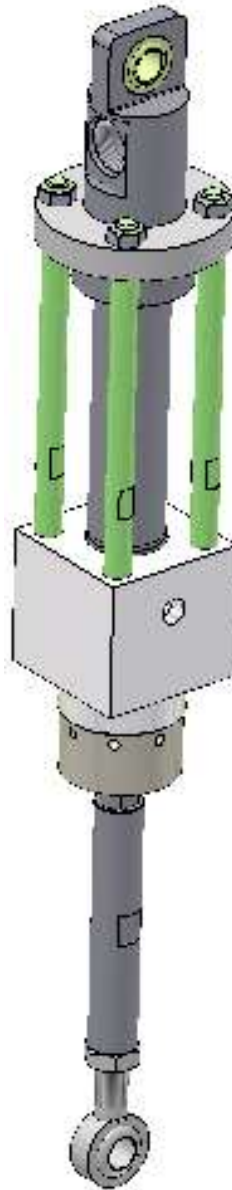


# UltraMAX Fluid Section

## Component Manual

This manual is applicable to the following models:

- UPLS-2300
- UPLS-2300-SS
- UPLS-2400
- UPLS-2400-SS





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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.

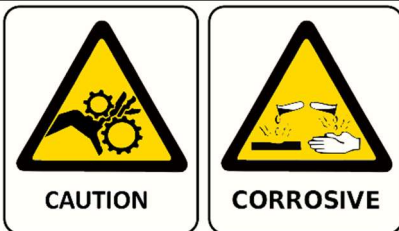
## Safety Precautions

- 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 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 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 UltraMAX Fluid Section. These fluid sections are used in multiple configurations. This manual only covers the fluid section itself; generic references are used when referring to other components that may be connected to the fluid section. Refer to the specific manual for your components for detailed information. The following procedures for the fluid section are included:

- Step-by-step assembly and disassembly
- Parts 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.

As you disassemble the equipment, lay out the components in the correct order and direction to assist with reassembly. Refer to the current parts drawing specific to the model you are working on to ensure you have the correct parts information.

## Items Needed

- ¼” wooden dowel – 6” length
- 12” adjustable wrench
- Set of open end wrenches
- Pliers
- Wire brush
- Table mounted soft-jawed vise
- Approved lubricant and grease for material being used
- Semi-permanent Loctite® (blue) or equivalent thread lock compound

- Fluid section repair kit (refer to drawings included with the unit for part number)

**Note**      ***The seal kit (SK) only comes with seals and O-rings. The repair kit (RK) comes with seals, O-rings, balls, and springs.***

**Note**      ***The Kalrez O-rings that are used on the UPLS-2300-SS fluid section are not included in any repair or seal kit and must be ordered separately.***



**WARNING**

***Due to high pressures and temperatures associated with some materials follow all safety precautions and proper start-up procedures before running new or rebuilt fluid sections.***

## **Disassembling Fluid Section**

### Remove Fluid Section from System



**WARNING**

***Release all fluid pressure from the system before disconnecting hoses or tie rods. Release surge chamber pressure before attempting to remove surge chamber. Parts under pressure could cause injury.***

1. Remove pickup wands from supply and drain or shut off supply to fluid section.
2. Switch the supply lines to approved solvent to flush the system, if possible.
3. Set operating pressure to zero (0) psi.
4. Open recirculation valve and/or gun to purge pressure from fluid sections.
5. Allow to drain until as much fluid as possible has been purged.
6. Turn air pressure to a very low setting, just enough to cycle the fluid section.
7. Cycle fluid section a few times very slowly to remove as much material from the cylinder as possible or flush with solvent until solvent is purged out.
8. Remove pickup wand assembly/feed hose from bottom of fluid section.
9. Remove the surge chamber/filter assembly from the bottom of the fluid section.
10. Remove the upper pin from the slave arm.
11. Remove the lower pin from the base mount.
12. Remove the fluid section from the unit and take to a work area for maintenance.

### Dismantle Fluid Section

13. Clamp the outlet body between the jaws of a soft-jawed table-mounted vise, as shown in Figure 1.

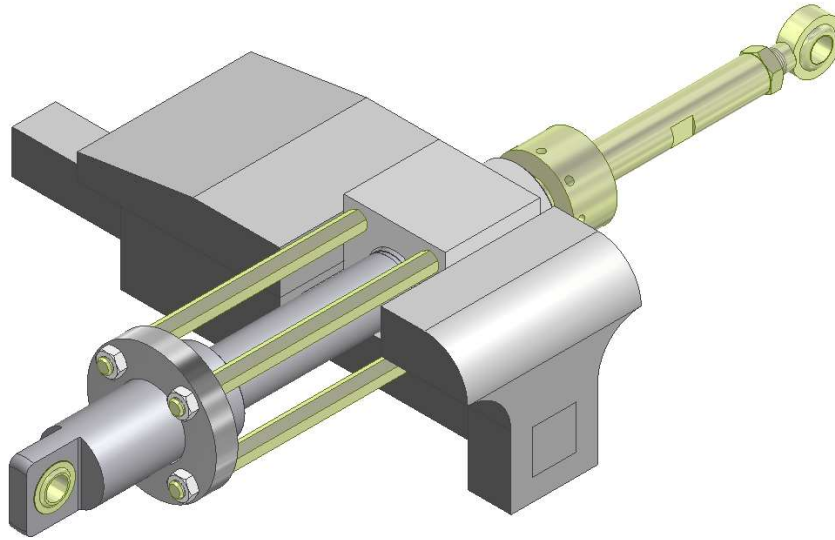
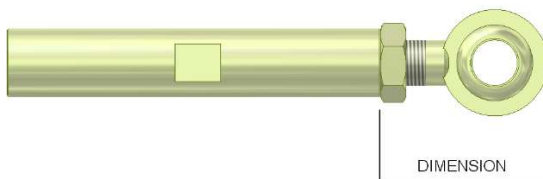
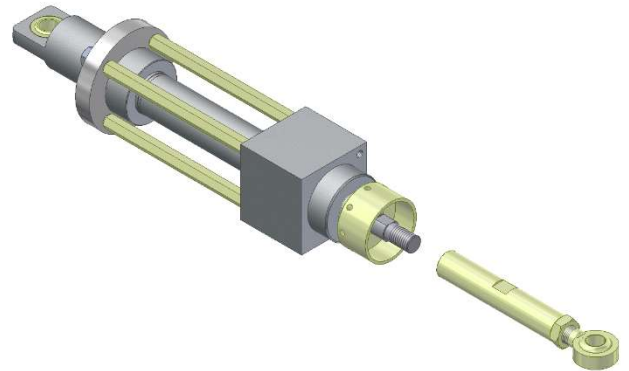


Figure 1. Fluid Section in Vise

14. Remove the rod adapter, leaving the hex nut and ball joint rod end in place.

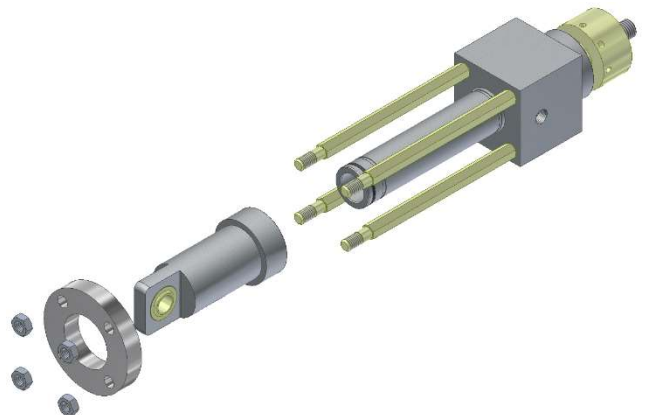
**Note** *If the hex nut and ball joint rod end have to be removed, carefully measure the distance from the end of the ball joint rod end to the top of the rod adapter to ensure that it is installed back in the same position. If this is not put back to factory specifications with 2 threads showing, damage to the chrome ball, foot valve spring, and ball stop can result.*

