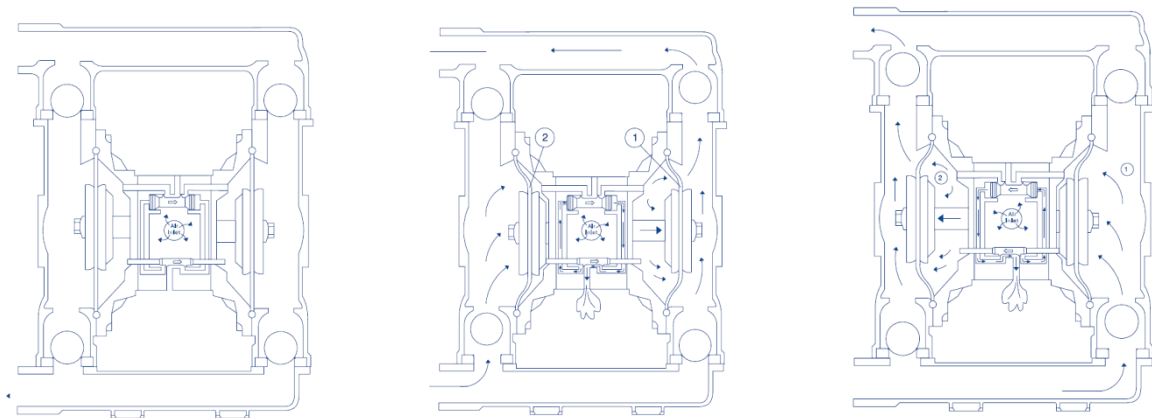


# AIR OPERATED DIAPHRAGM PUMPS



Working Principle



After connecting the compressed air, air valve control the compressed air impels diaphragm 1 moves toward right, meanwhile, the diaphragm 1 also extrudes medium and pushes it out of chamber. Diaphragm not only conveys medium but also isolates compressed air and medium in the pump chamber. When one diaphragm is pushed away from the center body, another diaphragm will move toward center body since these two diaphragms are connected by one shaft. When diaphragm 2 moves toward the center body, the high pressure compressed air will be discharged out through the muffler; meanwhile, the pump inlet side will create a vacuum, then the atmospheric pressure will push the medium into suction pipeline. The pump entry valve ball will be raised away from the valve seat. The medium will then enter into pump chamber.

When Diaphragm 1 is under high pressure, it will slowly move to maximum position of the stroke. Meanwhile, the compressed air will slowly enter into the space following the diaphragm 2 and will push the diaphragm 2 away from the center body. The diaphragm 1 also will move toward center body since these two diaphragms are connected by one shaft. The diaphragm 2 will extrude the medium and function on entry valve ball and seal up the suction pipeline through the water power. The water power also will function on exit valve ball and open the discharge pipeline. Meanwhile, exit valve ball of pump on the other side will shut down for pressure function, entry valve ball will open, and then the medium will enter into the pump chamber.

When one stroke finishes, the compressed air will enter in to the space following diaphragm 1 again through reversing valve. Simultaneously the diaphragm 2 following compressed air will discharge out through muffler.

# Main Applications

1. **Chemical Industry:** Acids, Alkalis, Solvents, Suspended Solids
2. **Petrochemical Industry:** Crude Oil, Heavy Oil, Grease, Mud, Sludge, etc.
3. **Coatings Industry:** Resins, Solvents, Coloring Agent, Paint, etc.
4. **Cosmetic Industry:** Detergent, Shampoo, Lotion, Emulsion, Camphor Ice, Surface Active Agents.
5. **Ceramics:** Mud Slurry Pottery, Lime Milk, Clay Slurry.
6. **Mining Industry:** Coal Slurry, Magma, Mud, Mortar and Explosives, Lubricant, etc.
7. **Water Treatment:** Lime Milk, Soft Sediments, Sewage, Chemicals, Waste Water.
8. **Food Industry:** Liquid Semi-solid, Chocolate, Salt Water, Vinegar, Syrup, Vegetable Oil, Honey, Animal Blood.
9. **Beverage Industry:** Yeast, Sugar Syrup, Concentrations, Gas-liquid Mixture, Wine, Fruit Juice, Corn pulp, etc.
10. **Pharmaceutical Industry:** Solvents, Acids, Alkalis, Plant Extract Liquid, Cream, Plasma and other Liquid Drugs.
11. **Paper Industry:** Adhesives, Reins, Paints, Inks, Paints, Hydrogen Peroxide, etc.
12. **Electronics Industry:** Solvents, Electroplating Fluid, Cleaning.
13. **Textile Solution:** Chemical Dyes, Resins, Rubber, etc.
14. **Construction Industry:** Grout, Ceramic Tile Adhesives, Rock Slurry, Ceiling Finish, etc.
15. **Automotive Industry:** Polishing Emulsion, Oil, Coolant, Automotive Priming, Oil Emulsion Paint, Varnish, Varnish Additives, Degreasing Fluid, Fluid, Paint, etc.
16. **Furniture Industry:** Adhesives, Varnishes, Decentralized System, Solvents, Color Agent, Sapwood Glue, Epoxy Resins, Starch Binder.
17. **Metallurgy, Casting and Dyeing Industry:** Metal Slurry, Hydroxides and Carbide Slurry, Dust Cleaning Slurry.





## Air-Operated Double Diaphragm (AODD) Pump Selection

Selection of the right diaphragm for an air-operated double-diaphragm (AODD) pump is a critical consideration for safety, efficiency and trouble-free operations. A number of factors must be taken into account when choosing the proper diaphragm that will be suitable for a specific application. Previous experience is always a very helpful guide, but new applications will often require research and outside advice to determine the appropriate diaphragm that will meet specific application requirements and parameters.

In selecting a diaphragm, there are ten primary factors to consider:

### Pump Capacity

To select the right ASTRO pump for your application, the following factors should be considered to achieve economy of operation, long pump life, and minimal maintenance costs:

- The nature of the medium to be pumped, its viscosity, and the solids content (proportion to total content)
- Pumping capacity in relation to the desired output (per unit of time)
- Suction and pressure conditions

Considering these parameters, an optimal pump size is selected when the intersection of the intended installation “pressure vs. flow rate” is near the middle section of the curves.

### Capacities with Specified Suction Lift

All ASTRO air-operated double diaphragm pumps are self-priming. There is a difference between “dry” (without medium) and “wet” (with medium) priming. When calculating the pumping capacity, the specific gravity of the product and the respective suction lift must be taken into consideration. Furthermore, losses attributed to piping or hoses on the suction side and the specific properties of housing and diaphragm materials must also be factored in.

### Capacities with Viscous Fluids

All capacity curves shown in the diagram are related to water (1 mPa•s). In order to determine the appropriate pump capacity for viscous media, the realized capacity reductions shown in the diagram must be considered in relation to the known viscosity. In addition, factors such as product flow properties, length and cross-section of piping or hoses on suction and discharge sides, and valve and pump sizes with their specific characteristics must be taken into account.

**Chemical Resistance**

Material compatibility with the fluid being pumped, the spectrum of fluids pumped can range from water to aggressive acids and caustics. Each diaphragm material has been tested to measure its compatibility against many chemicals. The operator should evaluate the pumped fluid against published chemical compatibility guides.

**Temperature Ranges**

Capability to remain flexible in low temperatures and not deteriorate in high temperature is a very critical factor, and the working range available in diaphragm materials varies greatly. The type of fluid can also affect the working temperature range of the material.

**Abrasion Resistance**

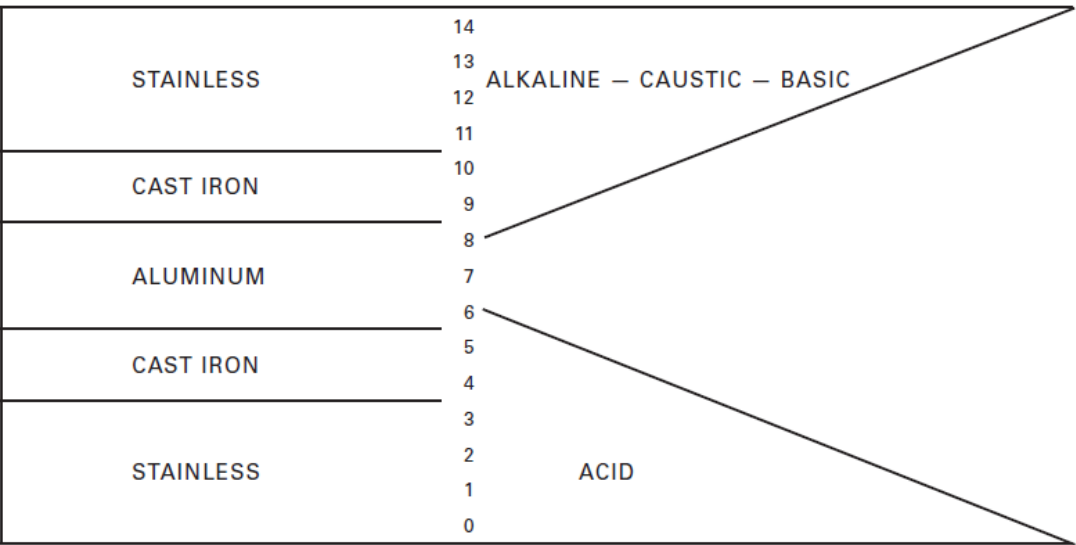
Ability to withstand wear and friction from contact with solids and particles in the fluid being pumped diaphragms are available to handle fluids ranging from clear to heavy slurries to dry bulk pumping.

