

PATRIOT SS CHOP CHECK FLUID SECTION MANUAL PAT-CCP-LS-0590-SS



MAGNUM VENUS PLASTECH
Patriot SS Chop Check Pump Manual



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Patriot SS Chop Check Pump Assembly Repair & Maintenance Manual

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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 safely. 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. 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.

- 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 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 pre-mix 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, oversprayed 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

Patriot Chop Check Pump **Introduction:**

This manual, the ***Patriot SS Chop Check Manual***, provides information you need to perform simple maintenance and repair on your equipment.

- Step-by-step assembly and disassembly procedures are included.

Please read the manual carefully. Follow the steps in the order given, otherwise you may damage the equipment or injure yourself. Be prepared by having a clean work area, tools and current parts drawing available.

DANGER: Always wear proper safety equipment, including eye protection and gloves when performing service and repair on this equipment. When removing Pump Fluid Section, Hoses and Resin Surge Chamber, be sure to bleed off fluid pressure from the system before disconnecting. Release Surge Chamber charge before removing Surge Chamber. System may be under pressure and cause injury.

This manual covers the following pump assembly:

- PAT-CCP-LS-0590-SS Patriot SS Chop Check Fluid Section

Note: The Fluid Section can be rebuilt in place or easily removed and taken to a workbench. Flushing the fluid section with suitable cleaning agent can make the rebuild process much easier.

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)
- PAT-LS-OIL (PAT-LS-OIL-1GL 1Gallon) (PAT-LS-OIL-5GL 5 Gallon)
- 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)
- Repair Kit: PAT-CCP-LS-0590-RK

Patriot Chop Check Pump Fluid Section Disassembly:

FLUID SECTION REMOVAL:

1. Remove the Ram and Pump from the material.
2. Place a piece of plastic or paper under the Ram and Pump to catch any dripping material.
3. Put the pump into the lowest position of the down stroke.
4. Shift the Ram Control valve into the down position; allow pump and Ram to travel to the lowest position.
5. Disconnect the resin hose from the side of the Pump fluid section.

Warning: Be sure to remove fluid pressure from the system before disconnecting resin hose, tie rods or surge chamber. System may be under pressure and can cause injury.

6. Remove the E-Ring (F-ER-1.00-HD), lift up the Sleeve (PAT-PA-9109) and remove the two Connectors (APP-9096).
7. Remove the four Hex Nuts (F-HN-06C) and Lock Washers (F-SW-06) holding the fluid section to the Adapter Tie Rods (PAT-CCP-0522).
8. Shift the Ram Control valve into the Ram up position, move the ram up until the Adapter Shaft (PAT-CCP-0521) clears the Transition Plate (PAT-CCP-0503) this will allow the pump fluid section to be removed.

DISASSEMBLY PROCEDURE:

Note: As you disassemble, lay the parts out on a towel or rag in the order you take them apart. This will help you remember how they go back together. Inspect each part for wear or damage and note parts that require replacement.