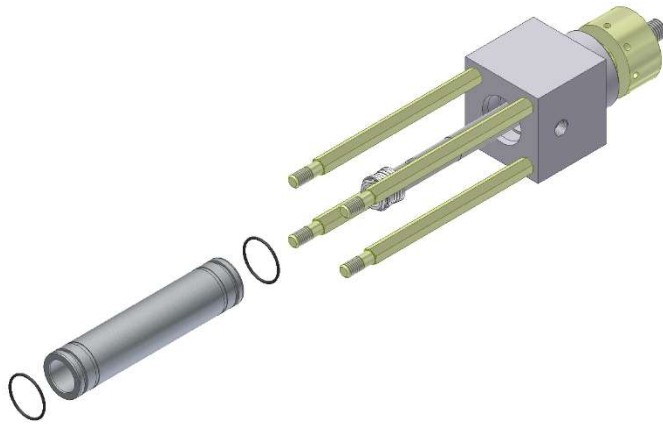


15. Remove the four hex nuts, foot valve collar, and foot valve from the bottom of the fluid section.

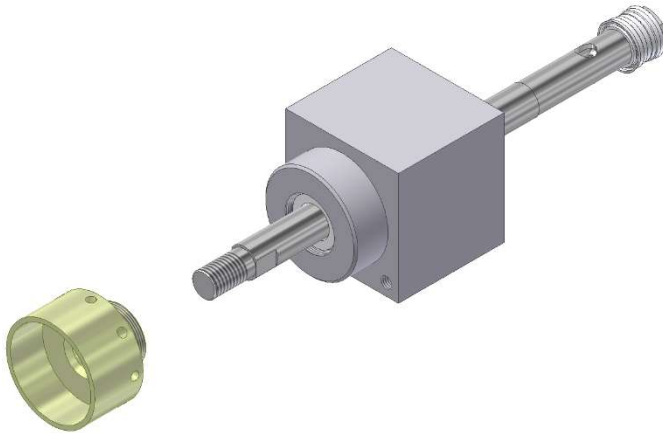
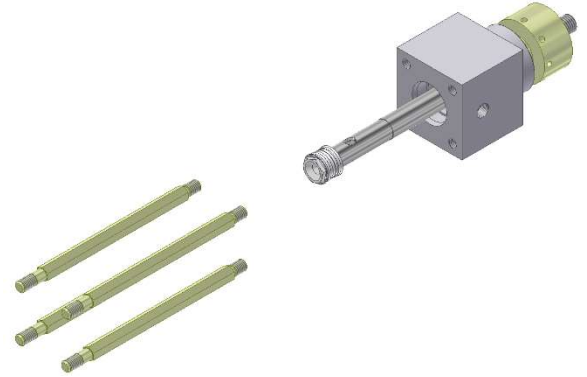
**Note** *Make note of the orientation of the foot valve inlet relative to the outlet body for reassembly purposes.*

16. Remove the cylinder.  
17. Remove and discard the two O-rings from the cylinder.

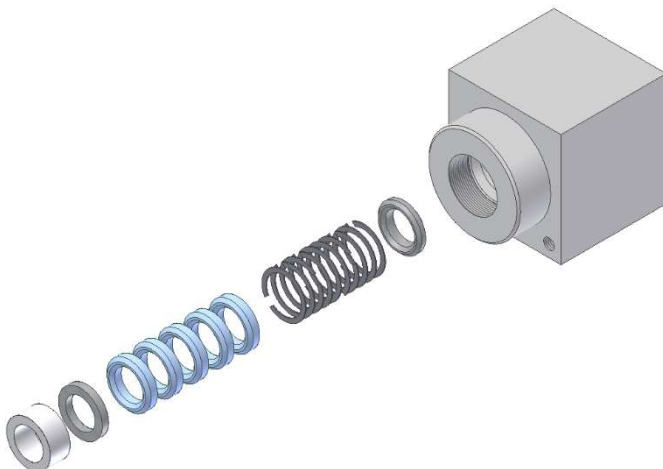
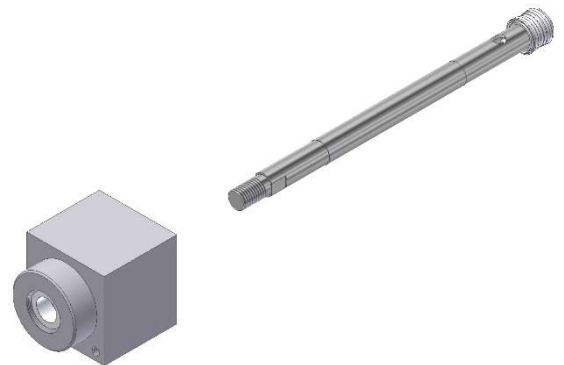




18. Remove the four cylinder tie rods from the outlet body.
19. Remove the packing nut from the outlet body.



20. Remove the piston rod assembly from the outlet body.
21. Using the 1/4" wooden dowel, push the wave springs, male compression ring, piston rod packing set, female compression ring, and the guide bushing out through the top of the outlet body.



## Disassemble Piston Rod

### UPLS-2300-SS Only

**Note**     *The UPLS-2300-SS piston body has an additional O-ring seal near the ball seat. **DO NOT remove this O-ring** during disassembly! It is not included in either the seal or repair kit and must be ordered separately. Under normal circumstances this O-ring will not have to be replaced, but you must replace if it is damaged.*

22. Wipe down the piston body with the approved solvent and inspect the O-ring.
23. If the O-ring is nicked, torn, or broken, replace with a new one.

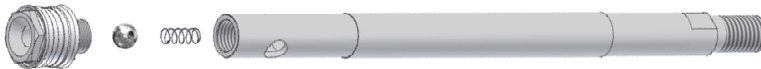


### Barrel Type Piston Seal

24. Using the appropriate wrenches, remove the piston body from the piston rod.

**Note**     *When you remove the piston body, the chrome ball may fall out. If you only have the seal kit, the chrome ball must be reused. Do not drop or dent the ball or it will be permanently damaged and must be replaced.*

25. Remove the piston body, barrel seat, chrome ball, and piston ball spring.

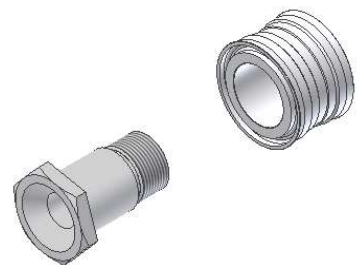


26. Remove the barrel seal from the piston body.

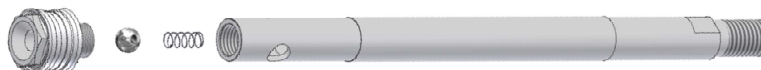
### Cup Style Piston Seal

27. Using the appropriate wrenches, remove the piston body from the piston rod.

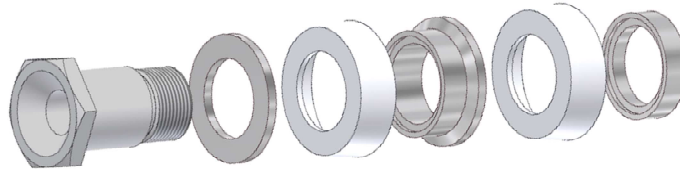
**Note**     *When you remove the piston body, the chrome ball may fall out. If you only have the seal kit, the chrome ball must be reused. Do not drop or dent the ball or it will be permanently damaged and must be replaced.*



28. Remove the piston body, barrel seat, chrome ball, and piston ball spring.



29. Remove the piston cup compression ring, upper piston cup, piston cup spacer, lower piston cup, and piston cup backup ring from the piston body.

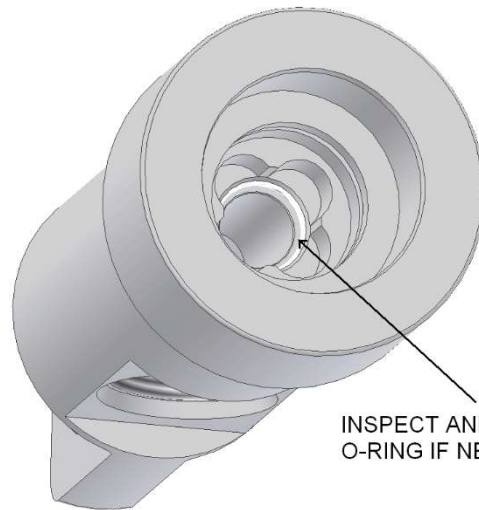


## Disassemble Foot Valve

### UPLS-2300-SS Only

**Note** *The stainless-steel foot valve has an additional O-ring seal near the ball seat.*

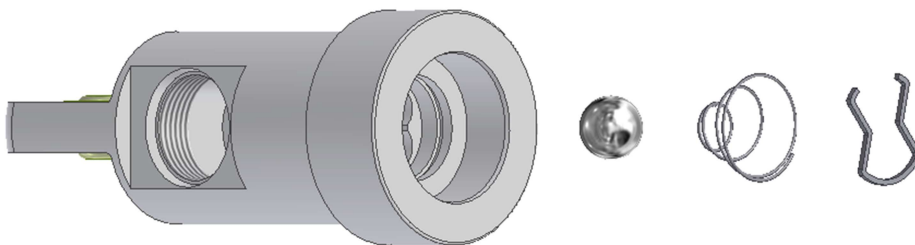
***DO NOT remove this O-ring during disassembly! It is not included in either the seal or repair kit and must be ordered separately. Under normal circumstances this O-ring will not have to be replaced, but you must replace it if it is damaged.***



INSPECT AND REPLACE THIS O-RING IF NECESSARY

30. Wipe down the foot valve body with the approved solvent and inspect the O-ring.
31. If the O-ring is nicked, torn, or broken, replace with a new one.
32. Using pliers, compress the ball stop and remove from the foot valve.
33. Remove the foot valve spring and chrome ball.