**Inlet condition (flooded suction and suction lift)**

Capacity to pump fluid from one location to another for different pumping configurations and conditions, certain diaphragm materials are more efficient and longer lasting than others. Outside advice from an expert such as ASTRO distributor can assist in determining the optimum material for specific applications.

**PH value**

PH is a measure of hydrogen-ion concentration.  
PH of 7 is neutral; below 7 is acid; above 7 is alkaline.



## Materials

To meet **your** ~~you're~~ most severe process conditions, yet still having a trouble-free operation, ASTRO pumps have thirteen different material options for the valve seat, diaphragm & balls. The combination of these high quality materials together with the choice of different pump materials gives the optimum pump selection.

<b>Material Profile:</b> 	Operating Temperatures	
	Max.	Min.
<i>Operating temperature limitations are as follows:</i>		
<b>Acetal</b> :Wide range of solvent resistant and withstands extreme fatigue. Good level of abrasion resistance. Electrically conductive (ATEX).	180°F 82°C	- 20°F - 29°C
<b>Polypropylene</b> : Wide chemical compatibility. General Purpose. Limited temperature resistant.	175°F 79°C	32°F 0°C
<b>PVDF (Kynar)</b> : PVDF is the best choice for even the most chemically aggressive media.	225°F 107°C	40°F 4°C
<b>Aluminium</b> : General purpose. Good for solvent based coatings and inks. Resistant to mild chemicals.	150°F 65.5°C	40°F 4.4°C
<b>Stainless Steel</b> : Resistant to most acids, bases and solvents. Can handle halogenated hydrocarbons. Good resistance to abrasive	392°F 200°C	40°F 4°C
<b>Teflon (PTFE)</b> : Most compatible material for chemical applications, extremely resistant to corrosion and high temperatures, very low friction coefficient, non-adhesive.	220°F 104°C	40°F 4°C
<b>Santoprene</b> : Good resistance to abrasive and chemical fluids. Santoprene is compatible with some solvents (e.g. Acetone, MEK), caustic solutions, dilute acids and alcohols.	220°F 104°C	- 20°F - 29°C
<b>Hytreil(TPE)</b> : Good performance properties at lower temperatures and good resistance to abrasive fluids. Thermoplastic polyester is often a substitute for Buna-N.	220°F 104°C	- 20°F - 29°C
<b>Viton(FKM)</b> : High heat resistance. Good resistance to aggressive chemicals including acids and some solvents. (e.g. xylene and mineral spirits). Good resistance to steam as well as animal, vegetable and petroleum oils. Resists unleaded fuels.	350°F 177°C	- 40°F - 40°C
<b>Geolast</b> : Abrasion resistance. Approximately same chemical compatibility as Buna-N.	180°F 82°C	- 40°F - 40°C
<b>EPDM</b> : Good water and chemical resistance. Not for use with oils, greases and most solvents.	280°F 138°C	- 60°F - 51°C
<b>BUNA N(Nitrile)</b> : Good for petroleum-based fluids, water, oils, hydrocarbons and mild chemicals (e.g. mineral spirits)	180°F 82°C	10°F - 12°C
<b>Neoprene</b> : Good chemical resistance, good performance with oils and many chemicals, good temperature resistance, outstanding physical toughness, outstanding resistance to damage caused by flexing and twisting. Resistance to abrasion is approximately 30% higher than Buna.	200°F 93°C	0°F - 18°C

Temperature limits are based upon mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperatures. Consult engineering guides for chemical compatibility and temperature limits. It must be emphasized that none of these figures are absolute and are only general guidelines.

**Note: These are average temperatures. Chemicals and solvents can have an effect on temperature limits.**

# Performance Introduction

ASTRO air operated diaphragm pump can not only pump fluid liquids and powders, but also some other mediums which usually are hard to flow. It takes advantages over some transportation machines, such as self-priming pump, submerged pump, shielding pump, slurry pump, and impurity pump.

1. Need no pilot water, suction lift up to 7m, pump head up to 80m, outlet pressure $\geq 0.8\text{Mpa}$ .
2. Spacious flow wat with good through-pass performance, the largest size of particles allowed can be up to 9.4mm. While pumping slurry and impurity, the abrasion is lower.
3. The pump head and capacity can be adjusted via the pressure of air source (between 0.1~0.84Mpa).
4. Temperature ranged by working environment:5~65°C
5. The pump has no rotating parts and shaft seals. The diaphragms separate the pumped medium from moving part and working medium completely, so that the pumped medium does not leak to outside. ~~So~~ Therefore there are no risks of environment pollution and personal injury while pumping poisonous, volatile or corrosive media.
6. It can work without electricity and be safe and reliable in inflammable and explosive conditions.
7. Can be submerged into the medium.
8. Easy to use and works reliably. When turning on/off the pump, just open and close the air valve. Even in cases of unexpected, long-term operation without medium or shut down, it will not be damaged. Once overloaded, it has self-protecting function and will shutdown automatically. As long as the load goes back to normal, it starts up automatically again.
9. Simple structure, less vulnerable parts. The pump has a simple design which makes it easier to install and maintain. The pumped medium does not come in contact with moving parts such as air-distributing valve and link rod, so the performance will not get worse with the abrasion of rotors, pistons, gears and vanes as with other types of pumps.
10. Can pump the viscous liquids (viscosity below 10000cm).
11. No need of lubrication. There are no effects to the pump in dry operation mode. This is a key feature of the pump.

# Symbols

## Warning Symbol



This symbol alerts you to the possibility of serious injury or death if you **DO NOT** follow the instructions.

## Caution Symbol



This symbol alerts you to the possibility of damage to equipment if you **DO NOT** follow the instructions.

## WARNING



### INSTRUCTIONS

#### EQUIPMENT MISUSE HAZARD

Any misuse of the equipment can cause them to rupture and failure, and result in serious injury.

- This equipment is for professional use only.
- Read and understand all instruction manuals, warning labels, and tags before you operate the equipment.
- This equipment can be used for specified purpose. Please contact with the distributor of ASTRO Company if you are not sure about it.
- Never alter or modify any part of this equipment. Use only genuine ASTRO parts and accessories.
- Check the equipment daily and repair or replace worn or damaged parts immediately.
- Do not exceed the maximum working pressure of 0.8Mpa when the maximum incoming air pressure is 0.8Mpa.
- Be sure that all fluids and solvents used are chemically compatible with the wetted parts.
- Always read the content about technical data in equipment instructions, and acquaint yourself with the warning of the manufacturer about relevant fluid or solvent.
- Never use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents in aluminum pressure equipments. Such use could result in a serious chemical reaction, with the possibility of explosion.
- Never use a hose to pull the equipment.
- The hose should be secured away from traffic areas, sharp edges and hot surface.
- Never move or lift a pump under pressure.
- Observe all relevant national regulations about fire, electrical and safety.

## ⚠ WARNING



### TOXIC FLUIDS HAZARDS

Improper handling of hazardous fluids or inhaling toxic vapors can cause extremely serious injury or death from to splashing in the eyes, ingestion, or bodily contamination.

- Know what fluid you are pumping and its specific hazards.
- Store hazardous fluid in an appropriate, approved container. Dispose of it according to national guidelines.
- Always wear appropriate clothing and equipment, such as eye protection and breathing apparatus recommended by manufacturer of fluids and solvents.
- Pipe and dispose of the exhaust air safely, away from people, animals, and food handling areas. If the diaphragm fails, the fluid is exhausted along with the air. See Air Exhaust Ventilation on page 11.



### FIRE AND EXPLOSION HAZARDS

If the equipment is not properly grounded and ventilated, sparking may occur and cause a fire or explosion and serious injury.

- Ground all equipment. Refer to Grounding on page 9.
- If you experience any static sparking or even a slight shock while using this equipment, stop pumping immediately. Do not use the system again until the problem has been identified and corrected.
- Provide ventilation of the fresh air. Avoid accumulating flammable gases in solvents and fluids to be pumped.
- Pipe and dispose of the exhaust air safely, away from all sources of ignition. If the diaphragm fails, the fluid is exhausted along with the air. See Air Exhaust Ventilation on page 11.
- Keep the working place clean and without any waste, including solvents, clouts and gasoline.
- Disconnect all equipments in working place from electrical connection.
- Extinguish all flames and indicating lamps in working place.
- Do not smoke in the work area.
- Do not switch on an off any lamp switches during operation or if there exists flammable gases.
- Never use gasoline engine in working place.

