

PATRIOT 1-3/4" SERIES FLUID SECTION MANUAL PAT-LS-24050





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Terms & Conditions of Sale:

- Customs duties, import and export licenses and certificates, if required, and all local taxes are excluded from this offer. If US state and local taxes are applicable and not included in equipment invoice, such amount may be invoiced later.
- Delivery dates or shipping schedules are approximate and based upon the most recent information available at the time of order. Dates may be adjusted upon receipt of subsequent information or modification of order. Seller will ship prior to the delivery date if possible, but not without Buyer's consent on Advanced Equipment sales.
- All contract dates and timelines begin upon receipt at MVP of customer purchase order, signed Terms and Conditions of Sale (if applicable), and down payment per quotation (if applicable).
- If shipments are delayed by the Buyer, or because the Buyer's account is in arrears, payments shall become due on the date when the Seller is prepared to make shipment. Products held by the Seller for the Buyer shall be at the risk and expense of the Buyer.
- Damages, defects or shortages must be communicated immediately to MVP. Discrepancy in pricing and/or quantities on invoices must be reported within 30 days of the invoice date. Claims made 30 days or more following the invoice date will not be honored.
- Permission to return items must be requested and granted in advance. No credit will be given if items are returned prior to requesting and receiving permission. All returns are subject to a restocking fee. The standard 15% charges may be increased or decreased depending on the reason for the return. Special ordered items may not be returned.
- Seller warrants that the mechanical operation of the goods as specified shall be free from faults in respect to materials and workmanship for a period of 12 months for parts from the date of invoice. For systems, 12 months from start-up or, if earlier, 18 months from the date of the Bills of Lading. The warranty does not cover general wear and tear or damage due to negligence or improper use. Seller's liability under the warranty shall be limited solely to repair or replacement costs, and has no responsibility for reimbursing repair cost incurred by Buyer in connection with equipment without first giving written authorization for such charges. Seller makes no express warranties except those set forth in this agreement, and disclaims all other warranties, expressed or implied, including without limitation, implied warranties of non-infringement merchantability and fitness for a particular purpose. Seller accepts no liability for loss of production, loss of profits, or other direct or indirect damages. In any claim by the Buyer



against the Seller in respect of the goods, the liability of the Seller shall be limited to the value of the goods.

- Many factors beyond Seller's control contribute to the success of Buyer's finished products, such as raw materials used to manufacture the product. Equipment is warranted to perform to specifications detailed in quotation, but Seller is not liable for quality or quantity of finished products produced by Buyer.
- The country of origin is the United States of America. Sale, installation and all rights of the parties are governed by the laws of the state of Florida. Venue with regard to any litigation shall be in Pinellas County, Florida. The parties agree to waive all rights to trial by jury as to any and all disputes.
- The goods remain the property of the Seller until full payment is received.
- Sale of equipment is subject to application and issuance of proper US Government export license and regulations, if applicable.
- Installation of equipment is responsibility of Buyer and Seller, with cost responsibility and number of days provided as detailed in original customer Quotation. Seller will provide installation supervision personnel within 30 days of customer request. If installation is delayed by the Buyer more than six months from the date of shipment, or if customer facility or material/parts are not prepared for installation, seller will invoice full installation costs, up to \$1,250 a day plus expenses, for each MVP installation technician on site. Seller has the option to waive this fee at its discretion.
- Parties shall be excused for delays caused by embargoes, acts of civil or military authorities, Acts of God, or other circumstances beyond the reasonable control of the parties. Notification of such delays must be made in writing within ten days of occurrence.
- Our agreement supersedes any previous agreement and applies in full.



SAFETY & WARNING INFORMATION:

OPERATING YOUR POLYESTER SYSTEM SAFELY



1. Introduction

Any tool, if used improperly, can be dangerous. Safety is ultimately the responsibility of those using the tool. In like manner, safe operation of polyester processes is the responsibility of those who use such processes and those who operate the equipment. This manual outlines procedures to be followed in conducting polyester operations safety. This system has been specifically designed for use of Polyester Resin, Gel-Coat, and Methyl Ethyl Ketone Peroxides (MEKP) applications. Other formulations or blends considered for use in this equipment is strictly prohibited without the expressed consent by Magnum Venus Plastech Inc. Magnum Venus Plastech cannot eliminate every danger nor foresee every circumstance that might cause an injury during equipment operation. Some risks, such as the high pressure liquid stream that exits the spray tip, are inherent to the nature of the machine operation and are necessary to the process in order to manufacture the end-product. For this reason, ALL personnel involved in polyester operations should read and understand the Safety Manual. It is very important for the safety of employees involved in the operation that equipment operators, maintenance and supervisory personnel understand the requirements for safe operation. Each user should examine his own operation, develop his own safety program and be assured that his equipment operators follow correct procedures. Magnum Venus Plastech hopes that this manual is helpful to the user and recommends that the precautions in this manual be included in any such program. Magnum Venus Plastech recommends this Safety Manual remain on your equipment at all times for your personnel safety. In addition to the manual, Magnum Venus Plastech recommends that the user consult the regulations established under the Occupational Safety & Health Act (OSHA), particularly the following sections:

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.

Other standards and recognized authorities to consult are the National Fire Protection Association (NFPA) bulletins as follows:

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

Type of Fire Extinguishing equipment recommended: Fire Extinguisher – code ABC, rating number 4a60bc.

Extinguishing Media – Foam, Carbon Dioxide, Dry Chemical, Water Fog.

Copies of the above bulletins are available, at a nominal charge from:



National Fire Protection Association
470 Atlantic Avenue
Boston, MA 02210

Research Report No.11 of the American Insurance Association deal with “Fire, Explosion and Health Hazards of Organic Peroxides”. It is published by:

American Insurance Association
85 John Street
New York, NY 10038

Local codes and authorities also have standards to be followed in the operation of your spraying equipment. Your insurance carrier will be helpful in answering questions that arise in your development of safe procedures.

1.2 Personal Safety Equipment

Magnum Venus Plastech recommends the following Personal Safety Equipment for conducting safe operations of the Polyester Systems:

Magnum Venus Plastech recommends that the user consult the state and local regulations established for all Safety equipment listed.

2.0 Material Safety

2.1 Hazards Associated with Laminating Operations

The major hazards which should be guarded against in polyester laminating operations are those associated with:

1. The flammability and explosion dangers of the catalyst normally used – Methyl Ethyl Ketone Peroxide (MEKP).
2. The flammability dangers of clean-up solvents sometimes used (Magnum Venus Plastech recommends that clean-up solvents be non-flammable), and of resin diluents used, such as styrene.
3. The flammability dangers of catalyst diluents, if used. (Magnum Venus Plastech recommends that catalyst not be diluted.
4. The flammability dangers of the uncured liquid resins used.
5. The combustibility dangers of the cured laminate, accumulations of over spray, and laminate sandings.
6. The toxicity dangers of all the chemicals used in laminating operations with respect to ingestion, inhalation and skin and eye hazards.

2.2 Catalyst (Methyl Ethyl Ketone Peroxide)

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.


Contamination with promoters or materials containing promoters, such as lan sandings, or with any readily oxidizing material, such as brass or iron, will exothermic “redox” reactions which can become explosive in nature. Heat applied to MEKP, or heat build-up from contamination reactions can cause it to reach what is called its Self-Accelerating Decomposition Temperature (SADT).



Researchers have reported measuring pressure rates-of-rise well in excess of 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 in regards to 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:

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

- D. Never add MEKP to anything that is hot, since explosive decomposition may result.
- E. 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. Fire fighting equipment should be at hand and ready.
- F. Avoid spillage, which can heat up to the point of self-ignition.
- G. 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.
- H. Use only original equipment or equivalent parts from Magnum Venus Plastech in the catalyst system (i.e.: hoses, fitting, etc.) because a dangerous chemical reaction may result between substituted parts and MEKP.
- I. Catalyst accumulated from the purging of hoses or the measurement of fluid output delivered  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.

2.3 Clean-Up Solvents and Resin Diluents

WARNING

A hazardous situation may be present in your pressurized fluid system! Hydrocarbon 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.). The explosion could cause serious injury, death and/or substantial property damage. Cleaning agents, coatings, paints, etc. may contain Halogenated Hydrocarbon Solvents. Some Magnum Venus Plastech spray equipment includes aluminum or galvanized components and will be affected by Halogenated Hydrocarbon Solvents.

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

A. 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. Furthermore, the mixing of HHC solvents with other materials or solvents, such as MEKP, alcohol, and toluene, may render the inhibitors ineffective.

B. The use of reclaimed solvents is particularly hazardous. Reclaimers may not add any inhibitors. Also, the possible presence of water in reclaimed solvents could feed the reaction.

C. 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, which will safely prevent the chemical reaction under all circumstances.

D. 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

(VOC's), 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 solvents in pressurized fluid systems having aluminum or galvanized wetted parts.

NOTE: Magnum Venus Plastech is aware of NO stabilizers available to prevent Halogenated Hydrocarbon solvents from reaction under all conditions with aluminum components in closed fluid system. TAKE IMMEDIATE ACTION... Halogenated Hydrocarbon solvents are dangerous when used with aluminum components in a closed fluid system.

A. Consult your material supplier to determine whether your solvent or coating contains Halogenated Hydrocarbon Solvents.

B. Magnum Venus Plastech recommends that you contact your solvent supplier regarding the best non-flammable clean-up solvent with the heat toxicity for your application.

C. If, however, you find it necessary to use flammable solvents, they must be kept in approved, electrically grounded containers.

D. Bulk solvent should be stored in a well-ventilated, separate building, 50 feet away from your main plant.

E. You should allow only enough solvent for one day's use in your laminating area.

F. "NO SMOKING" signs must be posted and observed in all areas of storage or where solvents and other flammable materials are used.

G. 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.

H. Solvents should be handled in accordance with OSHA Section 1910.106 and 1910.107.

2.4 Catalyst Diluents

Magnum Venus Plastech spray-up and gel-coat systems currently produced are designed so that catalyst diluents are not required. Magnum Venus Plastech, therefore, recommends that diluents not be used. This avoids the 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, however, diluents are absolutely required, contact your catalyst supplier and follow his instructions explicitly. Preferable, the supplier should premix the catalyst to prevent possible “on the job” contamination while mixing.

WARNING

If diluents are not used, it should be remembered that catalyst spillage, gun, hose and packing leaks are potentially more hazardous, since each drop contains a higher concentration of catalyst, and therefore will react quicker with over spray and the leak.

2.5 Cured Laminate, Overspray and Laminate Sandings Accumulation

A. Remove all accumulations of overspray, 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.

B. Floor coverings, if used, should be non-combustible.

C. Spilled or leaked catalyst may cause a fire if it comes in contact with an FRP product, over-sprayed chop or resin, FRP sandings or any other material with MEKP.

To prevent this spillage and leakage, you should:

1. Maintain your Magnum Venus Plastech 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.

2.7 Toxicity of Chemicals

A. Magnum Venus Plastech recommends that you consult OSHA Sections 1910.94, 1910.106, 1910.107 and NFPA No.33, Chapter 14, and NFPA No.91.

B. 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.

C. Also determine the best methods of first aid treatment for each chemical used in your plant.

2.8 Treatment of Chemical Injuries

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 Plastech 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 is 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 any injury and give him the information you have collected. If your information includes first aid instructions, administer first aid immediately while you are contacting your doctor.

Fast treatment of the outer skin and eyes that contact such 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, however, may be incorrect for some chemicals; that is why you must know the chemicals and treatment before an accident occurs. Treatment for swallowing a chemical frequently depends upon the nature of the chemical.

NOTE: Refer to your System User Manual for complete and detailed operating instructions and service information.

3.0 Equipment Safety

WARNING

Magnum Venus Plastech 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!

WARNING

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. (TREAT THE GUN AS IF IT WERE A LOADED PISTOL.)**

3.1 Emergency Stop Procedures

The following steps should be followed in order to stop the machinery in an emergency situation

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. To do this, simply rotate the lever on the ball valve 90 degrees. Doing this will cause all the system air to bleed out of the system in a matter of a few seconds, making the system incapable of operating

NOTE: Step 2 is a precautionary step and should be followed whenever the above mentioned ball valve is activated to the stop mode. Failure to do so, can damage the regulators and components on reactivating to the “ON” position.

2. Turn all system regulators to the “OFF” position (counter-clockwise) position

NOTE: Verify that the Catalyst relief line, located on the catalyst manifold, and the resin return line, located on the resin filter, are secured relieving catalyst and resin fluid pressure.

