Mix Gelcoat Gun EMG-1500-FIT

ITEM	PART NO.	QTY	DESCRIPTION
22	EMG-1097-01	1	CHECK VALVE ASSY
39A	EMG-35402-FIT	1	CATALYST TIP
46A	UGT-2220	1	SPRAY TIP

External Mix Gelcoat Gun EMG-1500-INT

ITEM	PART NO.	QTY	DESCRIPTION
22A	EMG-1097-01-03J	1	CHECK VALVE ASSY
39B	EMG-35402-INT	1	CATALYST TIP
46	UCT-521	1	SPRAY TIP



MAGNUM VENUS PRODUCTS

Check Valve Assembly

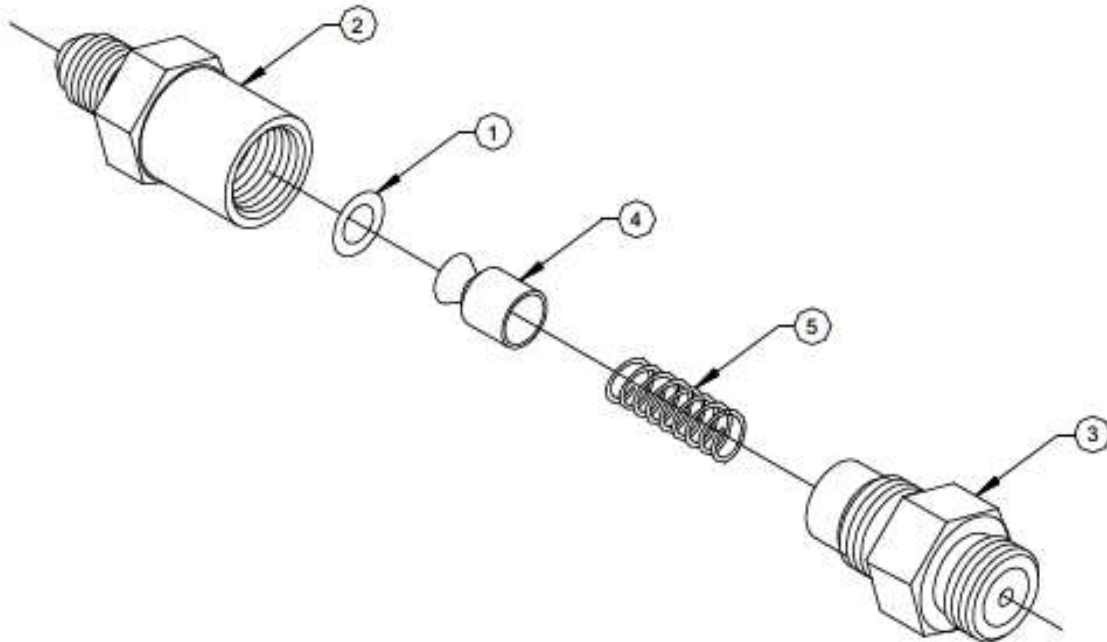
EMG-1097-01

REV. 2/25/03 JEM

Check Valve Assembly EMG-1097-01

PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
1	O-S-009A	1	O-RING
2	EMG-1097-02	1	O-RING HOUSING
3	EMG-1097-04	1	SPRING HOUSING
4	CV-1097-03	1	PISTON
5	CV-1097-05	1	SPRING



MAGNUM VENUS PRODUCTS

Check Valve Assembly

EMG-1097-01-03J

REV. 3/21/03 JEM

Check Valve Assembly EMG-1097-01

PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
1	O-S-009A	1	O-RING
2	CV-1097-02	1	O-RING HOUSING
3	EMG-1097-04	1	SPRING HOUSING
4	CV-1097-03	1	PISTON
5	CV-1097-05	1	SPRING