# Installation

## General Information

The typical installation information shown in Fig.2 is only used to guide you to select and install system components. If you want to plan a system to suit your need, please contact ASTRO distributor. Hold the outlet manifold to lift the pump safely.

## Tighten Fasteners before Setup




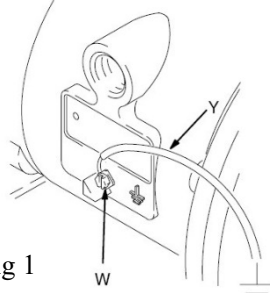
Before using the pump for the first time, check and re-torque all external fasteners. After unpacking the diaphragm pump, please check and re-torque all fasteners on the surface. Adjust the torque of screws of left and right fluid covers first, and then the top/bottom Liquid Chambers.





In this way, pump is guaranteed not affected by the fastened Liquid Chambers.

## Mounting

1. Be sure the mounting surface can support the weight of the pump, hoses, and accessories as well as the stress caused during operation.
2. For all mountings, be sure the pump is bolted directly to the mounting surface.
3. For ease of operation and service, mount the pump so air valve, air inlet, fluid inlet and fluid outlet ports are easily accessible
4. Rubber Foot Mounting Kit is available to reduce noise and vibration during operation.

## Grounding

  	<b>⚠ WARNING</b>
	<b>FIRE AND EXPLOSIVE HAZARD</b>
	<p>The equipment must be grounded to reduce the risk of static sparking. Static sparking can cause fumes to ignite or explode. Grounding provides an escape wire for the electric current.</p> <p><b>Air and fluid hoses:</b> Use only grounded hoses with a maximum of 500 ft (150 m) combined hose length to ensure grounding continuity.</p> <div data-bbox="1050 1467 1347 1758"><p>Fig 1</p></div>

   	 <b>WARNING</b>
	<b>Polypropylene and PVDF</b>
	<p>Only Aluminum, Conductive Polypropylene, Hastelloy, and Stainless Steel Pumps have a ground screw. Standard Polypropylene and PVDF Pumps are <b>not</b> conductive. <b>Never</b> use a Non-conductive Polypropylene or PVDF pump with non-conductive flammable fluids. Follow your local fire codes. When pumping conductive flammable fluids, <b>always</b> ground the entire fluid system as described.</p>

## Installation

### Fluid Inlet and Outlet Ports

**NOTE:** Remove and reverse the manifold(s) to change the orientation of inlet or outlet port(s).

If the fluid inlet and outlet manifolds each have multiple threaded ports, close off the unused ports, using the supplied plugs.

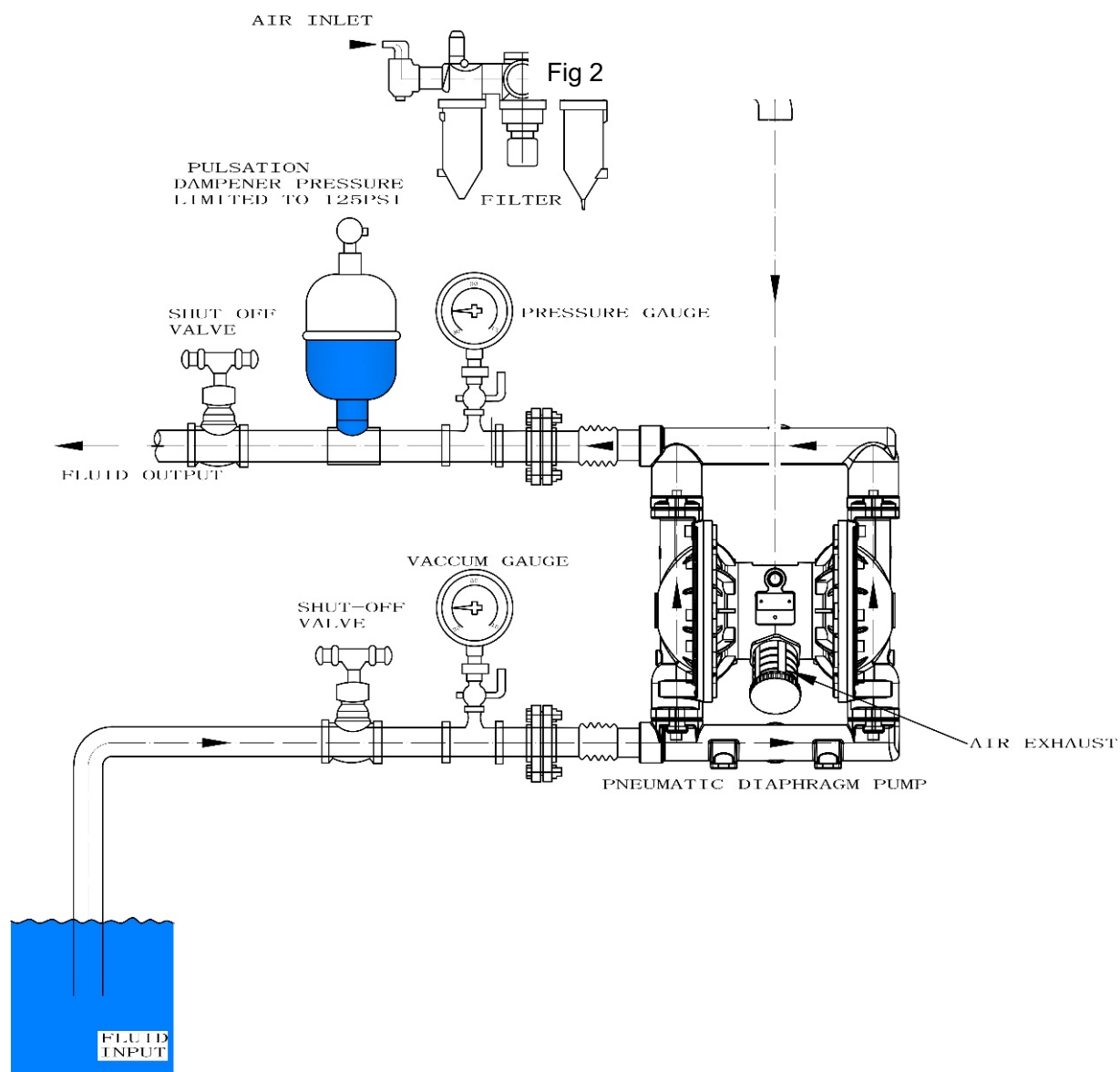
**Ground all of this Equipment:**

**Diaphragm Pump:** Connect a ground wire and clamp as shown in Fig.1. Loosen the grounding lug locknut (W). Insert one end of a 1.5mm<sup>2</sup> minimum ground wire(Y) into the slot in the locknut, and tighten the locknut securely. Connect the clamp end of the ground wire to a true earth ground.

**Air compressor:** Follow the manufacture's recommendations.

**Air and fluid hoses:** Use only conductive hoses.

**All solvent pails used when flushing:** Follow the local code. Use only metal pails, which are conductive. Do not place the pail on a non-conductive surface, such as paper or cardboard, which interrupts grounding continuity. **Fluid supply container:** Follow the local code.



# Operation

## Pressure Relief Procedure

### **WARNING**

#### PRESSURE EQUIPMENT HAZARDS

Before manual pressure relief, the equipment is in pressure state. In order to reduce the risk of extremely serious injury from pressure fluids, spray gun or splashing fluid, during the following operation, specified procedures should be observed:

- Request to relief pressure.
- Stop pumping.
- Check, clean and repair any system equipment.
- Install and clean the fluid spray gun.

1. Shut off the air to the pump.
2. Open the dispensing valves if exist.
3. Open any available out-bound fluid valves to relive fluid pressure from the pump, and prepare the container for discharged fluid.

#### KEY

**R. 1" Fluid Inlet Port**

**S. 1" Fluid Outlet Port**

**V. Pressure Relief Valve**

**Part No.110134 (Aluminum)**

**Part No.112119 (Stainless Steel)**

**Connect Fluid Outlet Line here,**

- ① Install valve between Fluid Inlet and Outlet Ports.
- ② Connect Fluid Inlet Line here.
- ③ Connect Fluid Outlet Line here.

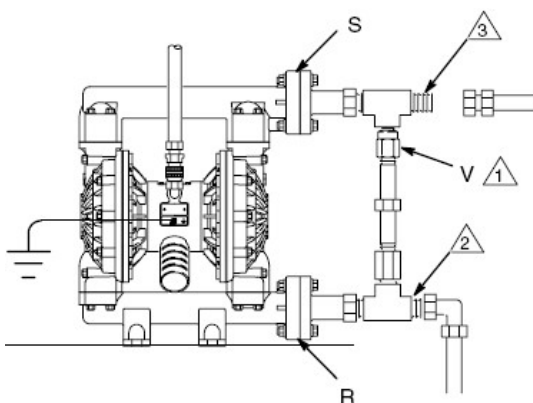
## Starting and Adjusting Pump



### **WARNING**

#### TOXIC FLUIDS HAZARDS

To reduce the risk of serious injury, splashing in the eyes or on the skin, and toxic fluid spills, never move or lift a pump under pressure. If the pump is dropped, the fluid section could rupture. Always follow the Pressure Relief Procedures above before you move or lift the pump.