1. If not already done, move the pump to the bottom of the down stroke.
2. Unscrew the four Hex Nuts (F-HN-06C) from the end of the Tie Rods (PAT-CCP-0520).
3. Pull the Inlet Bell Flange (PAT-CCP-0537) off the Tie Rods (PAT-CCP-0520).
4. Remove Hex Bolt (F-HB-04F-08) from the bottom of the Priming Rod (PAT-CCP-0527-SS). If the Priming Rod (PAT-CCP-0527-SS) spins put a wrench on the wrench flats of the Priming Rod just above the Priming Piston (PAT-CCP-0523).
5. Remove the Backup Washers (PAT-CCP-0528), Relief Washer (PAT-CCP-0525) and the Priming Piston (PAT-CCP-0523) from the Priming Rod (PAT-CCP-0527-SS).
6. Unscrew the Tie Rods (PAT-CCP-0520) out of the Outlet Body (PAT-CCP-0501-SS).
7. Pull the Cylinder (PAT-CCP-0519-SS) out of the Outlet Body (PAT-CCP-0501-SS) and off the Piston (PAT-CCP-0507-SS). This will also force the Intake Valve (PAT-CCP-0531-SS) off the end of the Priming Rod (PAT-CCP-0527-SS).
8. Remove Lower Seat (PAT-CCP-0518-SS) from out of the end of the Cylinder (PAT-CCP-0519-SS).
9. Remove the loose Intake Valve (PAT-CCP-0531-SS), Spacer (PAT-CCP-0529-SS) and Valve Stop (PAT-CCP-0530) out of the end of the Cylinder (PAT-CCP-0519-SS).
10. Remove the Piston Bushing (PAT-CCP-0513) and Piston Seal Assembly (PAT-CCP-0514) out of the other end of the Cylinder (PAT-CCP-0519-SS).
11. Unscrew the Valve Nut (PAT-CCP-0532) from the Intake Valve (PAT-CCP-0531-SS)
12. Remove both of the Foot Valve Seals (PAT-CCP-0536) from inside the Intake Valve (PAT-CCP-0531-SS).
13. Remove the Intake Bushing (PAT-CCP-0533) from inside the Valve Nut (PAT-CCP-0532).
14. Pull the Fluid Rod (PAT-CCP-0508-SS) and Piston assembly (PAT-CCP-0507-SS) out of the Outlet Body (PAT-CCP-0501-SS) and Rod Seal assemblies (PAT-CCP-0516) – set a side for now.
15. Remove the Packing Nut (PAT-CCP-0504) from the top of the Outlet Body (PAT-CCP-0501-SS).
16. Remove the Rod Bushing (PAT-CCP-0505) and Rod Seal assemblies (PAT-CCP-0516) from the top of the Outlet Body (PAT-CCP-0501-SS).

PISTON and PISTON VALVE DISASSEMBLY:

Note: Clean and inspect all parts for wear and damage. Replace damaged parts and all parts provided in the repair and seal kits.

1. Unscrew the Piston Valve (PAT-CCP-0509-SS) and Priming Rod (PAT-CCP-0527-SS) from the Piston (PAT-CCP-0507-SS). Use caution, the piston ball may fall out and become damaged. If the ball falls onto a hard surface it may become scratched or get a flat spot on it.
2. Remove the Piston Ball (VLS-2427-SS), Ball Guide (PAT-CCP-0512-SS), Ball Spring (PAT-LS-1010) and Ball Stop (PAT-CCP-0511) from inside the Piston (PAT-CCP-0507-SS).

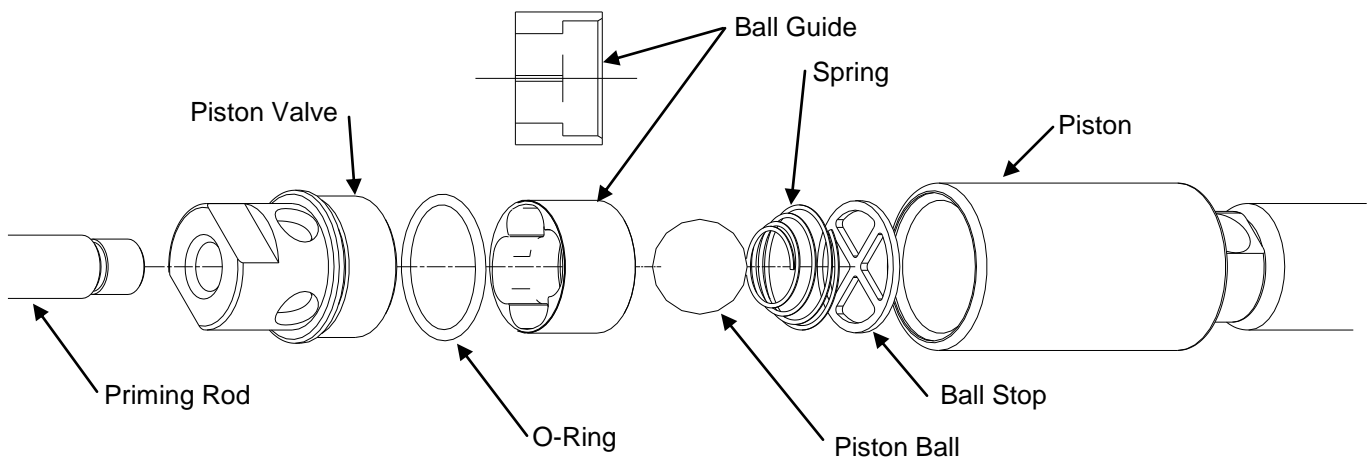
Patriot Chop Check Pump Fluid Section Assembly:

PISTON and PISTON VALVE ASSEMBLY:

1. Install the Ball Stop (PAT-CCP-0511) into the bottom of the Piston (PAT-CCP-0507-SS).
2. Install the Spring (PAT-LS-1010) into the Piston (PAT-CCP-0507-SS) narrow end towards the ball.
3. Insert the Ball Guide (PAT-CCP-0512-SS) into the Piston (PAT-CCP-0507-SS) over the Spring. (see below for proper orientation)

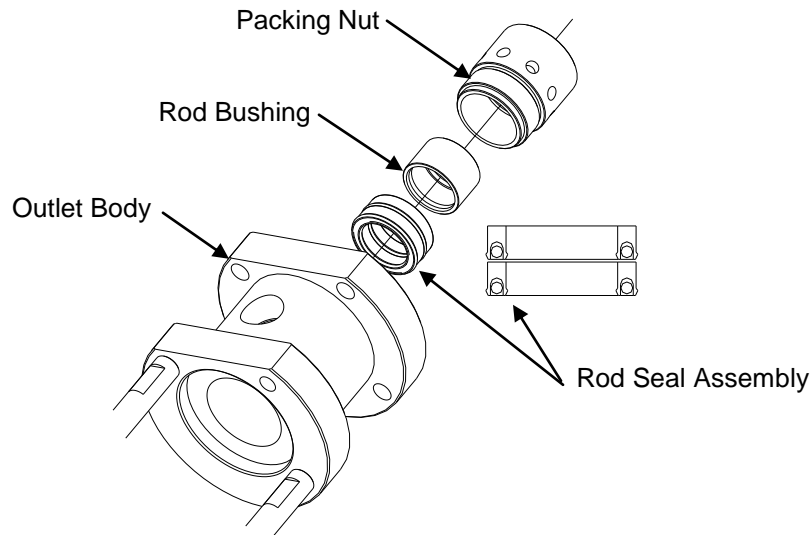
Note: The relief (round) end of the ball guide goes against the spring into the piston.

4. Install a new O-ring (O-E-022) onto the Piston Valve (PAT-CCP-0509-SS).
5. Place the Piston Ball (VLS-2427-SS) into the Piston (PAT-CCP-0507-SS) on top of the Spring (PAT-LS-1010).
6. Thread the Piston Valve (PAT-CCP-0509-SS) into the end of the Piston (PAT-CCP-0507-SS) and tighten. Set aside for now.

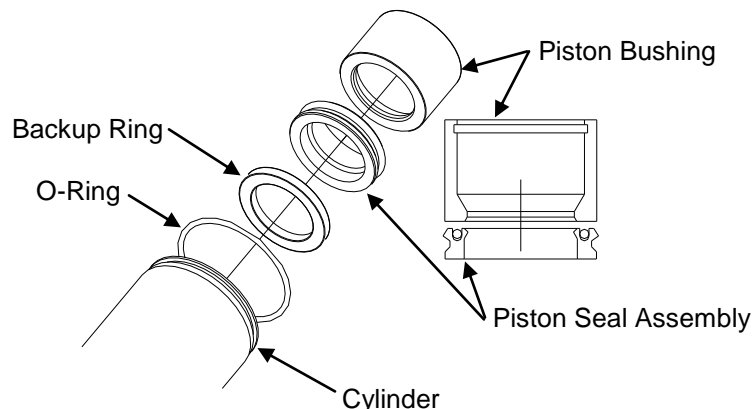


PUMP ASSEMBLY:

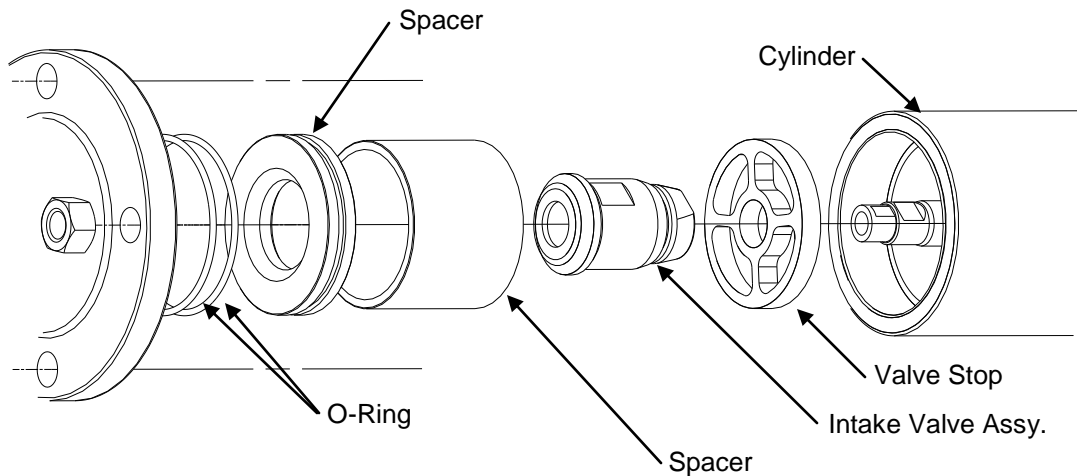
7. Now install the Rod Seal Assemblies (PAT-CCP-0516) into the top of the Outlet Body (PAT-CCP-0501-SS). The open side (side with o-ring) goes down inside.
8. Install the Rod Bushing (PAT-CCP-0505) into the Packing Nut (PAT-CCP-0504).
9. Thread the Packing Nut (PAT-CCP-0504) into the top of the Outlet Body (PAT-CP-0501-SS).



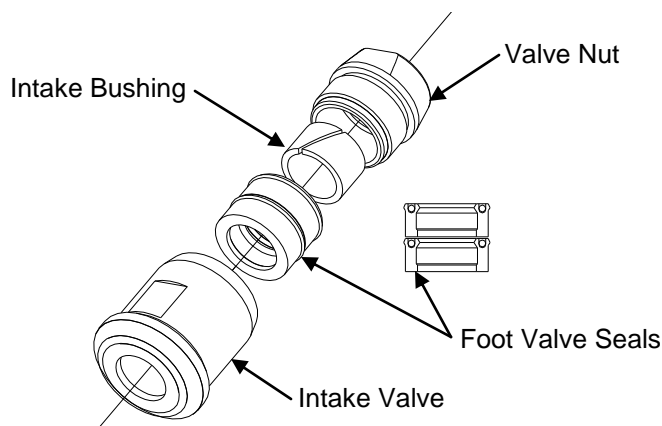
10. Carefully push the Fluid Rod Assembly (PAT-CCP-0508-SS) into the Rod Seal Assemblies (PAT-CCP-0516) from the bottom and then up through the Packing Nut (PAT-CCP-0504)
11. Install the Backup Ring (PAT-CCP-0515) into the top end of the Cylinder (PAT-CCP-0519-SS).
12. Install the Piston Seal Assembly (PAT-CCP-0514) into the top end of the Cylinder (PAT-CCP-0519-SS) on top of the Backup Ring. O-ring should be facing up.
13. Install the Piston Bushing (PAT-CCP-0513) into the top of the Cylinder (PAT-CCP-0519-SS).



14. Apply a light coat of red grease (6706-2-1) onto O-ring (O-E-140) and install onto the end of the Cylinder (PAT-CCP-0519-SS).
15. Install the Cylinder (PAT-CCP-0519-SS) over the Priming Rod and into the Outlet Body (PAT-CCP-0501-SS).
16. Install the Valve Stop (PAT-CCP-0530) over the Priming Rod (PAT-CCP-0527-SS) into the end of the Cylinder (PAT-CCP-0519-SS)
17. Install the Spacer (PAT-CCP-0529-SS) into the end of the Cylinder (PAT-CCP-0519-SS) on top of the Valve Stop.