**Note** *If only using the seal kit, the chrome ball must be reused. Do not drop or dent the ball or it will be permanently damaged and must be replaced.*



# Cleaning and Inspecting

## Clean Parts

1. Determine which parts are going to be reused and discard the rest.

**Note**      *All parts can be cleaned in most solvents, but it is inadvisable to let the parts soak in acetone for any length of time.*

2. Using a wire brush, thoroughly clean all threads and remove residue from all components.

**Note**      *When cleaning the foot valve and piston body on stainless-steel fluid sections use caution not to damage the Kalrez O-ring on the ball seat.*

3. If you have the stainless-steel version of the fluid section, inspect the Kalrez O-ring in the foot valve and piston body closely without removing, and if they are in good condition, wipe off with solvent and leave in place.

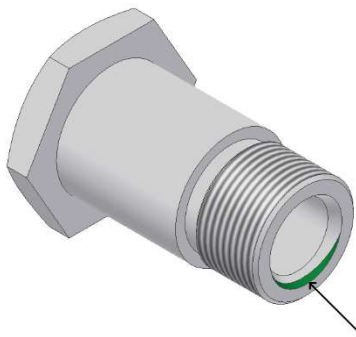
## Inspect Parts

**Note**      *After all the parts have been thoroughly cleaned it is important to inspect them for damage. If a faulty part is not replaced it could give poor performance and damage the entire assembly.*

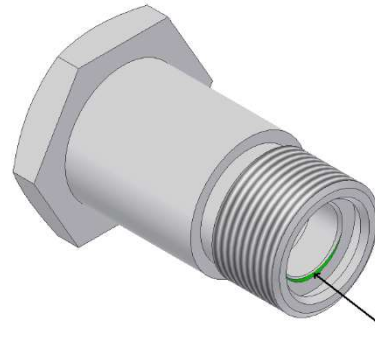
4. Ensure that the bearing in the ball joint rod end swivels and rotates freely.
5. Make sure the threads on the packing nut are clean and not marred.
6. Check for wear on the inside diameter of the male and female compression rings.
7. Make sure the threads on the outlet body are clean and not marred.
8. Clear any buildup from the area where the piston rod packing assembly is placed.
9. Ensure the piston ball spring is not bent.
10. Make sure the chrome ball that goes in the piston body is not dented, pitted, or scratched.
11. Make sure the piston rod threads are clean and not marred.
12. Check the piston rod spring guide to make sure it is straight.
13. Ensure there is no buildup inside the piston rod chamber.
14. Check the polished part of the piston rod for wear.
15. Make sure the threads on the piston body are clean and not marred.
16. Check the piston body ball seat for wear or damage.



**Note**      *The ball seat on the stainless steel version is behind the Kalrez O-ring, which must also be inspected and replaced if damaged.*



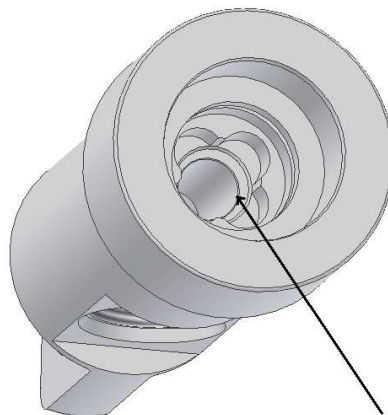
INSPECT THIS AREA FOR WEAR

*Figure 3. Piston Body Ball Seat, non-SS*

INSPECT THIS AREA FOR WEAR

*Figure 3. Piston Body Ball Seat, SS Version*

17. Make sure the cylinder bore is clean and free from scratches or pits.
18. Clear the cylinder O-ring areas of any buildup.
19. Make sure the ball stop is not bent in any way.
20. Ensure the foot valve spring is not bent.
21. Make sure the chrome ball that goes in the foot valve is not dented, pitted, or scratched.
22. Make sure the threads on the foot valve are clean and not marred.
23. Check the foot valve ball seat for abnormal wear or damage.



INSPECT THIS AREA FOR WEAR

24. Clean the ball stop groove thoroughly.
25. If you have the stainless-steel version, make sure the Kalrez O-ring is clean and not torn.

## Reassembling Fluid Section

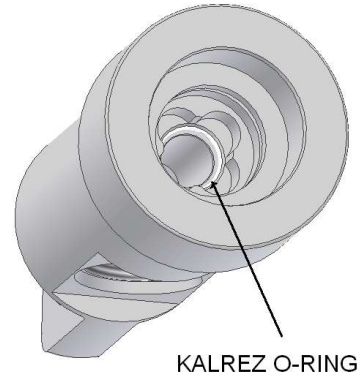
**Note**      *Assembly of the fluid section is opposite the disassembly procedure. Keeping the components organized as you disassemble them will make reassembly much easier.*

### Reassemble Foot Valve

1. Place the foot valve in the soft-jawed vise.

2. If you have the stainless-steel version and had to remove the Kalrez O-ring from the foot valve, insert the replacement back into the groove in the seat area, making sure it is seated properly.
3. Place the chrome ball gently into the foot valve.

**Note** *Use caution not to drop or dent this ball or it will be permanently damaged and have to be replaced. If the fluid section will be used with a polyester or vinylester resin system, a fine coat of red grease should be applied to the ball before installing into the foot valve. The chrome ball on an epoxy or urethane system should be clean and in good condition with no lubricant or grease. If in doubt, contact your materials manufacturer for recommendations.*



4. Place the foot valve spring on top of the chrome ball.
5. Using a set of pliers, compress the ball stop and place it on top of the foot valve spring.
6. Once centered, compress the foot valve spring until you can lock the ball stop into the appropriate groove in the foot valve.
7. Remove the foot valve assembly from the vise and set aside.



## Reassemble Piston Rod

8. Place the piston rod in the vise using the flats on the top of the rod.



**Note** *Placing the rod vertically in the vise will aid with installation.*

9. Insert the piston ball spring into the end of the piston rod and place over the dowel pin, then place the chrome ball on top of the piston ball spring.

**Note** *Use caution not to drop or dent this ball or it will be permanently damaged and have to be replaced. If the fluid section will be used with a polyester or vinylester resin system, a fine coat of red grease should be applied to the ball before installing into the foot valve. The chrome ball on an epoxy or urethane system should be clean and in good condition with no lubricant or grease. If in doubt, contact your materials manufacturer for recommendations.*

## Reassemble Piston Body

Depending on how the unit was configured from the factory, there are two distinct seal designs that could be used, either the barrel seal, or the cup seal.

10. If you have the stainless-steel version and had to remove the Kalrez O-ring from the piston body due to damage, insert the replacement back into the groove in the seat area, making sure it is seated properly.

There are three ways to configure the seals in the piston body assembly:

- Standard Piston Cup Configuration – Both cups face the same direction
- Optional Piston Cup Configuration – Cups face opposite directions
- Barrel Type Seal

11. Select the seal configuration for your system and follow the appropriate steps.



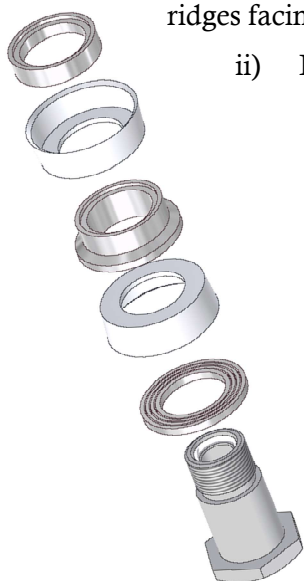
### Standard Piston Cup Configuration

- Place the piston cup backup down over the piston body with the ridges up.
- Place the first piston cup down over the piston body facing up.
- Place the piston cup spacer over the piston body, with the small end of the piston cup spacer down inside the piston cup that is in place and the ridge on the piston cup spacer facing up.
- Place the second piston cup down over the piston body facing up in the same orientation as the first.
- Place the piston cup compression ring over the piston body.



### Optional Piston Cup Configuration

- Place the piston cup spacer over the piston body with the small end facing up and the ridges facing down.
- Place the first piston cup down over the piston body facing down.
- Place the piston cup backup down over the piston body with the ridges up.
- Place the second piston cup down over the piston body facing up.
- Place the piston cup compression ring over the piston body.



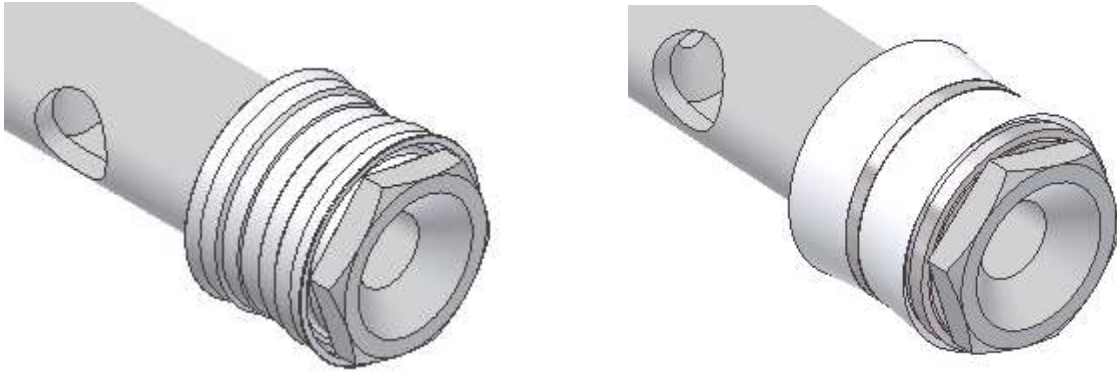
### Barrel Type Seal

- Place the piston barrel seal onto the piston body.