Be sure the pump is properly grounded. Refer to the instructions in Grounding section on page 9.

1. Check all fittings and make sure they are tight. Be sure to use compatible liquid thread sealant on all male threads.

Make sure the fittings at inlet and outlet are reliably secured.

2. Place the suction tube (if used) in the fluid to be pumped.



**NOTE:** If the inlet pressure to the pump is more than 25 percent of the outlet working pressure, the ball check valves will not close fast enough, resulting in inefficient pump operation.

3. Place the end of the outlet hose (L) into an appropriate container.
4. Close the fluid drain valve. Refer to Fig.2.
5. With the air regulator closed, open all bleed-type master air valves.
6. If the outlet hose has a dispensing device, hold it open while continuing with step 8.
7. Slowly open the air regulator until the pump starts to cycle. Allow the pump to cycle slowly until all air is pushed out of the lines and the pump is primed.
8. If you are flushing, run the pump long enough to thoroughly clean the pump and hoses, close the air regulator, and remove the suction hose from the solvent and place it in the fluid to be pumped.

# Maintenance

## Lubrication


The air valve is designed to operate un-lubricated. If lubrication, every 500 operation hours (or monthly), just add several drops of machine oil to container below in air regulator (C).

 <b>CAUTION</b>	 <b>WARNING</b>
Do not over-lubricate the pump. Excess oil is exhausted through the muffler, which could contaminate your fluid supply or other equipment. Over-lubrication may also result in operation failure	To reduce the risk of serious injury whenever you are instructed to relieving pressure procedure, and always follow the Pressure Relief Procedure on page 12.

## Flushing and Storage

Flush the pump often enough to prevent the fluid you are pumping from drying or freezing in the pump and damaging it. The fluid for flushing should be compatible with the pumped fluid, and doesn't affect the wetted parts. For recommendation on flushing fluids and periods, please contact with the provider and manufacturer. Always flush the pump and relieve before storing it for any length of time.

# Troubleshooting

 <b>WARNING</b>
To reduce the risk of serious injury whenever you are instructed to relieve pressure, always follow the Pressure Relief Procedure page 12.

- Be sure to relieve pressure before checking and repairing
- Check all possible problems and causes before you disassemble the pump

Problem	Cause	Solution
Pump cycles at stall or fails to hold pressure.	Check valve balls (01), seats (02) or o-rings (03).	Replace.
Pump does not cycle, or cycle once and stops	Air valve is stuck or dirty.	Disassemble and clean air valve filtered air.
	Valve ball (01) severely worn, and wedged in seat (02) or manifold (1 or 3)	Replace ball and seat.
	Valve ball (01) is wedged into seat (02) due to overpressure.	Install a pressure relief valve
	Dispensing valve is clogged.	Relieve pressure and clear valve.
Pump operates erratically	Suction line is clogged.	Inspect and clear.
	Sticky or leaking check valve balls (01).	Clean or replace.
	Diaphragm is ruptured.	Replace.
	Restricted exhaust.	Remove restriction.

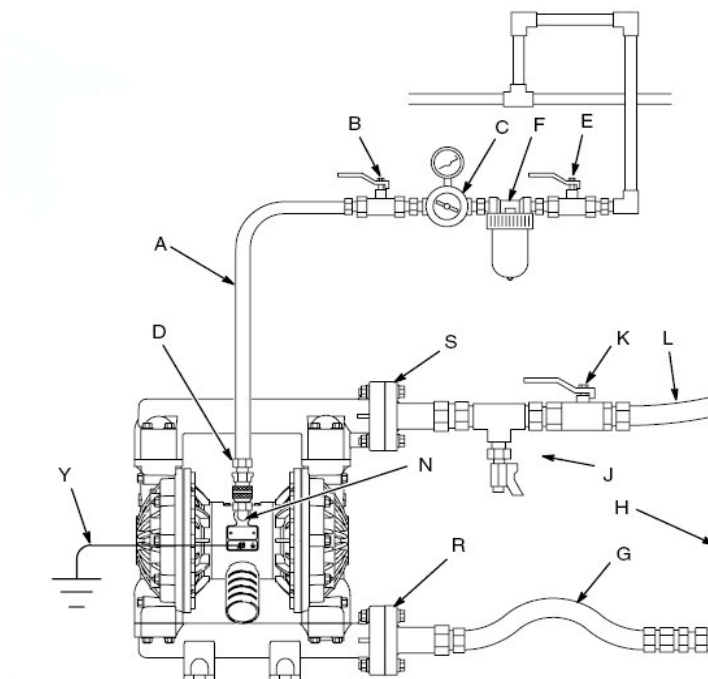
# Troubleshooting

Problem	Cause	Solution
Air bubbles in fluid	Suction line is clogged.	Tighten.
	Diaphragm is ruptured.	Replace.
	Loose inlet manifold (3), damaged seal between manifold and seat (02), or damaged O-ring (3).	Tighten manifold bolts, or replace seats (02) or O-ring (03).
	Loose diaphragm shaft bolt.	Tighten or replace.
	Damaged O-ring.	Replace.
Fluid in exhaust air.	Diaphragm is ruptured.	Replace.
	Loose diaphragm shaft bolt	Tighten or replace.
	Damaged o-ring.	Replace.
Pump discharge excess air during standstill	Worn air valves, O-ring, valve plate, position block, U-seals, or position pin O-ring.	Replace.
	Worn shaft seals.	Replace.
Pump leaks air externally.	Air valve cover (6) or screws are loose.	Tighten manifold bolts
	Air valve gasket or air cover gasket is damaged.	Inspect; replace.
	Air cover screws are loose.	Tighten manifold bolts
Pump leaks fluid Externally from ball Check valves.	Loose manifolds (1 or 3), damaged seals between manifold and seat (02). Damaged O-ring (03)	Tighten manifold bolts, or replace seat (02) or O-rings (03).

## FLOOR MOUNT TYPICAL INSTALLATION

### KEY

- A.** Air supply hose
- B.** Bleed-type master air valve (required for pump)
- C.** Air regulator
- D.** Air-line quick disconnect
- E.** Master air valve (for accessory)
- F.** Air-line filter
- G.** Fluid suction line
- H.** Fluid supply
- J.** Fluid drain valve (required)
- K.** Fluid line
- N.** 1/2npt (f) air inlet port
- S.** 1" fluid outlet port
- Y.** Ground wire (required; see page 9) for installation instructions)



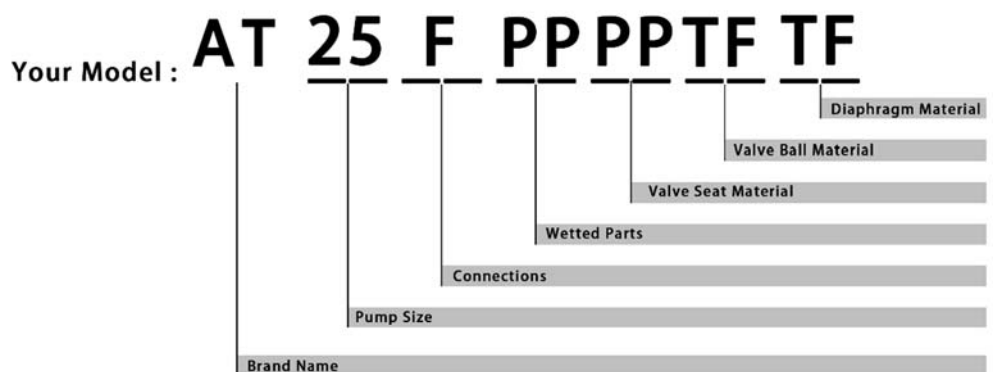
# Table for Selecting Models of ASTRO Pump

## ASTRO Pump Key Features:

- Higher flow rate, less maintenance.
- Quick-acting air valve.
- Free of air lubrication.
- Zero leak, simple operation.
- Can run dry without damage, dry self-priming.
- No mechanical seat, easy to maintain.
- Interchangeable modular design allows fewer spare parts inventories.

