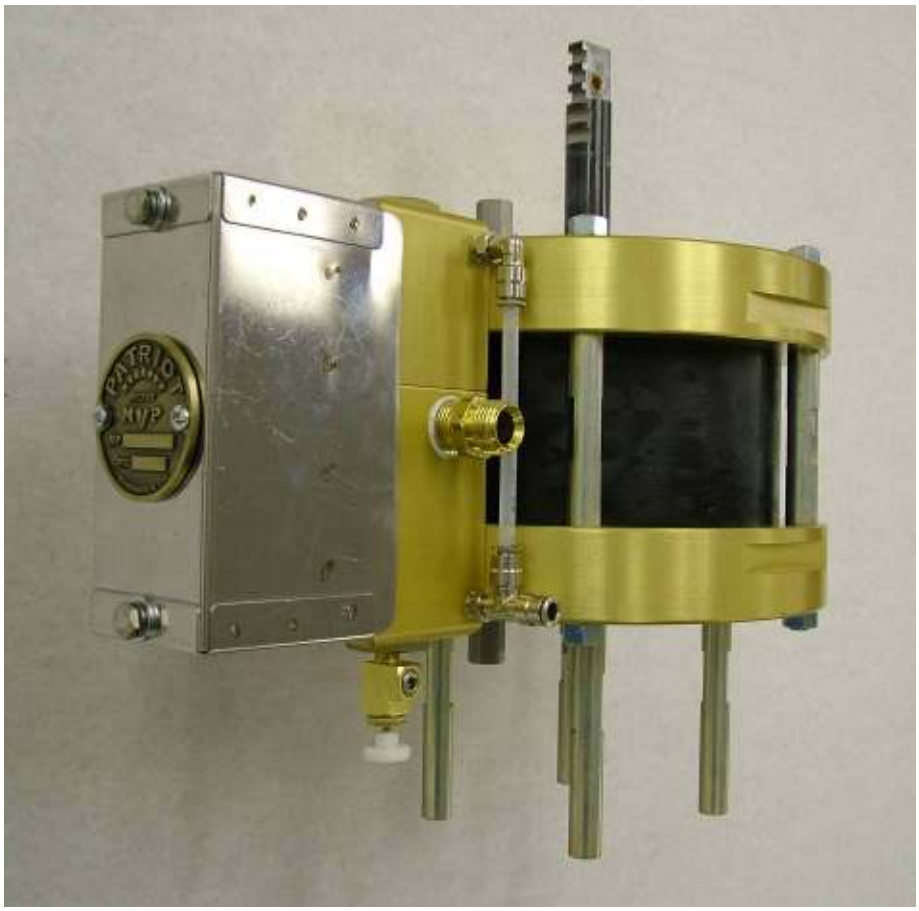
PATRIOT 7”
POWERHEAD MANUAL
PAT-PH-7000 Series



MagnumVenusPlastech

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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 laminate sandings, or with any readily oxidizing material, such as brass or iron, will cause 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. Firefighting 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 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.

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.

a. 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. b. 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.

b. Equipment capable of withstanding pressure. When HHC solvent contacts 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 carcinoge 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 diluents 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 suggests 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 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 PRECEDURES, 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 of the 7” diameter by 2” stroke length Patriot Powerheads:

- PAT-PH-7000 Patriot Powerhead Assembly
- PAT-PH-7000-CA Patriot Powerhead Assembly – Multi-Color
- PAT-PH-7000-D Patriot Powerhead Assembly – Duo Unit
- PAT-PH-7000-HD Patriot Powerhead Assembly – Heavy Duty
- PAT-PH-7000-P Patriot Powerhead Assembly – Putty

The Duo Unit powerhead (PAT-PH-7000-D) is also a heavy duty assembly – meaning it uses the same parts as the HD version except for the tie rods.

NOTE: Before starting any service work, release fluid and air pressure from system. Remove the two air lines from the air motor. The air motor 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. The reassembly will require the use of removable thread locking compound, Lithium grease (08465) and SUPERLUBE O-ring lubricant.

During Disassembly . . .

As you disassemble the equipment, lay out the components in the correct order and direction. This will help you to reassemble them. It is important to have a current drawing for reference during repair.

Tools required:

- Medium Removable Thread Locking Compound
- Brown Grease (08465)
- Super O-ring Lube (SUPERLUBE)
- 7/16-inch Socket Head Wrench (08472)
- Hex Wrench Set (08469)
- 9/16-inch Wrench (08476)
- 12-inch Adjustable Wrench (08468)
- Flat Blade Screw Driver
- Snap Ring Pliers

Valve Block Disassembly:

1. Remove the two hex head screws (F-HB-04C-52) from the front of the muffler and remove the muffler.

2. Remove the air line from the poly tee (MPH-2538) on the side of the valve block

3. Remove the valve block from the side of the powerhead by removing the four socket head cap screws (F-CS-04C-40-SS) from the valve block.

4. Remove the two end caps (MPH-2521) from the valve block.

5. Remove the pipe plug (PF-SP-08) from the side of the lower valve block (PAT-PH-5002). Rotate either of the two valve pistons (MPH-2517) until the hole in the valve poppet (PAT-PH-5005) aligns with the pipe plug port in the lower valve block.

6. Insert a 7/32" hex wrench through the pipe plug port and into the hole in the valve poppet (PAT-PH-5005). *(See Figure 1)*

Figure 1

Insert a 7/32" hex wrench through the pipe plug port and into the hole in the valve poppet (PAT-PH-5005). Unscrew either of the two valve pistons (MPH-2517) and remove. Repeat removal of the second valve piston.

NOTE: The hole diameter in the valve poppet is .2685 (6.81mm) if a 7/32" hex wrench is not available

7. Unscrew either of the two valve pistons (MPH-2517) and remove. Repeat removal of the second valve piston.

Figure 2

8. Using a 7/16 open end wrench remove the two hex cap screws (F-HB-04C-08) from the front of the lower valve block (PAT-PH-5002). Twist and pull the upper valve block (PAT-PH-5001) from the lower valve block (PAT-PH-5002). Remove the valve rod assembly from the valve block. (See fig. 2)

9. Remove the two cap screws (F-CS-04C-08-SS) from each of the two valve exhausts (MPH-5009). Pull both of the valve exhausts from the valve blocks. Remove the diaphragm (MPH-5010) from both valve blocks.

NOTE: Avoid putting any scratches in the valve blocks. To remove the diaphragm use a screwdriver and push the center riser on the diaphragm to one side and slide out.

10. Remove each O-ring and replace with new. Coat every new O-ring with brown grease (08465). Coat the diaphragm bore and both valve piston bores with brown grease (08465) before assembling. Use a wire brush to clean the valve rod threads of any dry thread locking compound.

Valve Block Assembly:

NOTE: Removable thread locking compound will be required for reassembly. During disassembly, put one to two drops of removable thread locking compound on threads of the valve poppet (PAT-PH-5005) and assemble.

NOTE: Replace all O-rings and Seals provided in the seal kit. Apply brown grease (08465) to all o-rings and seal areas before assembling.

1. Using your thumb push the valve piston (MPH-2517) all the way into the lower valve block (PAT-PH-5002).

2. Apply a small amount of removable thread locking compound to the threads on one end of the valve poppet (PAT-PH-5005) and thread it into the valve piston (MPH-2517) in the lower valve block while holding the valve piston with your thumb.

3. Turn the valve poppet in the lower valve block (PAT-PH-5002) so that the hole in the poppet body is aligned with the side port.

4. Insert a 7/32” hex wrench through the side port and into the hole in the valve poppet to hold the valve poppet in place, now use a 7/16” socket wrench to tighten the valve poppet into the valve piston. Do not over tighten.

5. Apply a small amount of removable thread locking compound to the threads on the other end of the valve poppet (PAT-PH-5005).

6. Apply some brown grease (08465) to o-ring (O-B-125) on the upper valve block (PAT-PH-5001) and push it into the lower valve block (PAT-PH-5002) over the valve poppet.

7. Insert the 7/32” hex wrench through the side port and into the hole in the valve poppet (PAT-PH-5005) to hold the valve poppet in place, now use a 7/16” socket wrench to tighten the other valve piston (MPH-2517) onto the valve poppet. Do not over tighten.

8. Using a 7/16” wrench install the two hex bolts (F-HB-04C-08) to hold the lower valve block (PAT-PH-5001) to the upper valve block (PAT-PH-5001).

9. Install the pipe plug (PF-SP-08) into the side port of the lower valve block (PAT-PH-5001). Use Teflon tape or pipe seal compound on the pipe plug threads to prevent an air leak.

10. Insert the diaphragms (MPH-5010) into the upper and lower valve blocks with the outside leading edge of the diaphragms facing out. Push the diaphragms all the way down into the valve block bore.

11. Install the valve exhausts (MPH-5009) onto the upper and lower valve blocks using the two socket head cap screws (F-CS-04C-08-SS) into each of the two valve exhausts and snug tight.

12. Install valve end caps (MPH-2521) into the upper and lower valve blocks and lightly snug tight.

13. Connect the air line to the poly tee (MPH-2538) on the side of the valve block.

Air Cylinder Disassembly:

NOTE: Have a current drawing for the Powerhead you are working on to reference for part numbers.

1. Remove the E-ring (APP-9102) from the lower piston rod (PAT-PH-5009). Lift the sleeve (APP-9109) up and remove the two connectors (APP-9096).

1a. HD & Putty – for the HD Powerheads remove Sleeve Clip (PAT-PH-9112) from the lower rod (PAT-PH-7009). Lift the Shell Retainer (PAT-PA-9110) up and remove the two Half Shells (VPH-10009)

NOTE: The air motor can be removed from the unit for repair or the following procedures can be performed while the motor is mounted in place

2. Remove the five upper hex nuts (F-HN-06F) from the tie rods (PAT-PH-5006). Pull the upper end cap (PAT-PH-7012) off the cylinder (PAT-PH-7003) and upper piston rod (PAT-PH-5008).

3. Slide cylinder (PAT-PH-7003) off of piston (MPH-7004)

4. Slide the piston assembly (MPH-7004) up from the lower end cap (note current drawing for correct part number).

5. Remove snap ring (7205-2-26) from the upper busing using the snap ring pliers.

6. Push the upper bushing out of the upper end cap.

7. Remove snap ring from the lower bushing.

8. Push the lower bushing out of the lower end cap.

9. Replace all O-rings and coat with brown grease (08465). Coat the inside of the cylinder, piston rods and piston rod bushing with brown grease (08465).

Pilot Valve Rebuild:

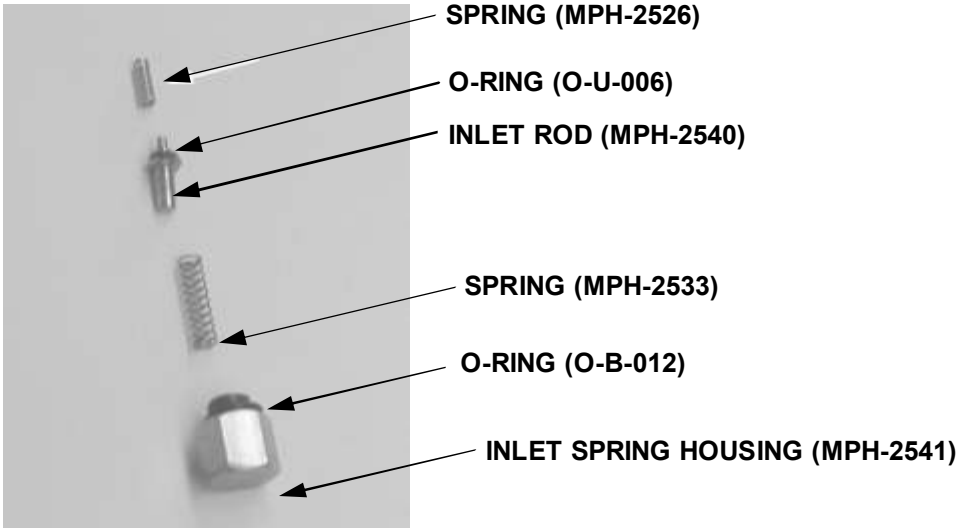
NOTE: The two pilot valves in the upper and lower end caps are the same. Start with the pilot valve in the upper end cap.

