PCP-1000 CATALYST PUMP MANUAL – MID RANGE

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 lamin sandings, or with any readily oxidizing material, such as brass or iron, will cau 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 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 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 diluent 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, the ***PCP-1000 Catalyst Pump Manual***, provides information you need to perform simple maintenance and repair on your equipment.

- Step-by-step assembly and disassembly procedures are included for each component.

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

DANGER: Always wear proper safety equipment, including eye protection and gloves when performing service and repair on this equipment.

During Disassembly:
As you disassemble the equipment, lay out the components on a clean surface in the correct order and direction. This will help you to reassemble them.

This manual covers the following Catalyst Pump Assemblies:

PCP-1000-C-3J	Catalyst Pump Assembly
PCP-1000-RV	Catalyst Pump Assembly – Relief Valve
PCP-1000-RV-INT	Catalyst Pump Assembly – Relief Valve – International
PCP-1000-TMA	Catalyst Pump Assembly – Tape Machine
85707-1	Catalyst Pump Assembly (old systems)
85707-3	Catalyst Pump Assembly (old systems)

Note: Some parts and part numbers will be different between the different Catalyst Pump Assemblies – it is important to have a current parts drawing for the Pump assembly you are working on.

Tools needed for removal and repair of Catalyst pump.

- 8” Adjustable wrench (08467)
- 6” Adjustable wrench (08466)
- Flat head screw driver
- 5/64” Allen wrench (9301-1-2) or (Allen wrench set 8469)
- Straight scribe (08126)

Note: If flushing the complete catalyst system from catalyst jug to gun is desired before working on system, use only distilled water.

Seal kit #: PCP-1000-SK

Installation & Set-up

CHECKLIST

1. Check all clamp brackets, pump column, slave arm bracket, manifold clamp, etc. to make sure they will not move when unit is in operation.

2. Check the mounting of catalyst pump to make sure pins are secure.

3. Make sure exhaust silencer is secured to the power cylinder of the resin pump.

IMPORTANT: Snug up the packing nut at the top of the catalyst pump approximately ¼ turn.

4. **Pro Gun:** Tighten the gun valve rod packing nuts until they are very snug. **IMPORTANT: Activate the gun trigger 10 - 15 times then tighten the packing nuts.** Repeat this tightening procedure 3 times to make sure the gun valve rod packing is tight.

5. Attach Suction Wand to Resin Pump.

   a. Check all fittings on the wand assembly to make sure they are airtight.

   b. Attach the wand assembly to the foot valve port of the resin pump.

6. Hose connections.

   a. Connect the black resin hose from the gun to the outlet fitting on the resin filter.

   b. Connect the catalyst hose from the catalyst pump to the inlet of the catalyst manifold.

   c. Connect the catalyst hose from the gun to the outlet of the catalyst manifold assembly.

   d. Attach the air hose from the gun to the fitting on the air manifold.

   e. (internal mix) Attach the yellow poly flush hose from the gun to the outlet fitting of the solvent tank.

   f. (internal mix) Attach the small red air supply hose from the flush regulator to the input fitting on the solvent tank.

   g. Attach the large red air hose from the pump regulator to the power cylinder of the resin pump.

Note: Check all hose fittings and fluid connections to make sure they are tight.

   h. Attach the ground wire from the gun to the electrical grounding lug on the pump mounting bracket.

Note: Check electrical ground to ensure it is installed from the pump mounting bracket to an earth ground.

   i. Remove the catalyst poly tubes from the component box.

   j. Cut the ½ inch diameter poly line, with the clamps, to 26 inches long. Clamp one end to the outlet of the catalyst jug and the other end to the inlet of the catalyst pump. Make sure clamps are airtight.

k. Connect the ¼-inch poly line to the relief valve on the catalyst manifold assembly and insert the other end into the hole in the top of the catalyst jug.

l. Connect the ¼-inch poly line to the catalyst recirculation valve on the catalyst manifold, and insert the other end into the hole in the top of the catalyst jug.

7. Check all components and hoses for damage.

8. Check and tighten all fittings.

9. Check resin filter – apply red grease to the filter cap threads and o-ring reinstall. Do not over tighten.

10. Check resin surge chamber – apply red grease to o-ring and nipple threads and reinstall surge chamber hand tight.

Maintenance

- At least every six months, completely disassemble and inspect the catalyst pump assembly. Replace the S.S. balls, O-Rings, springs, piston seal and packing assembly.

- Snug / tighten the Metering pump packing nut approximately 1/8 – 1/4 turn clockwise to prevent leakage. Repeat this procedure when necessary to prevent material from leaking. Do not over tighten as this will reduce the life of the packing set and may cause damage to the pump.

Troubleshooting

- The catalyst system should be checked if you are experiencing an uneven cure or slow gel time.

- For a complete troubleshooting guide, please refer to the manual “Testing & Adjusting Your MVP Pumping System” containing important testing procedures that should be performed every time the catalyst pump is serviced.

Remove Catalyst Pump Assembly:

CAUTION: There are four (4) small stainless steel balls in the catalyst pump assembly. If a ball drops to the floor, it will be damaged. (Even if it appears undamaged, it will contain dents and scratches that will create problems.) Damaged balls must be replaced or the pump will not work properly.

WARNING: Be sure hands, tools and work area are clean and free of resin, dirt or grease before attempting to disassemble the components of the catalyst pump assembly.

DANGER: To prevent injury, never perform service and repair on the catalyst system until system pressure has been relieved.

DANGER: If material is plugging the system, some parts of the system may still contain fluids under high pressure, even after following normal procedures to relieve pressure.

1. Turn Pump Pressure regulator to zero (0) psi.

2. Relieve fluid pressure by opening recirculation valve on the catalyst manifold. For system without a catalyst manifold hold the gun over an appropriate container and pull the trigger.

3. Drain any remaining catalyst from the catalyst jug.

WARNING: Follow catalyst manufacturer's recommendations regarding handling, storage or disposal of catalyst.

WARNING: To prevent injury, hold a large rag or shop towel around the wrench and fitting as you remove the fitting. Remove fitting slowly to allow fluid pressure to escape into the rag or towel.

