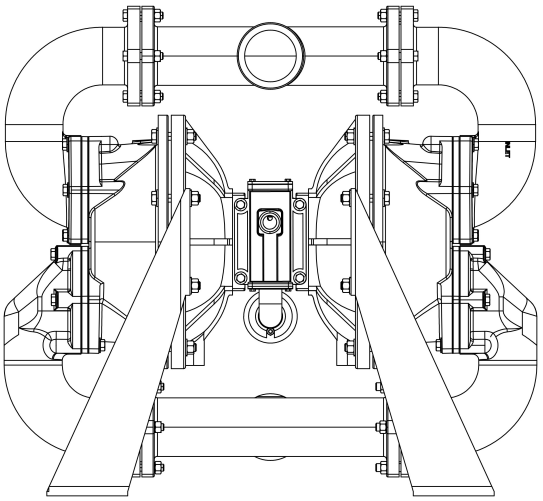
skylink

Specialist in Fluid Transfer

SKY-SK-SE-03-2016



This manual contains warnings and caution.
**READ AND RETAIN FOR REFERENCE**

*INSTRUCTIONS*

# SA80

## Operation and Maintenance Manual

CE

## Diaphragm Pump

## ⚠ IMPORTANT

- Read the safety warnings and instructions in this manual before pump installation and start-up. Failure to comply with the recommendations stated in this manual could damage the pump and void factory warranty.
- When the pump is used for materials that tend to settle out or solidify, the pump should be flushed after each use to prevent damage. In freezing temperatures the pump should be completely drained between uses.

## ⚠ CAUTION注意

- Before pump operation, inspect all fasteners for loosening caused by gasket creep. Retighten loose fasteners to prevent leakage. Follow recommended torques stated in this manual.
- Nonmetallic pumps and plastic components are not UV stabilized. Ultraviolet radiation can damage these parts and negatively affect material properties. Do not expose to UV light for extended periods of time.
- Pump not designed, tested or certifed to be powered by compressed natural gas. Powering the pump with natural gas will void the warranty.