## ASTRO Pump Model Selection Chart

The pump model has been marked up in the nameplates. The table below shows the 7 digital letters and numbers:



Brand Name	Pump Size	Connections	Wetted Parts
<b>AT</b> ASTRO	<b>06</b> 1/4"	<b>B</b> BSP	<b>AC</b> Acetal
	<b>15</b> 1/2"	<b>N</b> NPT	<b>PP</b> Polypropylene
	<b>20</b> 3/4"	<b>F</b> FLANGE	<b>KY</b> Kynar (PVDF)
	<b>25</b> 1"		<b>SS</b> Stainless Steel 304
	<b>40</b> 1-1/2"		<b>LL</b> Stainless Steel 316
	<b>50</b> 2"		<b>CI</b> Cast Iron
	<b>80</b> 3"		<b>AL</b> Aluminum

Valve Seat Material	Valve Ball Material	Diaphragm Material
<b>AC</b> Acetal	<b>AC</b> Acetal	<b>HY</b> Hytrel(TPE)
<b>PP</b> Polypropylene	<b>PP</b> Polypropylene	<b>SP</b> Santoprene
<b>AL</b> Aluminum	<b>AL</b> Aluminum	<b>KY</b> Kynar(PVDF)
<b>SS</b> Stainless Steel 304	<b>SS</b> Stainless Steel 304	<b>TF</b> Teflon(PTFE)
<b>LL</b> Stainless Steel 316	<b>LL</b> Stainless Steel 316	<b>BN</b> Buna N(Nitile)
<b>HY</b> Hytrel(TPE)	<b>HY</b> Hytrel(TPE)	<b>VT</b> Viton(FKM)
<b>SP</b> Santoprene	<b>SP</b> Santoprene	<b>GE</b> Geolast
<b>KY</b> Kynar(PVDF)	<b>TF</b> Teflon(PTFE)	<b>CR</b> Neoprene
<b>TF</b> Teflon(PTFE)	<b>BN</b> Buna N(Nitile)	<b>EP</b> EPDM
<b>BN</b> Buna N(Nitile)	<b>VT</b> Viton(FKM)	
<b>VT</b> Viton(FKM)	<b>GE</b> Geolast	
<b>GE</b> Geolast	<b>CE</b> Ceramic	

# Parts Drawing /List of AT06 Pump

## AT06 PUMP PARTS

### AT06 Parts List

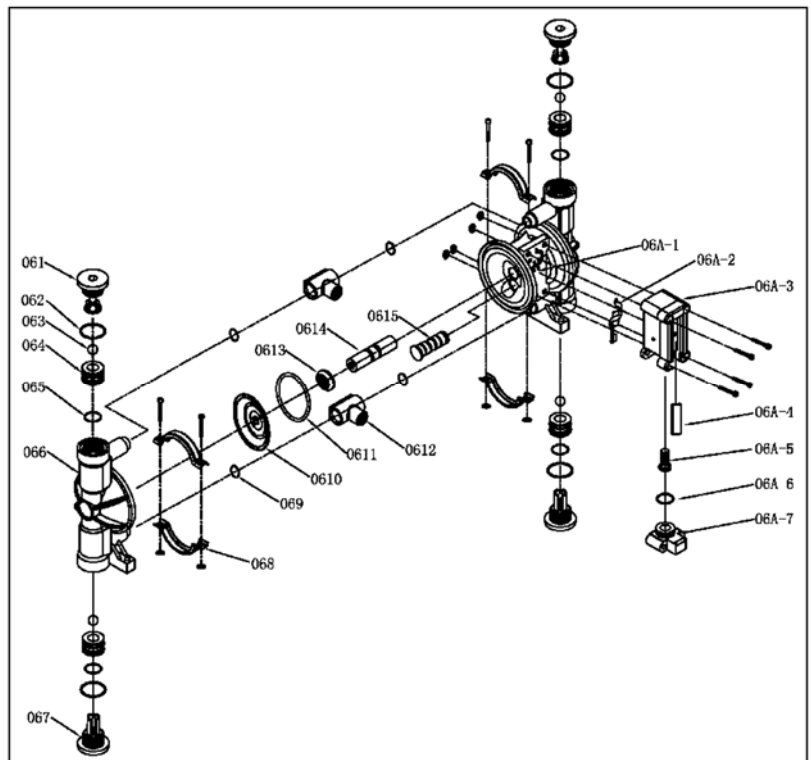
#### Fluid Section

Part No.	Parts Name	Qty.
061	Top Mounting cap	2
062	Cap O ring	4
063	Valve ball	4
064	Valve seat	4
065	Seat O ring	4
066	Liquid Chamber	2
067	Bottom Mounting cap	2
068	Clamp	4
069	Tee joint O ring	4
0610	Diaphragm(Teflon)	2
0611	Center block O ring	2
0612	Tee joint	2
0613	Inner plate	2
0614	Central shaft	1
0615	Pilot block	1

#### Air Motor

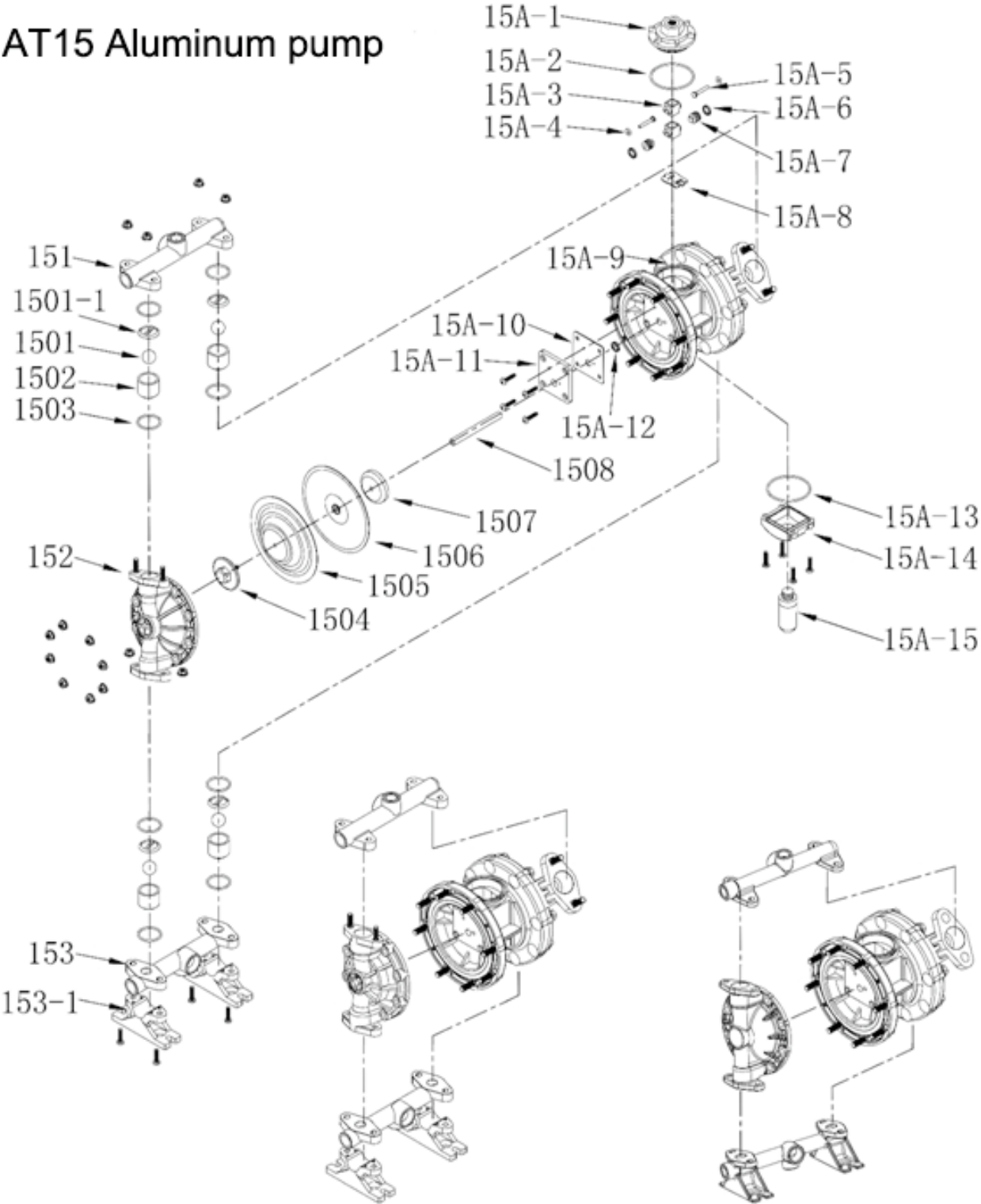
Part No.	Parts Name	Qty.
06A-1	Center block	1
06A-2	Valve Gasket	1
06A-3	Air distribution valve	1
06A-4	Muffler	1
06A-5	Piston	1
06A-6	Cover O ring	1
06A-7	Valve Cover	1