4. Read the warning above, then disconnect hose lines and cover them so they do not leak.

5. Remove the catalyst pump assembly from the slave arms by removing the priming knob (50100-1), and upper and lower quick pins (52106-3).

Catalyst Pump Disassembly:

Remove Outlet Body from Inlet Body

1. Place the pump in a smooth-jawed vise by clamping on the flat edges of the inlet body.
2. Unscrew the outlet body (15824-3) from the inlet body (4104-7-1) by using two opposing wrenches to loosen the lock nut (4101-1-1) above the inlet body.

NOTE: The O-Ring (O-S-014) between the outlet body and the inlet body will need to be replaced during reassembly.

3. Remove the inlet body assembly from the vise, being careful not to drop the S.S. ball (9101-1-14).

Disassemble Outlet Body

1. Unscrew the outlet check valve assembly (52108-1) from the catalyst pump's outlet body. Not all systems will have this check valve assembly installed; some systems will have the outlet fitting or the relief valve adapter.

2. Unscrew the bearing block assembly (50210-3) from the piston rod (85788-1).

NOTE: Do not remove the Bearing (9202-1-1) from the bearing block assembly unless it is worn or damaged.

3. Unscrew the packing nut (50590-1) from the outlet body.

4. Push the piston rod (85788-1) out of the outlet body. Be careful not to damage the outlet body.

CAUTION: **Be very careful not to scratch the inside of the outlet body with the rod.**

5. Use a clean ¼-inch (0.6 cm) dowel or rod to push the packing assembly (4102-5-01) and upper guide (4102-4-1) out of the top of the outlet body (15824-3).

NOTE: Some older catalyst pumps may have the spring disc set (04313-1) in the outlet body – install upgrade kit (04313-3).

Piston Rod Disassembly

Remove the following components from the piston rod:

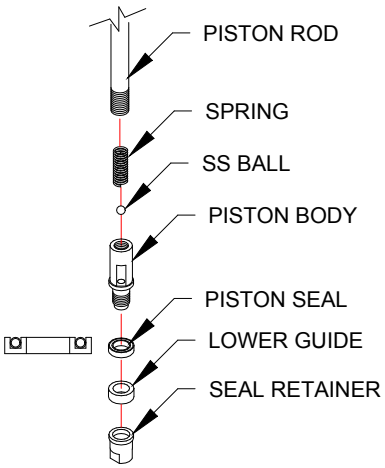
a. Seal Retainer (4102-9-1)

b. Piston Guide (4102-8-1)

c. Piston Seal (7304-1-1)

d. Piston Body (4102-7-1) being careful not to drop the S.S. ball

e. The S.S. Ball (9201-1-5) inside the piston body.



6. If the spring (4101-3-1) in the end of the piston rod is damaged, remove it.

7. Roll the piston rod on a flat surface to check that the piston rod is not bent. If the piston rod is bent, it must be replaced.

CAUTION: To prevent equipment damage, be sure to use only genuine Magnum Venus Plastech replacement parts. Using unauthorized parts may lead to equipment damage and personal injury.

Disassemble Outlet Check Valve Assembly

- **Not all systems will have this outlet check valve assembly installed; some systems will have the outlet fitting or the relief valve adapter.**

1. Unscrew the retainer (4101-17-1) with a hex wrench while the retainer side of the check valve is facing upward.

2. Remove the spring (4101-16-1) and S.S. ball (9201-1-7) from the check valve and inspect them. Clean or replace the spring or ball if necessary.

NOTE: The two O-Rings on the check valve will need to be replaced during reassembly.

Disassemble Inlet Body

1. Remove the S.S. ball (9201-1-14) from the inlet body (4101-7-1).

CAUTION: Be careful not to drop the S.S. ball. If the ball is dropped, it must be replaced.

2. From the inlet body, remove the tube fitting (4101-8-1).

For systems with inlet Check Valve CV-2000 installed:

A. Remove the Check Valve (CV-2000) for the inlet body (4101-7-1).

B. Remove o-ring (O-S-013) and replace with new o-ring.

C. Remove the Inlet Tube Fitting from the check valve. Remove and discard the O-Ring (O-S-013) replace with new o-ring depending on the inlet fitting.

D. Remove the seat housing (CV-2001) from the spring housing (CV-2002).

E. Remove and clean spring (CV-2004) and piston (CV-2003) with warm water.

F. Remove and clean o-ring O-S-011 with warm water, replace as necessary.

G. Clean seat housing and spring housing with warm water and inspect for damage.

H. Install the spring into piston and piston into the spring housing.

I. Install a new o-ring (O-S-011) into the seat housing and thread seat housing onto spring housing.

J. Install the tube fitting into the outlet side of the check valve.

K. Install the rebuilt check valve (CV-2000) onto the outlet body.

NOTE: Once disassembly is complete all parts should be flushed in distilled water and inspected for damage and replaced if necessary.

Catalyst Pump Assembly:

Assemble Outlet Check Valve Assembly

- **Not all systems will have this outlet check valve assembly installed; some systems will have the outlet fitting or the relief valve adapter.**

DANGER: Fire and Explosion hazard. Use only clean water to wet the S.S. ball. Fire or explosion may occur if the catalyst system is contaminated.

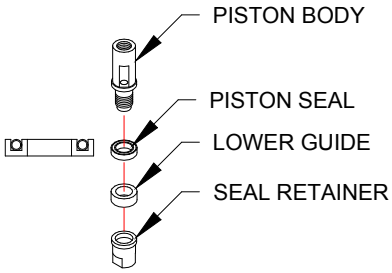
WARNING: Follow all materials handling and storage suggestions from your catalyst manufacturer.

1. Wet the S.S. ball (9201-1-7) and the ball seat with clean water, and gently roll the ball into the check valve body (4101-15-1).
2. Insert the spring (4101-16-1) on top of the S.S. ball in the check valve body.
3. Screw the retainer into the check valve.
4. Be sure the jam nut (4101-18-1) is screwed onto the check valve.