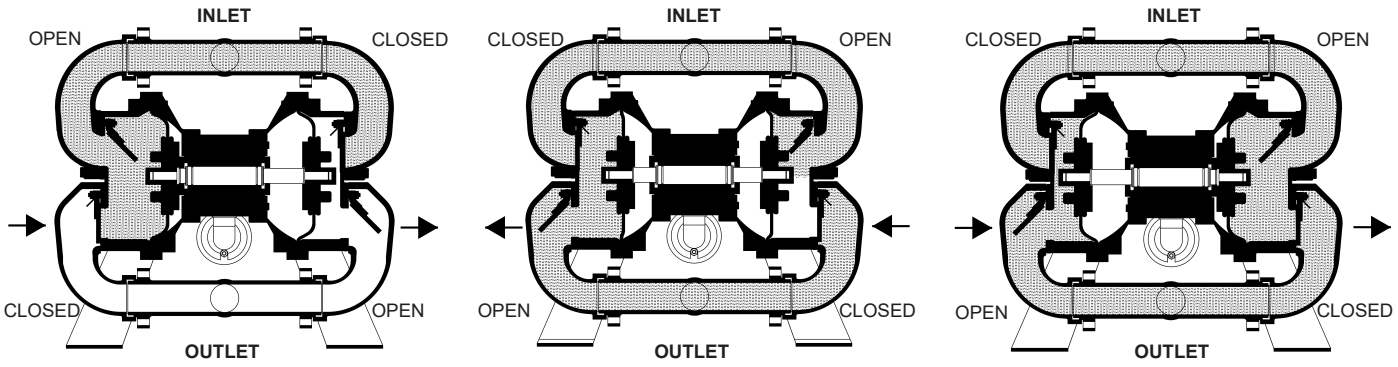
## ⚠ WARNING

- When used for toxic or aggressive fluids, the pump should always be lushed clean prior to disassembly.
- Before maintenance or repair, shut off the compressed air line, bleed the pressure, and disconnect the air line from the pump. Be certain that approved eye protection and protective clothing are worn at all times. Failure to follow these recommendations may result in serious injury or death.
- Airborne particles and loud noise hazards. Wear eye and ear protection.
- In the event of diaphragm rupture, pumped material may enter the air end of the pump, and be discharged into the atmosphere. If pumping a product that is hazardous or toxic, the air exhaust must be piped to an appropriate area for safe containment.
- Take action to prevent static sparking. Fire or explosion can result, especially when handling flammable liquids. The pump, piping, valves, containers and other miscellaneous equipment must be properly grounded.
- This pump is pressurized internally with air pressure during operation. Make certain that all fasteners are in good condition and are reinstalled properly during reassembly.

Torque sheet 1-1

| Description of Part | Torque |
|---|---|
| Air Valve & center Block(Aluminum) | 13.6 N·m(120 in-lb) |
| Air Valve & cap | 5.1 N ·m(45 in-lb) |
| Air Chamber/Center Block | 27.1 N · m(20 ft-lb) |
| Liquid Chamber /Air Chamber, Aluminum Bolted Only | 27.1 N · m(20 ft-lb) |
| Outer Pistons,Rubber & PTTE, Inner Pistons | 22 N · m(16 ft-lb) |
| Center Shaft & Inner Pistons | 109 N · m(16 ft-lb) |
| Bumper Plug & Center Block | 5 N · m(45 in-lb) |

The Skylink diaphragm pump is an air-operated, positive displacement, self-priming pump. These drawings show the low pattern through the pump upon its initial stroke. It is assumed that the pump has no fluid in it prior to its initial stroke.




Skylink AODD pumps adopt compressed air for power source and depend on diaphragms which move left and right to reach the volume sealed working chamber to achieve loading and discharging.

AODD pump is structured by suction port,discharge port, medium chamber and air chamber, air chamber is structured by main air valve, pilot valve, thimble on left diaphragm chamber and right diaphragm chamber,medium chamber is structured by left medium, right medium and check valve. Check valve are set on the top or bottom,left and right medium chambers are connected by suction port and discharge port.

When AODD pump is working,left and right diaphragms are moving by compressed air, and the air valve has lubricating demand, so clear and dry air can improve the performance of AODD pump.

Compressed air comes into air chamber across air inlet port,after the regulation of pilot valve,compressed air come into left diaphragm chamber and drive diaphragm move on the left ,the result is that the volume of left medium chamber decreases,the liquid is extruded.

Because the right diaphragm and the left diaphragm are connected by an axle,the right diaphragm moves to the left side,the right chamber volume increases,the liquid is inhaled. when the right diaphragm plate touches the right thimble, the right thimble can change the direction of compressed air by pilot valve,air come into the right chamber,the left and right diaphragm move to the right side,the left medium chamber volume increases,liquid is in inhaled,the right chamber volume decreases,liquid is excluded. When the left diaphragm plate touches the left thimble,the air comes into left diaphragm chamber through pilot valve. The actions above are repeated complete the fluid continuous transporting on by AODD pump.

## 3.1 Defination of Pump Nomenclature

### SA80 Air Operated Diaphragm pump

| Model | Size | Air Valve | Houseing Material | Intermediate Material | Air Valve Material | Diaphragm Material | Valve Seat Material | Valve FLAP Material | Other |
|---|---|---|---|---|---|---|---|---|---|
| SA80/3AAA/EEXB/0B0 | 50 | 3 | A | A | A | EE | X | B | 0B0 |

**SIZE (DN)**

1/2"=15
1"=25
1.5"=40
2"=50
3"=80

**AIR VALVE**

3= *SPGO

*SPGO=Glyd Ring Style

**HOUSING MATERIAL**

A= acrylic coated aluminium
I = acrylic coated Cast Iron
S= Stainless Steel (304)
X= Stainless Steel(316L)
H= Alloy-C

**INTERMEDIATE MATERIAL**

A= acrylic coated aluminium
T= Teflon coated aluminium
S= Stainless Steel
P= Polypropne

**AIR VALVE MATERIAL**

A= Epoxy coated aluminium
T= Telfon coated aluminium
S= Stainless Steel
N= Nickel coated aluminium