1. Remove the inlet spring housing (MPH-2541) from the upper end cap (PAT-PH-5012).

2. Remove spring (MPH-2533) with inlet rod (MPH-2540). Turn the end cap over and a small spring (MPH-2526) will fall out.

3. Replace O-ring (O-B-012) on the inlet spring housing (MPH-2541) and the O-ring (O-U-006) on the inlet rod (MPH-2540). Coat O-rings and Springs with a light coat of SUPERLUBE grease (SUPERLUBE). Set spring (MPH-2533) into the inlet spring housing (MPH-2541) with inlet rod (MPH-2540) facing up.

4. Screw the inlet spring housing (MPH-2541) into the upper end cap. Do not install the spring (MPH-2526) at this time it will be installed from the bottom.



5. Remove the stem seal (MPH-2511-01) from the bottom of the upper end cap (PAT-PH-5-12).

6. Remove the valve stem (MPH-2513) and seal guide (MPH-2512) with the spring (MPH-2528).

7. Replace O-ring (O-B-012) on stem seal (MPH-2511-01) and coat O-ring and stem seal with SUPERLUBE grease (SUPERLUBE). Drop the small spring (MPH-2526) into the stem seal bore, the spring should center itself onto the end of the inlet rod (MPH-2540).

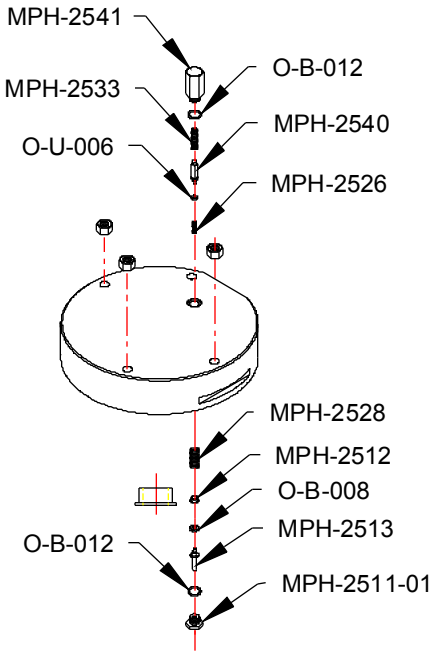


Fig. 6

8. Insert the spring (MPH-2528) with the seal guide (MPH-2512) into the end cap. Set the small end of the seal guide (MPH-2512) onto the spring (MPH-2528). Set a new O-ring (O-B-008) on top of the seal guide (MPH-2512). Screw the stem seal (MPH-2511-01) with valve stem (MPH-2513) into the upper end cap.

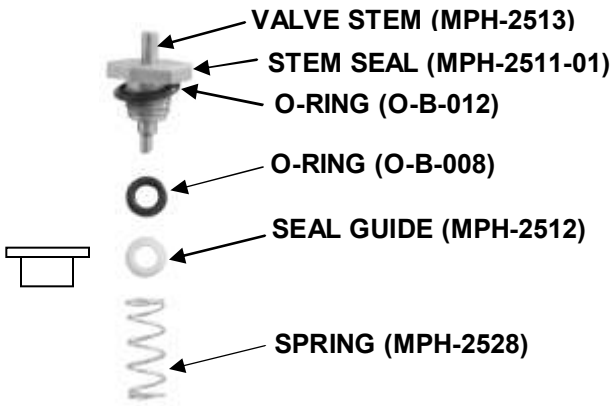


Fig. 7

9. Repeat the pilot valve rebuild on the lower end cap (PAT-PH-7004).

Air Cylinder Assembly:

NOTE: Have a current drawing for the Powerhead you are working on to reference for part numbers.

1. Apply a thin coat of brown grease to the inner bore of the lower end cap (PAT-PH-5004) and install the lower bushing (MPH-4254).

2. Install snap ring to secure the lower bushing in place.

3. Apply a thin coat of brown grease to the inner bore of the upper end cap (PAT-PH-7012) and install the upper bushing.

4. Install snap ring (7205-2-26) to secure the upper bushing in place.

5. Insert the lower piston rod through the piston rod bushing of the lower end cap.

6. Slide the cylinder (PAT-PH-7003) over the piston (MPH-7004) down onto the lower end cap o-ring (O-B-167).

NOTE: Use caution not to damage the o-ring in the upper bushing when installing the upper end cap over the upper piston rod.

7. Set the upper end cap (PAT-PH-7012) onto the cylinder with the valve block flats facing the same direction. Screw the hex nuts (F-HN-06F) onto the tie rods and snug the hex nuts. **See bolt torque procedures section of this manual for details.**

8. Install the connectors (APP-9096), sleeve (APP-9109) and e-ring (APP-9102) onto the piston rod.

8a. HD & Putty – for the HD Powerheads install Sleeve Clip (PAT-PH-9112) to the lower rod (PAT-PH-7009). Lift the Shell Retainer (PAT-PA-9110) up and remove the two Half Shells (VPH-10009)

9. Connect the pilot air hose and regulated air hose to air motor.

10. Install the muffler using the two hex head cap screws (F-HB-04C-52).

Bolt Torque Procedures:

Bolt & Nut Torque Procedure for Patriot Powerhead & 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.

Powerhead 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.

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

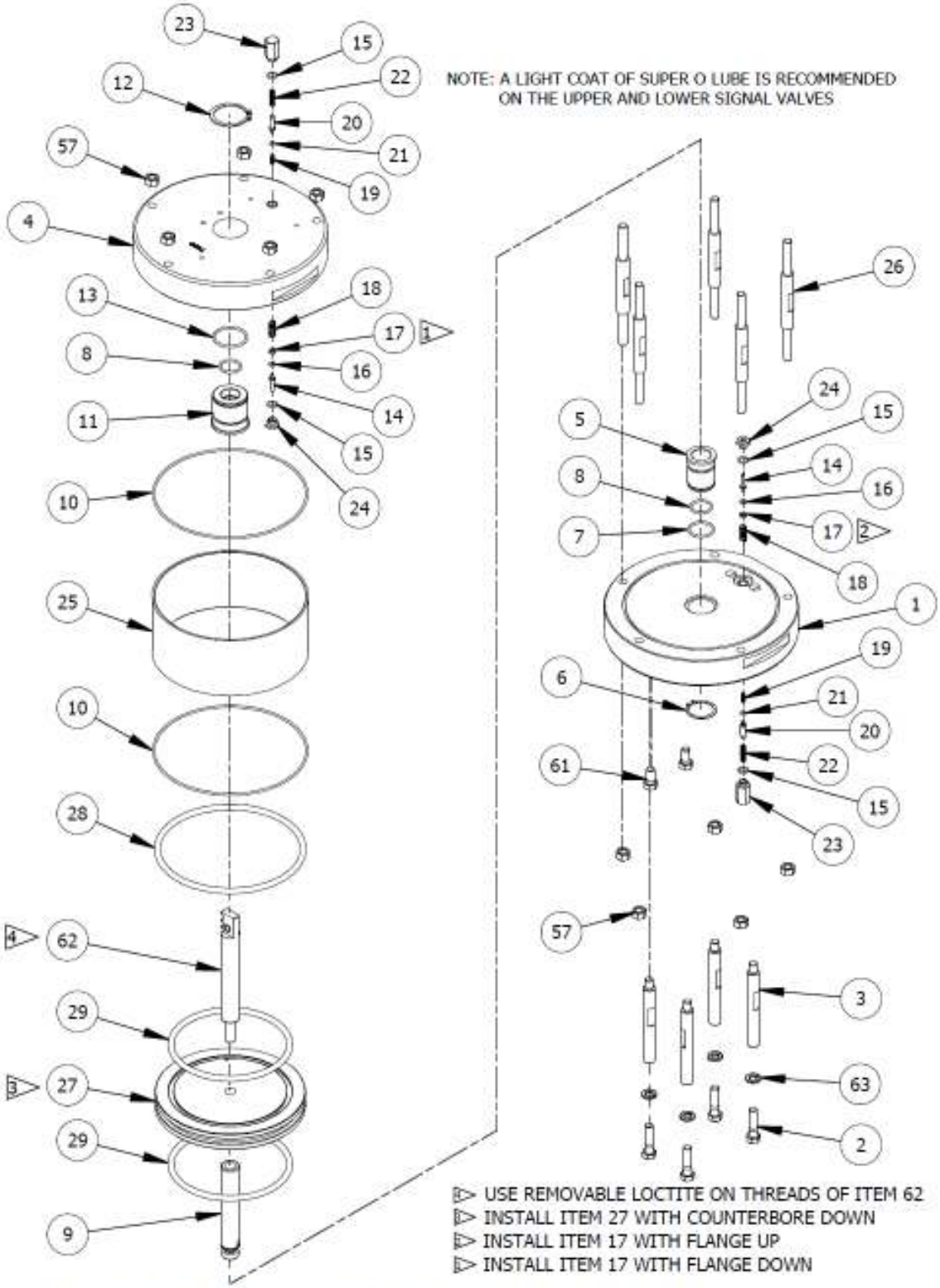
Apply removable thread locking compound to male thread.
Screw into Powerhead and torque to approximately 20 ft.lbs.
Use Grade 5 bolts & lock washers to connect Powerhead to fluid section.
Tighten to a final torque of 30 to 32 ft.lbs. using a 3 step procedure.

Fluid Section Socket Head Cap Screws (3/8-16 UNC)

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

Parts Drawings:

PAT-PH-7000	**7” PATRIOT POWERHEAD ASSEMBLY**
PAT-PH-7000-CA	**7” PATRIOT POWERHEAD – MULTI-COLOR**
PAT-PH-7000-D	**7” PATRIOT POWERHEAD – DUO UNIT**
PAT-PH-7000-HD	**7” PATRIOT POWERHEAD – HEAVY DUTY**
PAT-PH-7000-P	**7” PATRIOT POWERHEAD – PUTTY**
PAT-PH-7000-CA-SK	**SEAL KIT – MULTI-COLOR POWERHEAD**
PAT-PH-7000-HD-SK	**SEAL KIT – HEAVY DUTY POWERHEAD**
PAT-PH-7000-SK	**SEAL KIT – 7” PATRIOT POWERHEAD**
PAT-PH-SB-XL	**SHIFT BLOCK**



MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD	PAT-PH-7000

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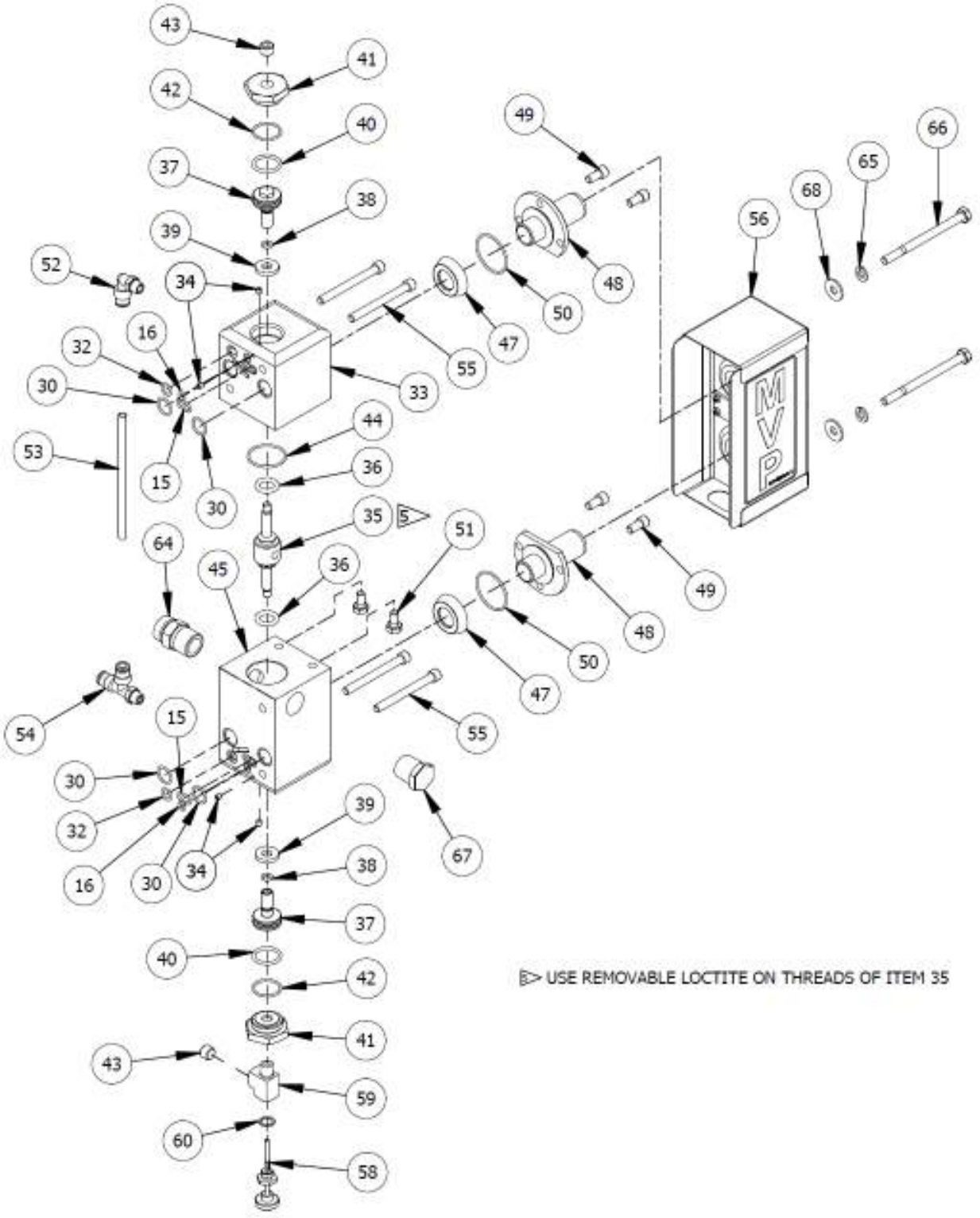


MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD	PAT-PH-7000

REV:A 05/24/11 SHEET 2 / 3 10/22/2009

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	PAT-PH-7004	1	LOWER END CAP
2	F-HB-06C-24-GR8	4	HEX BOLT
3	PAT-PH-5011	4	TIE ROD
4	PAT-PH-7012	1	UPPER END CAP - 7"
5	VPH-4254	1	BUSHING- 7/8 DIA. PISTON ROD
6	MPH-3261	1	SNAP RING - EXTERNAL
* 7	O-B-121	1	O-RING
* 8	O-B-118	2	O-RING
9	PAT-PH-5009	1	LOWER ROD
* 10	O-B-167	2	O-RING
11	PAT-PH-5007	1	UPPER BUSHING
12	7205-2-26	1	EXTERNAL SNAP RING
* 13	O-B-127	1	O-RING
14	MPH-2513	2	VALVE STEM- PILOT VALVE
* 15	O-B-012	6	O-RING
* 16	O-B-008	4	O-RING
17	MPH-2512	2	SEAL GUIDE- PILOT VALVE
18	MPH-2528	2	SPRING
19	MPH-2526	2	SPRING
20	MPH-2540	2	INLET ROD- PILOT VALVE
* 21	O-U-006	2	O-RING
22	MPH-2533	2	COMPRESSION SPRING
23	MPH-2541	2	SPRING HOUSING- PILOT VALVE
24	MPH-2511-01	2	STEM SEAL ASSY- PILOT VALVE
25	PAT-PH-7003	1	CYLINDER
26	PAT-PH-5006	5	TIE ROD - 2" STROKE
27	MPH-7004	1	PISTON - 7"
* 28	O-B-439	1	O-RING
* 29	O-B-431	2	O-RING
* 30	O-B-014	4	O-RING
* 32	O-B-011	2	O-RING
33	PAT-PH-5001	1	UPPER VALVE BLOCK
34	F-SS-832-02-SS	4	SET SCREW
35	PAT-PH-5005	1	POPPET VALVE - 2" STROKE
* 36	O-U-206-90	2	O-RING
37	MPH-2517	2	VALVE PISTON
* 38	O-D-010-90	2	O-RING
39	MPH-3262	2	PISTON STOP
* 40	O-B-116	2	O-RING
41	MPH-2521	2	VALVE END CAP
* 42	O-B-019	2	O-RING
43	PF-AP-02-SS	2	PIPE PLUG
* 44	O-B-024	1	O-RING
45	PAT-PH-5002	1	LOWER VALVE BLOCK
* 47	MPH-5010	2	DIAPHRAGM
48	MPH-5009	2	EXHAUST PORT
49	F-CS-04C-08-SS	4	CAP SCREW
* 50	O-B-026	2	O-RING
51	F-HB-04C-08	2	HEX BOLT
52	MPH-2539	1	MALE ELBOW
53	MS-2052-1	.313 FT	POLY TUBE
54	MPH-2538	1	MALE POLY TEE FITTING
55	F-CS-04C-40	4	CAP SCREW
56	PAT-PH-5010-01	1	MUFFLER ASSEMBLY
57	F-HN-06F	10	HEX NUT
58	MPH-2546-01	1	RESET STEM ASSEMBLY
59	PF-ST-02-BR	1	TEE FITTING
60	MPH-2545	1	SEAL
61	F-HB-06C-12	2	HEX BOLT
62	PAT-PH-5008	1	UPPER ROD ASSY
63	F-SW-06	4	LOCK WASHER
64	PF-HN-08-08S	1	HOSE ADAPTER
65	F-SW-04-SS	2	LOCK WASHER
66	F-HB-04C-56-SS	2	HEX BOLT
67	PF-HP-08	1	HEX PLUG
68	F-FW-04	2	FLAT WASHER

OPTIONAL PARTS AND ASSEMBLIES

PARTS LIST

PART No.	QTY	DESCRIPTION
MPH-2542	1	RESET BUTTON ASSY
PAT-PH-S8-XL	1	SHIFT BLOCK ASSY

REPAIR KITS

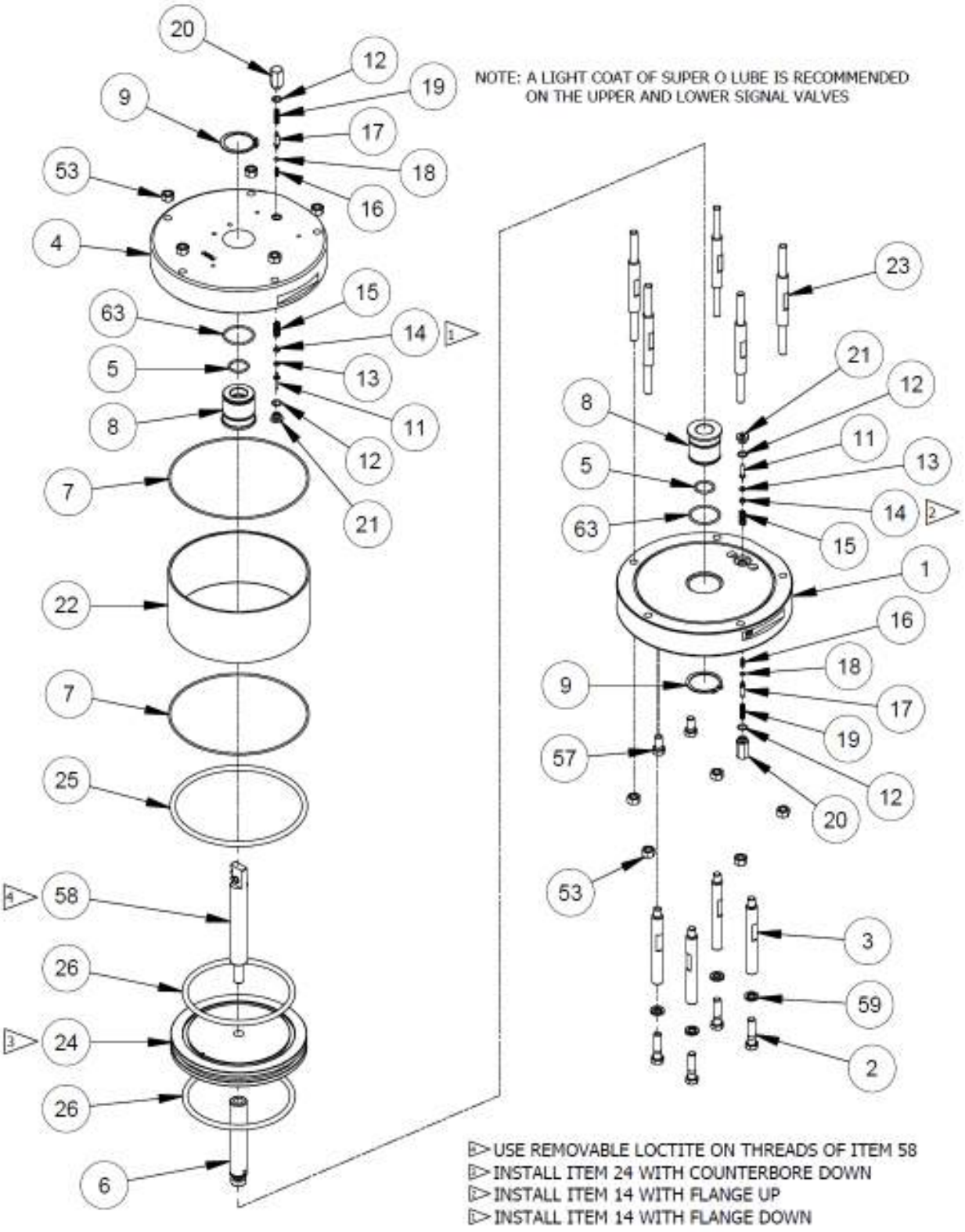
PART No.	DESCRIPTION
* PAT-PH-7000-SK	SEAL KIT

* ASTERISKS DENOTE PARTS IN SEAL KIT

MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD	PAT-PH-7000

REV:A 05/24/11 SHEET 3 / 3 10/22/2009



MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD	PAT-PH-7000-CA

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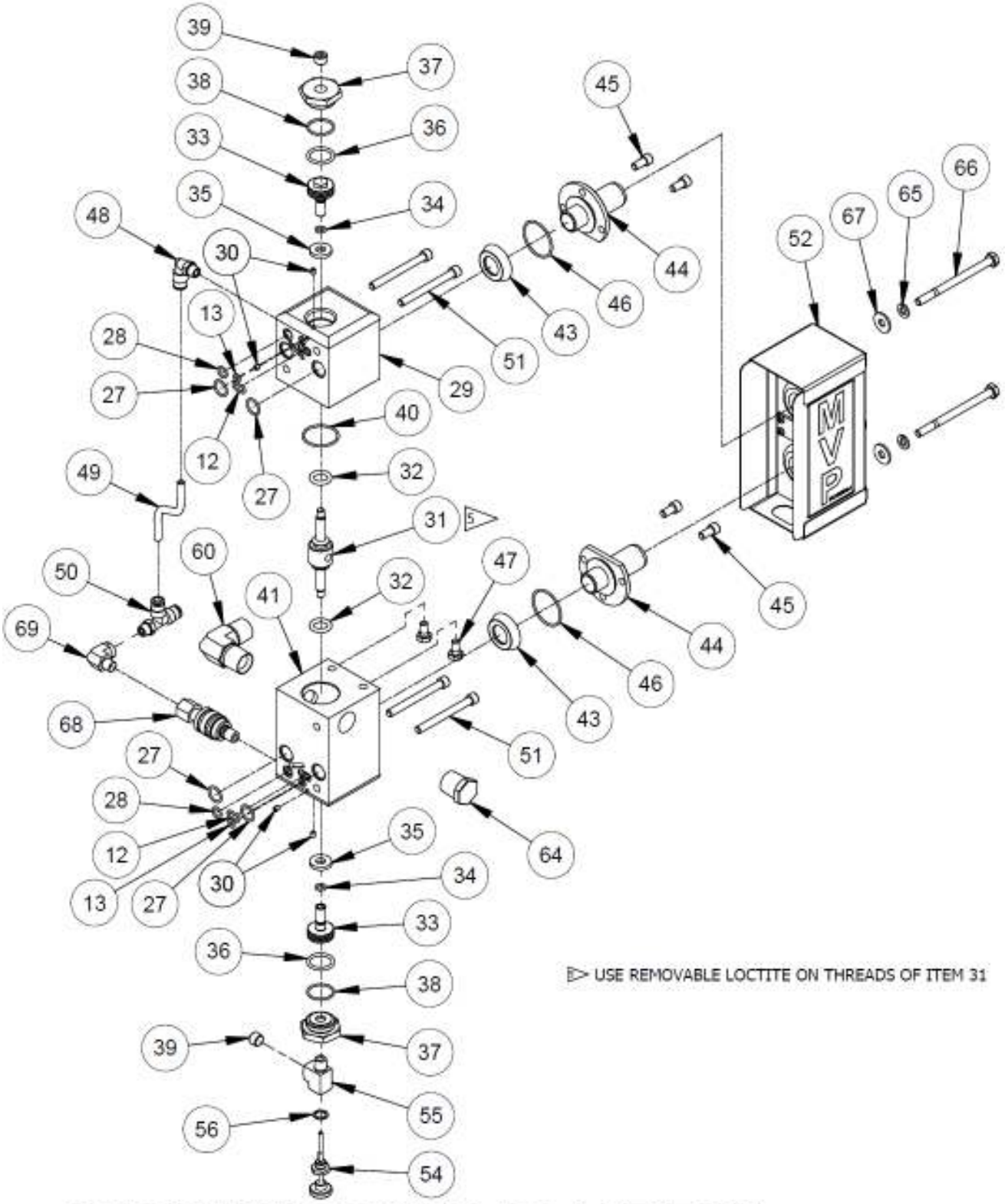

MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD	PAT-PH-7000-CA

REV: A 05/24/11

PAT-PH-7000-CA PARTS LIST			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	PAT-PH-7004-HD	1	LOWER END CAP
2	F-HB-06C-24-GR8	4	HEX BOLT
3	PAT-PH-5011	4	TIE ROD
4	PAT-PH-7012	1	UPPER END CAP - 7"
* 5	O-8-118	2	O-RING
6	PAT-PH-5009	1	LOWER ROD
* 7	O-8-167	2	O-RING
8	PAT-PH-5007	2	UPPER BUSHING
9	7205-2-2RS	2	EXTERNAL SNAP RING
11	MPH-2513	2	VALVE STEM- PILOT VALVE
* 12	O-8-012	6	O-RING
* 13	O-8-008	4	O-RING
14	MPH-2512	2	SEAL GUIDE- PILOT VALVE
15	MPH-2528	2	SPRING
16	MPH-2526	2	SPRING
17	MPH-2540	2	INLET ROD- PILOT VALVE
* 18	O-U-006	2	O-RING
19	MPH-2533	2	COMPRESSION SPRING
20	MPH-2541	2	SPRING HOUSING- PILOT VALVE
21	MPH-2511-01	2	STEM SEAL ASSY- PILOT VALVE
22	PAT-PH-7003	1	CYLINDER
23	PAT-PH-5006	5	TIE ROD - 2" STROKE
24	MPH-7004	1	PISTON - 7"
* 25	O-8-439	1	O-RING
* 26	O-8-431	2	O-RING
* 27	O-8-014	4	O-RING
* 28	O-8-011	2	O-RING
29	PAT-PH-5001	1	UPPER VALVE BLOCK
30	F-SS-832-02-SS	4	SET SCREW
31	PAT-PH-5005	1	POPPET VALVE - 2" STROKE
* 32	O-U-206-90	2	O-RING
33	MPH-2517	2	VALVE PISTON
* 34	O-D-010-90	2	O-RING
35	MPH-3262	2	PISTON STOP
* 36	O-8-116	2	O-RING
37	MPH-2521	2	VALVE END CAP
* 38	O-8-019	2	O-RING
39	PF-AP-02-SS	2	PIPE PLUG
* 40	O-8-024	1	O-RING
41	PAT-PH-5002	1	LOWER VALVE BLOCK
* 43	MPH-5010	2	DIAPHRAGM
44	MPH-5009	2	EXHAUST PORT
45	F-CS-04C-08-SS	4	CAP SCREW
* 46	O-8-026	2	O-RING
47	F-HB-04C-08	2	HEX BOLT
48	MPH-2539	1	MALE ELBOW
49	MS-2052-1	.50 FT	POLY TUBE
50	MPH-2538	1	MALE POLY TEE FITTING
51	F-CS-04C-40-SS	4	CAP SCREW
52	PAT-PH-5010-01	1	MUFFLER ASSEMBLY
53	F-HN-06F	10	HEX NUT
54	MPH-2546-01	1	RESET VALVE STEM
55	PF-ST-02-BR	1	TEE FITTING
56	MPH-2545	1	SEAL
57	F-HB-06C-12	2	HEX BOLT
58	PAT-PH-5008	1	UPPER ROD ASSY
59	F-SW-06	4	LOCK WASHER
60	PF-ME-08	1	MALE ELBOW
* 63	O-8-127	2	O-RING
64	PF-HP-08	1	HEX PLUG
65	F-SW-04-SS	2	LOCK WASHER
66	F-HB-04C-56-SS	2	HEX BOLT
67	F-FW-04	2	FLAT WASHER
68	RC-1007-MOD	1	SHUT OFF VALVE
69	PF-SE-02	1	STREET ELBOW

OPTIONAL PARTS AND ASSEMBLIES
PARTS LIST

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

REPAIR KITS

PART No.	DESCRIPTION
* PAT-PH-7000-CA-SK	SEAL KIT

* ASTERISKS DENOTE PARTS IN SEAL KIT

MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD PAT-PH-7000-CA

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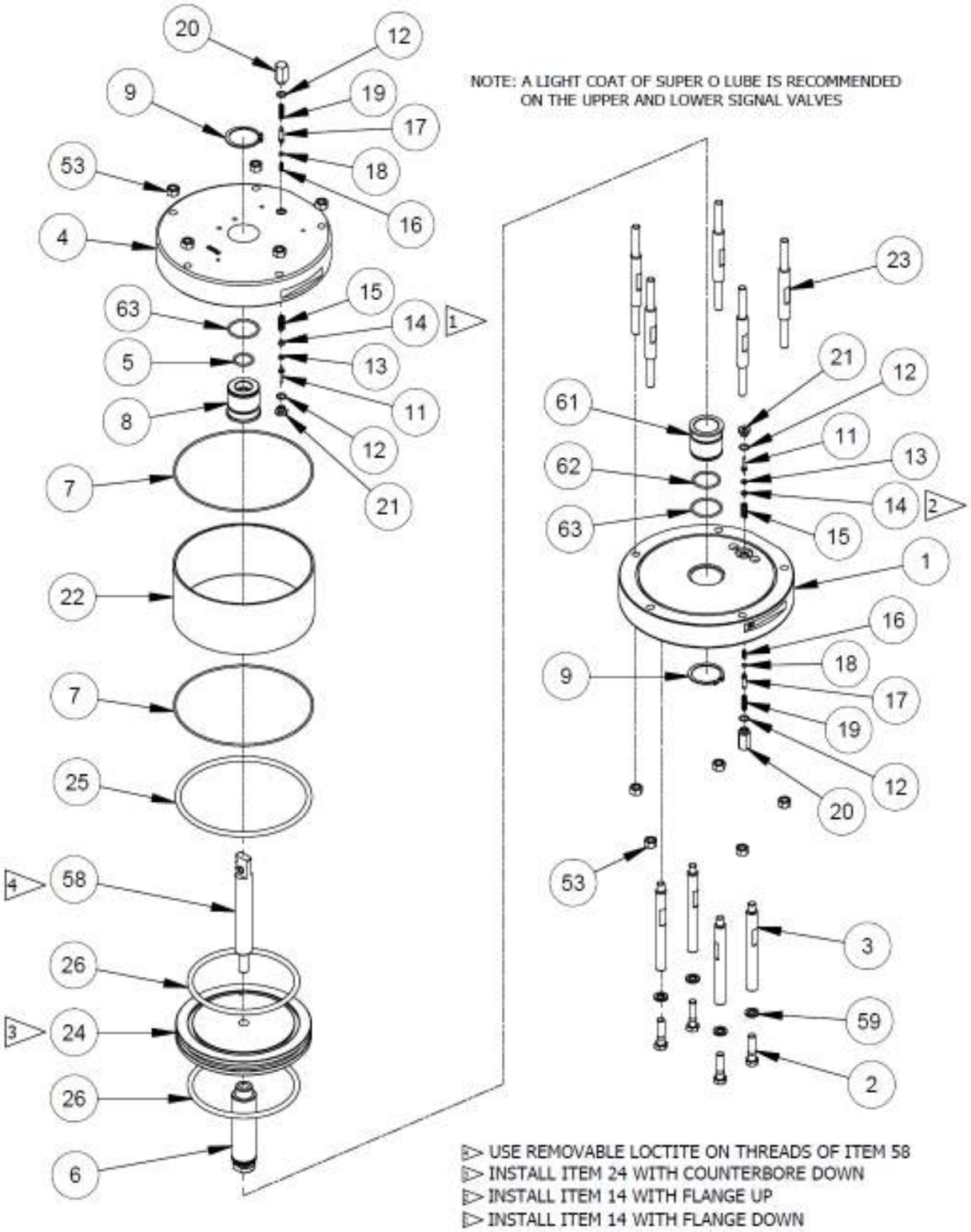

MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD -DUO PUMP	PAT-PH-7000-D

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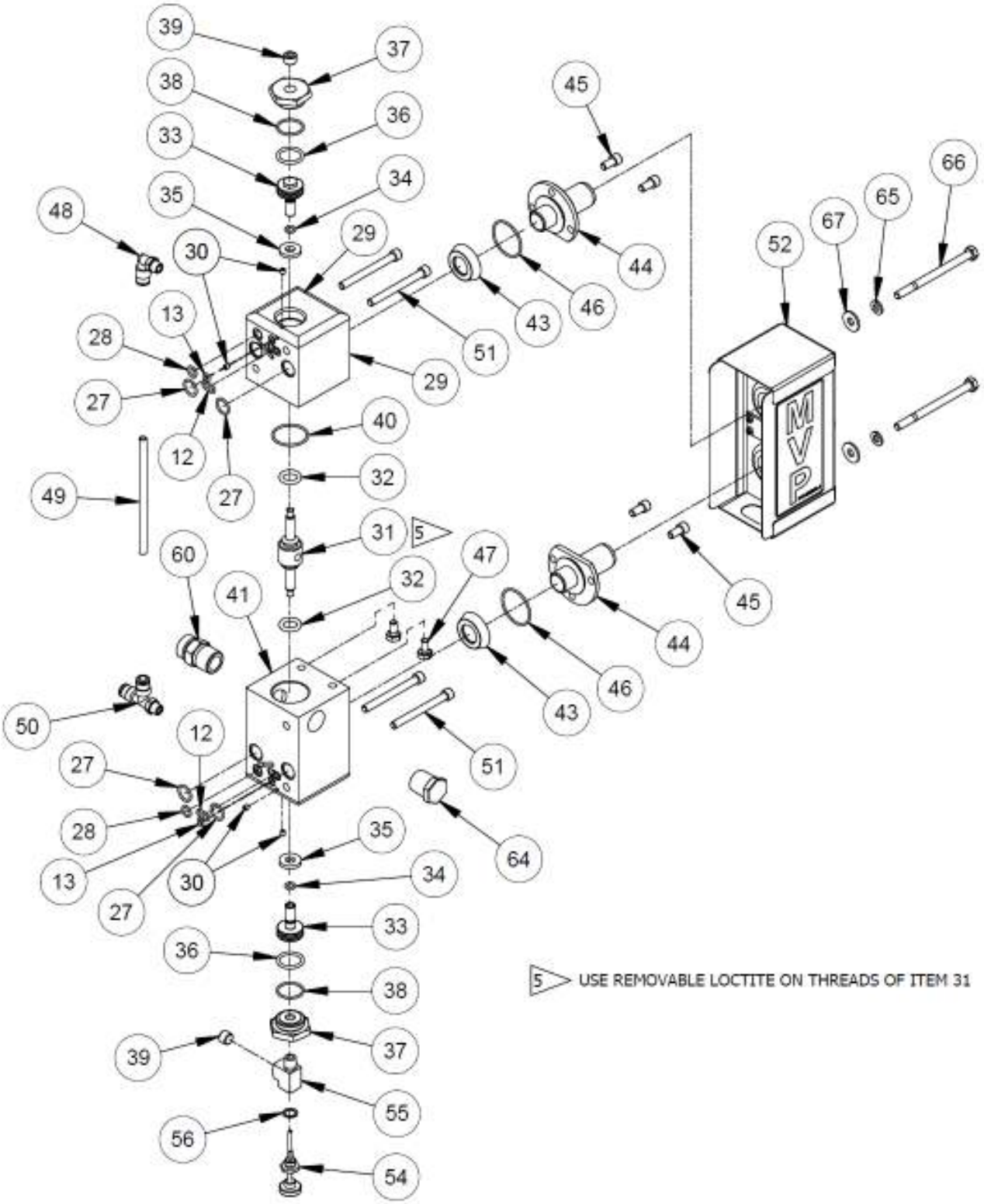


MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD - DUO PUMP PAT-PH-7000-D

REV: A 05/24/11

PAT-PH-7000-D PARTS LIST			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	PAT-PH-7004-HD	1	LOWER END CAP
2	F-HB-06C-24-GR8	4	HEX BOLT
3	PAT-PH-7013	4	LOWER TIE ROD
4	PAT-PH-7012	1	UPPER END CAP - 7"
* 5	O-B-118	1	O-RING
6	PAT-PH-7009	1	LOWER ROD - HD
* 7	O-B-167	2	O-RING
8	PAT-PH-5007	1	UPPER BUSHING
9	7205-2-26	2	EXTERNAL SNAP RING
11	MPH-2513	2	VALVE STEM- PILOT VALVE
* 12	O-B-012	6	O-RING
* 13	O-B-008	4	O-RING
14	MPH-2512	2	SEAL GUIDE- PILOT VALVE
15	MPH-2528	2	SPRING
16	MPH-2526	2	SPRING
17	MPH-2540	2	INLET ROD- PILOT VALVE
* 18	O-U-006	2	O-RING
19	MPH-2533	2	COMPRESSION SPRING
20	MPH-2541	2	SPRING HOUSING- PILOT VALVE
21	MPH-2511-01	2	STEM SEAL ASSY- PILOT VALVE
22	PAT-PH-7003	1	CYLINDER
23	PAT-PH-5006	5	TIE ROD - 2" STROKE
24	MPH-7004	1	PISTON - 7"
* 25	O-B-439	1	O-RING
* 26	O-B-431	2	O-RING
* 27	O-B-014	4	O-RING
* 28	O-B-011	2	O-RING
29	PAT-PH-5001	1	UPPER VALVE BLOCK
30	F-SS-832-02-SS	4	SET SCREW
31	PAT-PH-5005	1	POPPET VALVE - 2" STROKE
* 32	O-U-206-90	2	O-RING
33	MPH-2517	2	VALVE PISTON
* 34	O-D-010-90	2	O-RING
35	MPH-3262	2	PISTON STOP
* 36	O-B-116	2	O-RING
37	MPH-2521	2	VALVE END CAP
* 38	O-B-019	2	O-RING
39	PF-AP-02-SS	2	PIPE PLUG
* 40	O-B-024	1	O-RING
41	PAT-PH-5002	1	LOWER VALVE BLOCK
* 43	MPH-5010	2	DIAPHRAGM
44	MPH-5009	2	EXHAUST PORT
45	F-CS-04C-08-SS	4	CAP SCREW
* 46	O-B-026	2	O-RING
47	F-HB-04C-08	2	HEX BOLT
48	MPH-2539	1	MALE ELBOW
49	MS-2052-1	.40ft	POLY TUBE
50	MPH-2538	1	MALE POLY TEE FITTING
51	F-CS-04C-40-SS	4	CAP SCREW
52	PAT-PH-5010-01	1	MUFFLER ASSEMBLY
53	F-HN-06F	10	HEX NUT
54	MPH-2546-01	1	RESET VALVE STEM
55	PF-ST-02-BR	1	TEE FITTING
56	MPH-2545	1	SEAL
58	PAT-PH-5008	1	UPPER ROD ASSY
59	F-SW-06	4	LOCK WASHER
60	PF-HN-08-08S	1	HOSE ADAPTER
61	VPH-7005	1	BUSHING
* 62	O-B-124	1	O-RING
* 63	O-B-127	2	O-RING
64	PF-HP-08	1	HEX PLUG
65	F-SW-04-SS	2	LOCK WASHER
66	F-HB-04C-56-SS	2	HEX BOLT
67	F-FW-04	2	FLAT WASHER

OPTIONAL PARTS AND ASSEMBLIES
PARTS LIST

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

REPAIR KITS

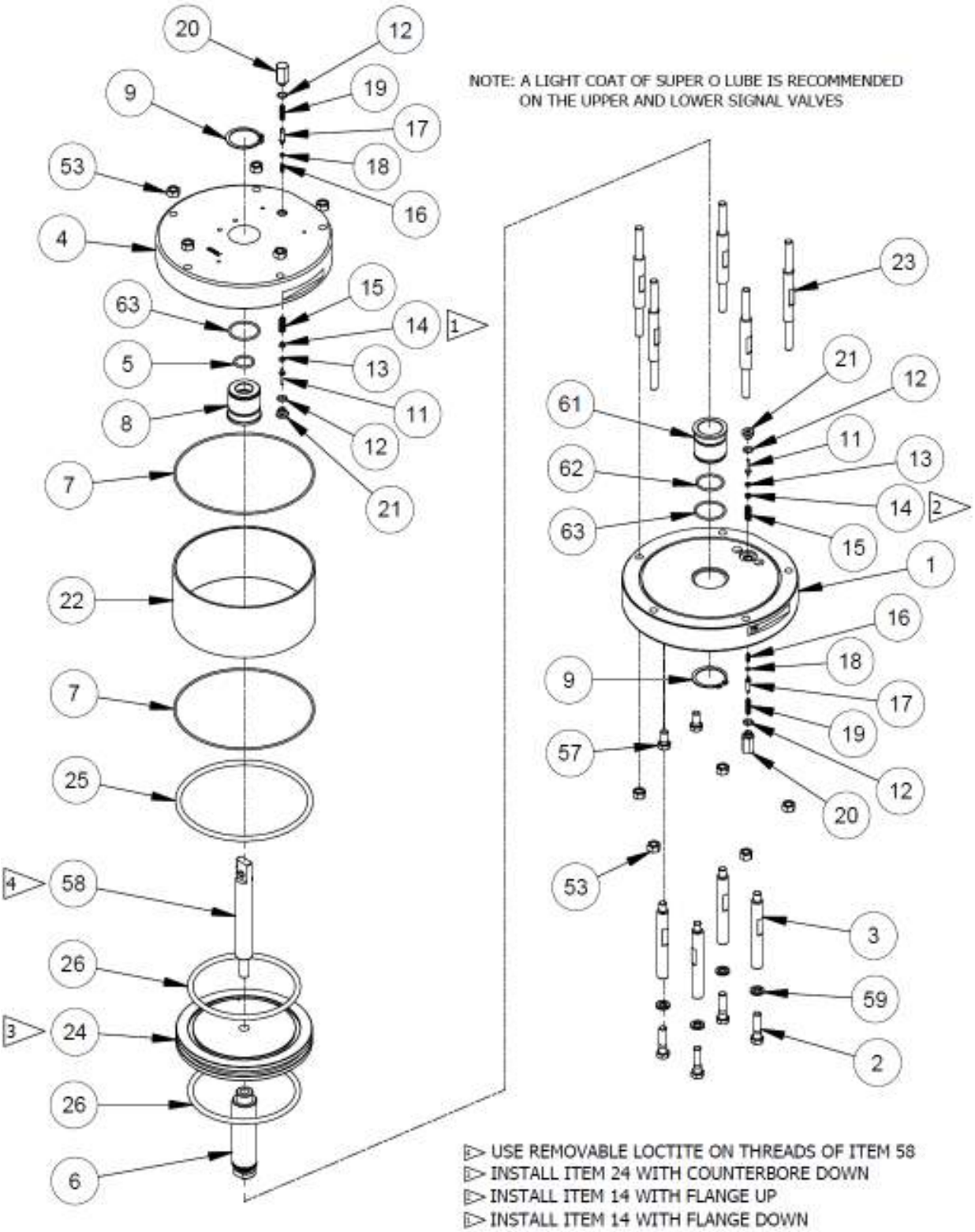
PART No.	DESCRIPTION
* PAT-PH-7000-HD-SK	SEAL KIT