Assemble Outlet Body

WARNING: Follow all materials handling and storage suggestions from your catalyst manufacturer.

1. On the piston body (4102-7-1), install the piston seal (7304-1-1). Be sure the spring in the piston seal faces toward the piston body (top of the pump).
2. Install the piston guide (4102-8-1) onto the piston body just below the piston seal.
3. Screw the seal retainer (4102-9-1) onto the piston body.



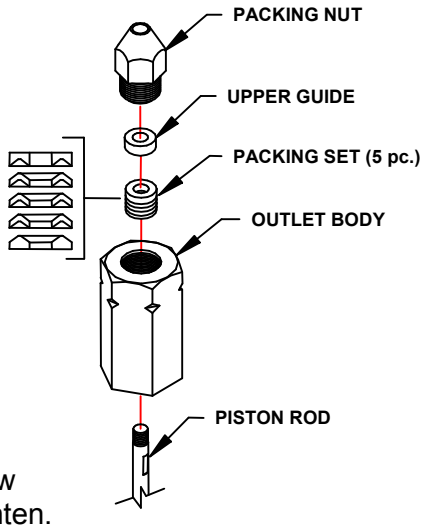
NOTE: Bottom out the seal retainer on the threads, but not over-tighten. The seal should still be able to move slightly.

4. Clean the piston seal with clean water.

5. Clean the S.S. ball (9201-1-5) and the ball seat with clean water, and gently roll the ball into the piston body.

DANGER: Fire and Explosion hazard. Use only clean water to we the S.S. ball. Fire or explosion may occur if the catalyst system is contaminated.

6. If the spring was removed from the piston rod, replace it with a new one.



7. Screw the piston body over the spring onto the piston rod.

8. Slide the piston body assembly into the outlet body, being careful not to cut the piston seal.

WARNING: Do not scratch the inside of the outlet body.

9. Slide the packing assembly (4102-5-01) onto the piston rod. Be sure the wide packing goes on last.

10. Slide the upper guide (4102-4-1) onto the piston rod on top of the packing set.

11. Install the packing nut (50590-1) onto the piston rod and screw into the outlet body. Tighten it hand-tight, but do not over-tighten.

NOTE: If the packing leaks, turn the nut one-quarter turn. Do not allow the packing nut to bottom out on the outlet body.

12. Put medium-strength Loctite® on the threads of the piston rod, then screw the bearing block assembly (50210-3) onto the top of the piston rod using two wrenches.

13. If your system has the outlet check valve, connect the outlet check valve assembly (4101-01-01) to the outlet body (15824-3).

14. The arrow on the outlet check valve should point away from the outlet body.

Assemble Inlet Body

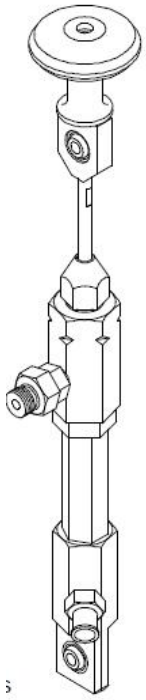
DANGER: Fire & Explosion Hazard. Use only clean water to wet the O-Ring and S.S. ball. Fire or explosion may occur if the catalyst system is contaminated.

1. Wet the S.S. ball (9201-1-14) with water. Gently roll the ball into the inlet body.

2. For systems that do not have the CV-2000 Inlet Check Valve - wet the new O-Ring (O-S-013) with clean water and slide it onto the tube fitting (4101-8-1).

3. Screw the tube fitting into the inlet body (4101-7-1).

Connect Outlet Body to Inlet Body



1. Be sure the lock nut (4101-1-1) is screwed onto the outlet body (15824-3).
2. Wet the new O-Ring (O-S-014) with clean water and place it on the outlet body.

CAUTION: Be sure the O-Ring is not on the threads of the outlet body.

3. Screw the outlet body into the inlet body, when the inlet body makes contact with the outlet body unscrew the outlet body part of a turn so that the inlet and outlet ports are offset one flat on hex. (See figure to the right)
4. Tighten the lock nut to the outlet body (15824-3).

Connect Catalyst Pump Assembly

NOTE: If you are continuing to service the rest of the Pumping system, do not connect the catalyst pump assembly until after you have serviced the pump and accumulator. If you have finished servicing the pump and want to connect the catalyst pump assembly, follow the procedures below.