**DIAPHRAGM MATERIAL**

EE= Santoprene
ET= Santoprene/Teflon
NE= Neoprene
NT= Neoprene/Teflon
BN= Buna
VT=Viton
GT=EPDM/Teflon
GE=EPDM

**VALVE SEAT MATERIAL**

X= Stainless Steel (316L)
A=AL

VALVE FLAP MATERIAL

E= Santoprene
N=Neoprene
B= Buna
V= Viton
G=EPDM

**OTHERS**

0B0= BSPT Thread (BSPT)
BSPT
0N0= NPT Thread (NPT)
DF0= DIN Flange(DIN)
AF0= ANSI Flange (ANSI)
JF0= JIS Flange (JIS)

## 3.2 SA80 Technical Data

| Suction/Discharge size | Capcacity | Air Valve | Solids-handing | Heads up to | Weight(kg) | | |
|---|---|---|---|---|---|---|---|
| 3" | 261gallon(US) | No-lub，no-stall | 2" | 125psi | Aluminum | Stainess Steel | Cast Iron |
| DN80 | 988lpm（max） | | 50mm(max) | 8.6bar | 75 KG | 138KG | 145 KG |

## Chemical Properties are as follows:

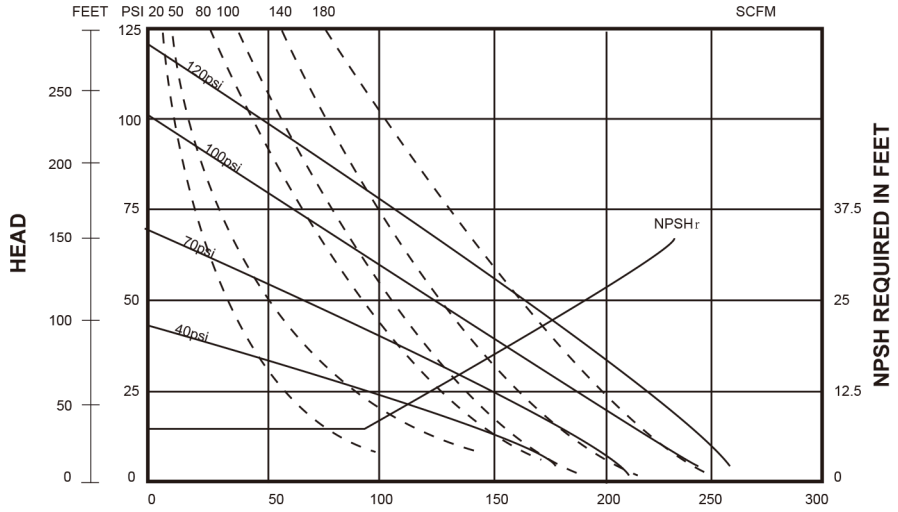
| Materials | Chemical Properties |
|---|---|
| **Virgin PTFE** | Chemically inert,virtually impervious. Very few chemicals are known to chemically react with PTFE; molten alkali metals, turbulent liquid or gaseous fluorine and few fluorochemicals such as chlorine trifluoride or oxygen difluoride with ready liberate free fluorine at elevated temperatures. |
| **Santoprene** | Injection molded thermoplastic elastomer with no fabric layer,Long mechanical flex life. Excellent abrasion resistance. |
| **Neoprene** | All purpose, Resistant to vegetable oil. Generally not affected by moderate chemicals, fats, greases and many oils and solvents. Generally attacked by strong oxidizing acids, ketones, esters, nitro hydrocarbons and chlorinated aromatic hydrocarbons. |
| **Buna** | General purpose, oil-resistant. Shows good solvent, oil, water and hydraulic fluid resistance. Should not be used with highly polar solvents like acetone and MEK, ozone, chlorinated hydrocarbons and nitro hydrocarbons. |
| **Viton** | Shows good resistance to a wide range of oils and solvents; especially all aliphatic, aromatic and halogenated hydrocarbons, acids, animal and vegetable oils. |
| **PVDF** | A durable fluoroplastic with excellent chemical resistance. Excellent for UV applications. High tensile strength and resistance. |
| **Polypropylene** | Thermoplastic polymer. Moderate tensile and flex strength. Resists strong acids and alkalie. Attacked by chlorine,fuming nitric acid and other strong oxidizing agents. |
| **Alloy C** | Equal to ASTM494 CW-12M-1 specification for nickel and nickel alloy. |
| **EPDM** | Shows very good water and chemical resistance. Has poor resistance to oil and solvents, but is fair in ketones and alcohols. |
| **Stainless steel** | Equal to exceeding ASTM specification A743CF-BW forcorrosion resistant iron chromium,iron chromium nickel,and nickel based alloy castings for general applications. Commonly referred to as 316 Stainless Steel in the pump industry. |