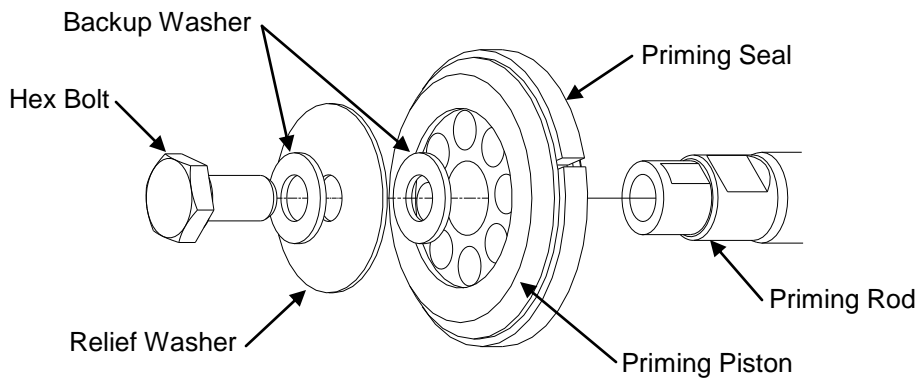


18. Install the Foot Valve Seals (PAT-CCP-0536) into the Intake Valve (PAT-CCP-0531-SS) o-ring side facing up.



19. Install the Intake Bushing (PAT-CCP-0533) into the Valve Nut (PAT-CCP-0532).
20. Thread the Valve Nut (PAT-CCP-0532) into the Intake Valve (PAT-CCP-0531-SS).
21. Use a threading motion to slide the Intake Valve assembly (PAT-CCP-0531-SS) onto the Priming Rod (PAT-CCP-0527-SS).

22. Install a new O-ring (O-E-032) onto the Lower Seat (PAT-CCP- 0518-SS).
23. Install the Lower Seat (PAT-CCP-0518-SS) into the end of the Cylinder (PAT-CCP-0519-SS) the small chamfer side (seat) should face in towards the Intake Valve.
24. Install the Priming Seal (PAT-CCP-0524) onto the Priming Piston (PAT-CCP-0523).
25. Install the Priming Piston (PAT-CCP-0523) onto the end of the Priming Rod (PAT-CCP-0527-SS).
26. Install onto Hex Bolt (F-HB-04F-08) a Backup Washer (PAT-CCP-0528) then the Relief Washer (PAT-CCP-0525) then the last Backup Washer (PAT-CCP-0528)
27. Thread the Hex Bolt (F-HB-04F-08) into the end of the Priming Rod (PAT-CCP-0527-SS).



28. Thread the four Tie Rods (PAT-CCP-0520) into the Outlet Body (PAT-CCP-0501-SS).
29. Install the Inlet Bell Frame (PAT-CCP-0537) onto the end of the Tie Rods (PAT-CCP-0520) over the Priming Piston. It is preferable to install the Bell Frame so that the fitting ports are perpendicular to the pump outlet.
30. Thread the four Hex Nuts (F-HN-06C) onto the end of the Tie Rods to secure the Bell Frame and pump assembly.