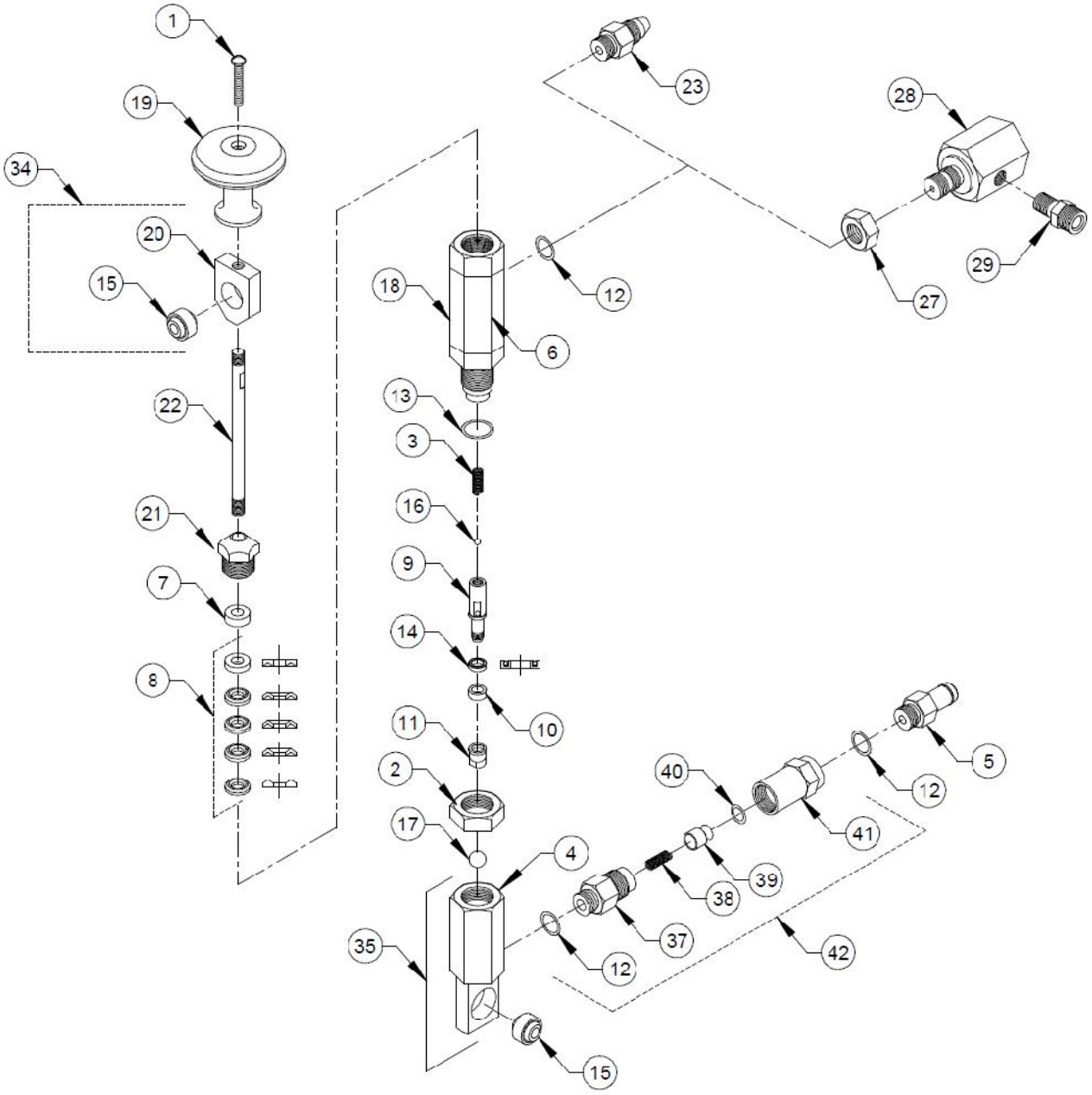
1. Reattach the catalyst pump assembly to the slave arms with the upper quick pin assembly (52106-3).

CAUTION: Be sure the quick pins are in the same hole on both the upper and lower slave arms.

2. Reattach the priming knob (50100-1) to the top of the bearing block assembly (50210-3).
3. Cut ½ inch (1.3 cm) off the end of the inlet hose that attaches to the inlet body's tube fitting (4104-8-1).
4. Connect the inlet hose between the catalyst jug and the pump.
5. Connect the remaining hoses.

Parts Drawings:

PCP-1000-X	Catalyst Pump Assembly – Internal & External
PCP-1000-RV-INT	Catalyst Pump Assembly – International
PCP-1000-TMA	Catalyst Pump Assembly – Tape Machine
85707-X	Catalyst Pump Assembly
PCP-1000-SK	Catalyst Pump Seal Kit



MAGNUM VENUS PRODUCTS

Assy - Catalyst Pump Internal Mix	PCP-1000-C-3J
Assy - Catalyst Pump External Mix	PCP-1000-RV

D = DELETED ITEMS 25, 26, 30, 31, ADDED CV-2000 AND ALL OF ITS COMPONENTS 12/22/05 BT2
E = ITEM 29 WAS PF-HN-02-03J-SS, ITEM 40 WAS O-S-011 02/23/06 BT2
F = REMOVED ITEM 23 FROM PARTS LIST 03/09/06 BT2
G = UPDATED FIGURE 1-1 01/29/07 BT2

Common Assy Parts List for ;
Assy - Catalyst Pump PCP-1000-C-3J
Assy - Catalyst Pump PCP-1000-RV
PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
1	02849-16	1	MACHINE SCREW
2	4101-1-1	1	LOCK NUT
3	4101-3-1	1	SPRING
4	4101-7-1	1	INLET BODY
5	4101-8-1	1	TUBE FITTNG
6	6701-24-EN	1	PUMP SEAL WARNING DECAL
* 7	4102-4-1	1	UPPER GUIDE
* 8	4102-5-01	1	PISTON ROD PACK SPA
9	4102-7-1	1	PISTON BODY
* 10	4102-8-1	1	PISTON GUIDE
11	4102-9-1	1	SEAL RETAINER
* 12	O-S-013	3	O-RING
* 13	O-S-014	1	O - RING
* 14	7304-1-1	1	PISTON SEAL
15	9202-1-1	2	BEARING
16	9201-1-5	1	SS BALL
17	9201-1-14	1	SS BALL
18	15824-3	1	OUTLET BODY
19	50100-1	1	PRIMING KNOB
20	50210-1	1	BUSHING BLOCK
21	50590-1	1	PACKING NUT
22	85788-1	1	PISTON ROD
37	CV-2002	1	SPRING HOUSING
38	CV-2004	1	SPRING
39	CV-2003	1	PISTON
* 40	O-S-011A	1	O-RING
41	CV-2001	1	SEAT HOUSING

Repair Kits

PART NO.	DESCRIPTION
* PCP-1000-SK	SEAL KIT

Assy - Catalyst Pump PCP-1000-C-3J
PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
23	51501-1	1	OUTLET FITTING

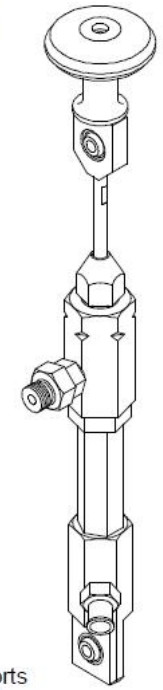
Assy - Catalyst Pump PCP-1000-RV
PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
27	4101-18-1	1	JAM NUT
28	RV-1021	1	ADAPTER
29	PF-HN-02-04S-SS	1	OUTLET FITTING