For specific applications,you can contact us ventas@skylink.com

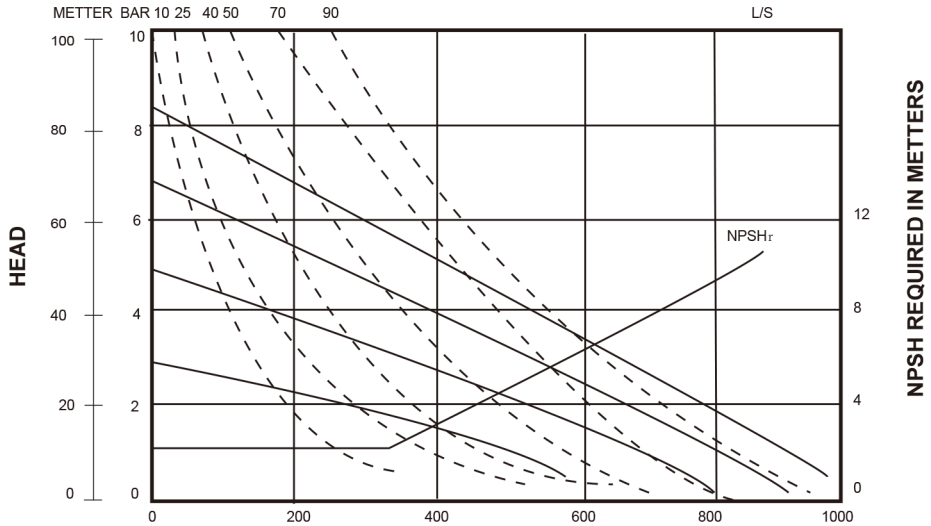
## Operating temperature limitations are as follows:

| Materials | Maximum | Minimum |
|---|---|---|
| **Virgin PTFE** | 220℉<br>104℃ | -35 ℉<br>-37℃ |
| **Santoprene** | 225 ℉<br>107℃ | -10 ℉<br>-23℃ |
| **Neoprene** | 177℉<br>77℃ | -10 ℉<br>-23℃ |
| **Buna** | 190 ℉<br>88℃ | -10 ℉<br>-23℃ |
| **Viton** | 350 ℉<br>177℃ | -40 ℉<br>-40℃ |
| **PVDF** | 250 ℉<br>121℃ | 0 ℉<br>-18℃ |
| **Polypropylene** | 150℉<br>66℃ | 32 ℉<br>0℃ |
| **EPDM** | 280 ℉<br>138℃ | -40 ℉<br>-40℃ |
| **Alloy C** | - | - |
| **Stainless steel** | - | - |