3. Catalyst pressure in the catalyst pump can be eliminated by rotating the ball valve on the catalyst manifold 90 degrees to the “open” or “on” 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.



4. Resin pressure in the resin pump can be eliminated by rotating the ball valve on the resin filter 90 degrees to the “open” or “on” position. Place a container under the ball valve to catch any resin that is ejected out of the valve.

3.2 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 a 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 Plastech 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. 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". Check with local codes and authorities for other specific standards that might apply to your application. NEVER USE HARD MATERIALS SUCH AS WIRE, PINS, ETC., TO CLEAR A PLUGGED GUN. HARD MATERIALS CAN CAUSE PERMANENT DAMAGE. DAB WITH A BRISTLE BRUSH, BLOW BACKWARDS WITH AIR UNTIL CLEAR WHILE WEARING A PROTECTIVE EYE SHIELD. REPEAT AS MANY TIMES AS NECESSARY. DO NOT PERFORM ANY MAINTENANCE OR REPAIRS UNTIL YOU HAVE FOLLOWED THE PRECAUTIONS STATED ABOVE. IF YOU, AS AN EQUIPMENT OPERATOR OR SUPERVISOR, DO NOT FEEL THAT YOU HAVE BEEN ADEQUATELY TRAINED OR INSTRUCTED AND THAT YOU LACK THE TECHNICAL KNOWLEDGE TO OPERATE OR PERFORM MAINTENANCE ON A PIECE OF MAGNUM VENUS PLASTECH EQUIPMENT, PLEASE CALL MAGNUM VENUS PLASTECH BEFORE OPERATING OR PERFORMING MAINTENANCE ON THE EQUIPMENT. IF YOU HAVE ANY QUESTIONS REGARDING THE ABOVE PRECAUTIONS OR ANY SERVICE OR OPERATION PROCEDURES, CALL YOUR MAGNUM VENUS PLASTECH DISTRIBUTOR OR MAGNUM VENUS PLASTECH.

NOTICE: *All statements, information and data given herein are believed to be accurate and reliable but are presented without guaranty, warranty or responsibility of any kind express or implied. The user should not assume that all safety measures are indicated or that other measures are not required.*

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 of dirt, grease or resin. Clean catalyst system components with clean water only.*

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.*

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



Introduction:

This manual covers the repair and rebuilding of the 1-3/4" diameter by 2" stroke length. There are several variations of the Patriot fluid section but most will only have small differences. Most of the procedures will be the same only with slightly different parts. The important differences will be noted or covered in a separate section. It is important to have a current drawing for the fluid section you are working on.

- PAT-LS-24050 Patriot Fluid Section
- PAT-LS-24050-AM Patriot Fluid Section
- PAT-LS-24050-GL Patriot Fluid Section
- PAT-LS-24050-GL-HD Patriot Fluid Section – Heavy Duty
- PAT-LS-24050-HD Patriot Fluid Section – Heavy Duty
- PAT-LS-24050-MC Patriot Fluid Section – Multi Color
- PAT-LS-24050-RTM Patriot Fluid Section – RTM Unit
- PAT-LS-24050-SSB Patriot Fluid Section – Patriot SSB Units

The Heavy Duty (-HD) version of the fluid section requires the heavy duty Fluid Rod (PAT-LS-2008-HD) which is only used with the 7" or 10" Heavy Duty power head configurations. The heavy duty Fluid Rod (PAT-LS-2008-HD) can be used in most of the other versions to make them heavy duty as well.

Seal Conversion Kits:

There are two Seal conversion kits available for this Patriot fluid section – the two conversion kit can be used together in the same fluid section.

- The PAT-LS-24050-AM-CK is used to convert the existing seals (PAT-LS-1016, PAT-LS-1014 and PAT-LS-1013) to the new versions (PAT-LS-1016-SP, PAT-LS-1014-SP and PAT-LS-1013-NT). This kit basically replaces the existing seal with new a version with no change to the Outlet Body, Solvent Cup or Fluid Rod.
- The PAT-LS-24050-GL-CK is used to convert the existing Upper Seals to the new Glutton Seal configuration. This kit also replaces the Outlet Body and Solvent Cup. See drawing PAT-LS-24050-GL for details.

NOTE: Before starting any service work, release fluid and air pressure from system. Remove the resin hose and suction wand from the fluid section. The Fluid Section Assembly does not have to be completely removed from the system for service work.

Please read the manual carefully. Follow the steps in the order given, otherwise you may damage the equipment or injure yourself.

During Disassembly . . .

As you disassemble the equipment, lay out the components in the correct order and direction. This will help you to reassemble them.

Tools required:

- Red Grease (6706-2-1 1 oz) (6706-2-16 16 oz) (6706-2-32 32 oz)
- Gun Oil (6706-3-1 1oz) (6706-3-8 8oz) (6706-3-16 16oz) (6706-3-32 32oz)
- Removable Thread Locking compound
- 5/16-inch Hex Wrench
- Hex Wrench Set (08469)
- 8-inch Adjustable Wrench (08467)
- 12-inch Adjustable Wrench (08468)
- 1/2-inch Wrench or 1/2" x 9/16" Combination Wrench (08476)
- 9/16-inch Wrench (08476) or 1/2" x 9/16" Combination Wrench (08476)
- PAT-GL-TOOL-2 (for the PAT-LS-24050-GL & PAT-LS-24050-GL-HD)
- Repair Kit:
 - PAT-LS-24050-AM-SK
 - PAT-LS-24050-GL-SK
 - PAT-LS-24050-R-SK
 - PAT-LS-24050-SK



Fluid Section Removal:

CAUTION: Remove all fluid pressure and air pressure before beginning service.

NOTE: Flushing the pumping system with suitable cleaning agent will make cleaning, repair and maintenance easier.

1. Remove Suction Hose, Resin Hose and Accumulator / Filter assembly from the Fluid Section. Follow all safety precautions before performing any repairs or maintenance.
2. Using a 1/2" Wrench and the Hex Wrench set remove the Shoulder Bolt (F-SB-06-20) Holding the Lower Arm of the Slave Drive to the Fluid Section.
3. Use a 9/16" Wrench to unscrew the four Hex Bolts (F-HB-06C-24-GR8) holding the Fluid Section to the Power Head. Use caution to prevent the Fluid Section from dropping after the bolts are removed.

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Fluid Section Disassembly:

NOTE: Use care not to damage the pump when clamping it into a vise. Use a soft jawed vise or a towel or rag between the vise and pump. Replace all parts provided in the repair kit. Use only original MVP parts.

1. With the Fluid Section securely mounted in a vise or on the system use a 5/16 Hex wrench to remove the four socket cap screws from the Inlet Body.
2. Securely mount the Fluid Section vertically in a vise. Push the Fluid Rod Assembly down into the pump as far as it will go.

NOTE: Secure the pump vertically in the vise by the flats on the Inlet Valve or the Inlet Body. Use care not to damage the pump when clamping it into a vise. Use a soft jawed vise or a towel or rag between the vise and pump.

• Inlet Body Disassembly –

3. With the pump mounted in the vertical position carefully lift the Outlet Body off the top of the Inlet Body. Use caution as the Fluid Rod assembly may lift out with the Outlet Body.
4. Remove the Fluid Rod assembly from the Inlet Body or Outlet Body if it came out with the Outlet Body. Set the Fluid Rod assembly aside.
5. Remove the Piston Bushing and O-ring from the Inlet Body or Outlet Body depending on where it is stuck.
6. Remove the Piston Seal from the Inlet Body.
7. Remove the Inlet Valve from the Inlet Body. If the pump is mounted in the vise by the Inlet Valve flats you should be able to turn the Inlet Body free of the Inlet valve leaving the Inlet Valve mounted in the vise.

- **Inlet Valve Disassembly –**

8. Using a pair of Pliers squeeze the Ball Stop and remove it from the Inlet Valve.
9. Remove the Foot Valve Spring and Ball from the Inlet Valve.

NOTE: Use care not to drop the hard chrome balls in the Inlet and Piston Bodies as they will be damaged. Replace all parts provided in the repair kit. Use only original MVP parts.

- **Outlet Body Disassembly –**

10. Unscrew the Packing Nut from the Outlet Body.
11. Remove the two Piston Seal Assemblies from Outlet Body.

NOTE: Some versions of the fluid section have only one Rod Seal.

NOTE: The PAT-LS-24050-GL Fluid Section also has the Spacer (PAT-LS-2023) and Glutton Seal (PAT-LS-2024) in the Outlet Body (PAT-LS-2001-GL) see drawing.



Fluid Section Assembly:

• Inlet Valve Assembly –

1. Properly clean Inlet Valve – checking the ball seat area.
2. Install a new O-Ring on the Inlet Valve, lubricate O-Ring and threads with Red Grease (6706-2-1 1 oz).
3. Lightly grease the Inlet Ball with Red Grease and place in the Inlet Valve.

NOTE: Use care not to drop the Inlet ball as it will be damaged.

4. Install the Foot Valve Spring onto the Inlet Ball, narrow side against the Ball.
5. Place the back of the Ball Stop on top of the Foot Valve Spring and into the groove in the Inlet Valve, using a pair of Pliers squeeze the Ball Stop and push the front into the groove. Set the Inlet Valve aside for now.

• Inlet Body Assembly –

6. Properly clean Inlet Body, lightly lubricate the threads and seal area with Red Grease (6706-2-1 1 oz).
7. Screw the assembled Inlet Valve Assembly into the bottom of the Inlet Body, lightly tighten.
8. Mount the Inlet Body into a vise by the flats on the Inlet Valve.

NOTE: Secure the pump vertically in the vise by the flats on the Inlet Valve or the Inlet Body. Use care not to damage the pump when clamping it into a vise. Use a soft jawed vise or a towel or rag between the vise and pump.



Piston Seal – install with the o-ring or spring facing up

9. Install the Piston Seal Assembly into the top of the Inlet Body with o-ring or spring side facing up.
10. Install the Piston Bushing into the Inlet Body on top of the Piston Seal Assembly. Apply Red Grease to the inside of the Piston Bushing.
11. Lightly lubricate a new O-Ring with Red Grease and install over the Piston Bushing into the groove on the Inlet Body.

• **Fluid Rod & Piston Assembly –**

NOTE: See special instructions for the repair of Fluid Section (PAT-LS-24050-GL).

12. Properly clean Piston, Fluid Rod and Piston Valve, check ball seat area of the Piston Valve for damage or debris.
13. Install a new O-Ring on the Piston Valve, lubricate O-Ring and threads with Red Grease (6706-2-1 1 oz).
14. Lightly grease the Piston Ball with Red Grease and place in the Piston Valve.

NOTE: Use care not to drop the Piston Ball as it will be damaged.

15. Install the Spring onto the Piston Ball, narrow side against the Ball.
16. Place the back of the Spring Retainer on top of the Spring and into the groove in the Piston Valve, using a pair of Pliers squeeze the Spring Retainer and push the front into the groove.
17. Screw the Piston Valve Assembly into the bottom of the Piston and tighten firmly. Check that the Fluid Rod is tightened onto the Piston.

- **Outlet Body Assembly –**

NOTE: See below for special instructions to assemble the Outlet Body for the Fluid Section (PAT-LS-24050-GL).

1. Properly clean Outlet Body, lightly lubricate the thread and seal areas with Red Grease (6706-2-1 1oz.)
2. Lightly lubricate the Rod Seals with Red Grease and install the first Rod Seal into the top of the Outlet Body with the O-Ring facing down.



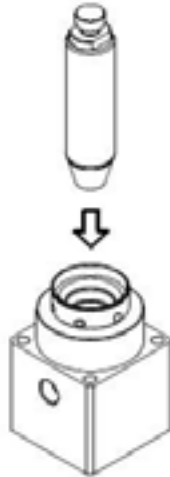
3. Repeat the process for the second Rod Seal. For systems with a single Rod Seal go to the next step.

NOTE: Some versions of the fluid section have only one Rod Seal.

4. Check the Rod Bushing for wear or damage replace as necessary. Lightly lubricate with Red Grease and install it into the Packing Nut.
5. Screw the Packing Nut and Rod Bushing into the top of the Outlet Body just so that it makes contact with the Piston Seal.