### Parts Drawing of AT06 Pump



# Parts Drawing of AT15/20 Pump

AT15 Aluminum pump



AT15 PP pump

AT15 SS pump

## AT15/20 Pump Parts List

### Fluid Section

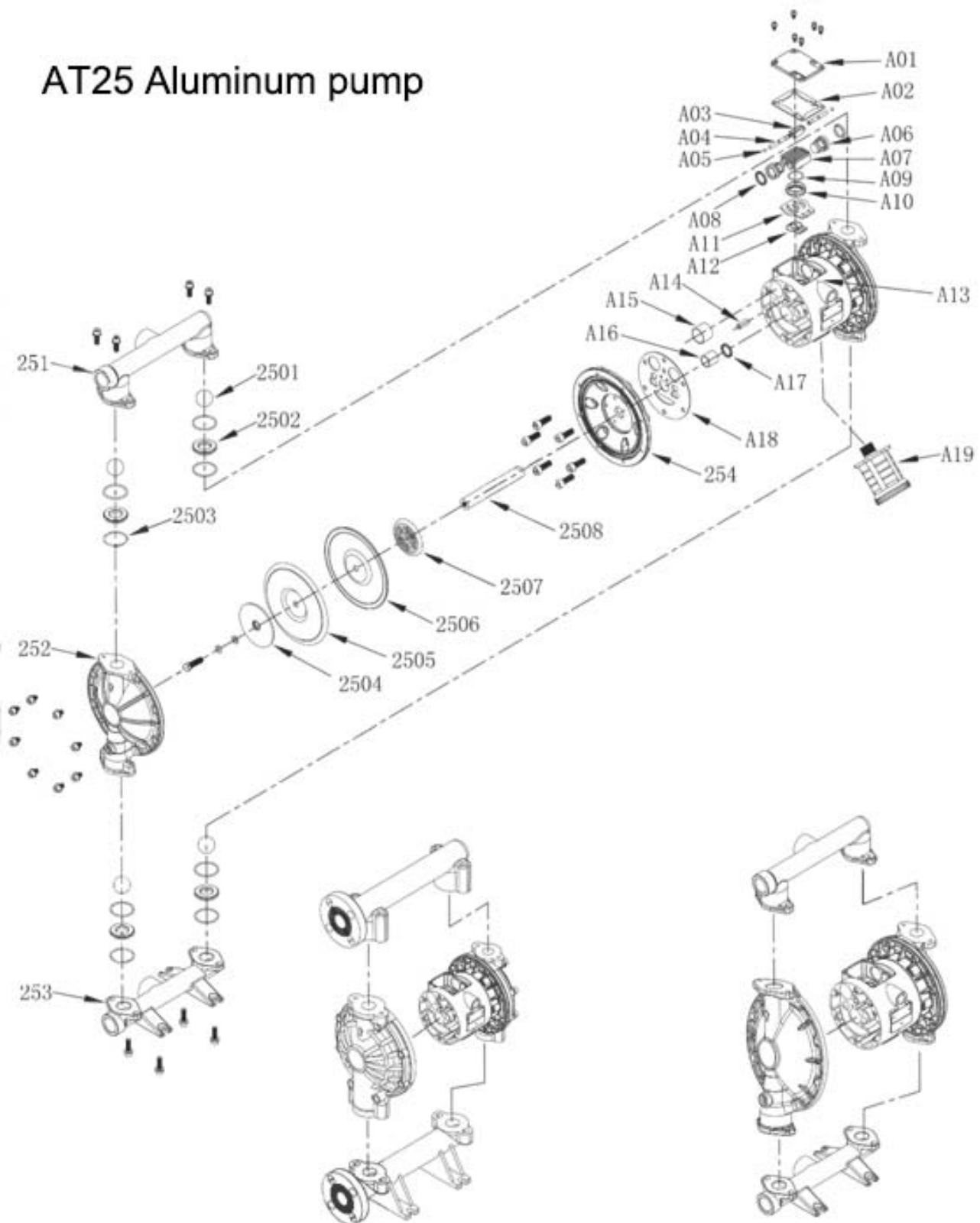
Part NO.	Parts Name	Qty.
151	Outlet manifold	1
152	Liquid Chamber	2
153	Inlet manifold	1
153-1	Footing	2
1501	Valve ball	4
1501-1	Ball Stopper	4
1502	Valve seat	4
1503	Seat O-ring	8
1504	Outer Plate	2
1505	Diaphragm (Teflon)	2
1506	diaphragm (rubber)	2
1507	Inner Plate	2
1508	Central shaft	1

### Air Motor

Part NO.	Parts Name	Qty.
15A-1	Valve Chamber Cover	1
15A-2	Cover O-ring (VT)	1
15A-3	Commutation switch (AC)	2
15A-4	Pin O-ring	2
15A-5	Commutation pin (AC)	2
15A-6	Piston O-ring (VT)	2
15A-7	Piston (AL)	2
15A-8	Air valve plate (SS)	1
15A-9	Center block (PP)	1
15A-10	platen gasket (BN)	2
15A-11	Air valve platen	2
15A-12	Central shaft U cup (VT)	2
15A-13	Muffler base O-ring (VT)	1
15A-14	Muffler base (PP)	1
15A-15	Muffler (PE)	1

## Parts Drawing of AT25 Pump

AT25 Aluminum pump



AT25 PP pump

AT25 SS pump

## AT25 Pump Parts List

### Fluid Section

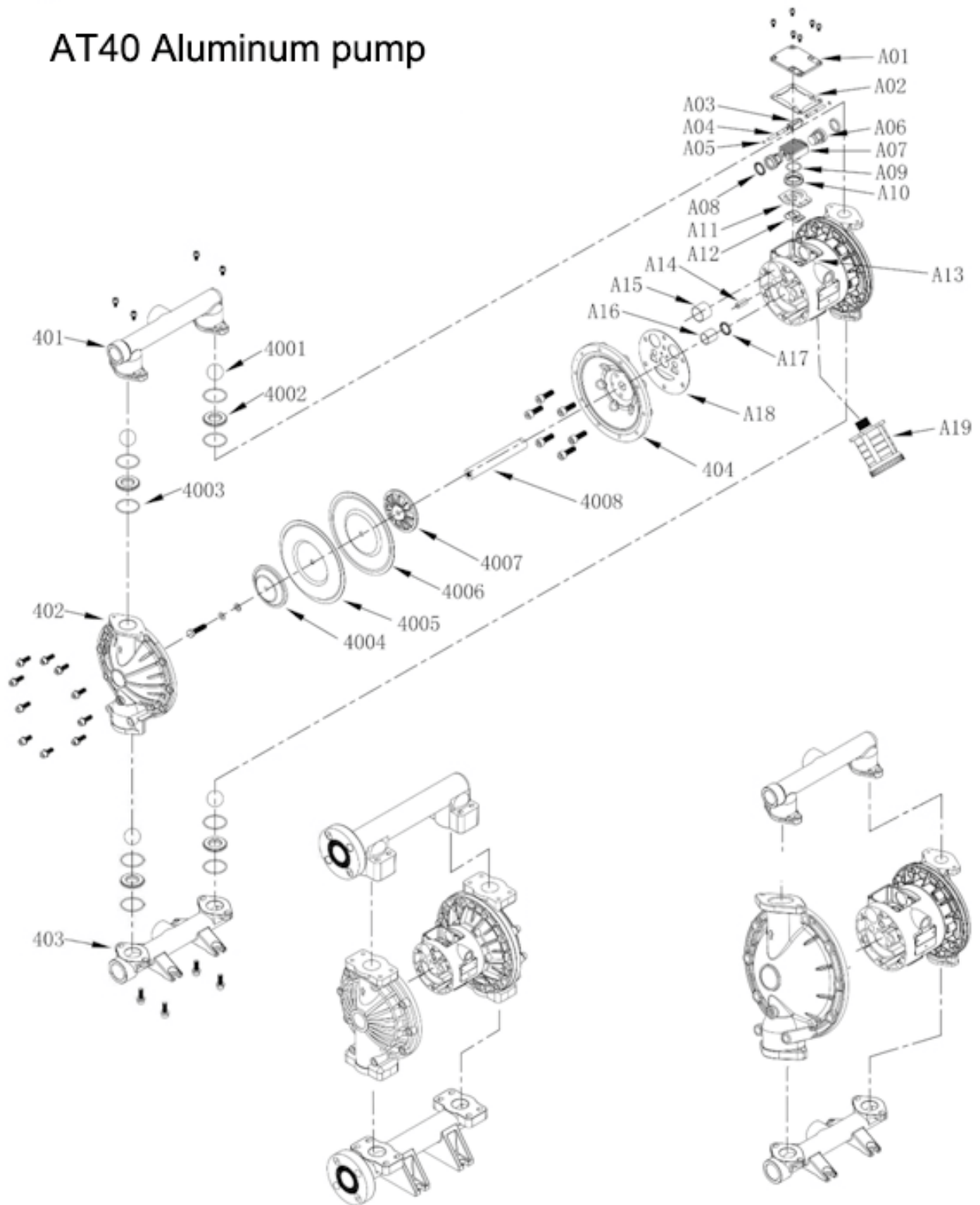
Part NO.	Parts Name	Qty.
251	Outlet manifold	1
252	Liquid Chamber	2
253	Inlet manifold	1
254	Inner splint	2
2501	Valve ball	4
2502	Valve seat	4
2503	Seat O-ring	8
2504	Outer Plate	2
2505	Diaphragm (Teflon)	2
2506	Diaphragm (rubber)	2
2507	Inner plate	2
2508	Central shaft	1
25-P01	Center Shaft Screw	1
P02	Outer Plate O-ring	1