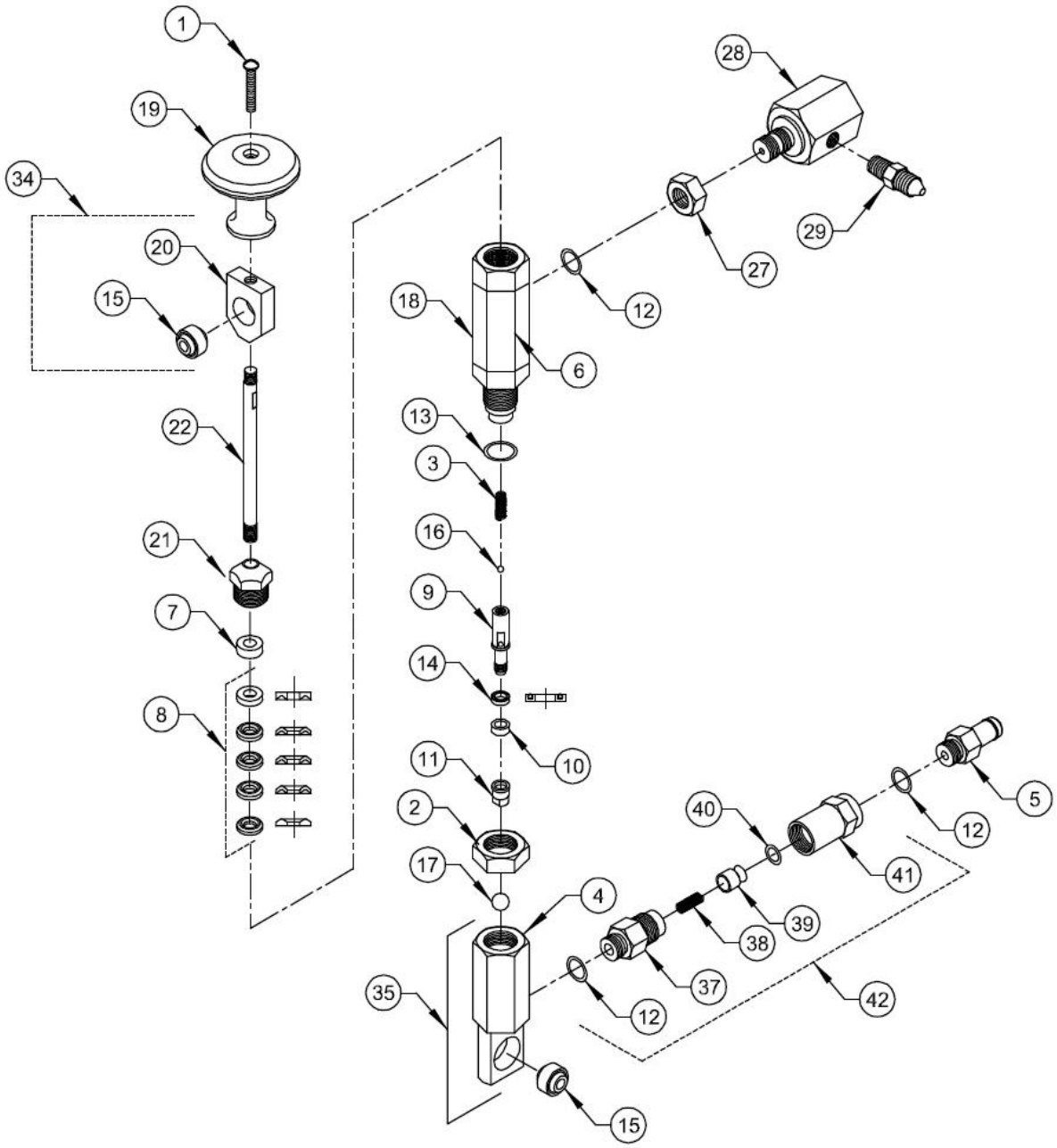
Associated Parts and Assemblies

ITEM	PART NO.	QTY	DESCRIPTION
34	50210-3	1	ASSY - BUSHING BLOCK
35	4101-7-01	1	INLET BODY SPA
42	CV-2000	1	CHECK VAVLE

FIGURE 1-1



Note:
Offset intake and outlet ports one flat on hex as shown in figure 1-1



MAGNUM VENUS PLASTECH

Catalyst Pump External Mix - International PCP-1000-RV-INT

REV. 02/23/06 BT2
REV. A - UPDATED FIGURE 1-1 01-30-07 BT2

Assy - Catalyst Pump PCP-1000-RV-INT

PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
1	02849-16	1	MACHINE SCREW
2	4101-1-1	1	LOCK NUT
3	4101-3-1	1	SPRING
4	4101-7-1	1	INLET BODY
5	4101-8-1	1	TUBE FITTNG
6	6701-24-EN	1	PUMP SEAL WARNING DECAL
* 7	4102-4-1	1	UPPER GUIDE
* 8	4102-5-01	1	PISTON ROD PACK SPA
9	4102-7-1	1	PISTON BODY
* 10	4102-8-1	1	PISTON GUIDE
11	4102-9-1	1	SEAL RETAINER
* 12	O-S-013	3	O-RING
* 13	O-S-014	1	O - RING
* 14	7304-1-1	1	PISTON SEAL
15	9202-1-1	2	BEARING
16	9201-1-5	1	SS BALL
17	9201-1-14	1	SS BALL
18	15824-3	1	OUTLET BODY
19	50100-1	1	PRIMING KNOB
20	50210-1	1	BUSHING BLOCK
21	50590-1	1	PACKING NUT
22	85788-1	1	PISTON ROD
23	51501-1	1	OUTLET FITTING
27	4101-18-1	1	JAM NUT
28	RV-1021	1	ADAPTER
29	PF-HN-02-03J-SS	1	OUTLET FITTING
37	CV-2002	1	SPRING HOUSING
38	CV-2004	1	SPRING
39	CV-2003	1	PISTON
* 40	O-S-011A	1	O-RING
41	CV-2001	1	SEAT HOUSING