• **Special Outlet Body Assembly PAT-LS-200-GL:**

1. Install O-ring (O-E-037) into the Outlet Body (PAT-LS-2001-GL)
2. Install Glutton Seal (PAT-LS-2024) and Spacer (PAT-LS-2023) into the Outlet Body (PAT-LS-2001-GL)
3. Install Bushing (PAT-LS-2005-GL) and Seals (PAT-LS-1014) into solvent cup.
4. Firmly tighten the Solvent cup into the Outlet Body (PAT-LS-2001-GL)
5. Screw item Seal Tool (PAT-GL-TOOL-2) on to Upper rod
6. Push shaft downward through the Glutton Seal using a hard rubber or plastic mallet to form seal.



7. Remove the Seal Tool (PAT-GL-TOOL-2) from the Upper Rod
8. Screw Piston to bottom of the Upper Rod.
9. Connect the Outlet Body to the Inlet Body and torque bolts as noted below in Chapter 5.

- **Pump Assembly –**

1. With the assembled Inlet Body mounted in the vise slowly and firmly push the Piston and Fluid Rod assembly all the way down into the Inlet Body.



2. Carefully and firmly push the assembled Outlet Body onto the Inlet Body until the Fluid Rod extends through the Packing Nut.



3. Align the Inlet and Outlet Bodies and install the four Socket Headed Cap Screws (CS-06C-32). **Tighten and torque the four Socket Headed Cap Screws (CS-06C-32) using the procedures in chapter 5 “Bolt & Nut Toque Procedures”.**





Torque Procedures:

Bolt & Nut Torque Procedure for Patriot Power Head & Fluid Section

Tightening sequence should always be the across method. Tighten first nut or bolt to a little more than hand tight, then jump to the nut or bolt directly across or opposite side and tighten. Repeat this procedure thru a 3 step torque sequence minimum.

Power Head Tie Rod Nuts (3/8-24 UNF)

- 1) Torque to 5 to 7 ft.lbs.
- 2) Torque to 15 ft.lbs.
- 3) Torque to 23 ft.lbs.

Power Head to Fluid Section Tie Rods (3/8-16 UNC)

Apply removable thread locking compound to male thread.
Screw into Power Head and torque to approximately 20 ft.lbs.
Use Grade 5 bolts & lock washers to connect power head to fluid section.
Tighten to a final torque of 30 to 32 ft.lbs. using a 3 step procedure.

Fluid Section Socket Head Cap Screws (CS-06C-32) (3/8-16 UNC)

Tighten to a final torque of 32 ft.lbs., using a 3 step procedure.
Removable thread locking compound is optional.

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Operating Procedures:

INSPECTION AND MAINTENANCE OF UNIT

- 1) Check solvent cup to be sure it is 1/2 full with oil (PAT-LS-OIL).
- 2) Check catalyst and material levels.
- 3) Inspect material spray tip and o-ring. Replace if necessary.
- 4) Inspect catalyst tip assembly and o-rings. Replace if necessary. (ATC Gun)
- 5) Inspect tip pin o-rings on front of gun head and replace if nicked or worn. (ATC Gun)
- 6) Assemble catalyst tip and material tip onto gun. (ATC Gun)
- 7) Lubricate threads on retaining ring and assembly onto gun. (ATC Gun)
- 8) Inspect hose assemblies and connections for leaks and wear and tear. Replace if necessary. Do not wait until hose is so worn that it may burst.
- 9) Check roving quantity (if applicable).
- 10) Inspect and replace if necessary: (if applicable)
 - a) Chopper Blades
 - b) Anvil Sleeve
 - c) Cutter Head Bearing
 - d) Idler Bearing
- 11) Inspect and adjust if necessary: (if applicable)
 - a) Cutter head to Anvil Sleeve tension
 - b) Idler Bearing to Anvil Sleeve tension
 - c) Check Chopper position for most efficient disbursement of chop into spray pattern.
- 12) Oil Cutter assembly Air Motor with Magnum Air Motor Oil as necessary (normally 2 – 3 drops daily, depending on usage).

PREPARATION AND PRIMING OF “NEW” SYSTEM

1. Be sure all air regulators are turned completely to the left, shutting off air to the components.
2. Slowly open main air.
3. **Seat Pro Gun Packing:** Tighten the gun valve rod packing nuts until they are snug. **IMPORTANT: Activate the gun trigger 8 - 10 times then tighten the packing nuts again.** Repeat this tightening procedure 3 times to make sure the gun valve rod packing is tight.
4. Prime empty catalyst line:
 - a. Disengage catalyst pump
 - b. Open ball valve on catalyst manifold (if applicable)
 - c. Eliminate air pockets by manually hand pumping the catalyst 5-10 short strokes (2-3 in.). After eliminating air pockets, and while continuing to hand pump, close ball valve on catalyst manifold.
 - d. Pull and hold trigger on gun while hand pumping catalyst pump with short strokes until there is a solid, steady catalyst flow from the head of the gun. This will ensure that all air is purged from the line. Release trigger.
 - e. Continue to hand pump the catalyst pump with short strokes until catalyst pump is fully primed and pressurized (generally within 5 additional strokes or less).

NOTE: Do NOT engage slave pump until material pump has been primed.

5. Material Pump: *(be sure catalyst pump is disengaged)* Place a container or bucket under ball valve located at the bottom of the resin filter assembly to catch material while priming. Open ball valve. Slowly bring up pressure on material pump regulator just enough to allow pump to stroke up and down evenly. After a smooth flow of material is flowing from the valve, turn regulator off and close the valve.
6. Remove mix chamber and turbulent mixer from front of gun (Pro Gun). Pull trigger on gun and allow gun to hang above waste container. Slowly bring up pump pressure again to allow material to flow out of gun. Release trigger to close gun. Pump will cycle until it is fully primed and then will stall out.
7. Engage slave pump.

PREPARATION AND PRIMING OF PREVIOUSLY USED (shut down) SYSTEM

1. Slowly open main air.
2. Material Pump: *(be sure catalyst pump is disengaged)* Place a container or bucket under ball valve located at the bottom of the resin filter assembly to catch material while priming. Open ball valve. Slowly bring up pressure on material pump regulator just enough to allow pump to stroke up and down evenly. After a smooth flow of material is flowing from the valve, turn regulator off and close the valve.
3. Catalyst Slave Pump:
 - a. Disengage slave pump.
 - b. Open ball valve of catalyst manifold (if applicable).
 - c. Eliminate all air pockets in feed lines by manually pumping catalyst pump until catalyst exits ball valve. Close ball valve.
 - d. Remove mix chamber and mixer from front of gun.
 - e. Open gun by pulling trigger and continue hand pumping until catalyst exits gun.
 - f. Leave Catalyst Pump disengaged.
4. Pull trigger on gun and allow gun to hang above waste container. Slowly bring up pump pressure again to allow material to flow out of gun. Release trigger to close gun. Pump will cycle until it is fully primed and then will stall out.
5. Flush gun into appropriate container.
6. Engage slave pump.

SHUT DOWN PROCEDURES FOR SPRAY EQUIPMENT

1. Trigger gun until pump shaft is in the full down position (at bottom of stroke position).
2. Engage gun trigger lock.
3. Relieving pressures:
 - a. Close main air valve to system.
 - b. Purge excess air from system by relieving air from the bottom of the air filter or water trap.
 - c. Catalyst pressure: “Dump” or relieve catalyst pressure at catalyst manifold (if applicable) by opening catalyst ball valve. Pressure will immediately be relieved. Close the ball valve at once to avoid draining of catalyst from catalyst line.
 - d. Material pressure: Place a container under material ball valve at bottom of fluid filter assembly to catch material flow when relieving pressure. **Slowly** open material ball valve to relieve pressure.

Remember - the pump is under extreme pressure. Use the utmost caution when opening the valve to avoid injury or being sprayed with material. Once material pressure is relieved, close ball valve.

4. Remove catalyst and material tip assemblies or nozzle and mix chamber from head of gun and clean thoroughly.
5. Thoroughly clean diffuser cavity in front of gun head / clean gun block face.
6. Inspect entire gun and equipment for over spray and clean.
7. Relieve flush pressure by lifting the ring on the flush tank relief valve.

System is now “shut-down” and ready for the next start-up

Important Notes:

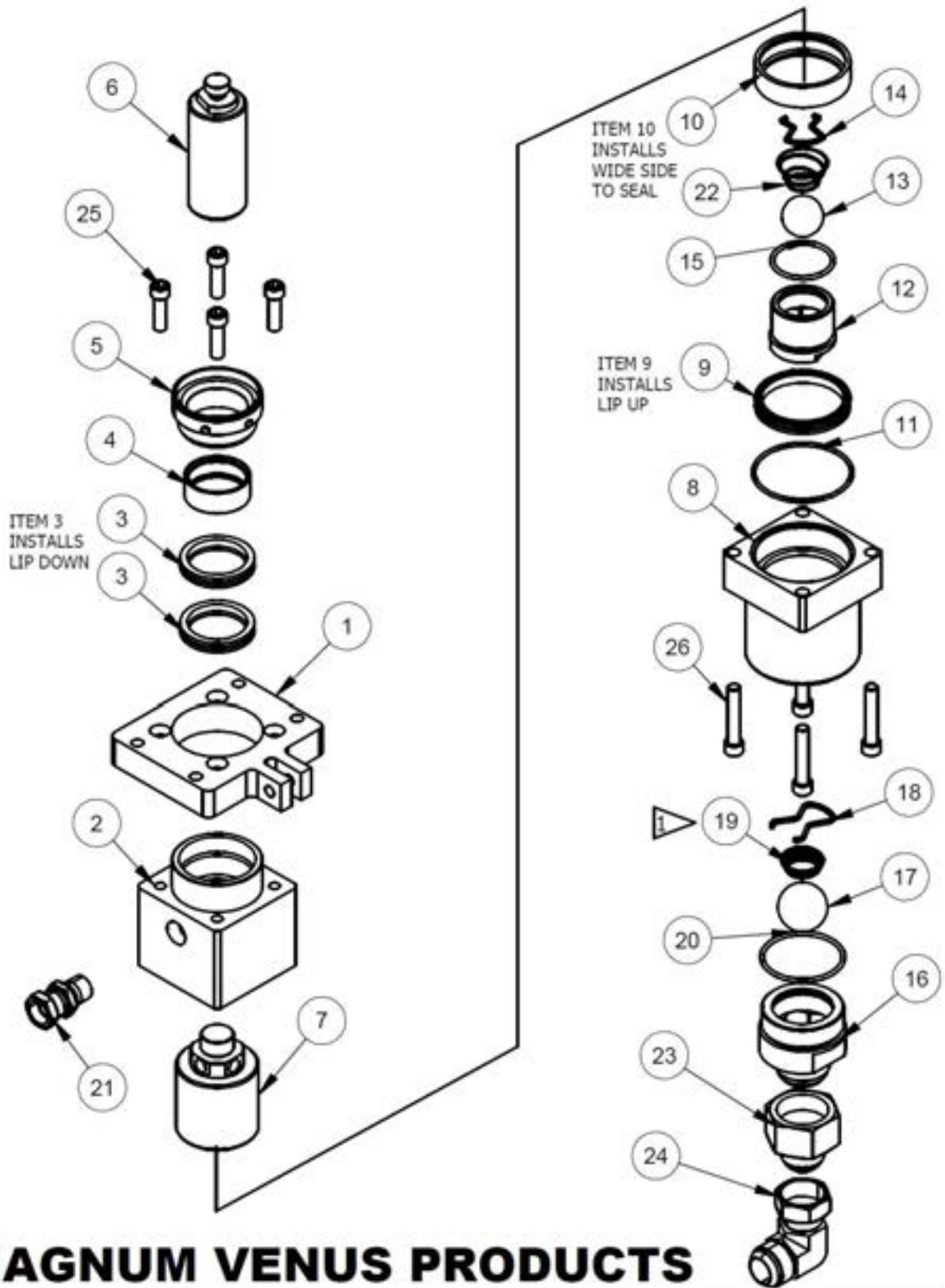
- When cleaning gun with solvents, avoid getting solvent in exhaust port of “air trigger” gun by covering port with thumb or finger while cleaning and pointing gun downward.
- Proper cleanliness habits of your spray equipment goes a long way in keeping down unnecessary maintenance and repair costs.