### Air Motor

Part NO.	Parts Name	Qty.
A01	Valve chamber cover (AL)	1
A02	Cover gasket (BN)	1
A03	Commutation switch	1
A04	Commutation pin (SS)	2
A05	Pin O-ring (VT)	2
A06	Piston (PP)	2
A07	Air valve block (AL)	1
A08	Piston U cup (VT)	2
A09	Pilot block O ring	1
A10	Pilot block (PP)	1
A11	Air valve plate (SS)	1
A12	Air valve plate gasket (BN)	1
A13	Center block (AL)	1
A14	Pin bushing (PP)	2
A15	Piston bushing (AC)	2
A16	Shaft bushing (AC)	2
A17	Shaft U cup	2
A18	Center block gasket	2
A19	Muffler (PP)	1

## Parts Drawing of AT40 Pump

AT40 Aluminum pump



AT40 PP pump

AT40 SS pump

## AT40 Pump Parts List

### Fluid Section

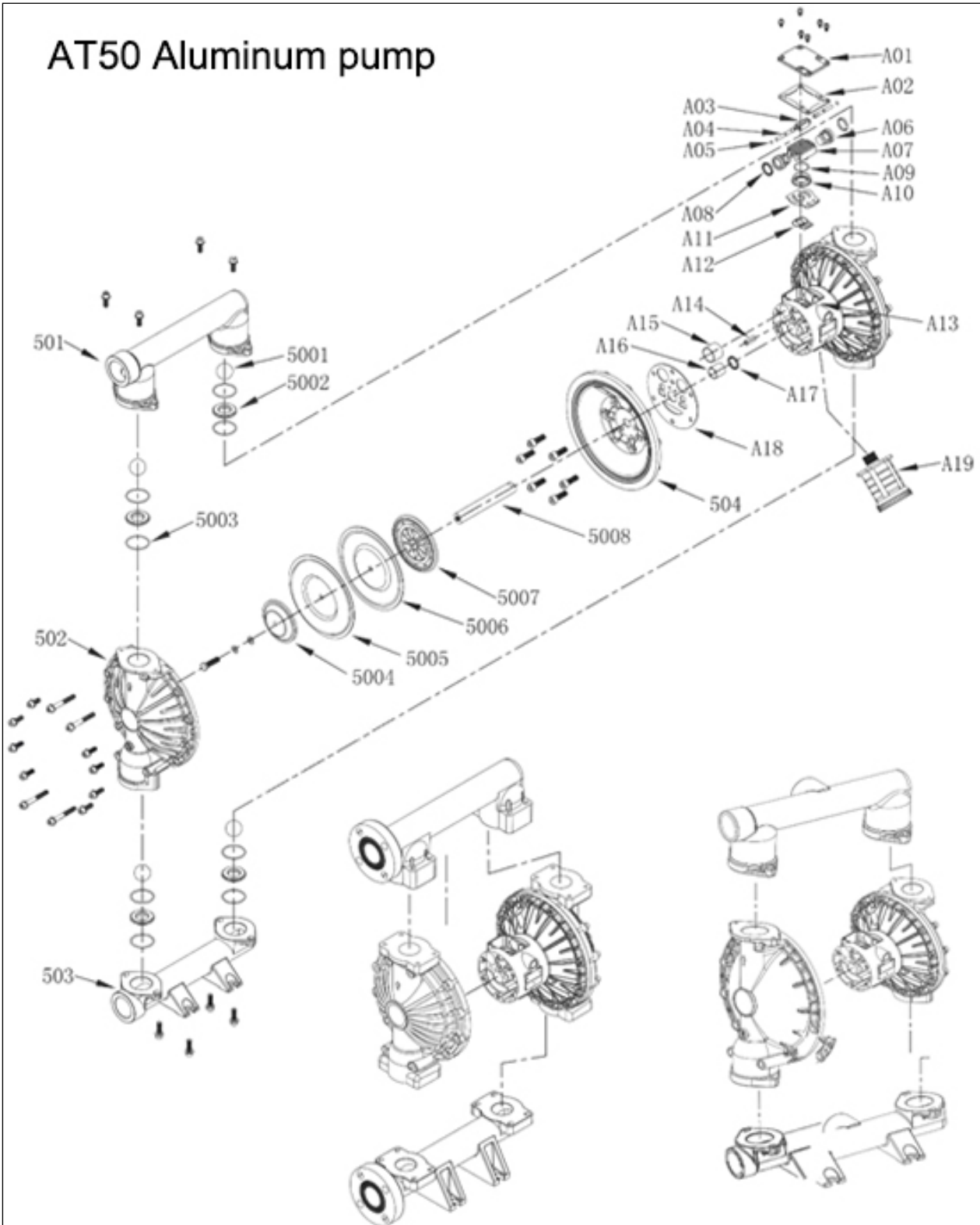
Part NO.	Parts Name	Qty.
401	Outlet manifold	1
402	Liquid Chamber	2
403	Inlet manifold	1
404	Inner splint	2
4001	Valve ball	4
4002	Valve seat	4
4003	Seat O-ring	8
4004	Outer Plate	2
4005	Diaphragm (Teflon)	2
4006	Diaphragm (rubber)	2
4007	Inner plate	2
4008	Central shaft	1
40-P01	Center Shaft Screw	1
P02	Outer Plate O-ring	1

### Air Motor

Part NO.	Parts Name	Qty.
A01	Valve chamber cover (AL)	1
A02	Cover gasket (BN)	1
A03	Commutation switch	1
A04	Commutation pin (SS)	2
A05	Pin O-ring (VT)	2
A06	Piston (PP)	2
A07	Air valve block (AL)	1
A08	Piston U cup (VT)	2
A09	Pilot block O ring	1
A10	Pilot block (PP)	1
A11	Air valve plate (SS)	1
A12	Air valve plate gasket (BN)	1
A13	Center block (AL)	1
A14	Pin bushing (PP)	2
A15	Piston bushing (AC)	2
A16	Shaft bushing (AC)	2
A17	Shaft U cup	2
A18	Center block gasket	2
A19	Muffler (PP)	1