CHAPTER

4

Patriot Chop Check Pump **Parts Drawings:**

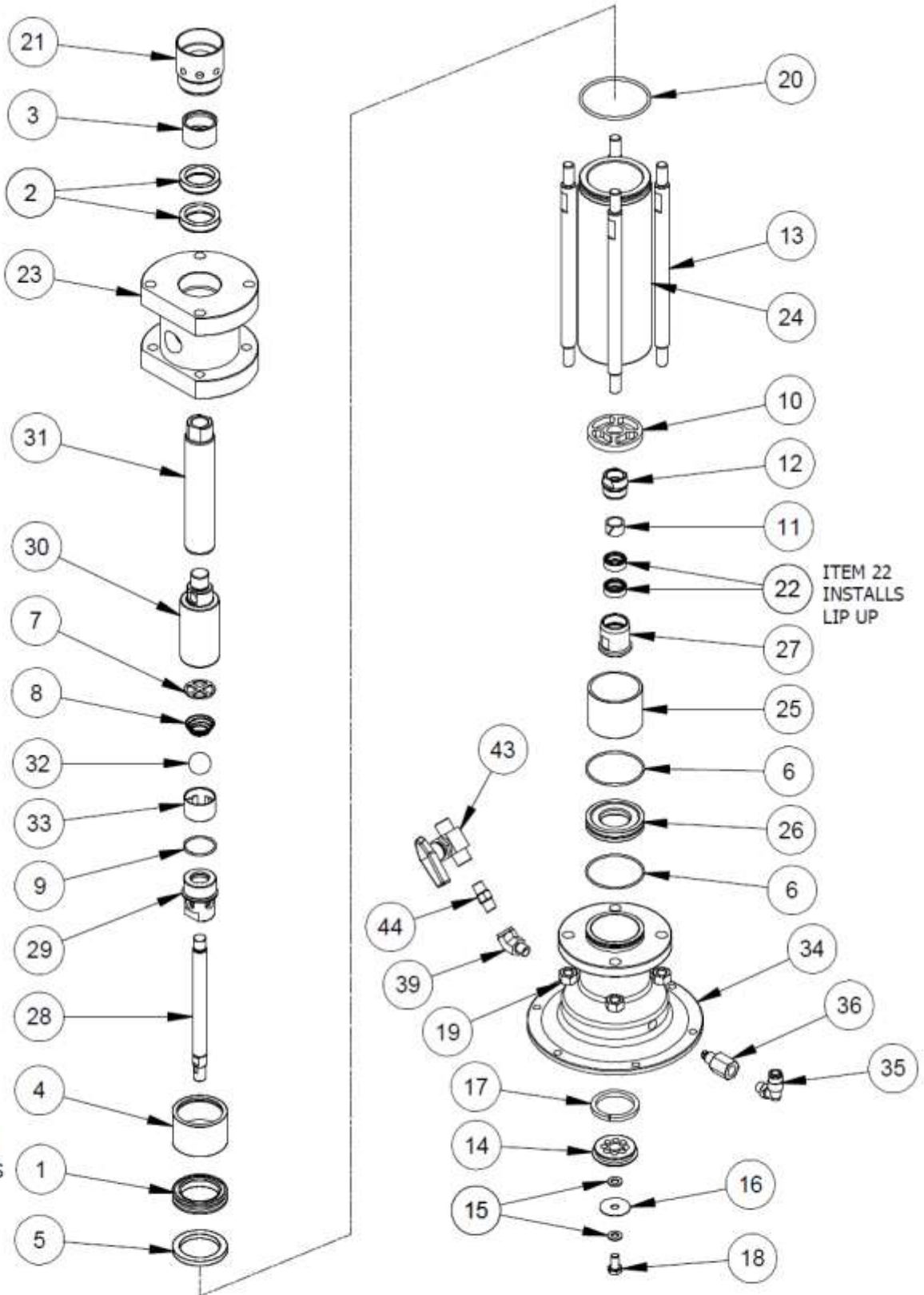
**PAT-CCP-LS-0590-SS
PAT-CCP-PA-1300-SS
PAT-CCP-LS-0590-RK**

**PATRIOT SS CHOP CHECK FLUID SECTION
SS CHOP CHECK PUMP ASSEMBLY
REPAIR KIT – CHOP CHECK PUMP**

ITEM 2
INSTALLS
LIP DOWN

ITEM 1
INSTALLS
LIP UP

ITEM 22
INSTALLS
LIP UP



MAGNUM VENUS PLASTECH

MINI CHOPCHECK LOWER SECT.