Parts Drawings:

PAT-LS-24050	Patriot Fluid Section
PAT-LS-24050-AM	Patriot Fluid Section
PAT-LS-24050-GL	Patriot Fluid Section
PAT-LS-24050-GL-HD	Patriot Fluid Section – Heavy Duty
PAT-LS-24050-HD	Patriot Fluid Section – Heavy Duty
PAT-LS-24050-MC	Patriot Fluid Section – Multi Color
PAT-LS-24050-RTM	Patriot Fluid Section – RTM Unit
PAT-LS-24050-SSB	Patriot Fluid Section – Patriot SSB Units
PAT-LS-24050-AM-SK	Patriot Fluid Section Seal Kit
PAT-LS-24050-GL-SK	Patriot Fluid Section Seal Kit
PAT-LS-24050-R-SK	Patriot Fluid Section Seal Kit
PAT-LS-24050-SK	Patriot Fluid Section Seal Kit
PAT-LS-24050-AM-CK	Patriot Fluid Section Conversion Kit
PAT-LS-24050-GL-CK	Patriot Fluid Section Conversion Kit

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MAGNUM VENUS PRODUCTS

Assy - Patriot 1-3/4 " Fluid Section

PAT-LS-24050

REV:02-21-08

1-3/4 dia. Fluid Section Parts List				
ITEM	PART NUMBER	QTY	DESCRIPTION	
1	PAT-LS-1003	1	TRANSITION PLATE	
2	PAT-LS-2001	1	OUTLET BODY	
*	3	PAT-LS-1014	2	ROD SEAL ASSY
	4	PAT-LS-2005	1	ROD BUSHING
	5	PAT-LS-2004	1	PACKING NUT
	6	PAT-LS-2008	1	FLUID ROD
	7	PAT-LS-2007	1	PISTON ϕ 2-1/2"
	8	PAT-LS-2002	1	INLET BODY
*	9	PAT-LS-2014	1	PISTON SEAL ASSY
	10	PAT-LS-2013	1	PISTON BUSHING
*	11	O-E-150	1	O-RING
	12	PAT-LS-2009	1	PISTON VALVE
	13	VLS-4622	1	ϕ 1-1/4 CHROME BALL
	14	PAT-LS-2011	1	SPRING RETAINER
*	15	O-E-3-924	1	O-RING
	16	PAT-LS-2015	1	INLET VALVE 1-1/4
	17	PAT-LS-2017	1	ϕ 1-1/2 CHROME BALL
	18	VLS-4620	1	BALL STOP
	19	VLS-4621	1	FOOT VALVE SPRING
*	20	O-E-3-932	1	O-RING
	21	PF-SW-08	1	PIPE SWIVEL
	22	PAT-LS-2006	1	PISTON SPRING
	23	PF-RA-20J-16J	1	REDUCER ADAPTER
	24	PF-SE-SW-16J	1	SWIVEL ELBOW JIC
	25	F-CS-06C-20	4	ALLEN CAP SCREW
	26	F-CS-06C-32	4	ALLEN CAP SCREW

REPAIR KITS

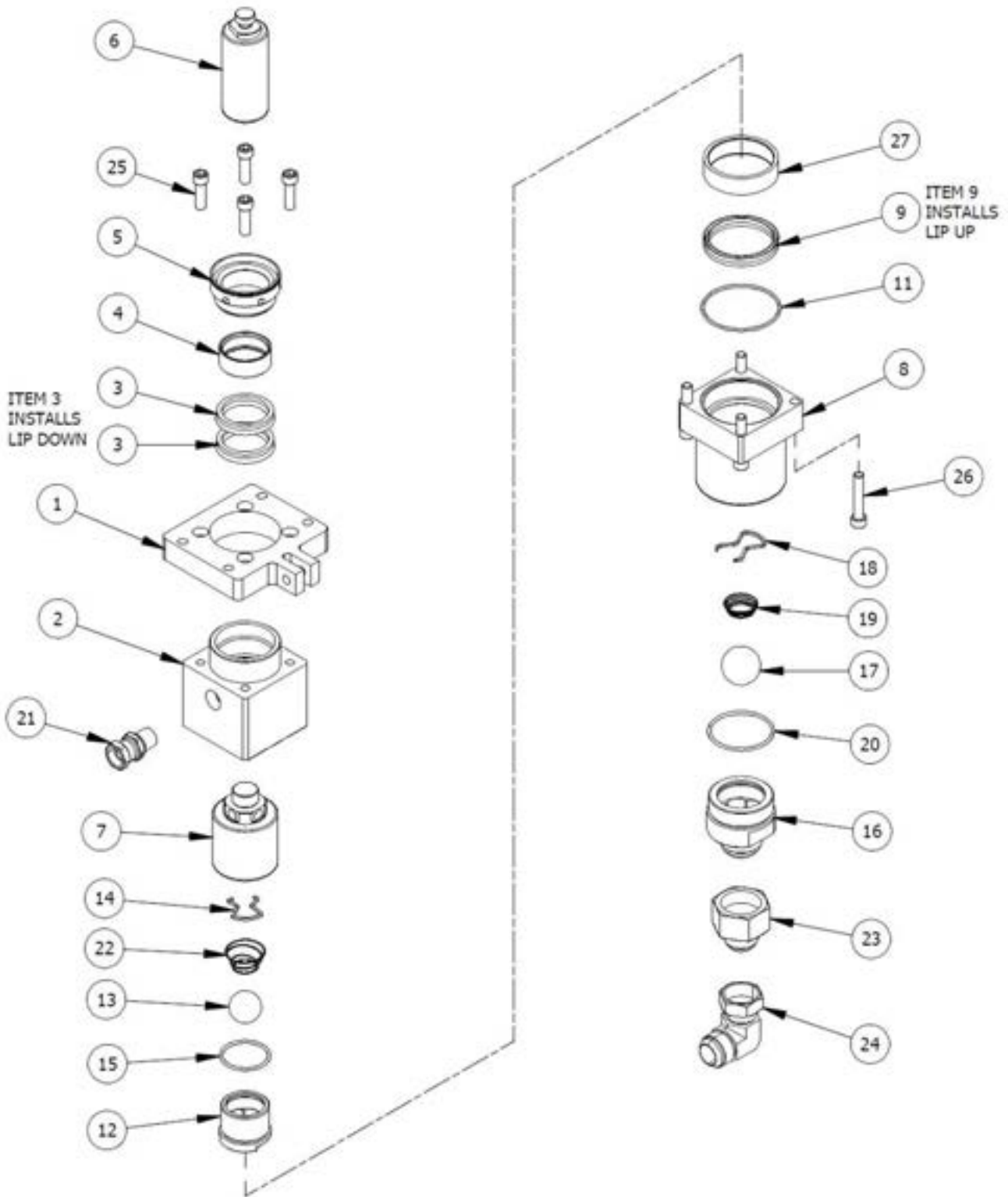
PARTS No.	DESCRIPTION
PAT-LS-24050-SK	SEAL KIT

* NOTE: ASTERISK DENOTES PARTS USED IN SEAL KIT

MAGNUM VENUS PRODUCTS

Assy - Patriot 1-3/4 fluid Section	PAT-LS-24050
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REV:02-21-08



MAGNUM VENUS PLASTECH

FLUID SECTION - PATRIOT 1-3/4

PAT-LS-24050-AM

REV:

SHEET 1 / 2

8/27/2009

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
	1 PAT-LS-1003	1	TRANSITION PLATE
	2 PAT-LS-2001	1	OUTLET BODY
*	3 PAT-LS-1014-SP	2	PISTON SEAL
	4 PAT-LS-2005	1	ROD BUSHING
	5 PAT-LS-2004	1	PACKING NUT
	6 PAT-LS-2008	1	FLUID ROD
	7 PAT-LS-2007	1	PISTON $\phi 2-1/2"$
	8 PAT-LS-2002	1	INLET BODY
*	9 PAT-LS-2014-SP	1	PISTON SEAL
*	11 O-E-150	1	O-RING
	12 PAT-LS-2009	1	PISTON VALVE
	13 VLS-4622	1	$\phi 1-1/4$ CHROME BALL
	14 PAT-LS-2011	1	SPRING RETAINER
*	15 O-E-3-924	1	O-RING
	16 PAT-LS-2015	1	INLET VALVE 1-1/4
	17 PAT-LS-2017	1	$\phi 1-1/2$ CHROME BALL
	18 VLS-4620	1	BALL STOP
	19 VLS-4621	1	FOOT VALVE SPRING
*	20 O-E-3-932	1	O-RING
	21 PF-SW-08	1	PIPE SWIVEL
	22 PAT-LS-2006	1	PISTON SPRING
	23 PF-RA-20J-16J	1	REDUCER ADAPTER
	24 PF-SE-SW-16J	1	SWIVEL ELBOW JIC
	25 F-CS-06C-20	4	ALLEN CAP SCREW
	26 F-CS-06C-32	4	ALLEN CAP SCREW
	27 PAT-LS-2013-NT	1	PISTON BUSHING

REPAIR KITS

PART No.	DESCRIPTION
* PAT-LS-24050-AM-SK	SEAL KIT

* NOTE: ASTERISKS DENOTE PARTS USED IN SEAL KIT.

MAGNUM VENUS PLASTECH

FLUID SECTION - PATRIOT 1-3/4

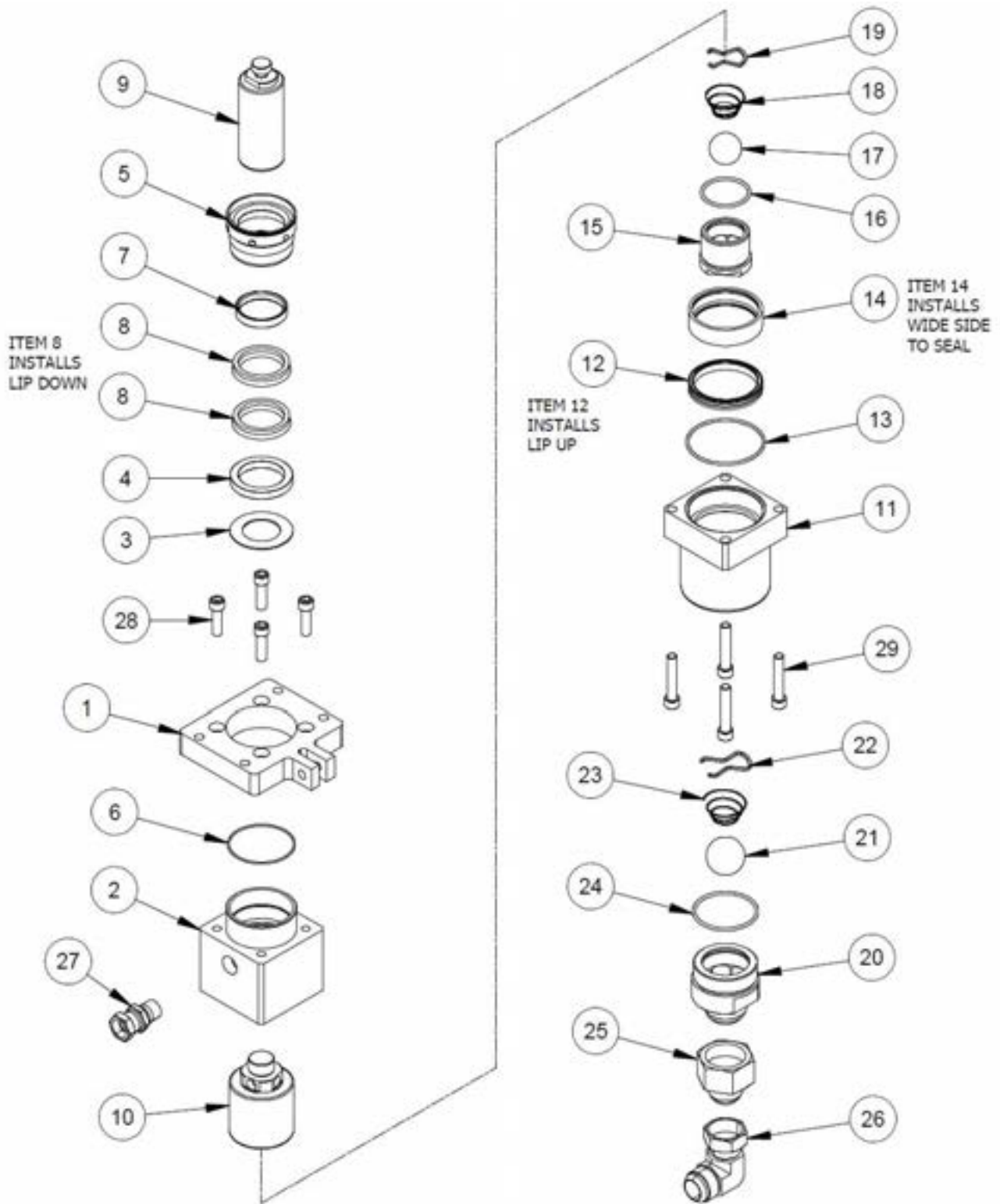
PAT-LS-24050-AM

REV:

SHEET 2 / 2

8/27/2009





MAGNUM VENUS PLASTECH

PATRIOT FLUID SECTION

PAT-LS-24050-GL

REV:01-08-09 BT2

Parts List				
ITEM	PART NUMBER	QTY	DESCRIPTION	
	1	PAT-LS-1003	1	TRANSITION PLATE
	2	PAT-LS-2001-GL	1	OUTLET BODY
*	3	PAT-LS-2024	1	GLUTTON SEAL
	4	PAT-LS-2023	1	SPACER
	5	PAT-LS-2004-GL	1	SOLVENT CUP
*	6	O-E-037	1	O-RING
	7	PAT-LS-2005-GL	1	ROD BUSHING
*	8	PAT-LS-1014	2	ROD SEAL ASSY
	9	PAT-LS-2008	1	FLUID ROD
	10	PAT-LS-2007	1	PISTON \varnothing 2-1/2"
	11	PAT-LS-2002	1	INLET BODY
*	12	PAT-LS-2014	1	PISTON SEAL ASSY
*	13	O-E-150	1	O-RING
	14	PAT-LS-2013	1	PISTON BUSHING
	15	PAT-LS-2009	1	PISTON VALVE
*	16	O-E-3-924	1	O-RING
	17	VLS-4622	1	\varnothing 1-1/4 CHROME BALL
	18	PAT-LS-2006	1	PISTON SPRING
	19	PAT-LS-2011	1	SPRING RETAINER
	20	PAT-LS-2015	1	INLET VALVE 1-1/4
	21	PAT-LS-2017	1	\varnothing 1-1/2 CHROME BALL
	22	VLS-4620	1	BALL STOP
	23	VLS-4621	1	FOOT VALVE SPRING
*	24	O-E-3-932	1	O-RING
	25	PF-RA-20J-16J	1	REDUCER ADAPTER
	26	PF-SE-SW-16J	1	SWIVEL ELBOW JIC
	27	PF-SW-08	1	PIPE SWIVEL
	28	F-CS-06C-20	4	ALLEN CAP SCREW
	29	F-CS-06C-32	4	ALLEN CAP SCREW

REPAIR KITS

PART No.	DESCRIPTION
* PAT-LS-24050-GL-SK	SEAL KIT

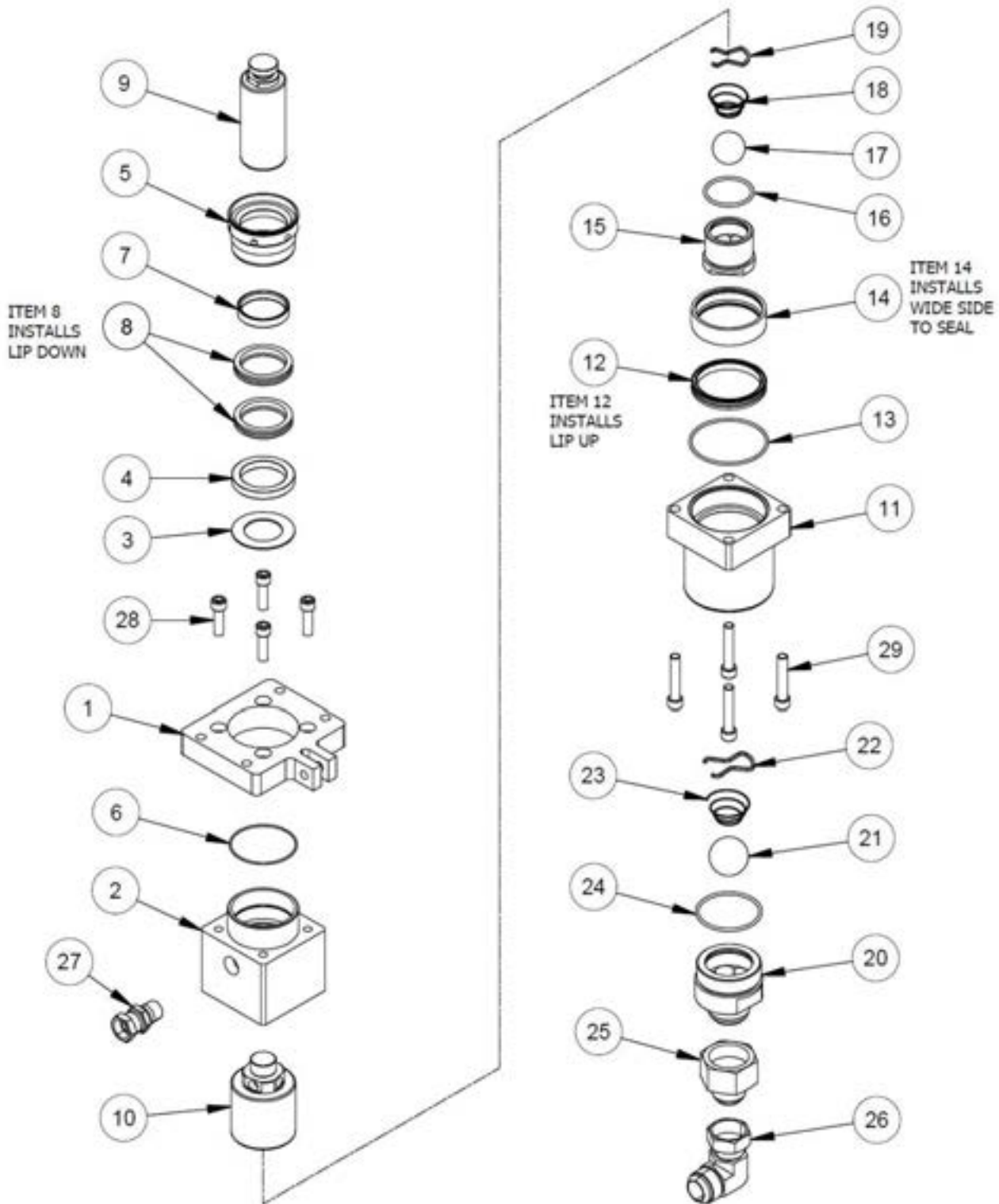
*NOTE: ASTERISKS DENOTE PARTS USED IN SEAL KIT

MAGNUM VENUS PLASTECH

PATRIOT FLUID SECTION

PAT-LS-24050-GL

REV:01-08-09 BT2



MAGNUM VENUS PLASTECH

PATRIOT FLUID SECTION

PAT-LS-24050-GL-HD

REV:08-23-10 BT2

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
	1 PAT-LS-1003	1	TRANSITION PLATE
	2 PAT-LS-2001-GL	1	OUTLET BODY
*	3 PAT-LS-2024	1	GLUTTON SEAL
	4 PAT-LS-2023	1	SPACER
	5 PAT-LS-2004-GL	1	SOLVENT CUP
*	6 O-E-037	1	O-RING
	7 PAT-LS-2005-GL	1	ROD BUSHING
*	8 PAT-LS-1014	2	ROD SEAL ASSY
	9 PAT-LS-2008-HD	1	FLUID ROD - HD
	10 PAT-LS-2007	1	PISTON Ø2-1/2"
	11 PAT-LS-2002	1	INLET BODY
*	12 PAT-LS-2014	1	PISTON SEAL ASSY
*	13 O-E-150	1	O-RING
	14 PAT-LS-2013	1	PISTON BUSHING
	15 PAT-LS-2009	1	PISTON VALVE
*	16 O-E-3-924	1	O-RING
	17 VLS-4622	1	Ø1-1/4 CHROME BALL
	18 PAT-LS-2006	1	PISTON SPRING
	19 PAT-LS-2011	1	SPRING RETAINER
	20 PAT-LS-2015	1	INLET VALVE 1-1/4
	21 PAT-LS-2017	1	Ø1-1/2 CHROME BALL
	22 VLS-4620	1	BALL STOP
	23 VLS-4621	1	FOOT VALVE SPRING
*	24 O-E-3-932	1	O-RING
	25 PF-RA-20J-16J	1	REDUCER ADAPTER
	26 PF-SE-SW-16J	1	SWIVEL ELBOW JIC
	27 PF-SW-08	1	PIPE SWIVEL
	28 F-CS-06C-20	4	CAP SCREW
	29 F-CS-06C-32	4	ALLEN CAP SCREW

REPAIR KITS

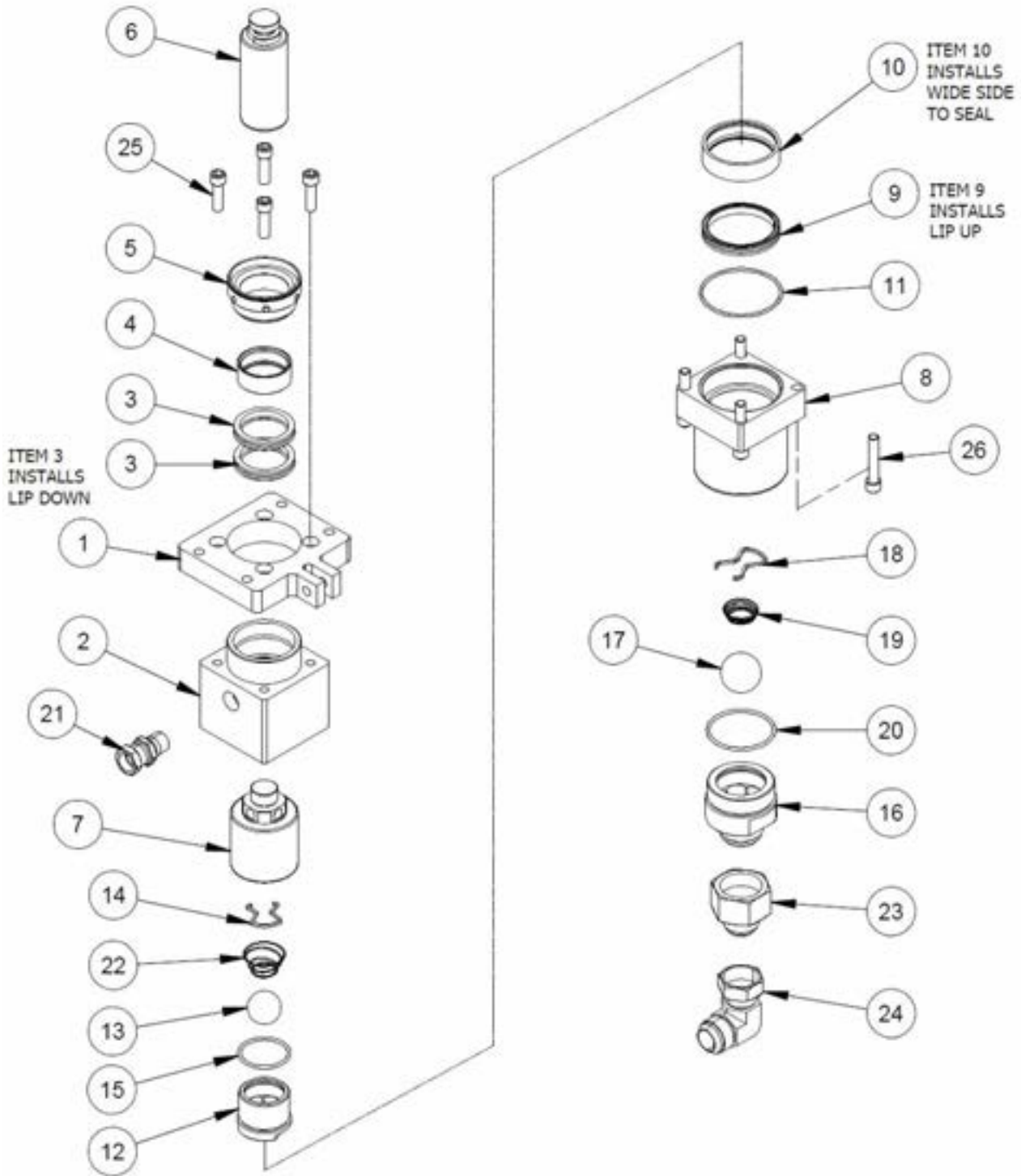
PART No.	DESCRIPTION
* PAT-LS-24050-GL-SK	SEAL KIT

* NOTE: ASTERISKS DENOTE PARTS USED IN SEAL KIT

MAGNUM VENUS PLASTECH

PATRIOT FLUID SECTION	PAT-LS-24050-GL-HD
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REV:08-23-10 BT2