For specific applications,you can contact us ventas@skylink.com



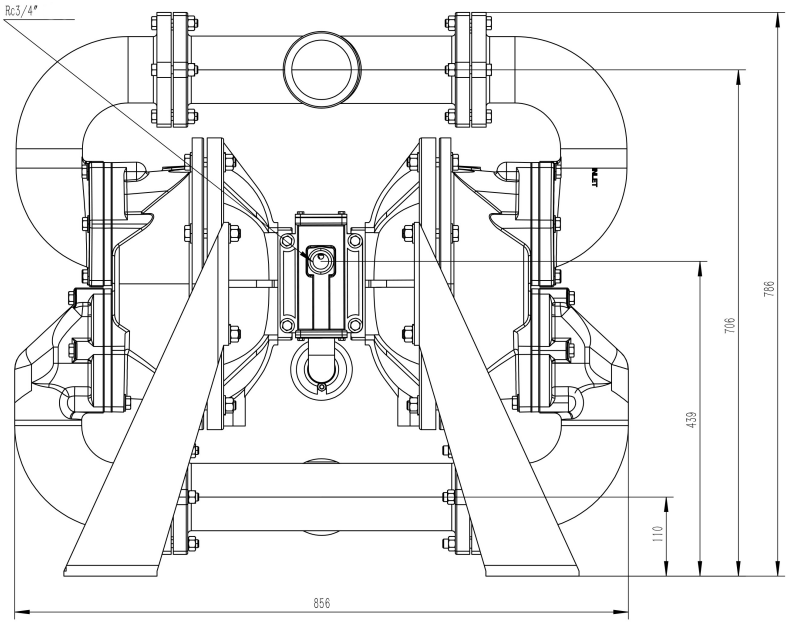

Fluid flow - gpm

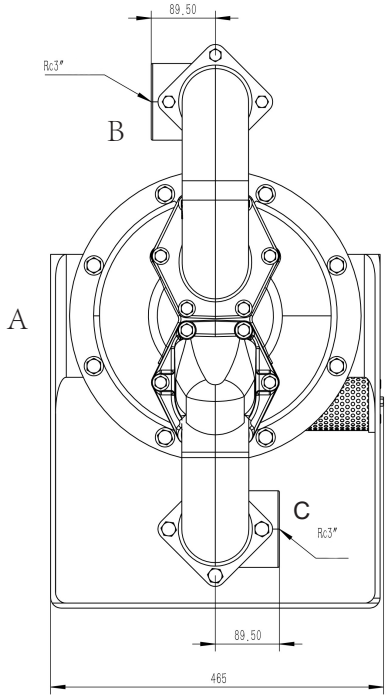


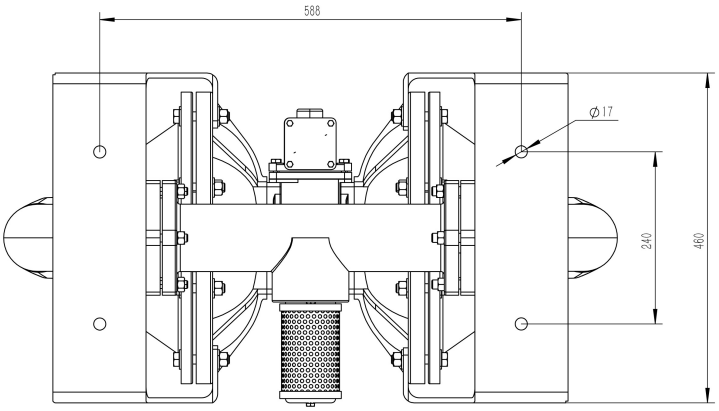

Fluid flow - lpm

*Performance is based on the following: elastomer fitted pump, flooded suction, water at ambient conditions. The use of other materials and varying hydraulic conditions may result in deviations in excess of 5%.