PAT-CCP-LS-0590-SS

REV:12-08-08 BT2

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
*	1	PAT-CCP-0514	1 PISTON SEAL ASSY
*	2	PAT-CCP-0516	2 ROD SEAL ASSY
	3	PAT-CCP-0505	1 ROD BUSHING
	4	PAT-CCP-0513	1 PISTON BUSHING
	5	PAT-CCP-0515	1 BACKUP RING
*	6	O-E-032	2 O-RING
	7	PAT-CCP-0511	1 BALL STOP
	8	PAT-LS-1010	1 SPRING
*	9	O-E-022	1 O-RING
	10	PAT-CCP-0530	1 VALVE STOP
	11	PAT-CCP-0533	1 INTAKE BUSHING
	12	PAT-CCP-0532	1 VALVE NUT
	13	PAT-CCP-0520	4 TIE ROD
	14	PAT-CCP-0523	1 PRIMING PISTON
	15	PAT-CCP-0528	2 BACKUP WASHER
*	16	PAT-CCP-0525	1 RELIEF WASHER
*	17	PAT-CCP-0524	1 PRIMING SEAL
	18	F-HB-04F-08	1 HEX BOLT
	19	F-HN-06C	4 HEX NUT
*	20	O-E-140	1 O-RING
	21	PAT-CCP-0504	1 PACKING NUT
*	22	PAT-CCP-0536	2 FOOT VALVE SEAL
	23	PAT-CCP-0501-SS	1 OUTLET BODY
	24	PAT-CCP-0519-SS	1 CYLINDER
	25	PAT-CCP-0529-SS	1 SPACER
	26	PAT-CCP-0518-SS	1 LOWER SEAT
	27	PAT-CCP-0531-SS	1 INTAKE VALVE
	28	PAT-CCP-0527-SS	1 PRIMING ROD
	29	PAT-CCP-0509-SS	1 PISTON VALVE
	30	PAT-CCP-0507-SS	1 PISTON - 1.323 DIA
	31	PAT-CCP-0508-SS	1 FLUID ROD
	32	VLS-2427-SS	1 3/4" SS BALL
	33	PAT-CCP-0512-SS	1 BALL GUIDE
	34	PAT-CCP-0537	1 INLET BELL FLANGE
	35	MPH-2539	1 MALE ELBOW
	36	CV-CCP-1	1 CHECK VALVE
	39	PF-SE45-02-SS	1 45 DEG STREET ELBOW
	43	MRD-1017	1 BALL VALVE
	44	PF-HN-02-SS	1 HEX NIPPLE

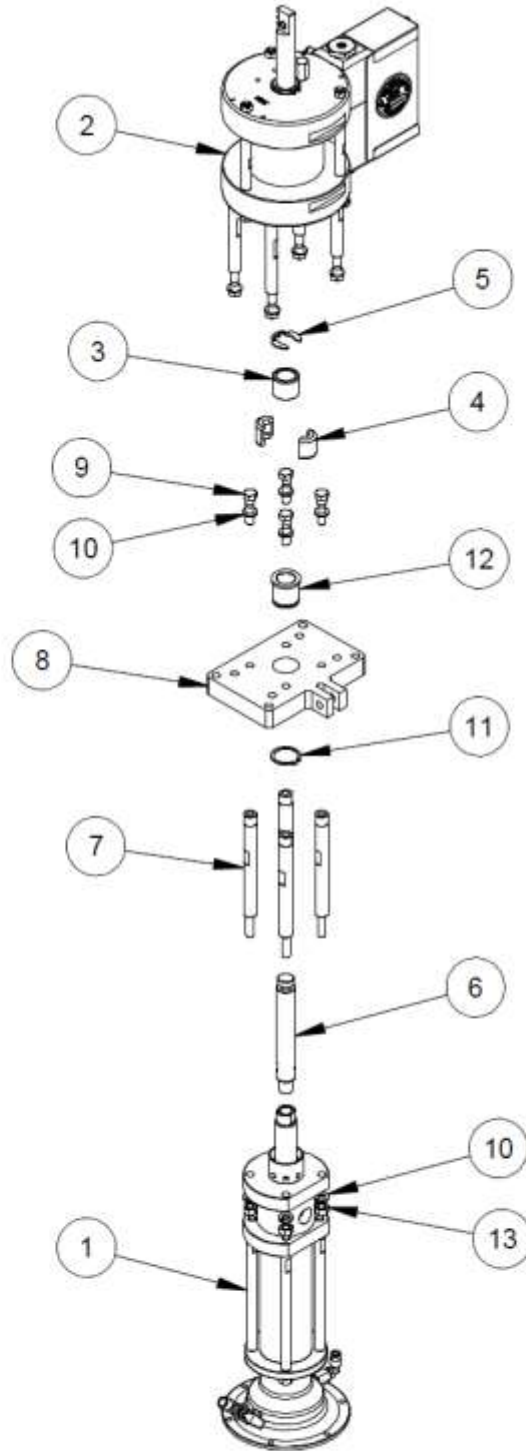
REPAIR KIT

* PAT-CCP-LS-0590-RK (ASTERISKS DENOTE PARTS IN KIT)