* ASTERISKS DENOTE PARTS IN SEAL KIT

MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD - DUO PUMP PAT-PH-7000-D

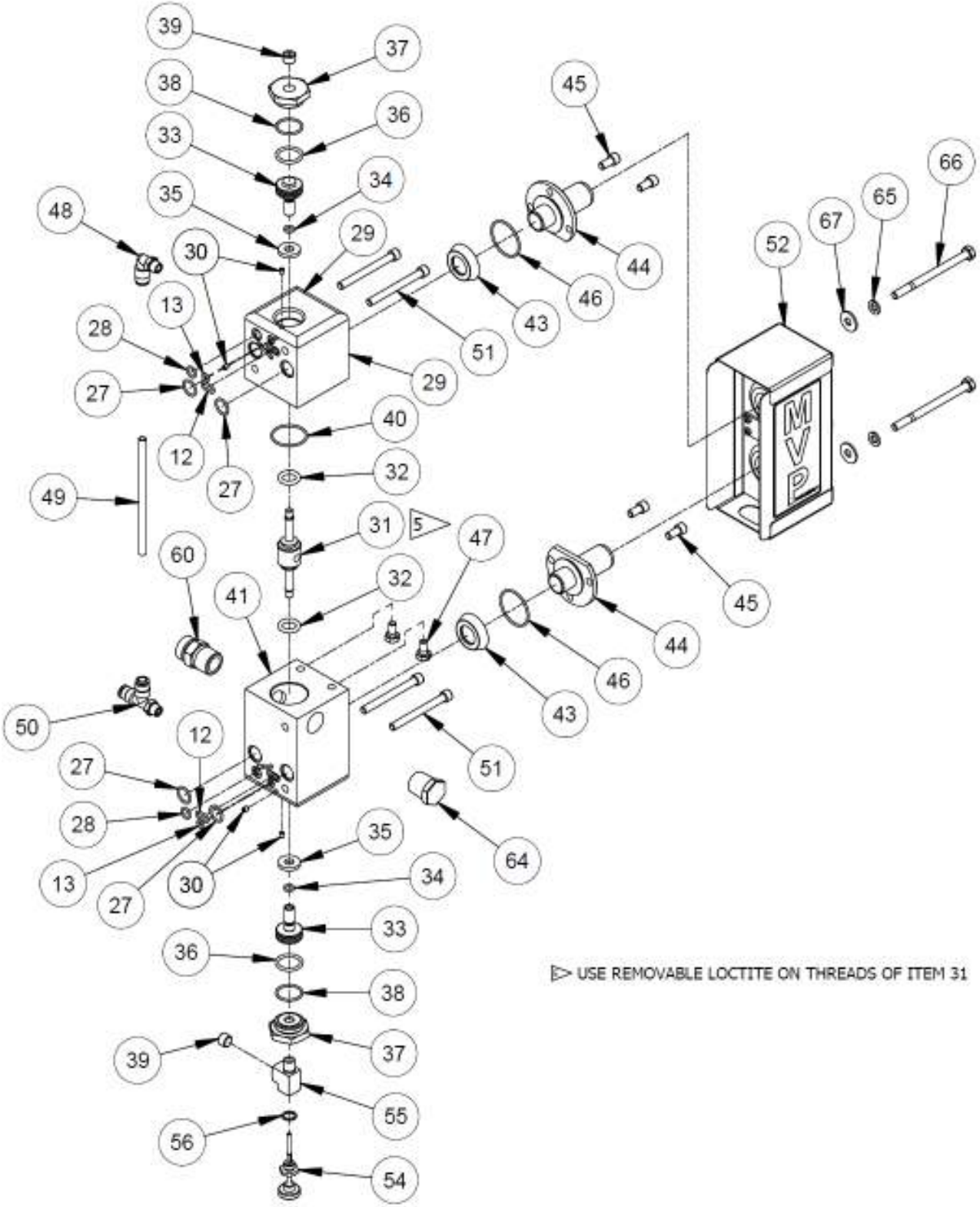
REV: A 05/24/11



MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD -HD	PAT-PH-7000-HD

REV: A 05/24/11



MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD - HD	PAT-PH-7000-HD

REV: A 05/24/11

	PAT-PH-7000-HD PARTS LIST			
	ITEM	PART NUMBER	QTY	DESCRIPTION
	1	PAT-PH-7004-HD	1	LOWER END CAP
	2	F-HB-06C-24-GR8	4	HEX BOLT
	3	PAT-PH-5011	4	TIE ROD
	4	PAT-PH-7012	1	UPPER END CAP - 7"
*	5	O-B-118	1	O-RING
	6	PAT-PH-7009	1	LOWER ROD - HD
*	7	O-B-167	2	O-RING
	8	PAT-PH-5007	1	UPPER BUSHING
	9	7205-2-26	2	EXTERNAL SNAP RING
	11	MPH-2513	2	VALVE STEM- PILOT VALVE
*	12	O-B-012	6	O-RING
*	13	O-B-008	4	O-RING
	14	MPH-2512	2	SEAL GUIDE- PILOT VALVE
	15	MPH-2528	2	SPRING
	16	MPH-2526	2	SPRING
	17	MPH-2540	2	INLET ROD- PILOT VALVE
*	18	O-U-006	2	O-RING
	19	MPH-2533	2	COMPRESSION SPRING
	20	MPH-2541	2	SPRING HOUSING- PILOT VALVE
	21	MPH-2511-01	2	STEM SEAL ASSY- PILOT VALVE
	22	PAT-PH-7003	1	CYLINDER
	23	PAT-PH-5006	5	TIE ROD - 2" STROKE
	24	MPH-7004	1	PISTON - 7"
*	25	O-B-439	1	O-RING
*	26	O-B-431	2	O-RING
*	27	O-B-014	4	O-RING
*	28	O-B-011	2	O-RING
	29	PAT-PH-5001	1	UPPER VALVE BLOCK
	30	F-SS-832-02-SS	4	SET SCREW
	31	PAT-PH-5005	1	POPPET VALVE - 2" STROKE
*	32	O-U-206-90	2	O-RING
	33	MPH-2517	2	VALVE PISTON
*	34	O-D-010-90	2	O-RING
	35	MPH-3262	2	PISTON STOP
*	36	O-B-116	2	O-RING
	37	MPH-2521	2	VALVE END CAP
*	38	O-B-019	2	O-RING
	39	PF-AP-02-SS	2	PIPE PLUG
*	40	O-B-024	1	O-RING
	41	PAT-PH-5002	1	LOWER VALVE BLOCK
*	43	MPH-5010	2	DIAPHRAGM
	44	MPH-5009	2	EXHAUST PORT
	45	F-CS-04C-08-SS	4	CAP SCREW
*	46	O-B-026	2	O-RING
	47	F-HB-04C-08	2	HEX BOLT
	48	MPH-2539	1	MALE ELBOW
	49	MS-2052-1	40ft	POLY TUBE
	50	MPH-2538	1	MALE POLY TEE FITTING
	51	F-CS-04C-40-SS	4	CAP SCREW
	52	PAT-PH-5010-01	1	MUFFLER ASSEMBLY
	53	F-HN-06F	10	HEX NUT
	54	MPH-2546-01	1	RESET VALVE STEM
	55	PF-ST-02-BR	1	TEE FITTING
	56	MPH-2545	1	SEAL
	57	F-HB-06C-12	2	HEX BOLT
	58	PAT-PH-5008	1	UPPER ROD ASSY
	59	F-SW-06	4	LOCK WASHER
	60	PF-HN-08-08S	1	HOSE ADAPTER
	61	VPH-7005	1	BUSHING
*	62	O-B-124	1	O-RING
*	63	O-B-127	2	O-RING
	64	PF-HP-08	1	HEX PLUG
	65	F-SW-04-SS	2	LOCK WASHER
	66	F-HB-04C-56-SS	2	HEX BOLT
	67	F-FW-04	2	FLAT WASHER

OPTIONAL PARTS AND ASSEMBLIES

PARTS LIST

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

REPAIR KITS

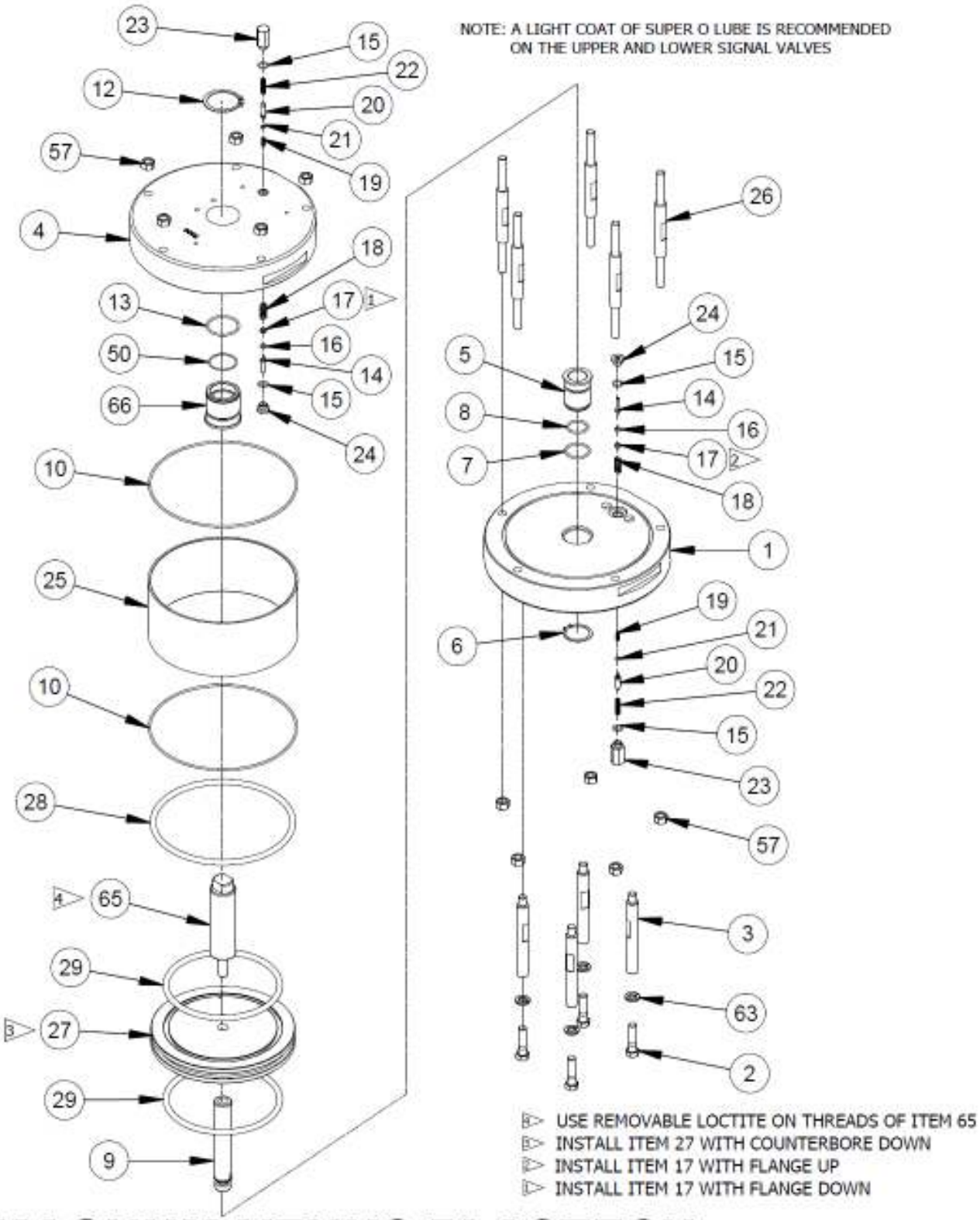
PART No.	DESCRIPTION
* PAT-PH-7000-HD-SK	SEAL KIT