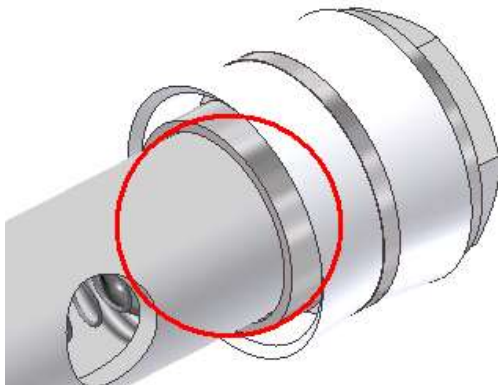
## Install Piston Body onto Piston Rod

12. Place one to two drops of thread lock compound on the piston body threads.
13. Screw the piston body and seal assembly into the piston rod.



14. Before tightening, make sure the piston cup compression ring is lined up with the piston rod.

**Note**      *If you are using the piston cup design, the piston cup compression ring will be damaged if not correctly installed/aligned.*



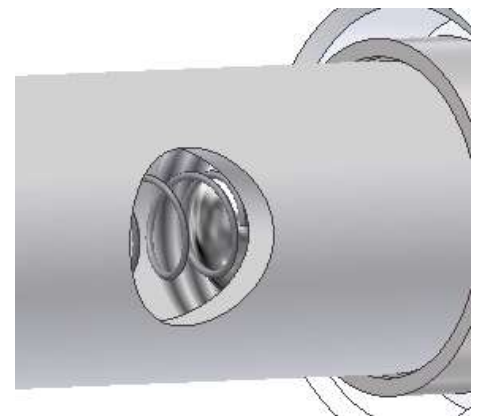
15. Using the appropriate wrenches, tighten the piston body down onto the piston rod.

**Note**      *Make sure the piston ball spring and piston ball are lined up correctly in the bore of the piston rod.*



### CAUTION

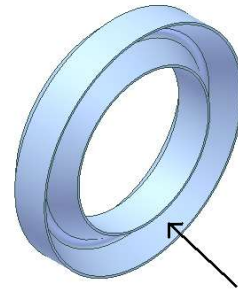
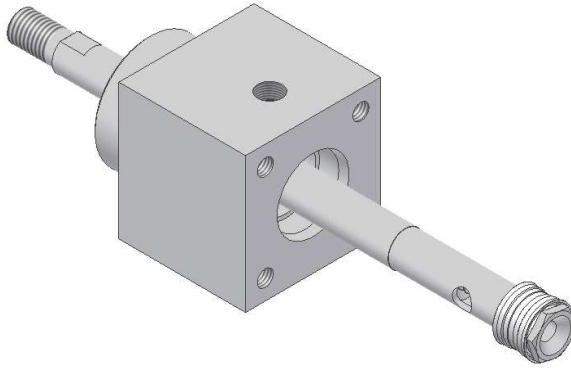
*Overtightening the piston body when using cup style seals will damage the seals.*



16. Remove the piston rod assembly from the vise and set aside.

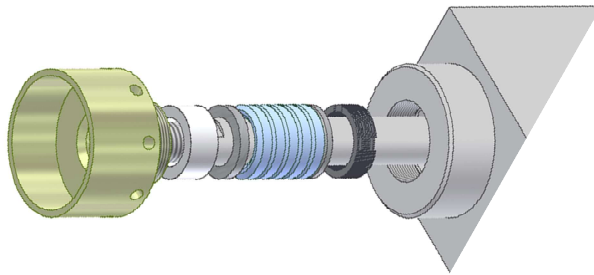
## Reassemble Outlet Body

17. Place a liberal amount of grease inside the chevron area on all the packings.
18. Gently slide the piston rod assembly through the bottom of the outlet body.



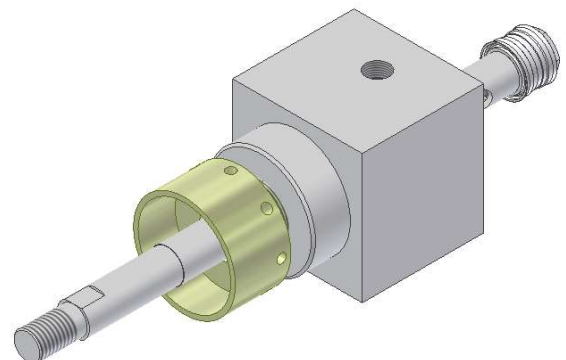
PACK THIS AREA WITH  
APPROVED GREASE

19. Slide the wave springs over the piston rod assembly, offsetting the openings of the wave springs so that all the ends are staggered.
20. Slide the male compression ring over the piston rod assembly.
21. Slide the piston rod packings over the piston rod assembly.
22. Slide the female compression ring over the piston rod assembly.
23. Slide the guide bushing over the piston rod assembly.

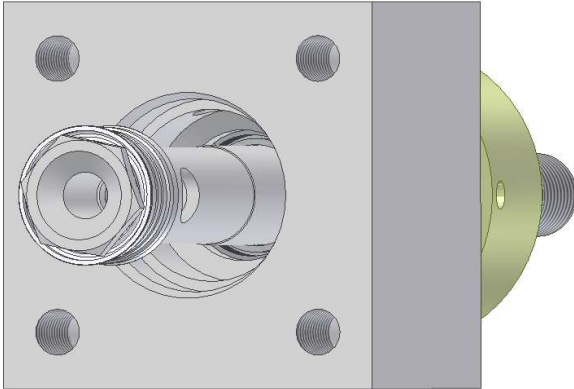


24. Coat the threads of the packing nut with approved lubricant and gently slide the packing nut over the piston rod assembly.
25. Slowly work the packing assembly into the outlet body until the packing nut can be threaded approximately 2 to 3 threads.

**Note**      ***Do not tighten the packing nut at this time.***

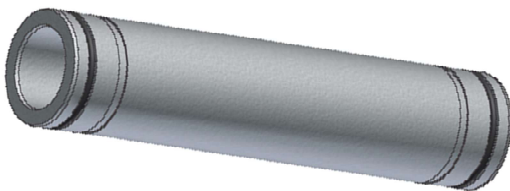
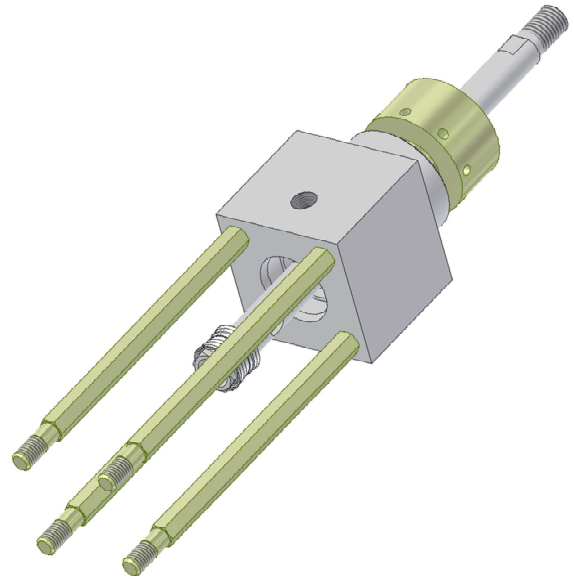


26. Look into the bottom of the outlet body and confirm that everything is straight and aligned correctly.

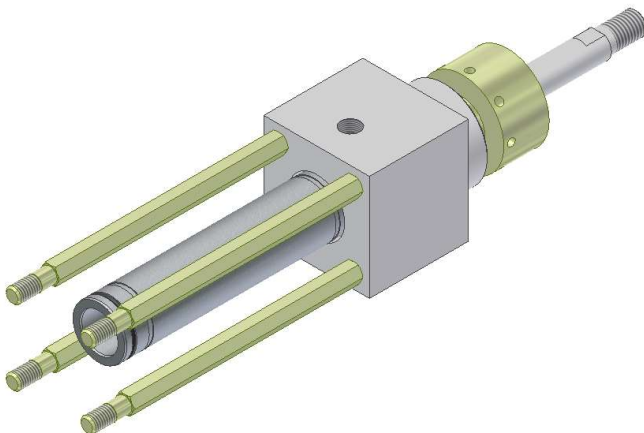


## Install Cylinder

27. Place a small amount of lubricant on the threads of the tie rods that will go into the outlet body.
28. Install the tie rods and tighten with a wrench.
29. Lightly coat the cylinder O-rings with approved lubricant and place them on each end of the cylinder tube.