# Parts Drawing of AT50 Pump

AT50 Aluminum pump



AT50 PP pump

AT50 SS pump

## AT50 Pump Parts List

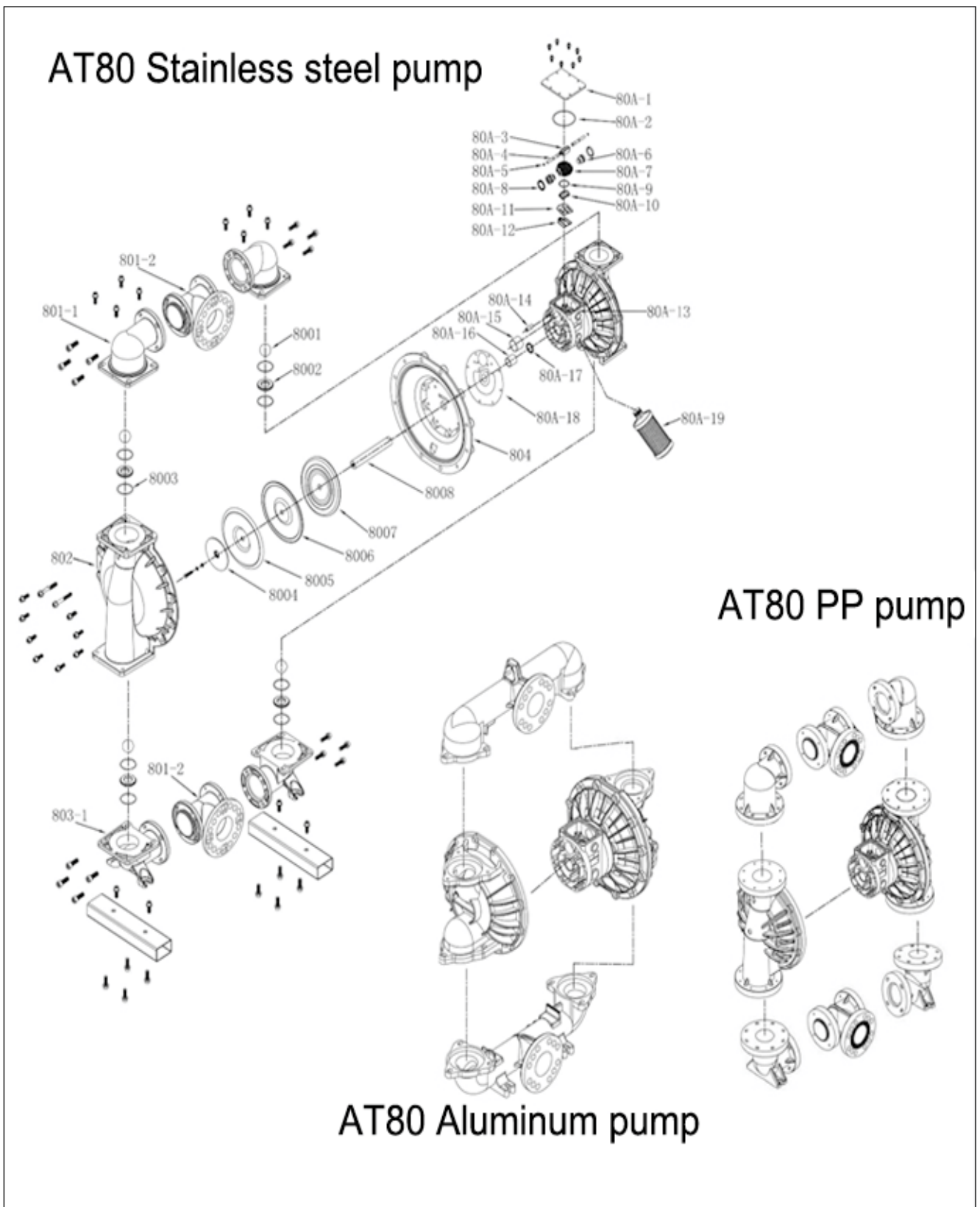
### Fluid Section

Part NO.	Parts Name	Qty.
501	Outlet manifold	1
502	Liquid Chamber	2
503	Inlet manifold	1
504	Inner splint	2
5001	Valve ball	4
5002	Valve seat	4
5003	Seat O-ring	8
5004	Outer Plate	2
5005	Diaphragm (Teflon)	2
5006	Diaphragm (rubber)	2
5007	Inner plate	2
5008	Central shaft	1
50-P01	Center Shaft Screw	1
P02	Outer Plate O-ring	1

### Air Motor

Part NO.	Parts Name	Qty.
A01	Valve chamber cover (AL)	1
A02	Cover gasket (BN)	1
A03	Commutation switch	1
A04	Commutation pin (SS)	2
A05	Pin O-ring (VT)	2
A06	Piston (PP)	2
A07	Air valve block (AL)	1
A08	Piston U cup (VT)	2
A09	Pilot block O ring	1
A10	Pilot block (PP)	1
A11	Air valve plate (SS)	1
A12	Air valve plate gasket (BN)	1
A13	Center block (AL)	1
A14	Pin bushing (PP)	2
A15	Piston bushing (AC)	2
A16	Shaft bushing (AC)	2
A17	Shaft U cup	2
A18	Center block gasket	2
A19	Muffler (PP)	1

## Parts Drawing of AT80 Pump



# AT80 PUMP Parts List

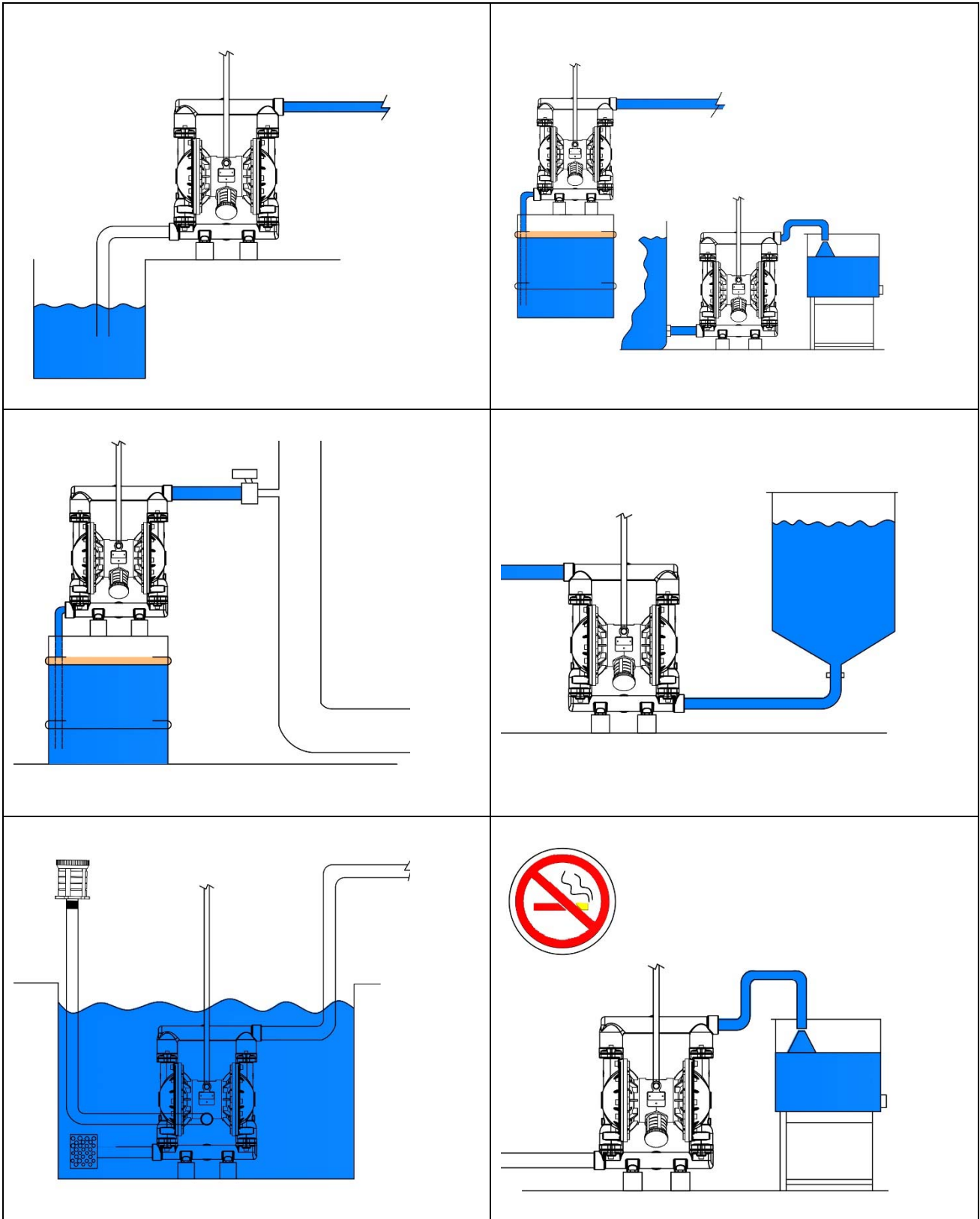
## Fluid Section

Part NO.	Parts Name	Qty.
801	Outlet manifold	1
801-1	Upper elbow	2
801-2	Tee joint	2
802	Liquid Chamber	2
803	Inlet manifold	1
803-1	Bottom elbow	2
804	Inner splint	2
8001	Valve ball	4
8002	Valve seat	4
8003	Seat O-ring	8
8004	Outer Plate	2
8005	Diaphragm (Teflon)	2
8006	Diaphragm (rubber)	2
8007	Inner plate	2
8008	Central shaft	1
80-P01	Center Shaft Screw	1
80-P02	Outer Plate O-ring	1
80-P03	Outer Plate Gasket	1

## Air Motor

z	Parts Name	Qty.
80A-1	Valve chamber cover (AL)	1
80A-2	Cover washer (BN)	1
80A-3	Commutation switch (AC)	1
80A-4	Commutation pin (SS)	2
80A-5	Pin O-ring (VT)	2
80A-6	Piston (PP)	2
80A-7	Air valve block (AL)	1
80A-8	Piston U cup (VT)	2
80A-10	Pilot block (PP)	1
80A-11	Air valve plate (SS)	1
80A-12	Air valve plate gasket (BN)	1
80A-13	Center block (AL)	1
80A-14	Pin bushing (PP)	2
80A-15	Piston bushing (AC)	2
80A-16	Shaft bushing (AC)	2
80A-17	Shaft U cup	2
80A-18	Center block gasket	2
80A-19	Muffler (Metal)	1

## Various installation reference of AT pump



## **ASTRO Standard Diaphragm Pump Warranty**

ASTRO warrants all equipment referenced in this document which is manufactured by ASTRO and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by ASTRO, ASTRO will, for a period of one year from the date of sale, repair or replace any part of the equipment determined by ASTRO to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with ASTRO's written recommendations.

This warranty does not cover, and ASTRO shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-ASTRO component parts. Nor shall ASTRO be liable for malfunction, damage or wear caused by the incompatibility of ASTRO equipment with structures, accessories, equipment or materials not supplied by ASTRO, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by ASTRO.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized ASTRO distributor for verification of the claimed defect. If the claimed defect is verified, ASTRO will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

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