MAGNUM VENUS PLASTECH

FLUID SECTION - PATRIOT 1-3/4 HD

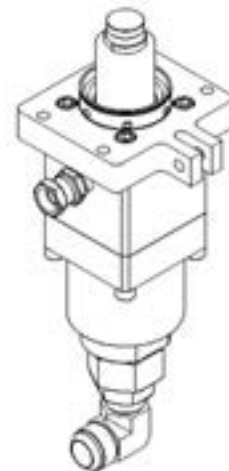
PAT-LS-24050-HD

REV:07-07-09 BT2

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	PAT-LS-1003	1	TRANSITION PLATE
2	PAT-LS-2001	1	OUTLET BODY
* 3	PAT-LS-1014	2	PISTON SEAL ASSY
4	PAT-LS-2005	1	ROD BUSHING
5	PAT-LS-2004	1	PACKING NUT
6	PAT-LS-2008-HD	1	FLUID ROD - HD
7	PAT-LS-2007	1	PISTON $\varnothing 2-1/2"$
8	PAT-LS-2002	1	INLET BODY
* 9	PAT-LS-2014	1	PISTON SEAL ASSY
10	PAT-LS-2013	1	PISTON BUSHING
* 11	O-E-150	1	O-RING
12	PAT-LS-2009	1	PISTON VALVE
13	VLS-4622	1	$\varnothing 1-1/4$ CHROME BALL
14	PAT-LS-2011	1	SPRING RETAINER
* 15	O-E-3-924	1	O-RING
16	PAT-LS-2015	1	INLET VALVE 1-1/4
17	PAT-LS-2017	1	$\varnothing 1-1/2$ CHROME BALL
18	VLS-4620	1	BALL STOP
19	VLS-4621	1	FOOT VALVE SPRING
* 20	O-E-3-932	1	O-RING
21	PF-SW-08	1	PIPE SWIVEL
22	PAT-LS-2006	1	PISTON SPRING
23	PF-RA-20J-16J	1	REDUCER ADAPTER
24	PF-SE-SW-16J	1	SWIVEL ELBOW JIC
25	F-CS-06C-20	4	ALLEN CAP SCREW
26	F-CS-06C-32	4	ALLEN CAP SCREW

PART No. DESCRIPTION
 * PAT-LS-24050-SK SEAL KIT

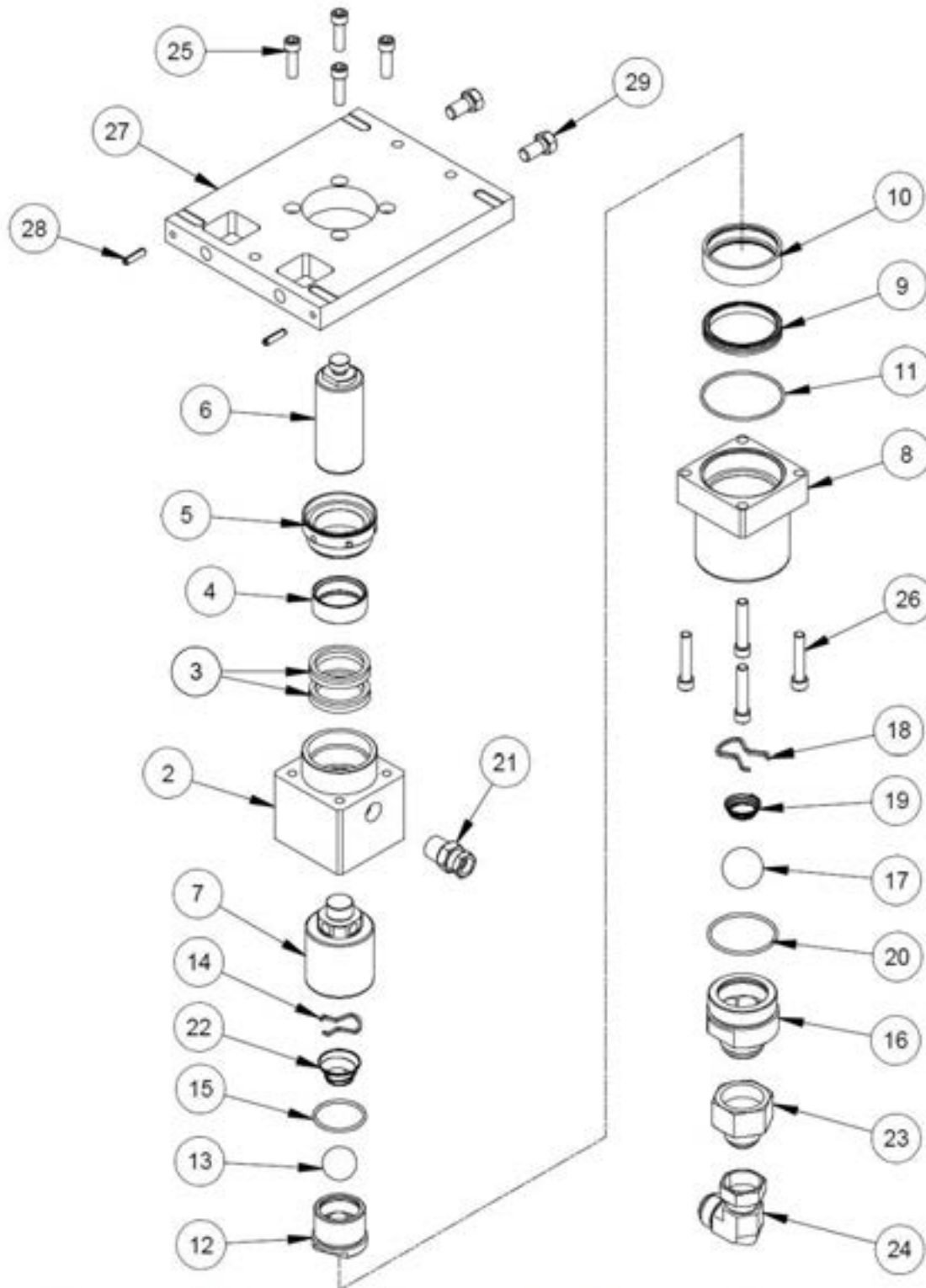
* NOTE: ASTERISKS DENOTE PARTS USED IN SEAL KIT



MAGNUM VENUS PLASTECH

FLUID SECT. ASSY. - PATRIOT 1-3/4 HD PAT-LS-24050-HD

REV:07-07-09 BT2



MAGNUM VENUS PLASTECH

FLUID SECTION ASSEMBLY

PAT-LS-24050-MC

REV:01-30-09 BT2

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
	2 PAT-LS-2001	1	OUTLET BODY
*	3 PAT-LS-1014	2	PISTON SEAL ASSY
	4 PAT-LS-2005	1	ROD BUSHING
	5 PAT-LS-2004	1	PACKING NUT
	6 PAT-LS-2008	1	FLUID ROD
	7 PAT-LS-2007	1	PISTON $\varnothing 2-1/2"$
	8 PAT-LS-2002	1	INLET BODY
*	9 PAT-LS-2014	1	PISTON SEAL ASSY
	10 PAT-LS-2013	1	PISTON BUSHING
*	11 O-E-150	1	O-RING
	12 PAT-LS-2009	1	PISTON VALVE
	13 VLS-4622	1	$\varnothing 1-1/4$ CHROME BALL
	14 PAT-LS-2011	1	SPRING RETAINER
*	15 O-E-3-924	1	O-RING
	16 PAT-LS-2015	1	INLET VALVE 1-1/4
	17 PAT-LS-2017	1	$\varnothing 1-1/2$ CHROME BALL
	18 VLS-4620	1	BALL STOP
	19 VLS-4621	1	FOOT VALVE SPRING
*	20 O-E-3-932	1	O-RING
	21 PF-SW-08M-06F	1	SWIVEL FITTING
	22 PAT-LS-2006	1	PISTON SPRING
	23 PF-RA-20J-16J	1	REDUCER ADAPTER
	24 PF-SE-SW-16J	1	SWIVEL ELBOW JIC
	25 F-CS-06C-20	4	ALLEN CAP SCREW
	26 F-CS-06C-32	4	ALLEN CAP SCREW
	27 PAT-LS-1003-MC	1	PUMP MOUNT PLATE
	28 F-RP-04-16	2	ROLL PIN
	29 F-HB-08C-16	2	HEX BOLT

REPAIR KITS

PART No.	DESCRIPTION
* PAT-LS-24050-SK	SEAL KIT

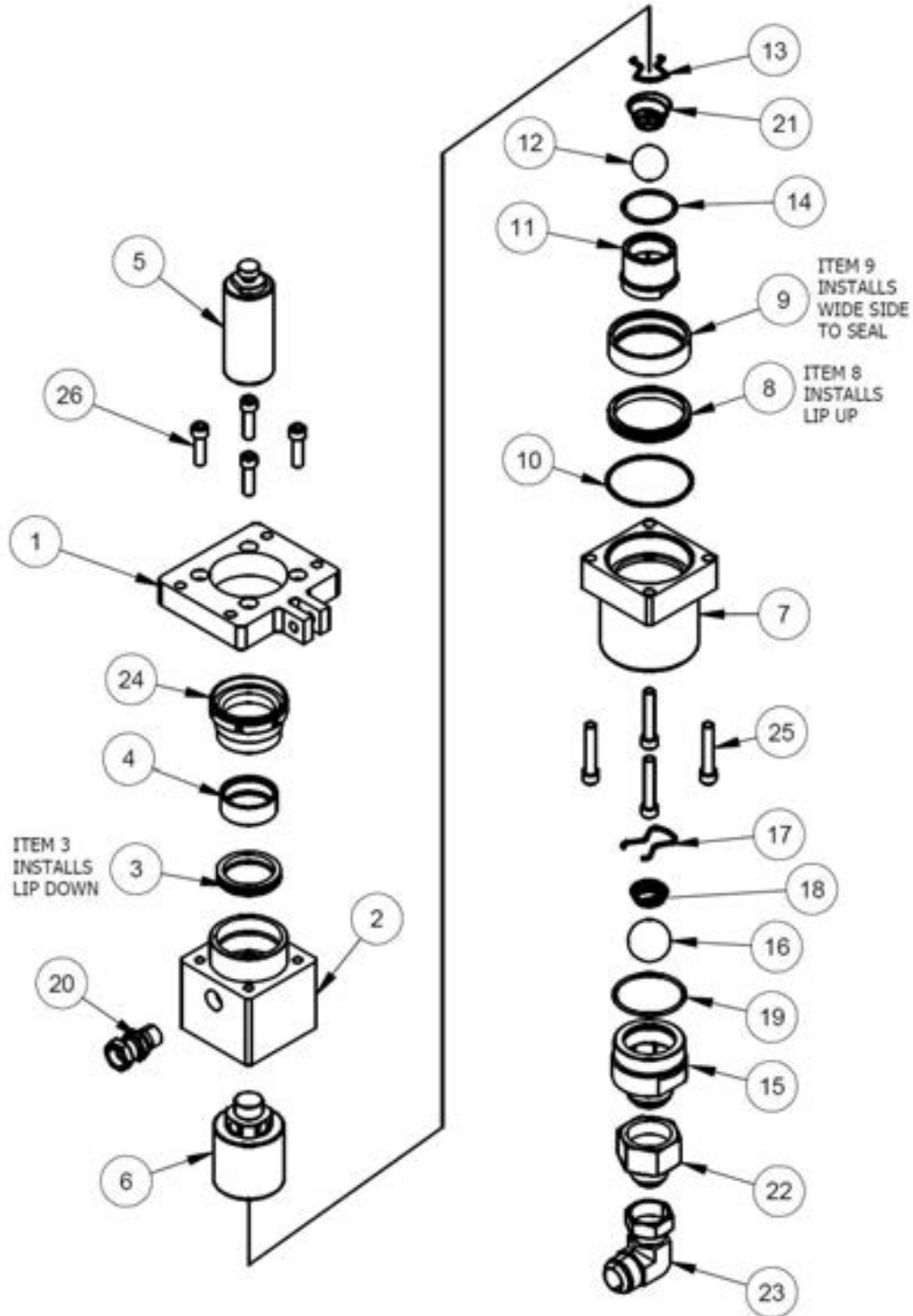
* NOTE: ASTERISK DENOTES PARTS USED IN SEAL KIT.