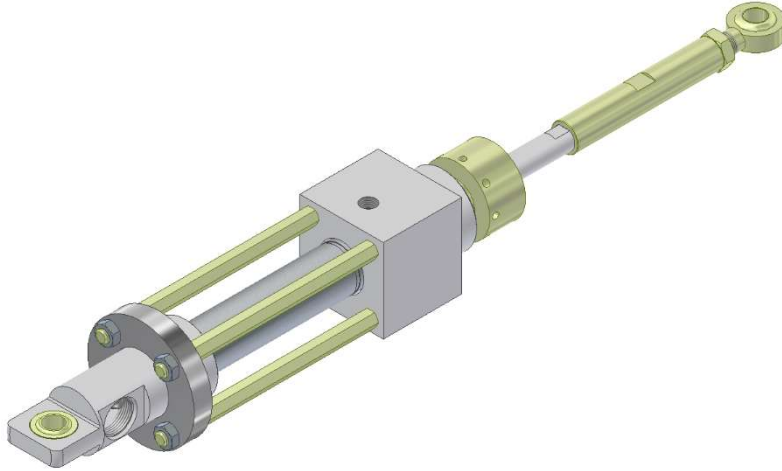
30. Slide the cylinder tube over the piston rod assembly until the top of the cylinder tube bottoms out on the outlet body.



31. Install the foot valve assembly and the collar.
32. Install the hex nuts onto the cylinder tie rods.
33. Check the orientation of the inlet port on the foot valve and make sure it is in the correct position, then tighten the hex nuts.

**Note**      ***Be careful not to overtighten the hex nuts.***

34. Place 1 to 2 drops of thread lock compound on the piston body threads and install the rod adapter assembly onto the piston rod.



## Reinstalling Fluid Section

1. Before installing the fluid section, move the piston rod assembly up and down a few times to make sure the assembly is moving freely.
2. Place the fluid section on the bottom mount and insert the pin.
3. Tilt the fluid section up and install the upper pin.
4. Install the surge chamber/filter assembly.
5. Tighten the packing nut by hand.
6. Turn the air pressure to a very low setting, just enough to cycle the fluid section.
7. Cycle the fluid section a few times very slowly to ensure it is moving freely.
8. Remove the pickup wand assembly/feed hoses from solvent.
9. Install the pickup wand assembly/feed hoses.
10. Using an Allen wrench, tighten the packing nut just enough to compress the packings but not so tight that it does not allow the piston rod to move freely.
11. Put approved lubricant into the packing nut reservoir.
12. Set system operating pressure to zero (0) psi.
13. Put the pickup wand back into the material and/or turn the feed line back on.

The rebuilt fluid section is now ready for normal operation.

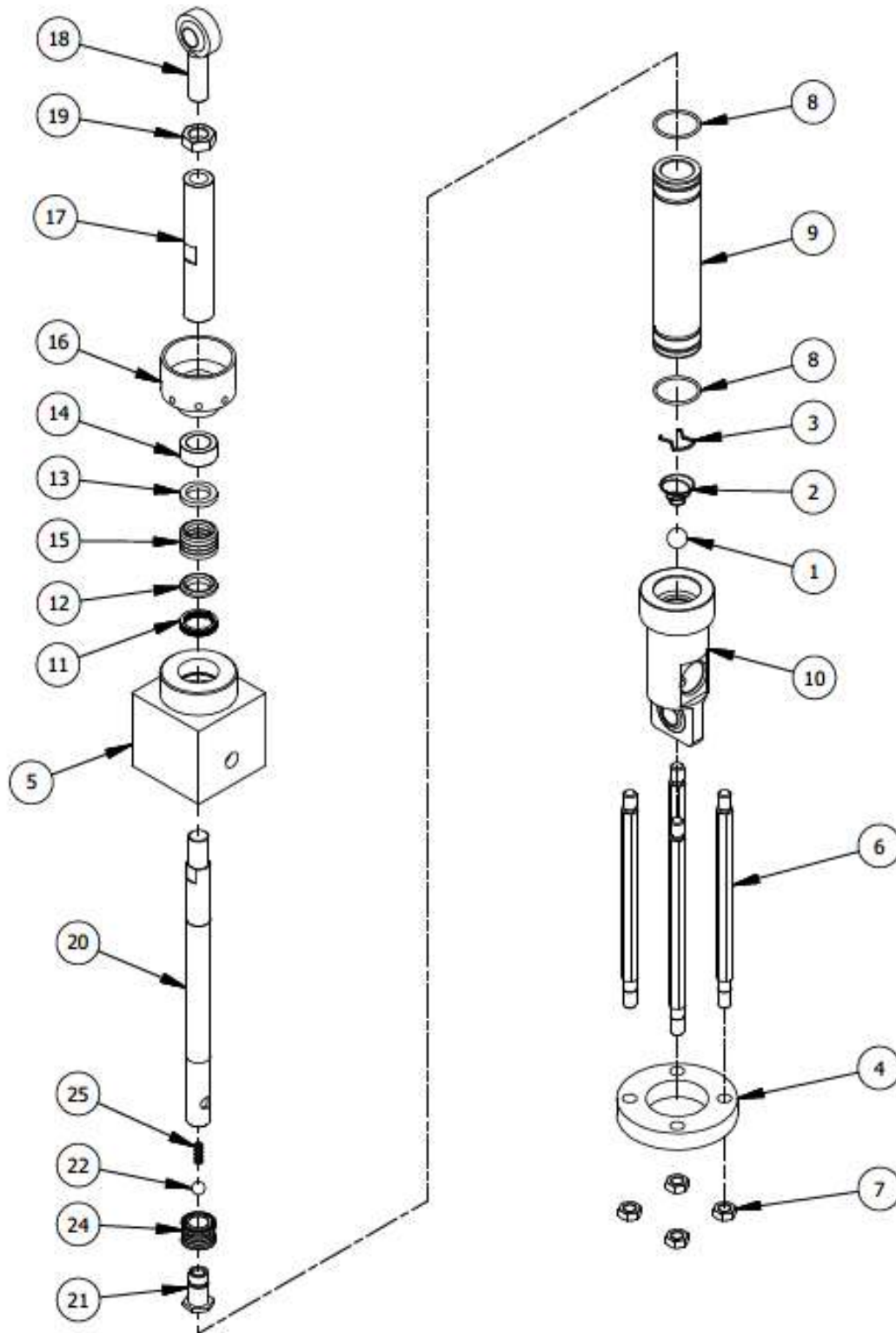
# Starting Up and Troubleshooting

1. Make sure system pressure is set to zero (0) psi and turn on pneumatic pressure from system.
2. Turn on the recirculation circuit and/or open the filter bypass valves.
3. Using the priming button, slowly ramp up pressure to cycle the fluid section until a solid flow is achieved, observing the up and down strokes to make sure both have a steady fluid stream.
4. Close the recirculation valves and/or gun.
5. Using the priming/manual override circuit, pump the system up to operating pressure.
6. Note which way the pump is travelling and measure from the top of the packing nut to the end of the piston rod.
7. After 15 minutes, bypass some fluid to get the fluid section travelling in the opposite direction.
8. Measure from the top of the packing nut to the end of the piston rod.
9. Let the system set for approximately 15 minutes, then remeasure.
10. If after 15 minutes the piston rod assembly has moved, there is a problem with one or more of the ball seats; address as follows:
  - i) If the fluid section is on the upstroke and continues to move up after recirculation and/or gun has been closed, replace any of the following components that may be faulty: piston body ball seat, O-ring, or piston seal/cup assembly.
  - ii) If the fluid section is on the downstroke and continues to move down after the recirculation and/or gun has been closed, replace the faulty foot valve ball seat and/or O-ring.
11. Check the cylinder seals for leakage.
12. Check the packing nut cavity for leakage.
13. Check the outlet fitting for leakage.
14. Check the inlet fittings for leakage.
15. Tighten or replace components as needed.

## Parts Drawings

The following illustrated parts breakdowns are included for reference when servicing the equipment. Make sure you refer to the drawing specific to the assembly you are working on to ensure you obtain the correct part numbers and orientation.

- UPLS-2300
- UPLS-2300-SS
- UPLS-2300-TSE
- UPLS-2400
- UPLS-1000



# MAGNUM VENUS PLASTECH

LOWER SECTION

UPLS-2300

REV:A 10/7/10

SHEET 1 / 2

5/18/2010

| Parts List |                  |     |                         |
|------------|------------------|-----|-------------------------|
| ITEM       | PART NUMBER      | QTY | DESCRIPTION             |
| 1          | VLS-2427         | 1   | 3/4" CHROME BALL        |
| 2          | 3102-16-1        | 1   | FOOT VALVE SPRING       |
| 3          | VLS-2420         | 1   | BALL STOP               |
| 4          | 87160-1          | 1   | COLLAR                  |
| 5          | 60351-1          | 1   | OUTLET BODY             |
| 6          | VLS-4623         | 4   | CYLINDER TIE ROD        |
| 7          | F-HN-08C         | 4   | HEX NUT                 |
| * 8        | O-V-129          | 2   | O-RING                  |
| 9          | UPLS-2308        | 1   | CYLINDER TUBE           |
| 10         | 60292-1          | 1   | FOOT VALVE              |
| 11         | VLS-2410         | 10  | WAVE SPRING             |
| 12         | VLS-2406         | 1   | MALE COMPRESSION RING   |
| 13         | VLS-2404         | 1   | FEMALE COMPRESSION RING |
| 14         | VLS-2403         | 1   | GUIDE BUSHING           |
| * 15       | VLS-2405         | 1   | PISTON ROD PACKING SET  |
| 16         | VLS-2407         | 1   | PACKING NUT             |
| 17         | UPLS-2313        | 1   | ROD ADAPTOR             |
| 18         | B-BJRE-.750-1-XS | 1   | BALL JOINT ROD END      |
| 19         | F-JN-12F         | 1   | JAM NUT                 |
| 20         | 60352-1          | 1   | PISTON ROD ASSY         |
| 21         | VLS-2419         | 1   | PISTON BODY             |
| 22         | VLS-2426         | 1   | 1/2" CHROME BALL        |
| * 24       | UPLS-2314        | 1   | PISTON CUP SEAL         |
| 25         | VLS-2414         | 1   | PISTON BALL SPRING      |

### REPAIR KITS

| PART No.           | DESCRIPTION              |
|--------------------|--------------------------|
| * UPLS-23SK-4T-1UB | SEAL KIT                 |
| UPLS-23RK-4T-1UB   | SEAL KIT INCLUDING BALLS |

\* NOTE: ASTERISKS DENOTE PARTS USED IN SEAL KIT.