Repair Kits

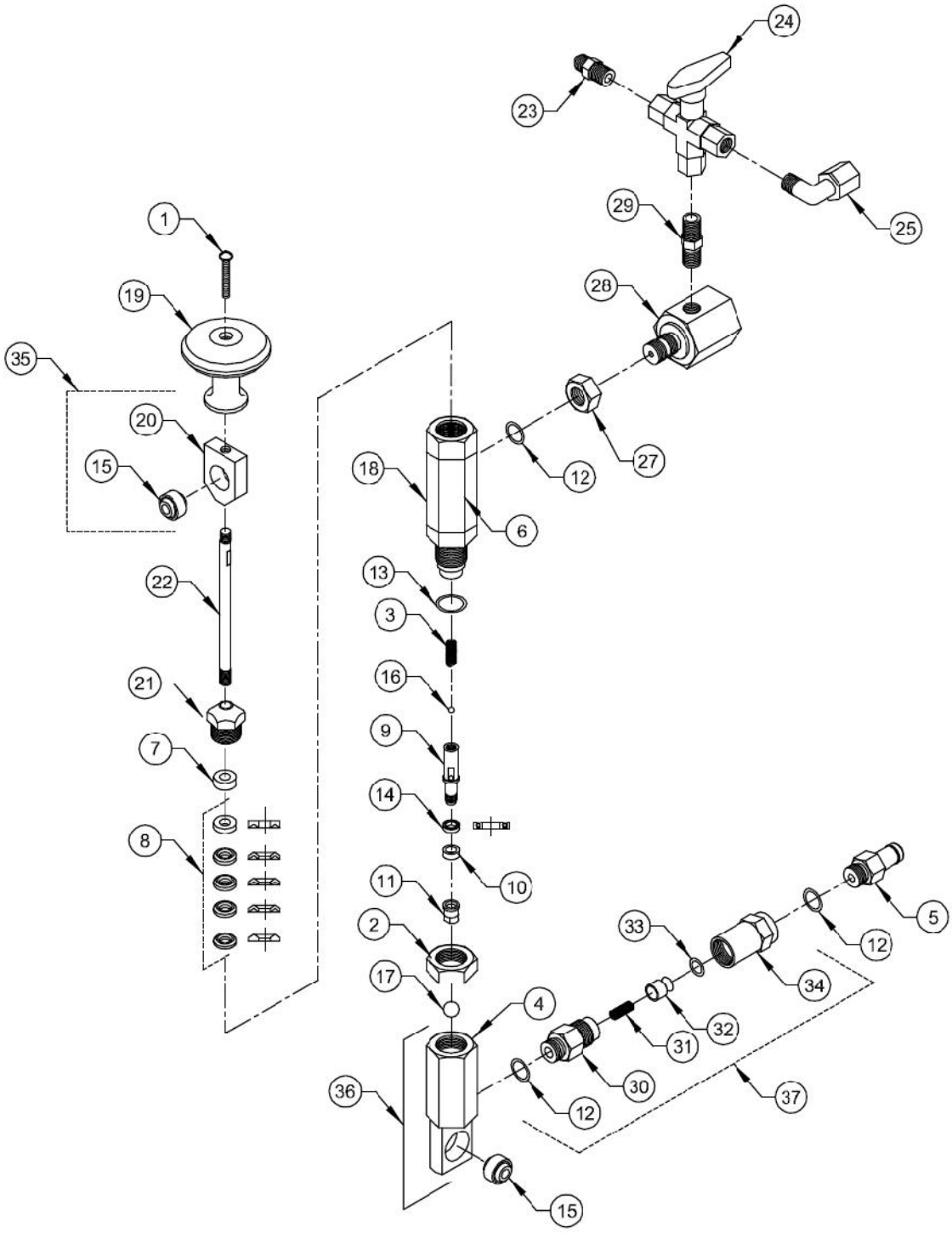
PART NO.	DESCRIPTION
* PCP-1000-SK	SEAL KIT