* ASTERISKS DENOTE PARTS IN SEAL KIT

MAGNUM VENUS PLASTECH

7" PATRIOT POWER HEAD - HD PAT-PH-7000-HD

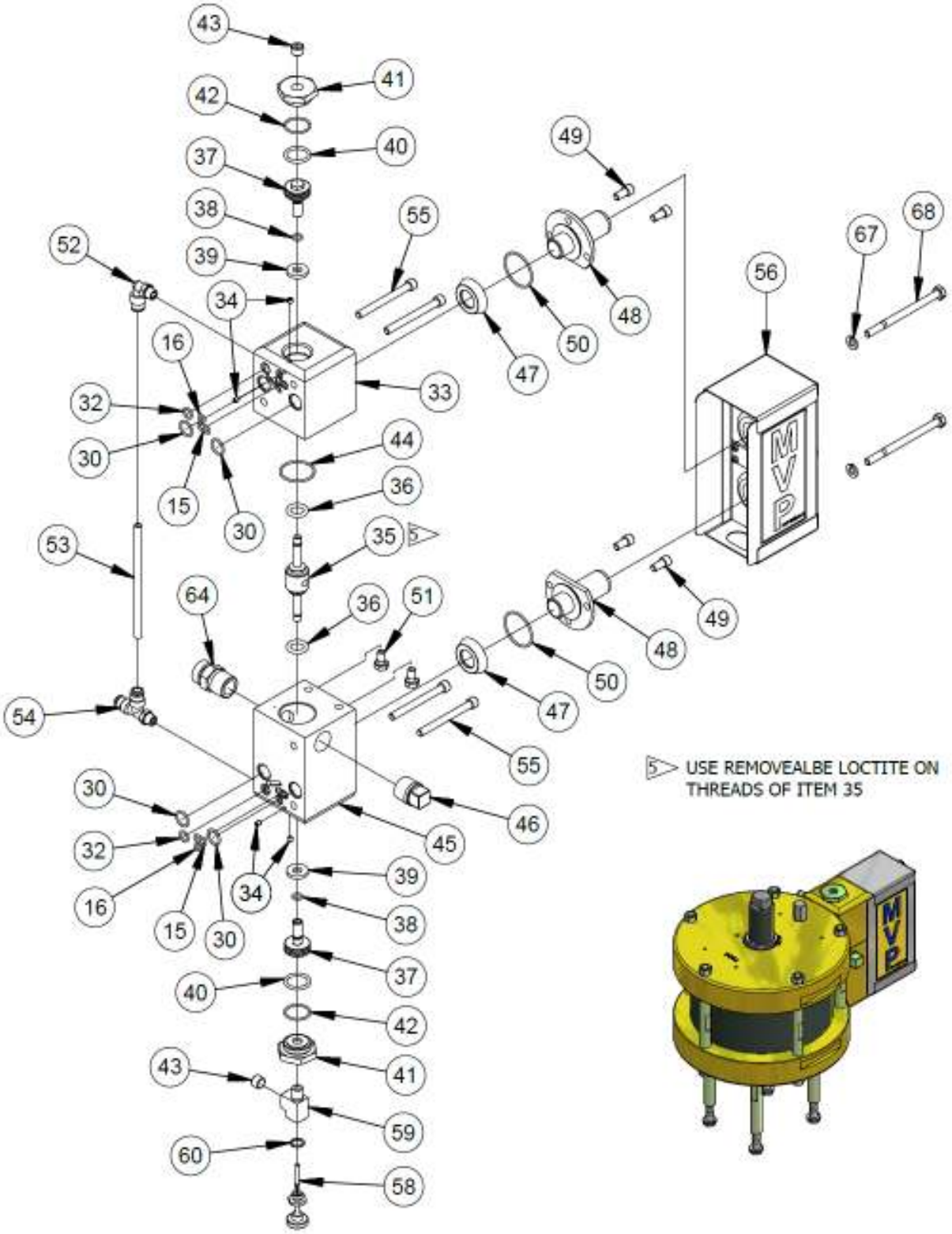
REV: A 05/24/11



MAGNUM VENUS PLASTECH

7" Patriot Power Head - Putty	PAT-PH-7000-P

REV:A 05/24/11



MAGNUM VENUS PLASTECH

7" Patriot Power Head - Putty	PAT-PH-7000-P

REV:A 05/24/11

	Parts List			
	ITEM	PART NUMBER	QTY	DESCRIPTION
	1	PAT-PH-7004	1	LOWER END CAP
	2	F-HB-06C-24-GR8	4	HEX BOLT
	3	PAT-PH-5011	4	TIE ROD
	4	PAT-PH-7012	1	UPPER END CAP - 7"
	5	VPH-4254	1	BUSHING- 7/8 DIA. PISTON ROD
	6	MPH-3261	1	SNAP RING - EXTERNAL
*	7	O-B-121	1	O-RING
*	8	O-B-118	1	O-RING
	9	PAT-PH-5009	1	LOWER ROD
*	10	O-B-167	2	O-RING
	12	7205-2-26	1	EXTERNAL SNAP RING
*	13	O-B-127	1	O-RING
	14	MPH-2513	2	VALVE STEM- PILOT VALVE
*	15	O-B-012	6	O-RING
*	16	O-B-008	4	O-RING
*	17	MPH-2512	2	SEAL GUIDE- PILOT VALVE
	18	MPH-2528	2	SPRING
	19	MPH-2526	2	SPRING
	20	MPH-2540	2	INLET ROD- PILOT VALVE
*	21	O-U-006	2	O-RING
	22	MPH-2533	2	COMPRESSION SPRING
	23	MPH-2541	2	SPRING HOUSING- PILOT VALVE
	24	MPH-2511-01	2	STEM SEAL ASSY- PILOT VALVE
	25	PAT-PH-7003	1	CYLINDER
	26	PAT-PH-5006	5	TIE ROD - 2" STROKE
	27	MPH-7004	1	PISTON - 7"
*	28	O-B-439	1	O-RING
*	29	O-B-431	2	O-RING
*	30	O-B-014	4	O-RING
*	32	O-B-011	2	O-RING
	33	PAT-PH-5001	1	UPPER VALVE BLOCK
	34	F-SS-832-02-SS	4	SET SCREW
	35	PAT-PH-5005	1	POPPET VALVE - 2" STROKE
*	36	O-U-206-90	2	O-RING
	37	MPH-2517	2	VALVE PISTON
*	38	O-D-010-90	2	O-RING
	39	MPH-3262	2	PISTON STOP
*	40	O-B-116	2	O-RING
	41	MPH-2521	2	VALVE END CAP
*	42	O-B-019	2	O-RING
	43	PF-AP-02-SS	2	PIPE PLUG
*	44	O-B-024	1	O-RING
	45	PAT-PH-5002	1	LOWER VALVE BLOCK
	46	PF-HP-08	1	PIPE PLUG
	47	MPH-5010	2	DIAPHRAGM
*	48	MPH-5009	2	EXHAUST PORT
	49	F-CS-04C-08-SS	4	CAP SCREW
*	50	O-B-026	3	O-RING
	51	F-HB-04C-08	2	HEX BOLT
	52	MPH-2539	1	MALE ELBOW
	53	MS-2052-1	.40 FT	POLY TUBE
	54	MPH-2538	1	MALE POLY TEE FITTING
	55	F-CS-04C-40-SS	4	CAP SCREW
	56	PAT-PH-5010-01	1	MUFFLER ASSEMBLY
	57	F-HN-06F	10	HEX NUT
	58	MPH-2546-01	1	RESET STEM ASSEMBLY
	59	PF-ST-02-BR	1	TEE FITTING
	60	MPH-2545	1	SEAL
	63	F-SW-06	4	LOCK WASHER
	64	PF-HN-08-08S	1	HOSE ADAPTER
	65	PAT-PH-7008	1	UPPER ROD - PUTTY
	66	VPH-7005	1	BUSHING - UPPER PISTON ROD
	67	F-SW-04-SS	2	LOCK WASHER
	68	F-HB-04C-56-SS	2	HEX BOLT

OPTIONAL PARTS AND ASSEMBLIES

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

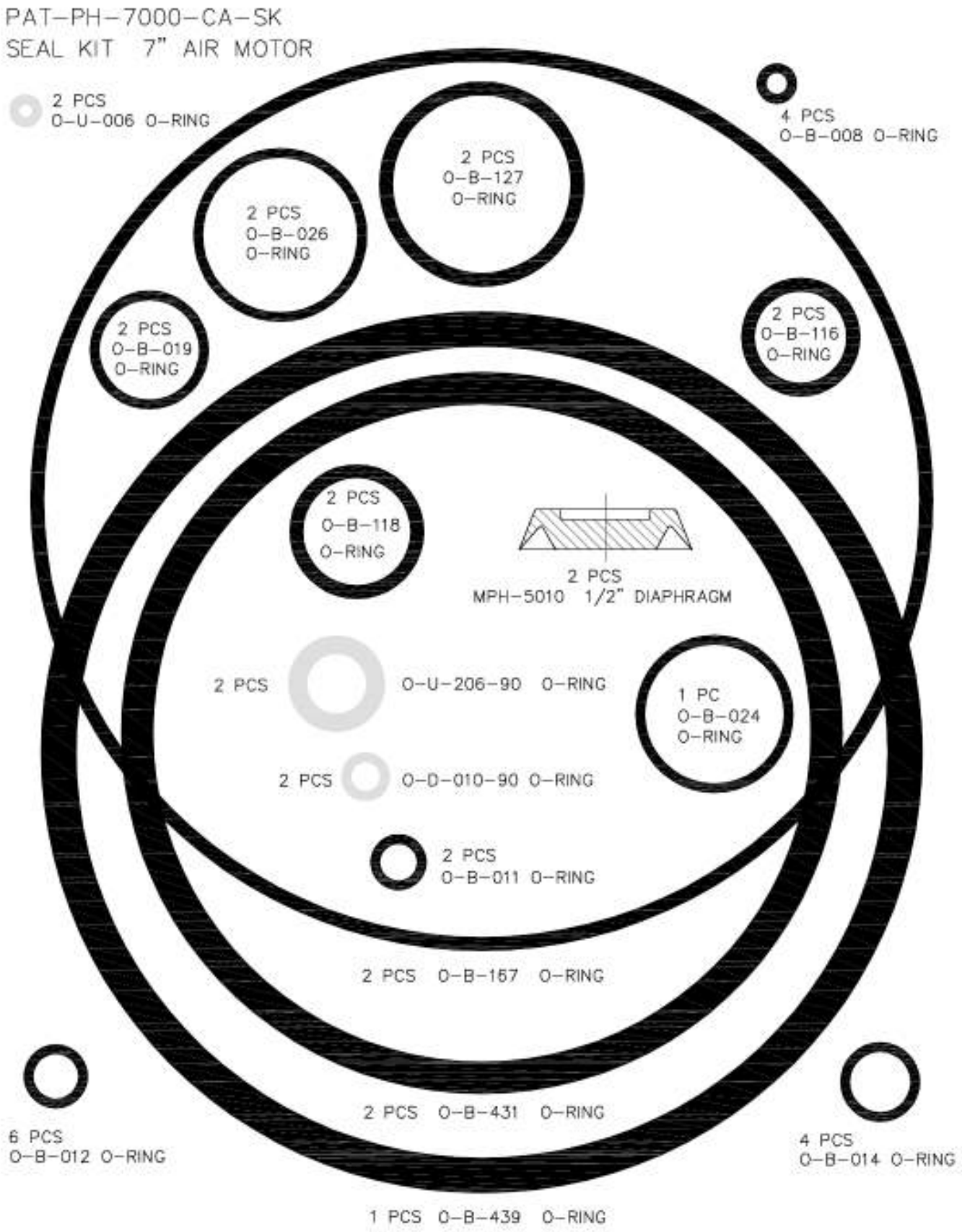
REPAIR KIT

* PAT-PH-7000-SK (ASTERISKS DENOTE PARTS IN KIT)