## MAGNUM VENUS PLASTECH

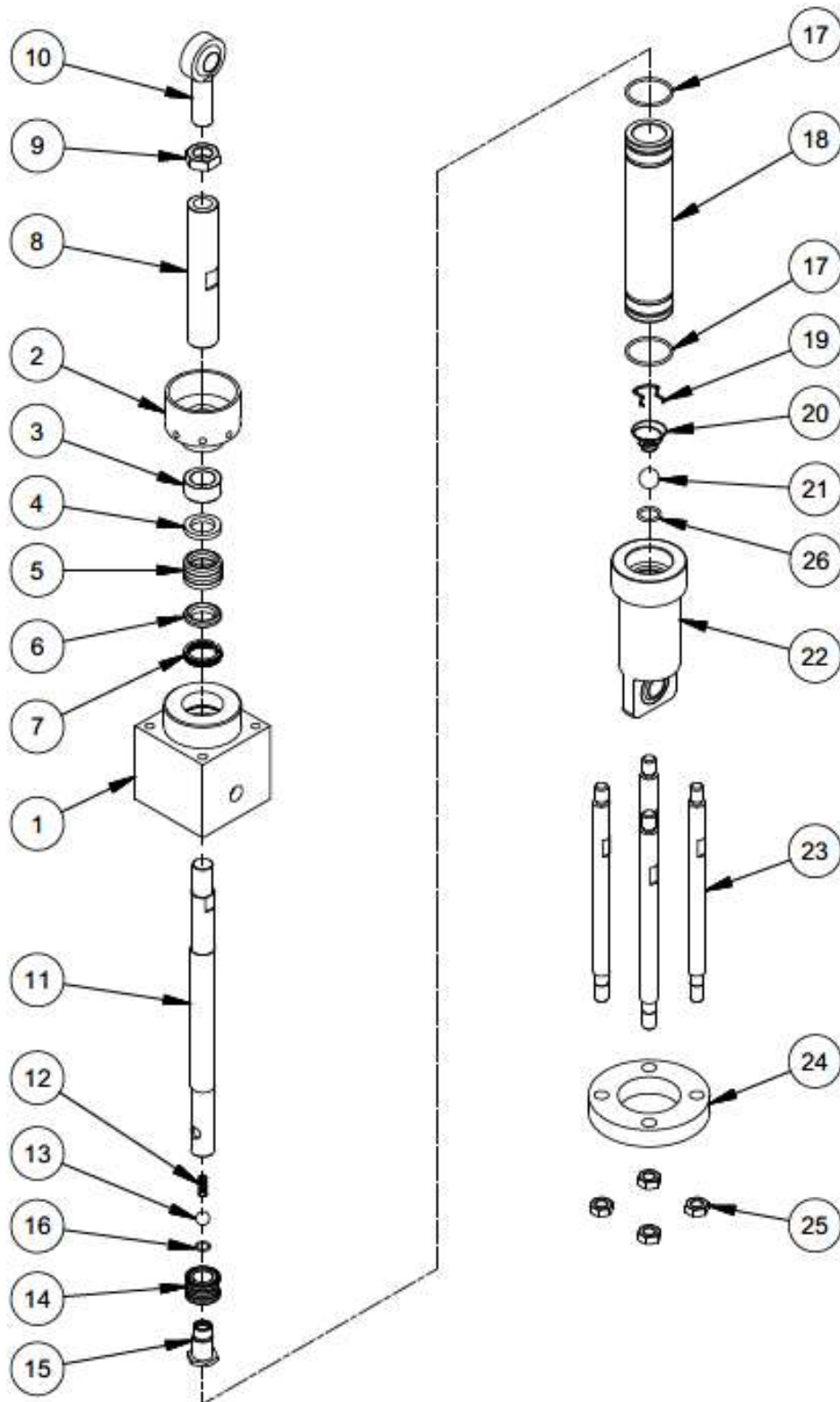
LOWER SECTION

UPLS-2300

REV:A 10/7/10

SHEET 2 / 2

5/18/2010



# MAGNUM VENUS PLASTECH

LOWER SECTION

UPLS-2300-SS

REV:C 01/19/2017

SHEET 1 / 2

4/6/2010

| Parts List |                  |     |                         |
|------------|------------------|-----|-------------------------|
| ITEM       | PART NUMBER      | QTY | DESCRIPTION             |
| 1          | 60351-1-SS       | 1   | OUTLET BODY             |
| 2          | VLS-2407         | 1   | PACKING NUT             |
| 3          | VLS-2403         | 1   | GUIDE BUSHING           |
| 4          | VLS-2404-SS      | 1   | FEMALE COMPRESSION RING |
| * 5        | VLS-2405-2U2G    | 1   | PACKING SET             |
| 6          | VLS-2406-SS      | 1   | MALE COMPRESSION RING   |
| 7          | VLS-2410         | 10  | WAVE SPRING             |
| 8          | UPLS-2313        | 1   | ROD ADAPTOR             |
| 9          | F-JN-12F         | 1   | JAM NUT                 |
| 10         | B-BJRE-.750-1-XS | 1   | BALL JOINT ROD END      |
| 11         | 60352-1-SS       | 1   | PISTON ROD ASSEMBLY     |
| 12         | VLS-2414         | 1   | PISTON BALL SPRING      |
| 13         | 03402            | 1   | BALL                    |
| * 14       | UPLS-2314-GFT    | 1   | PISTON CUP SEAL         |
| 15         | UPLS-2319-SS     | 1   | PISTON BODY             |
| 16         | O-K-013          | 1   | O-RING                  |
| * 17       | O-V-129          | 2   | O-RING                  |
| 18         | UPLS-2308-SS     | 1   | CYLINDER TUBE           |
| 19         | VLS-2420         | 1   | BALL STOP               |
| 20         | 3102-16-1        | 1   | FOOT VALVE SPRING       |
| 21         | VLS-2427-SS      | 1   | BALL                    |
| 22         | UPLS-2302-SS     | 1   | FOOT VALVE              |
| 23         | VLS-4623         | 4   | CYLINDER TIE ROD        |
| 24         | 87160-1          | 1   | COLLAR                  |
| 25         | F-HN-08C         | 4   | HEX NUT                 |
| 26         | O-K-115          | 1   | O-RING                  |

## REPAIR KITS

|                      |             |
|----------------------|-------------|
| PART No.             | DESCRIPTION |
| * UPLS-23SK-2U2G-1GB | SEAL KIT    |