Associated Parts and Assemblies

ITEM	PART NO.	QTY	DESCRIPTION
34	50210-3	1	ASSY - BUSHING BLOCK
35	4101-7-01	1	INLET BODY SPA
42	CV-2000	1	CHECK VAVLE

FIGURE 1-1

Note:
Offset intake and outlet ports one flat on hex as shown in figure 1-1



MAGNUM VENUS PLASTECH

Catalyst Pump For Tape Machine	PCP-1000-TMA

REV. - 03/19/08 BT2

Assy - Catalyst Pump PCP-1000-TMA

PARTS LIST

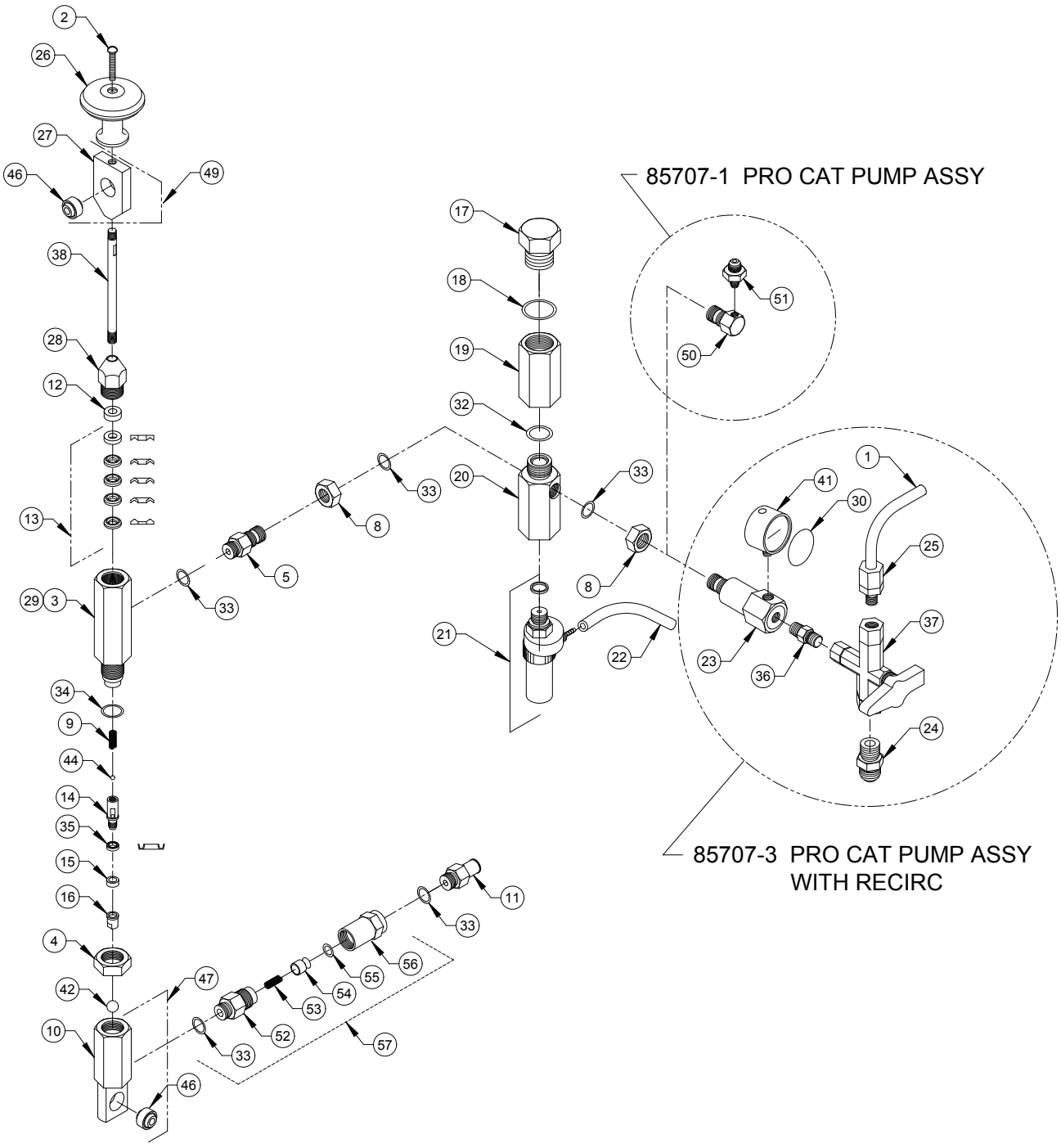
ITEM	PART NO.	QTY	DESCRIPTION
1	02849-16	1	MACHINE SCREW
2	4101-1-1	1	LOCK NUT
3	4101-3-1	1	SPRING
4	4101-7-1	1	INLET BODY
5	4101-8-1	1	TUBE FITTNG
6	6701-24-EN	1	PUMP SEAL WARNING DECAL
* 7	4102-4-1	1	UPPER GUIDE
* 8	4102-5-01	1	PISTON ROD PACK SPA
9	4102-7-1	1	PISTON BODY
* 10	4102-8-1	1	PISTON GUIDE
11	4102-9-1	1	SEAL RETAINER
* 12	O-S-013	3	O-RING
* 13	O-S-014	1	O - RING
* 14	7304-1-1	1	PISTON SEAL
15	9202-1-1	2	BEARING
16	9201-1-5	1	SS BALL
17	9201-1-14	1	SS BALL
18	15824-3	1	OUTLET BODY
19	50100-1	1	PRIMING KNOB
20	50210-1	1	BUSHING BLOCK
21	50590-1	1	PACKING NUT
22	85788-1	1	PISTON ROD
23	PF-HN-02-03J-SS	1	PISTON ROD
24	8407-6-1	1	BALL VALVE
25	MS-2053	1	ELBOW
27	4101-18-1	1	JAM NUT
28	RV-1021	1	ADAPTER
29	PF-HN-02-SS	1	OUTLET FITTING
30	CV-2002	1	SPRING HOUSING
31	CV-2004	1	SPRING
32	CV-2003	1	PISTON
* 33	O-S-011A	1	O-RING
34	CV-2001	1	SEAT HOUSING

Repair Kits

PART NO.	DESCRIPTION
* PCP-1000-SK	SEAL KIT

Associated Parts and Assemblies

ITEM	PART NO.	QTY	DESCRIPTION
35	50210-3	1	ASSY - BUSHING BLOCK
36	4101-7-01	1	INLET BODY SPA
37	CV-2000	1	CHECK VAVLE



MAGNUM VENUS PRODUCTS

MID RANGE PRO CAT PUMP ASSY	85707-1
MID RANGE PRO CAT PUMP ASSY WITH RECIRC	85707-3

REV. C - REPLACED BURST DISC ASSY WITH 4101-10-1 CAP, & RELIEF VALVE WITH RV-100-1500 7/31/02 JEM
REV. D - ITEM 50. WAS 55900-1 09/08/05 BT2
REV. E - DELETED ITEMS 6, 7, 45, ADDED CV-2000 AND ALL ITS COMPONENTS 12/22/05 BT2
REV. F - ITEM 55 WAS O-S-011 03/10/06 BT2

MID RANGE PRO CAT PUMP ASSY 85707-1
MID RANGE PRO CAT PUMP ASSY WITH RECIRC 85707-3

COMMON ASSEMBLY PARTS LIST

ITEM	PART NO.	QTY	DESCRIPTION
2	02849-16	1	MACHINE SCREW
3	15824-3	1	CYLINDER OUTLET BODY
4	4101-1-1	1	LOCK NUT
5	4101-15-1	1	CHECK VALVE BODY
8	4101-18-1	2	JAM NUT
9	4101-3-1	1	PISTON ROD SPRING
10	4101-7-1	1	INLET BODY
11	4101-8-1	1	INLET TUBE FITTING
12	4102-4-1	1	UPPER GUIDE
13	4102-5-01	1	ASSY - PACKING SET
14	4102-7-1	1	PISTON BODY
15	4102-8-1	1	PISTON GUIDE
16	4102-9-1	1	SEAL RETAINER
17	4104-10-1	1	SURGE CHAMBER CAP
18	O-T-019	1	O-RING
19	4104-3-1	1	CATALYST SURGE CHAMBER BODY
20	4104-4-1	1	SURGE RELIEF VALVE BODY
21	RV-1000-1500	1	RELIEF VALVE ASSY
22	01417	3 FT	RETURN TUBE
26	50100-1	1	PRIMING KNOB CAT PUMP
27	50210-1	1	BUSHING BLOCK -PISTON ROD END
28	50590-1	1	PACKING NUT
29	6701-24-EN	1	PUMP SEAL WARNING DECAL
32	O-S-3-908	1	O-RING
33	O-S-013	5	O-RING
34	O-S-014	1	O RING
35	7304-1-1	1	PISTON SEAL
38	85788-1	1	PISTON ROD
42	9201-1-14	1	7/16 DIA SS BALL
44	9201-1-5	1	5/32 DIA SS BALL
46	9202-1-1	2	SPHERICAL BEARING
52	CV-2002	1	SPRING HOUSING
53	CV-2004	1	SPRING
54	CV-2003	1	PISTON
55	O-S-011A	1	O-RING
56	CV-2001	1	SEAT HOUSING