MAGNUM VENUS PLASTECH

MINI CHOPCHECK LOWER SECT.	PAT-CCP-LS-0590-SS
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REV:12-08-08 BT2



MAGNUM VENUS PLASTECH

PUMP ASSEMBLY	PAT-CCP-PA-1300-SS
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REV: 05-20-08 BT2

Parts List			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	PAT-CCP-LS-0590-SS	1	LOWER PUMP SECTION ASSY
2	PAT-PH-3250	1	POWER HEAD - 3-1/4" DIA
3	PAT-PA-9109	1	SHELL RETAINER
4	APP-9096	2	HALF SHELL
5	F-ER-1.00-HD	1	Ø1" E-RING HEAVY DUTY
6	PAT-CCP-0521	1	ADAPTER SHAFT
7	PAT-CCP-0522	4	ADAPTER TIE ROD
8	PAT-CCP-0503	1	TRANSITION PLATE
9	F-HB-06C-24	4	HEX BOLT
10	F-SW-06	8	LOCK WASHER
11	MPH-3261	1	SNAP RING - EXTERNAL
12	PAT-CCP-0517	1	MID BUSHING
13	F-HN-06C	4	HEX NUT

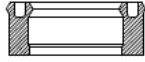
MAGNUM VENUS PLASTECH

PUMP ASSEMBLY

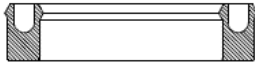
PAT-CCP-PA-1300-SS

REV:05-20-08 BT2

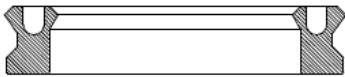
PAT-CCP-LS-0590-RK
REPAIR KIT



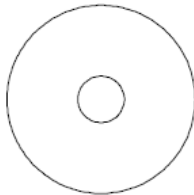
2 PCS
PAT-CCP-0536 FOOT VALVE SEAL ASSY



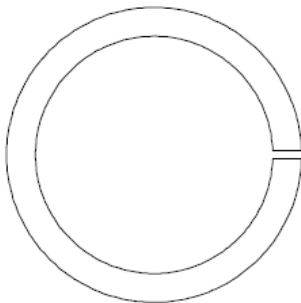
2 PC
PAT-CCP-0516 ROD SEAL ASSY



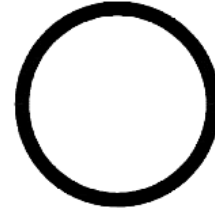
1 PC
PAT-CCP-0514 PISTON SEAL ASSY



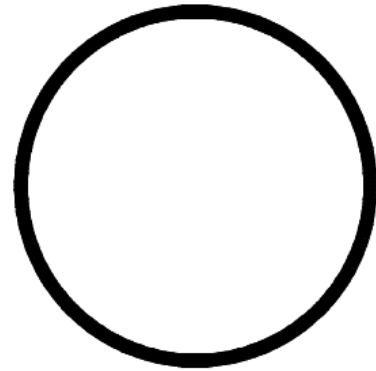
1 PC
PAT-CCP-0525 RELIEF WASHER



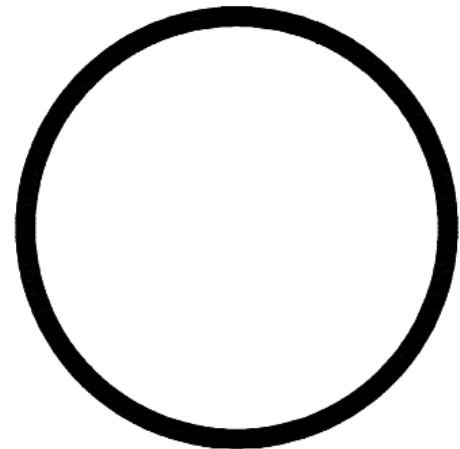
1 PC
PAT-CCP-0524 PRIMING SEAL



1 PC
0-E-022 O-RING



2 PCS
0-E-032 O-RING



1 PC
0-E-140 O-RING

CHAPTER

5

Patriot Chop Check Pump **Revision Information:**

Revision:

Description:

Rev. 12/2010

Added the Revision Information Chapter and updated the drawings. We updated the manual format and MVP logo. Added the assembly detail drawings.



MAGNUM VENUS PLASTECH

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Rev. 12/2010