\* NOTE: ASTERISKS DENOTE PARTS USED IN SEAL KIT

**MAGNUM VENUS PLASTECH**

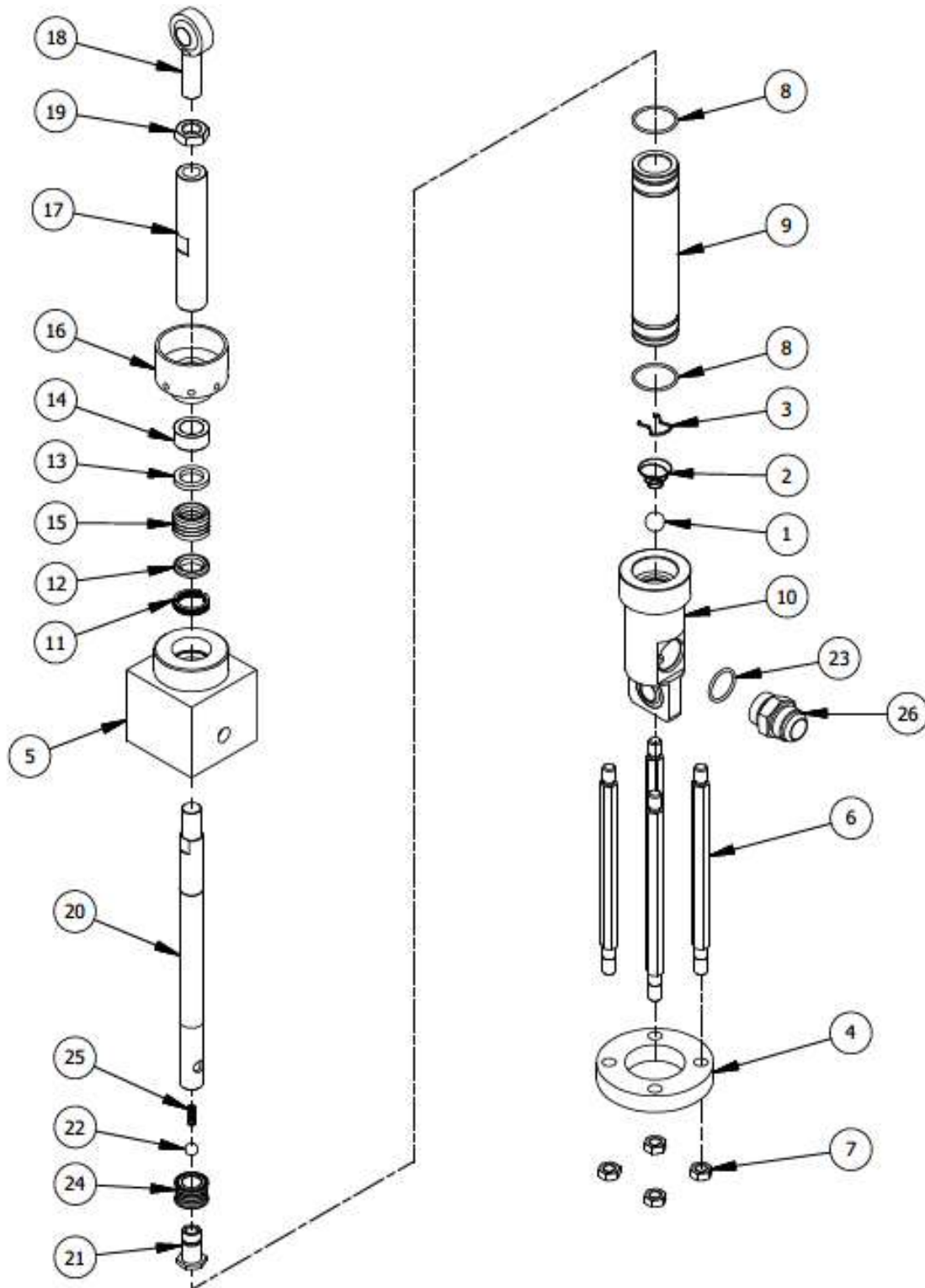
LOWER SECTION

UPLS-2300-SS

REV:C 01/19/2017

SHEET 2 / 2

4/6/2010



# MAGNUM VENUS PLASTECH

LOWER SECTION

UPLS-2300-TSE

REV:A 10/7/10

SHEET 1 / 2

9/23/2010

| Parts List |                  |     |                         |
|------------|------------------|-----|-------------------------|
| ITEM       | PART NUMBER      | QTY | DESCRIPTION             |
| 1          | VLS-2427         | 1   | 3/4" CHROME BALL        |
| 2          | 3102-16-1        | 1   | FOOT VALVE SPRING       |
| 3          | VLS-2420         | 1   | BALL STOP               |
| 4          | 87160-1          | 1   | COLLAR                  |
| 5          | 60351-1          | 1   | OUTLET BODY             |
| 6          | VLS-4623         | 4   | CYLINDER TIE ROD        |
| 7          | F-HN-08C         | 4   | HEX NUT                 |
| * 8        | O-V-129          | 2   | O-RING                  |
| 9          | UPLS-2308        | 1   | CYLINDER TUBE           |
| 10         | 60292-1          | 1   | FOOT VALVE              |
| 11         | VLS-2410         | 10  | WAVE SPRING             |
| * 12       | VLS-2406         | 1   | MALE COMPRESSION RING   |
| * 13       | VLS-2404         | 1   | FEMALE COMPRESSION RING |
| * 14       | VLS-2403         | 1   | GUIDE BUSHING           |
| * 15       | VLS-2405-2U2G    | 1   | PACKING SET             |
| 16         | VLS-2407         | 1   | PACKING NUT             |
| 17         | UPLS-2313        | 1   | ROD ADAPTOR             |
| 18         | B-BJRE-.750-1-XS | 1   | BALL JOINT ROD END      |
| 19         | F-JN-12F         | 1   | JAM NUT                 |
| 20         | 60352-1          | 1   | PISTON ROD ASSY         |
| 21         | VLS-2419         | 1   | PISTON BODY             |
| 22         | VLS-2426         | 1   | 1/2" CHROME BALL        |
| * 23       | O-E-3-916        | 1   | O-RING                  |
| * 24       | UPLS-2314        | 1   | PISTON CUP SEAL         |
| 25         | VLS-2414         | 1   | PISTON BALL SPRING      |
| 26         | 08211            | 1   | ADAPTER                 |

### REPAIR KIT

| PART No.        | DESCRIPTION                           |
|-----------------|---------------------------------------|
| * UPLS-23RK-TSE | REPAIR KIT (ALSO INCLUDES GR-ISO-100) |

\* NOTE: ASTERISKS DENOTE PARTS USED IN SEAL KIT.