MAGNUM VENUS PLASTECH

FLUID SECTION ASSEMBLY

PAT-LS-24050-MC

REV:01-30-09 BT2



MAGNUM VENUS PLASTECH

PATRIOT RTM FLUID SECTION ASSY. PAT-LS-24050-RTM

REV:A 01-29-08 BT2

FLUID SECTION PARTS LIST			
ITEM	PART NUMBER	QTY	DESCRIPTION
	1 PAT-LS-1003	1	TRANSITION PLATE
	2 PAT-LS-2001	1	OUTLET BODY
*	3 PAT-LS-1014	1	PISTON SEAL ASSY (INSTL LIP DN)
	4 PAT-LS-2005	1	ROD BUSHING
	5 PAT-LS-2008	1	FLUID ROD
	6 PAT-LS-2007	1	PISTON $\varnothing 2-1/2"$
	7 PAT-LS-2002	1	INLET BODY
*	8 PAT-LS-2014	1	PISTON SEAL ASSY (INSTL LIP UP)
	9 PAT-LS-2013	1	PISTON BUSHING
*	10 O-E-150	1	O-RING
	11 PAT-LS-2009	1	PISTON VALVE
	12 VLS-4622	1	$\varnothing 1-1/4$ CHROME BALL
	13 PAT-LS-2011	1	SPRING RETAINER
*	14 O-E-3-924	1	O-RING
	15 PAT-LS-2015	1	INLET VALVE 1-1/4
	16 PAT-LS-2017	1	$\varnothing 1-1/2$ CHROME BALL
	17 VLS-4620	1	BALL STOP
	18 VLS-4621	1	FOOT VALVE SPRING
*	19 O-E-3-932	1	O-RING
	20 PF-SW-08	1	PIPE SWIVEL
	21 PAT-LS-2006	1	PISTON SPRING
	22 PF-RA-20J-16J	1	REDUCER ADAPTER
	23 PF-SE-SW-16J	1	SWIVEL ELBOW JIC
	24 PAT-LS-2018	1	PACKING NUT - RTM
	25 F-CS-06C-32	4	ALLEN CAP SCREW
	26 F-CS-06C-20	4	ALLEN CAP SCREW

REPAIR KITS

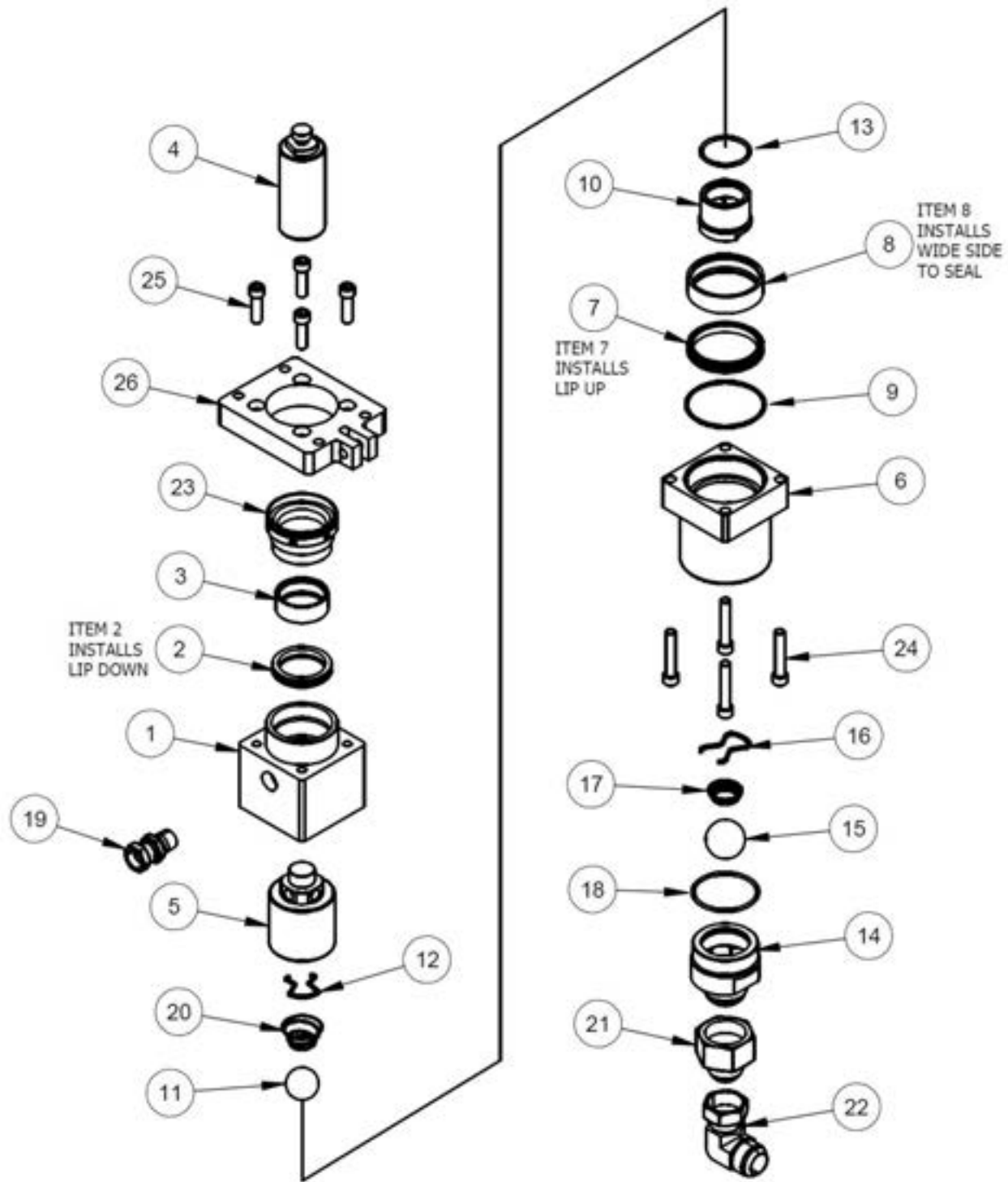
PART No.	DESCRIPTION
* PAT-LS-24050-R-SK	SEAL KIT

* NOTE: ASTERISKS DENOTE PARTS USED IN SEAL KIT.

MAGNUM VENUS PLASTECH

PATRIOT RTM FLUID SECTION ASSY. PAT-LS-24050-RTM

REV:A 01-29-08 BT2



MAGNUM VENUS PLASTECH

PATRIOT LOWER SECTION

PAT-LS-24050-SSB

REV:01-28-08 BT2

Parts List				
ITEM	PART NUMBER	QTY	DESCRIPTION	
	1	PAT-LS-2001	1	OUTLET BODY
*	2	PAT-LS-1014	1	ROD SEAL ASSY
	3	PAT-LS-2005	1	ROD BUSHING
	4	PAT-LS-2008	1	FLUID ROD
	5	PAT-LS-2007	1	PISTON $\varnothing 2-1/2"$
	6	PAT-LS-2002	1	INLET BODY
*	7	PAT-LS-2014	1	PISTON SEAL ASSY
	8	PAT-LS-2013	1	PISTON BUSHING
*	9	O-E-150	1	O-RING
	10	PAT-LS-2009	1	PISTON VALVE
	11	VLS-4622	1	$\varnothing 1-1/4$ CHROME BALL
	12	PAT-LS-2011	1	SPRING RETAINER
*	13	O-E-3-924	1	O-RING
	14	PAT-LS-2015	1	INLET VALVE 1-1/4
	15	PAT-LS-2017	1	$\varnothing 1-1/2$ CHROME BALL
	16	VLS-4620	1	BALL STOP
	17	VLS-4621	1	FOOT VALVE SPRING
*	18	O-E-3-932	1	O-RING
	19	PF-SW-08	1	PIPE SWIVEL
	20	PAT-LS-2006	1	PISTON SPRING
	21	PF-RA-20J-16J	1	REDUCER ADAPTER
	22	PF-SE-SW-16J	1	SWIVEL ELBOW JIC
	23	PAT-LS-2018	1	PACKING NUT - RTM
	24	F-CS-06C-32	4	ALLEN CAP SCREW
	25	F-CS-06C-20	4	ALLEN CAP SCREW
	26	PAT-TRPLT-6343	1	TRANSITION PLATE

REPAIR KITS

PART No.	DESCRIPTION
* PAT-LS-24050-R-SK	SEAL KIT

* NOTE: ASTERISKS DENOTE PARTS USED IN SEAL KIT.

MAGNUM VENUS PLASTECH

PATRIOT LOWER SECTION

PAT-LS-24050-SSB

REV:01-28-08 BT2

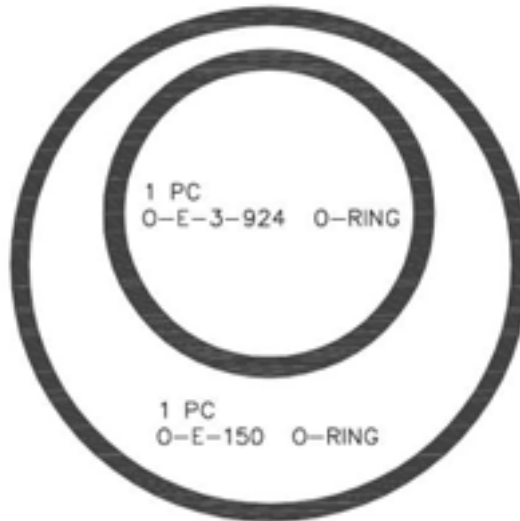
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SEAL REPAIR KIT
PATRIOT 1.75 FLUID SECTION



1 PC
PAT-LS-2014-SP SEAL



2 PCS
PAT-LS-1014-SP SEAL



1 PC
O-E-3-924 O-RING

1 PC
O-E-150 O-RING



1 PC
O-E-3-932 O-RING

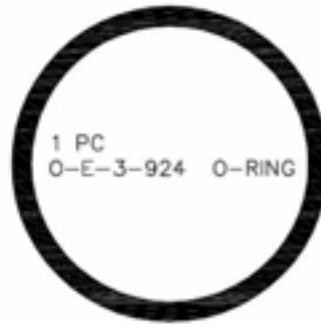
PAT-LS-24050-GL-SK
SEAL REPAIR KIT



1 PC
PAT-LS-2014 SEAL ASSY



2 PCS
PAT-LS-1014 SEAL ASSY



1 PC
O-E-3-924 O-RING



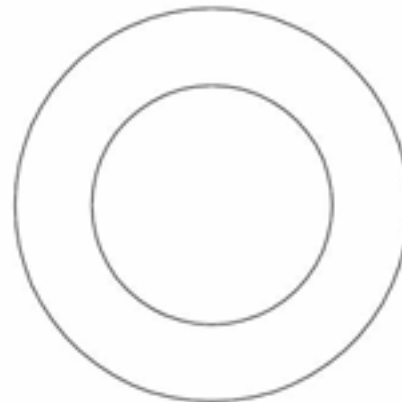
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O-E-150 O-RING



1 PC
O-E-037 O-RING

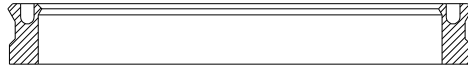


1 PC
O-E-3-932 O-RING

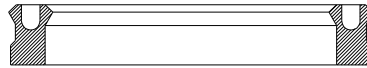


1 PC
PAT-LS-2024 GLUTTON SEAL

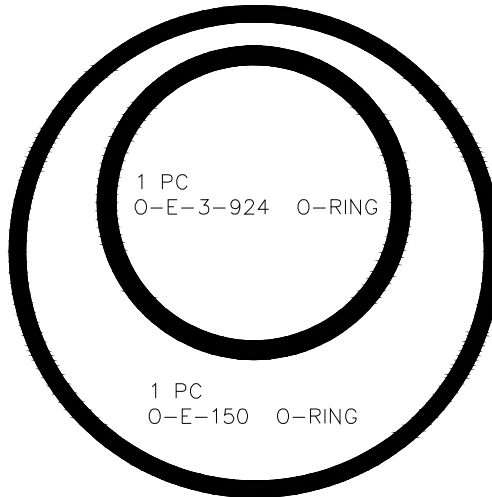
PAT-LS-24050-R-SK
SEAL REPAIR KIT
PATRIOT RTM FLUID SECTION