MID RANGE PRO CAT PUMP ASSY 85707-1

ITEM	PART NO.	QTY	DESCRIPTION
50	55910-1	1	ELBOW - CAT HOSE TO GUN
51	55800-1	1	FITTING - CAT HOSE TO GUN

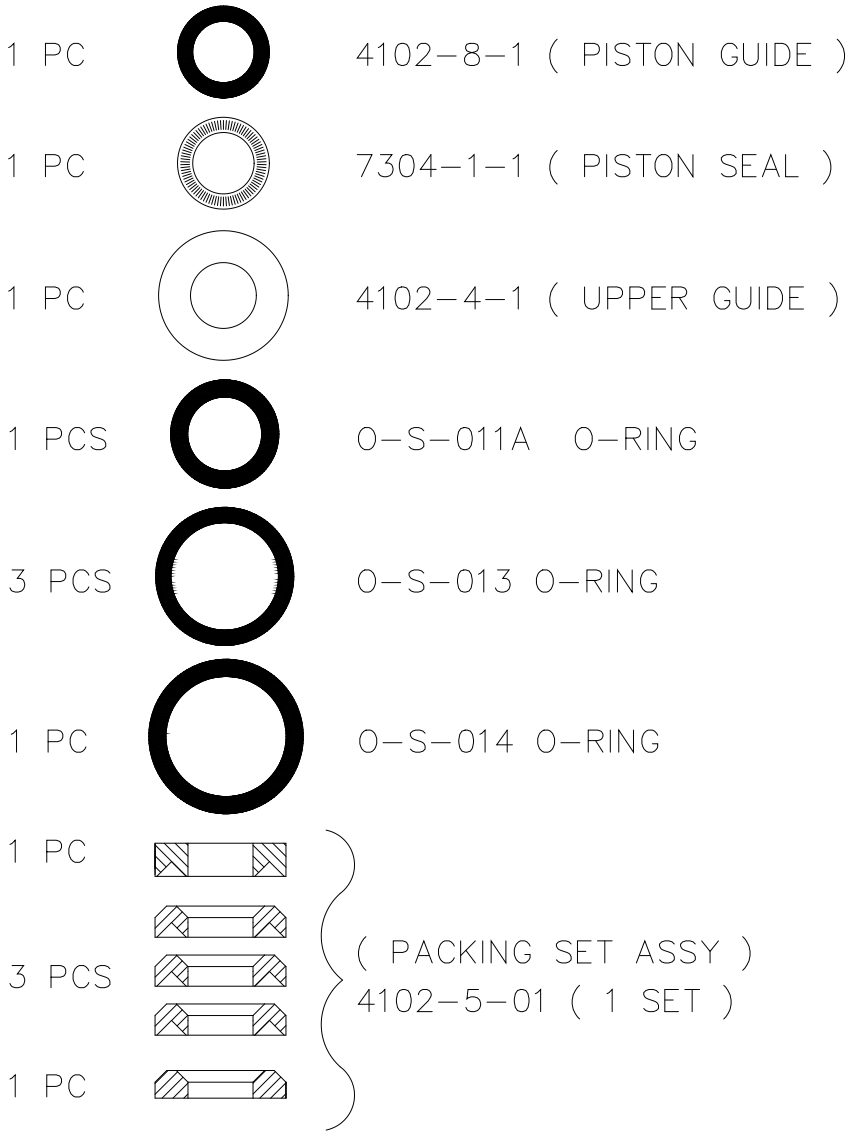
MID RANGE PRO CAT PUMP ASSY WITH RECIRC 85707-3

ITEM	PART NO.	QTY	DESCRIPTION
1	01417	4'	1/4" POLY TUBE NATURAL
23	4104-8-1	1	GAUGE ADAPT0R
24	4104-9-1	1	FITTING - CAT HOSE TO 1/8" NPT
25	4108-1-01	1	ASSY - TUBE FITTING
30	6701-6-1	1	2-1/4 DIA CLEAR STICKER
36	7701-3-20	1	1/8-NPT SS HEX NIPPLE
37	8407-6-1	1	BALL VALVE
41	8702-1-1	1	3000 PSI/KPA SS GAUGE

ASSOCIATED PARTS AND ASSEMBLIES

47	4101-7-01	1	INLET BODY SPA
49	50210-3	1	BUSHING BLOCK SPA
57	CV-2000	1	CHECK VALVE

PCP-1000-SK
SEAL KIT - CATALYST PUMP



Revision Information:

Rev. 04/2011 Updated document drawings and format. The Revision information chapter was added.

Rev. 05/2012 Updated the Logo, MVP Address and the manual format, added the Terms and Conditions section. Removed the Accumulator section and drawings and separated the assembly and disassembly procedures.

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Assemblies Covered in this Manual:

PCP-1000-C-3J	Catalyst Pump Assembly
PCP-1000-RV	Catalyst Pump Assembly – Relief Valve
PCP-1000-RV-INT	Catalyst Pump Assembly – Relief Valve – International
PCP-1000-TMA	Catalyst Pump Assembly – Tape Machine
85707-1	Catalyst Pump Assembly (old systems)
85707-3	Catalyst Pump Assembly (old systems)

Rev. 05/2012