## MAGNUM VENUS PLASTECH

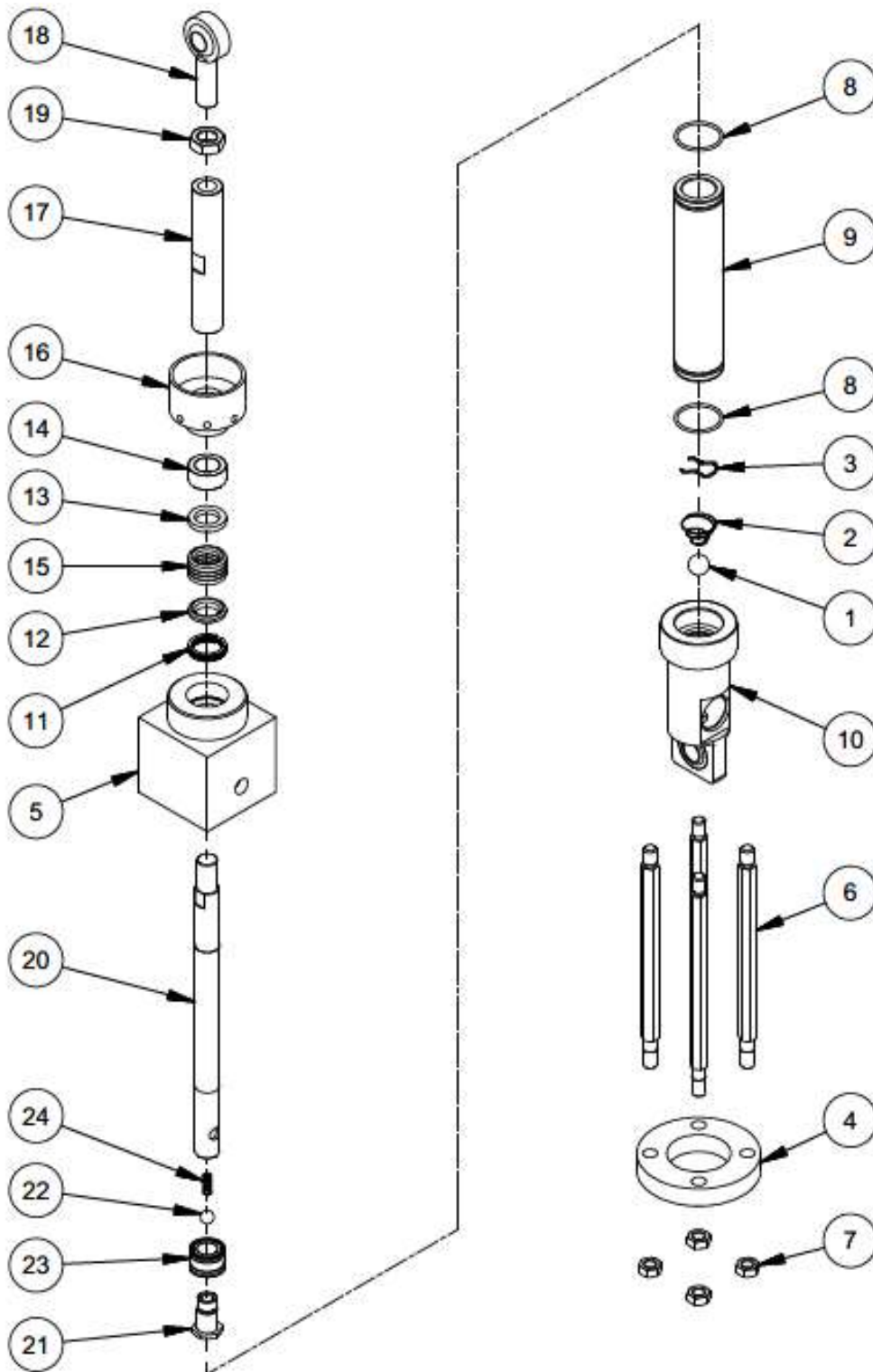
LOWER SECTION

UPLS-2300-TSE

REV:A 10/7/10

SHEET 2 / 2

9/23/2010



# MAGNUM VENUS PLASTECH

LOWER SECTION

UPLS-2400

REV:A 10/7/10

SHEET 1 / 2

4/8/2010

| Parts List |                  |     |                         |
|------------|------------------|-----|-------------------------|
| ITEM       | PART NUMBER      | QTY | DESCRIPTION             |
| 1          | VLS-2427         | 1   | 3/4" CHROME BALL        |
| 2          | 3102-16-1        | 1   | FOOT VALVE SPRING       |
| 3          | VLS-2420         | 1   | BALL STOP               |
| 4          | 87160-1          | 1   | COLLAR                  |
| 5          | 60351-1          | 1   | OUTLET BODY             |
| 6          | VLS-4623         | 4   | CYLINDER TIE ROD        |
| 7          | F-HN-08C         | 4   | HEX NUT                 |
| * 8        | O-V-129          | 2   | O-RING                  |
| 9          | 87190-1          | 1   | CYLINDER TUBE           |
| 10         | 60292-1          | 1   | FOOT VALVE              |
| 11         | VLS-2410         | 10  | WAVE SPRING             |
| 12         | VLS-2406         | 1   | MALE COMPRESSION RING   |
| 13         | VLS-2404         | 1   | FEMALE COMPRESSION RING |
| 14         | VLS-2403         | 1   | GUIDE BUSHING           |
| * 15       | VLS-2405         | 1   | PISTON ROD PACKING SET  |
| 16         | VLS-2407         | 1   | PACKING NUT             |
| 17         | UPLS-2313        | 1   | ROD ADAPTOR             |
| 18         | B-BJRE-.750-1-XS | 1   | BALL JOINT ROD END      |
| 19         | F-JN-12F         | 1   | JAM NUT                 |
| 20         | 60352-1          | 1   | PISTON ROD ASSY         |
| 21         | VLS-2419         | 1   | PISTON BODY             |
| 22         | VLS-2426         | 1   | 1/2" CHROME BALL        |
| * 23       | VLS-2433-GFT     | 1   | PISTON CUP SEAL         |
| 24         | VLS-2414         | 1   | PISTON BALL SPRING      |

### REPAIR KITS

| PART No.           | DESCRIPTION |
|--------------------|-------------|
| * UPLS-24SK-4T-1GB | SEAL KIT    |

\* NOTE: ASTERISKS DENOTE PARTS USED IN SEAL KIT

## MAGNUM VENUS PLASTECH

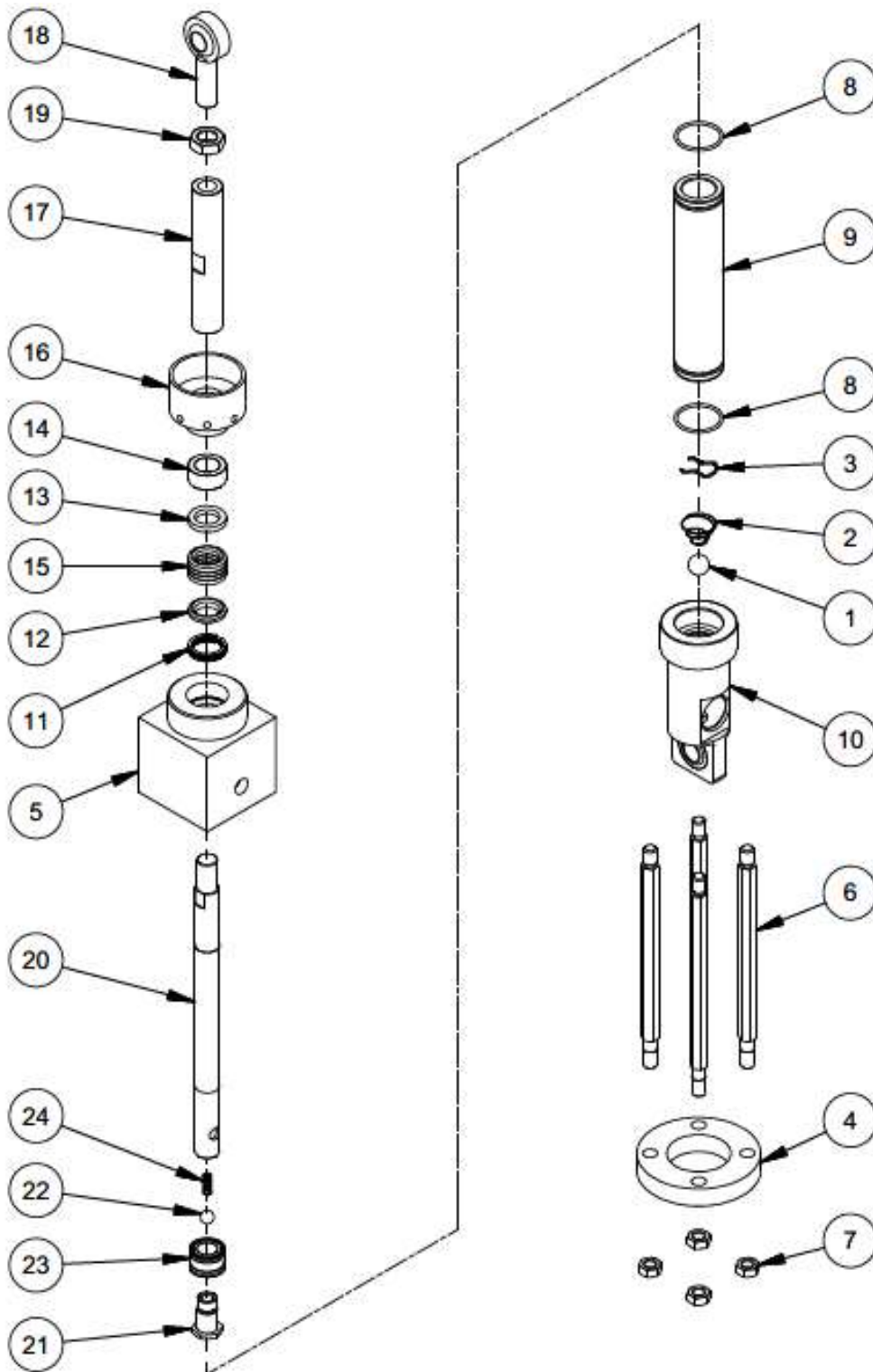
LOWER SECTION

UPLS-2400

REV:A 10/7/10

SHEET 2 / 2

4/8/2010



# MAGNUM VENUS PLASTECH

LOWER SECTION

UPLS-2400

REV:A 10/7/10

SHEET 1 / 2

4/8/2010

| Parts List |                  |     |                         |
|------------|------------------|-----|-------------------------|
| ITEM       | PART NUMBER      | QTY | DESCRIPTION             |
| 1          | VLS-2427         | 1   | 3/4" CHROME BALL        |
| 2          | 3102-16-1        | 1   | FOOT VALVE SPRING       |
| 3          | VLS-2420         | 1   | BALL STOP               |
| 4          | 87160-1          | 1   | COLLAR                  |
| 5          | 60351-1          | 1   | OUTLET BODY             |
| 6          | VLS-4623         | 4   | CYLINDER TIE ROD        |
| 7          | F-HN-08C         | 4   | HEX NUT                 |
| * 8        | O-V-129          | 2   | O-RING                  |
| 9          | 87190-1          | 1   | CYLINDER TUBE           |
| 10         | 60292-1          | 1   | FOOT VALVE              |
| 11         | VLS-2410         | 10  | WAVE SPRING             |
| 12         | VLS-2406         | 1   | MALE COMPRESSION RING   |
| 13         | VLS-2404         | 1   | FEMALE COMPRESSION RING |
| 14         | VLS-2403         | 1   | GUIDE BUSHING           |
| * 15       | VLS-2405         | 1   | PISTON ROD PACKING SET  |
| 16         | VLS-2407         | 1   | PACKING NUT             |
| 17         | UPLS-2313        | 1   | ROD ADAPTOR             |
| 18         | B-BJRE-.750-1-XS | 1   | BALL JOINT ROD END      |
| 19         | F-JN-12F         | 1   | JAM NUT                 |
| 20         | 60352-1          | 1   | PISTON ROD ASSY         |
| 21         | VLS-2419         | 1   | PISTON BODY             |
| 22         | VLS-2426         | 1   | 1/2" CHROME BALL        |
| * 23       | VLS-2433-GFT     | 1   | PISTON CUP SEAL         |
| 24         | VLS-2414         | 1   | PISTON BALL SPRING      |

### REPAIR KITS

| PART No.           | DESCRIPTION |
|--------------------|-------------|
| * UPLS-24SK-4T-1GB | SEAL KIT    |

\* NOTE: ASTERISKS DENOTE PARTS USED IN SEAL KIT

## MAGNUM VENUS PLASTECH

LOWER SECTION

UPLS-2400

REV:A 10/7/10

SHEET 2 / 2

4/8/2010



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