1 PC
PAT-LS-2014 SEAL ASSY

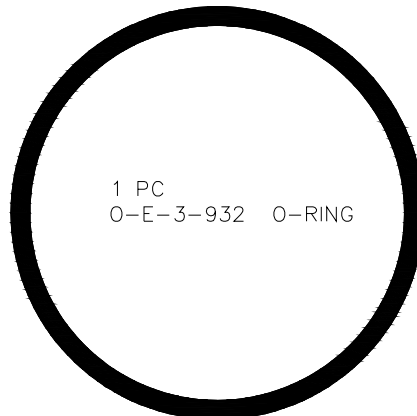


1 PCS
PAT-LS-1014 SEAL ASSY



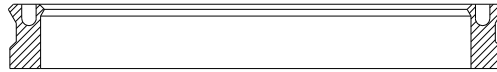
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O-E-3-924 O-RING

1 PC
O-E-150 O-RING

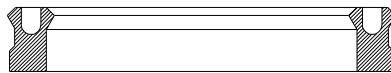


1 PC
O-E-3-932 O-RING

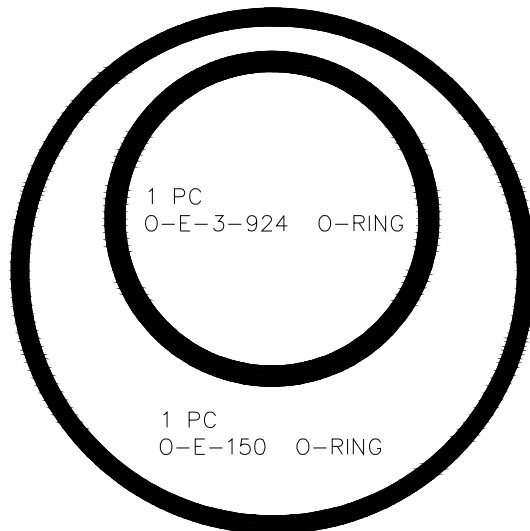
PAT-LS-24050-SK
SEAL REPAIR KIT
PATRIOT 1.75 FLUID SECTION



1 PC
PAT-LS-2014 SEAL ASSY

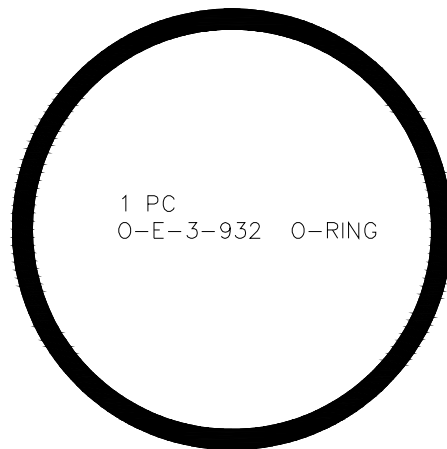


2 PCS
PAT-LS-1014 SEAL ASSY

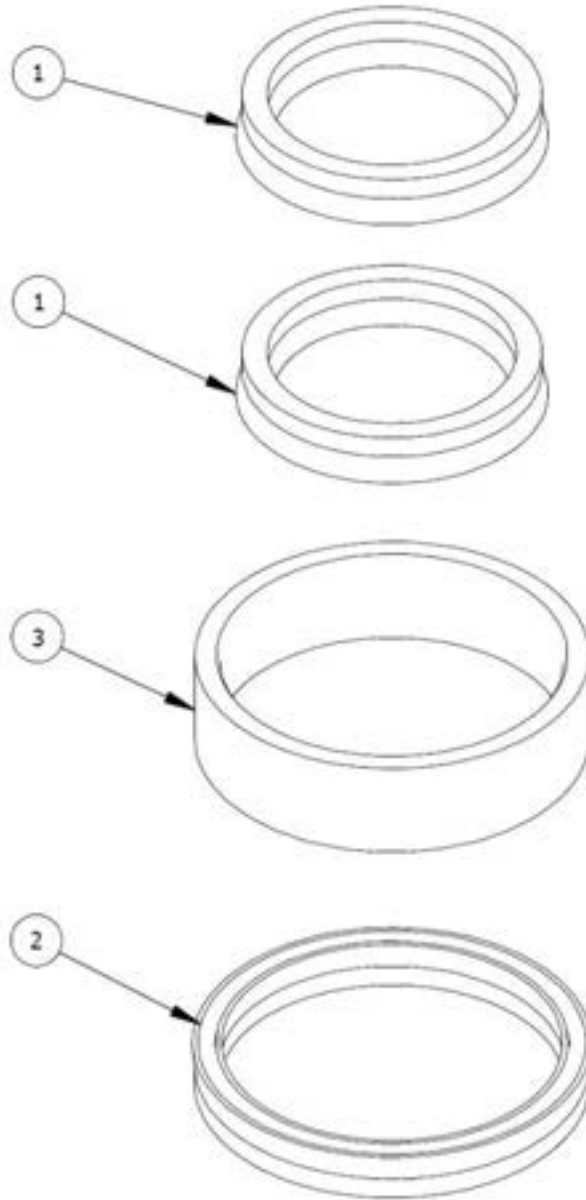


1 PC
O-E-3-924 O-RING

1 PC
O-E-150 O-RING



1 PC
O-E-3-932 O-RING



Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	PAT-LS-1014-SP	2	PISTON SEAL
2	PAT-LS-2014-SP	1	PISTON SEAL
3	PAT-LS-2013-NT	1	PISTON BUSHING

MAGNUM VENUS PLASTECH

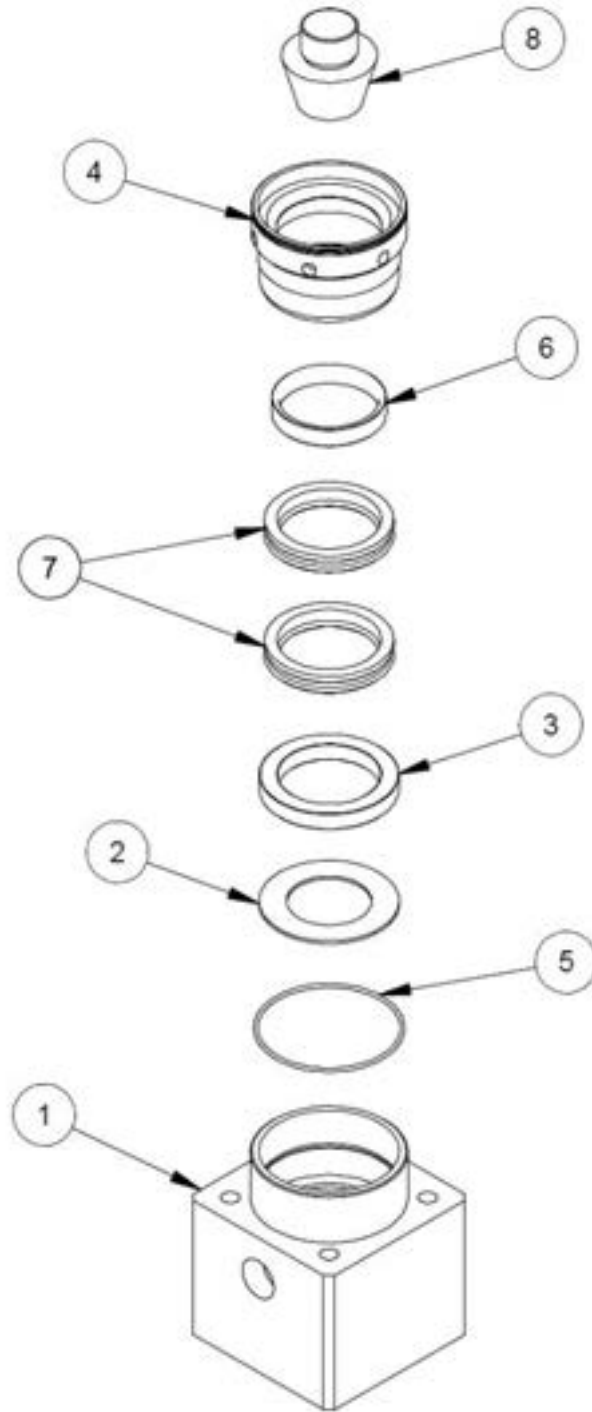
CONVERSION KIT	PAT-LS-24050-AM-CK
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8/27/2009

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MAGNUM VENUS PLASTECH

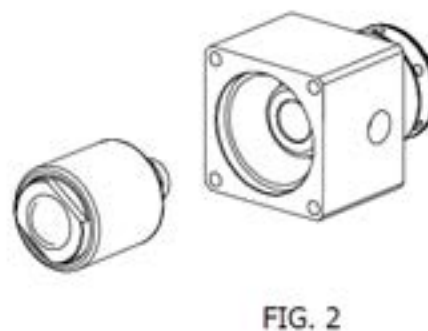
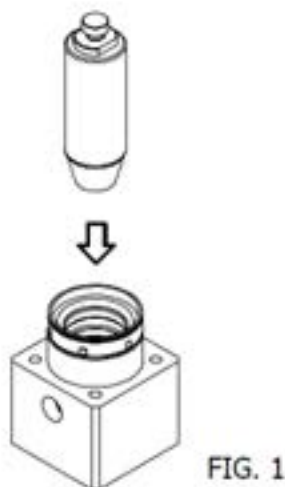
GLUTTON SEAL CONVERSION KIT PAT-LS-24050-GL-CK

REV:10-18-10 BT2

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	PAT-LS-2001-GL	1	OUTLET BODY
2	PAT-LS-2024	1	GLUTTON SEAL
3	PAT-LS-2023	1	SPACER
4	PAT-LS-2004-GL	1	SOLVENT CUP
5	O-E-037	1	O-RING
6	PAT-LS-2005-GL	1	ROD BUSHING
7	PAT-LS-1014	2	PISTON SEAL ASSY
8	PAT-GL-TOOL-2	1	SEAL TOOL

ASSEMBLY INSTRUCTIONS

1. DISASSEMBLE UPPER PORTION OF EXISTING FLUID SECTION, SEPARATING INLET AND OUTLET BODIES. EXISTING PAT-LS-2001 OUTLET BODY, PAT-LS-2004 PACKING NUT, PAT-LS-2005 BUSHING AND PAT-LS-1014 SEALS WILL BE REPLACED.
2. ASSEMBLE ITEMS 1 THRU 7 AS SHOWN ON PAGE 1. NOTE PAT-LS-2005-GL BUSHING AND PAT-LS-1014 SEALS GO INTO SOLVENT CUP. FIRMLY TIGHTEN PAT-LS-2004-GL SOLVENT CUP TO PAT-LS-2001-GL OUTLET BODY.
3. SCREW ITEM 8 PAT-GL-TOOL-2 ON TO EXISTING PAT-LS-2008 (OR PAT-LS-2008-HD) UPPER ROD.
4. PUSH SHAFT DOWNWARD THRU GLUTTON SEAL USING A HARD RUBBER OR PLASTIC Mallet TO FORM SEAL. (fig. 1)
5. REMOVE PAT-GL-TOOL-2 FROM PAT-LS-2008 (PAT-LS-2008-HD) ROD.
6. SCREW EXISTING PAT-LS-2007 PISTON TO BOTTOM OF PAT-LS-2008 (PAT-LS-2008-HD) ROD (fig. 2)
7. CONNECT PAT-LS-2001-GL OUTLET BODY TO EXISTING INLET BODY.



MAGNUM VENUS PLASTECH

GLUTTON SEAL CONVERSION KIT PAT-LS-24050-GL-CK

REV:10-18-10 BT2



Revision Information:

- Rev. 9/2008** Added Bolt Torque procedures.
- Rev. 12/2008** Updated drawings section, added notes for RTM & SSB versions of the fluid section assembly.
- Rev. 10/2010** Added the information for the additional fluid sections and updated the drawings. Added the section for the PAT-LS-24050-GL Outlet Body assembly.
- Rev. 01/2012** Updated the Logo, MVP Address and the manual format, added the Terms and Conditions section.



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Plastech**

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Fax: +44 (0) 1822 833999

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Assemblies Covered in this Manual:

PAT-LS-24050	Patriot Fluid Section
PAT-LS-24050-AM	Patriot Fluid Section
PAT-LS-24050-GL	Patriot Fluid Section
PAT-LS-24050-GL-HD	Patriot Fluid Section – Heavy Duty
PAT-LS-24050-HD	Patriot Fluid Section – Heavy Duty
PAT-LS-24050-MC	Patriot Fluid Section – Multi Color
PAT-LS-24050-RTM	Patriot Fluid Section – RTM Unit
PAT-LS-24050-SSB	Patriot Fluid Section – Patriot SSB Units

Rev. 01/2012