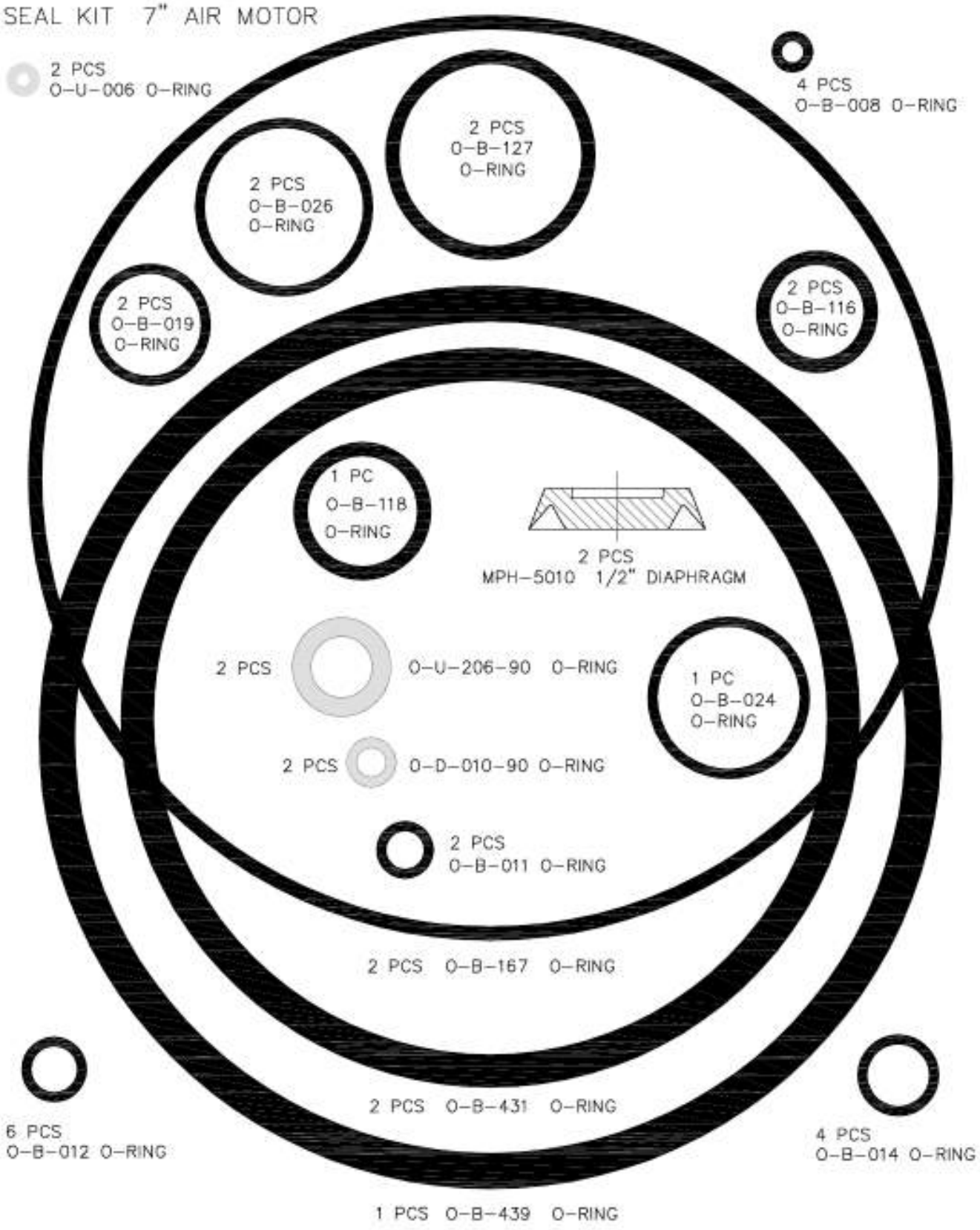
MAGNUM VENUS PLASTECH

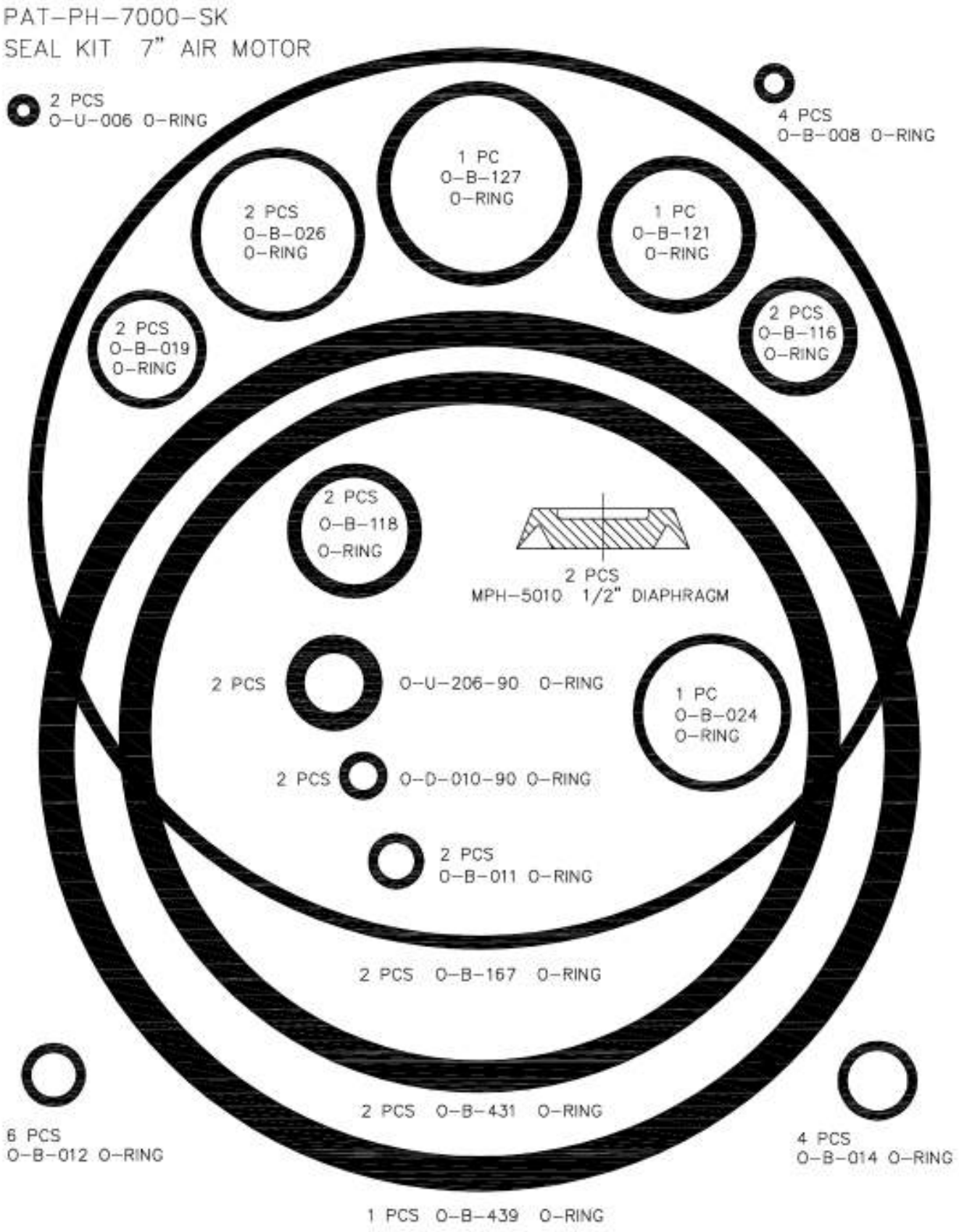
7" Patriot Power Head - Putty PAT-PH-7000-P

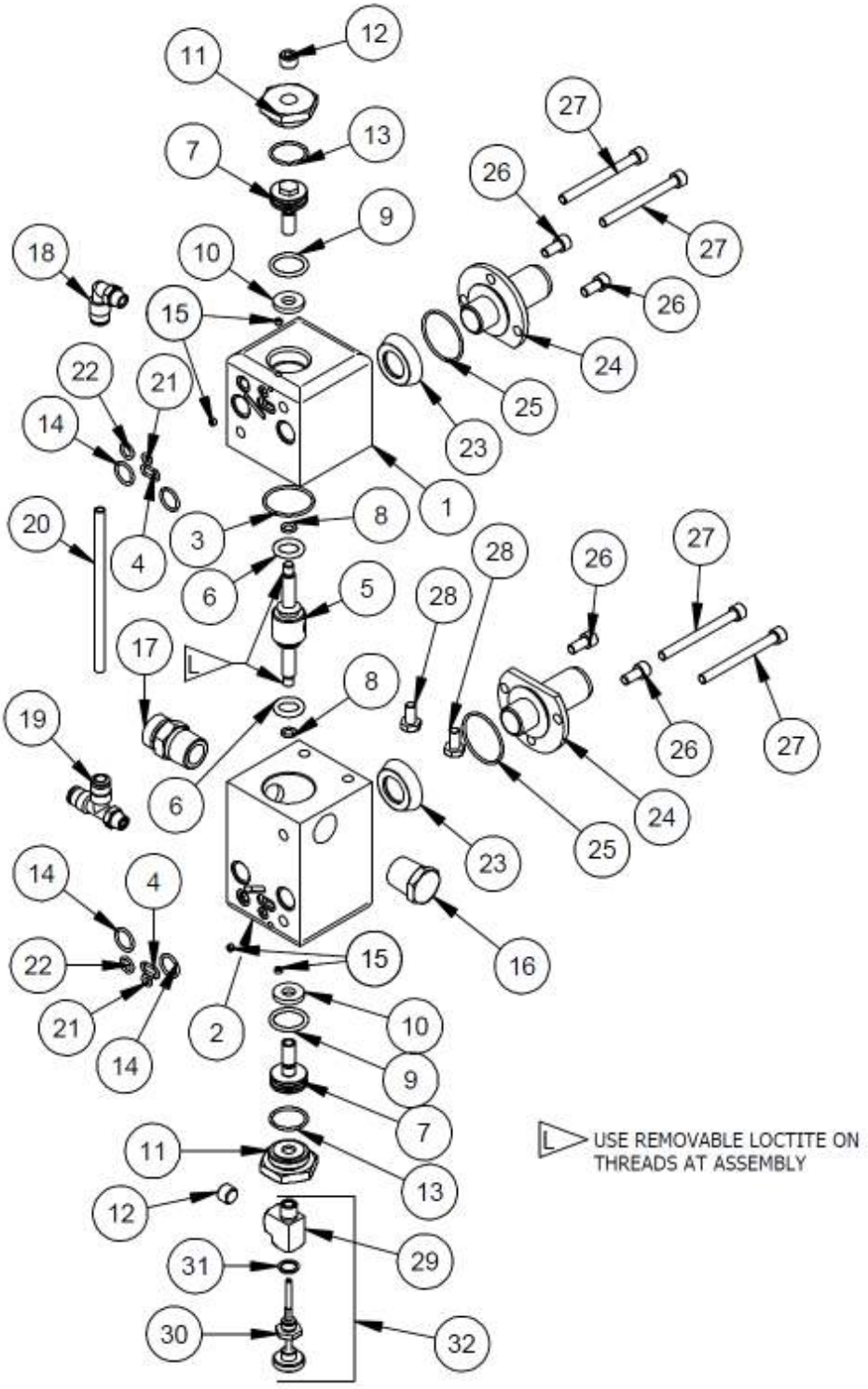
REV: A 05/24/11


PAT-PH-7000-CA-SK
SEAL KIT 7" AIR MOTOR
2 PCS
O-U-006 O-RING
4 PCS
O-B-008 O-RING
2 PCS
O-B-127
O-RING
2 PCS
O-B-026
O-RING
2 PCS
O-B-019
O-RING
2 PCS
O-B-116
O-RING
2 PCS
O-B-118
O-RING
2 PCS
MPH-5010 1/2" DIAPHRAGM
2 PCS
O-U-206-90 O-RING
1 PC
O-B-024
O-RING
2 PCS
O-D-010-90 O-RING
2 PCS
O-B-011 O-RING
2 PCS O-B-157 O-RING
2 PCS O-B-431 O-RING
6 PCS
O-B-012 O-RING
4 PCS
O-B-014 O-RING
1 PCS O-B-439 O-RING

PAT-PH-7000-HD-SK
SEAL KIT 7" AIR MOTOR




PAT–PH–7000–SK
SEAL KIT 7" AIR MOTOR
2 PCS
O–U–006 O–RING
4 PCS
O–B–008 O–RING
1 PC
O–B–127
O–RING
2 PCS
O–B–026
O–RING
1 PC
O–B–121
O–RING
2 PCS
O–B–019
O–RING
2 PCS
O–B–116
O–RING
2 PCS
O–B–118
O–RING
2 PCS
MPH–5010 1/2" DIAPHRAGM
2 PCS
O–U–206–90 O–RING
1 PC
O–B–024
O–RING
2 PCS
O–D–010–90 O–RING
2 PCS
O–B–011 O–RING
2 PCS O–B–167 O–RING
2 PCS O–B–431 O–RING
6 PCS
O–B–012 O–RING
4 PCS
O–B–014 O–RING
1 PCS O–B–439 O–RING



MAGNUM VENUS PRODUCTS

Assy - Shift Block Patriot 5" & 7 " Power Head PAT-PH-SB-XL

REV:

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	PAT-PH-5001	1	UPPER VALVE BLOCK
2	PAT-PH-5002	1	LOWER VALVE BLOCK
3	O-B-024	1	O-RING
4	O-012-ELONGATED	2	O-RING, BUTYL, -012
5	PAT-PH-5005	1	POPPET VALVE - 2" STROKE
6	O-U-206-90	2	O-RING, URETHANE
7	MPH-2517	2	VALVE PISTON
8	O-D-010-90	2	O-RING, DISGRIN
9	O-B-116	2	O-RING, BUTYL, -116
10	MPH-3262	2	PISTON STOP
11	MPH-2521	2	VALVE END CAP
12	PF-AP-02-SS	2	PIPE PLUG
13	O-B-019	2	O-RING, BUTYL, -019
14	O-B-014	4	O-RING, BUTYL, -014
15	F-SS-832-02-SS	4	SS SET SCREW
16	PF-HP-08	1	HEX PIPE PLUG
17	PF-HN-08-08S	1	HOSE ADAPTER
18	MPH-2539	1	MALE ELBOW
19	MPH-2538	1	MALE POLY TEE FITTING
20	MS-2052-1x 4.75	1	POLY TUBE
21	O-B-008	2	O-RING, BUTYL, -008
22	O-B-011	2	O-RING
23	MPH-5010	2	DIAPHRAM
24	MPH-5009	2	EXHAUST PORT
25	O-B-026	2	O-RING, BUTYL, -026
26	F-CS-04C-08-SS	4	SOCKET HEAD CAP SCREW
27	F-CS-04C-40-SS	4	SOCKET HEAD CAP SCREW
28	F-HB-04C-08	2	1/4 HEX BOLT
29	PF-ST-02-BR	1	TEE FITTING
30	MPH-2546-01	1	VALVE STEM ASSY
31	MPH-2545	1	SEAL

OPTIONAL PARTS AND ASSEMBLIES

PARTS LIST

ITEM	PART No.	QTY	DESCRIPTION
32	MPH-2542	1	RESET BUTTON ASSY

MAGNUM VENUS PRODUCTS

Assy - shift Block Patriot 5" & 7" Power Head	PAT-PH-SB-XL

REV:

Revision Information:

Revision:	Description:
Rev. 01/2010	Added the information for the Heavy Duty (HD) Powerhead including the drawing.
Rev. 10/2010	Added the information for the Multi-Color (-CA), Duo (-D) and Putty (-P) version of the powerhead. Updated document format and added the Safety & Warning information.
Rev. 07/2011	Included the note for the SUPERLUBE grease on the Upper and Lower Pilot Valves. Updated the drawings in the manual.
Rev. 05/2012	Updated the Logo, MVP Address and the manual format, added the Terms and Conditions section.

MAGNUM VENUS PLASTECH

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Assemblies Covered in this Manual:

PAT-PH-7000	Patriot Powerhead Assembly
PAT-PH-7000-CA	Patriot Powerhead Assembly – Multi-Color
PAT-PH-7000-D	Patriot Powerhead Assembly – Duo Unit
PAT-PH-7000-HD	Patriot Powerhead Assembly – Heavy Duty
PAT-PH-7000-P	Patriot Powerhead Assembly – Putty

Rev. 05/2012