## 3.6 SA80 dimensional drawing (Thread)



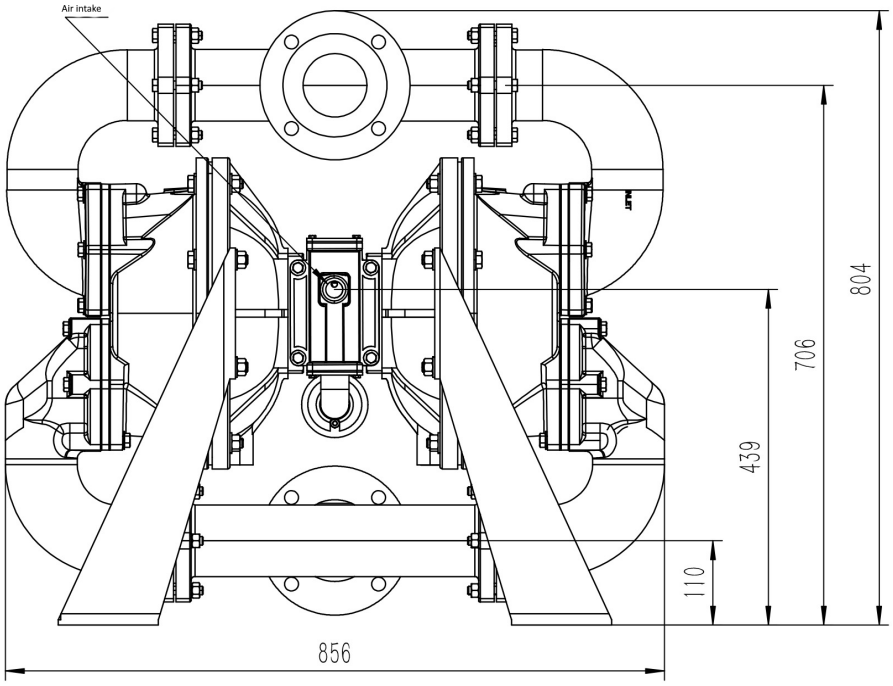



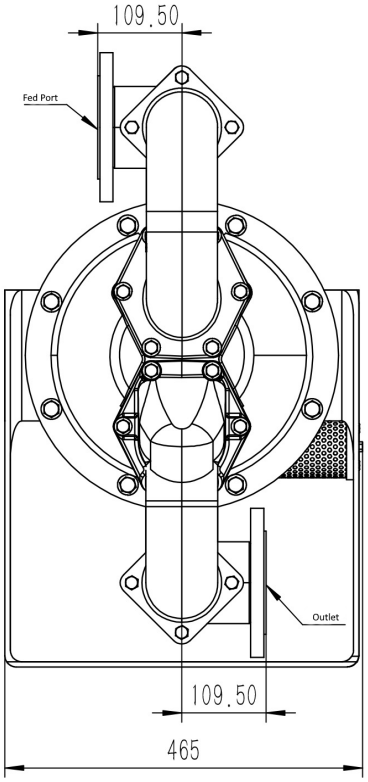



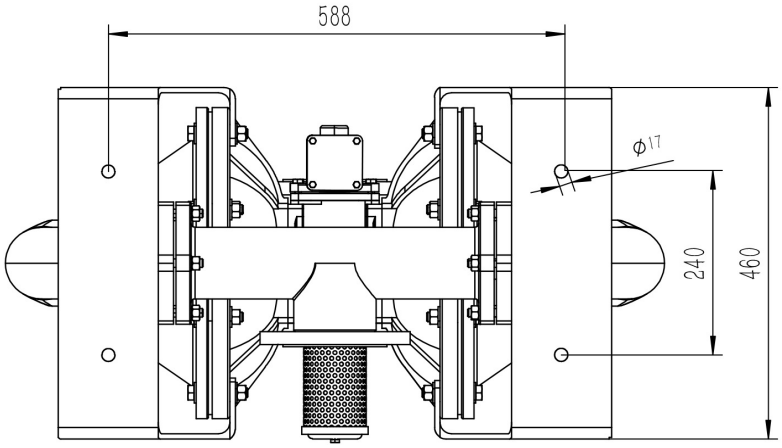

| Thread | B(Air Inlet) | C(Discharge) | A(Suction) |
|---|---|---|---|
| GB | 3/4-14BSPT | 2"-11BSPT | 2"-11BSPT |
| ANSI | 3/4"-14NPT | 2"-11.5NPT | 2"-11.5NPT |
| JIS | 3/4"-14BSPT | 2"-11BSPT | 2"-11BSPT |

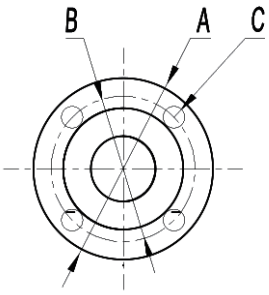
* The dimensions on this drawing are for reference only A certified drawing can be requested if physical are needed.

## 3.7 SA80 Dimensional drawing(flange)



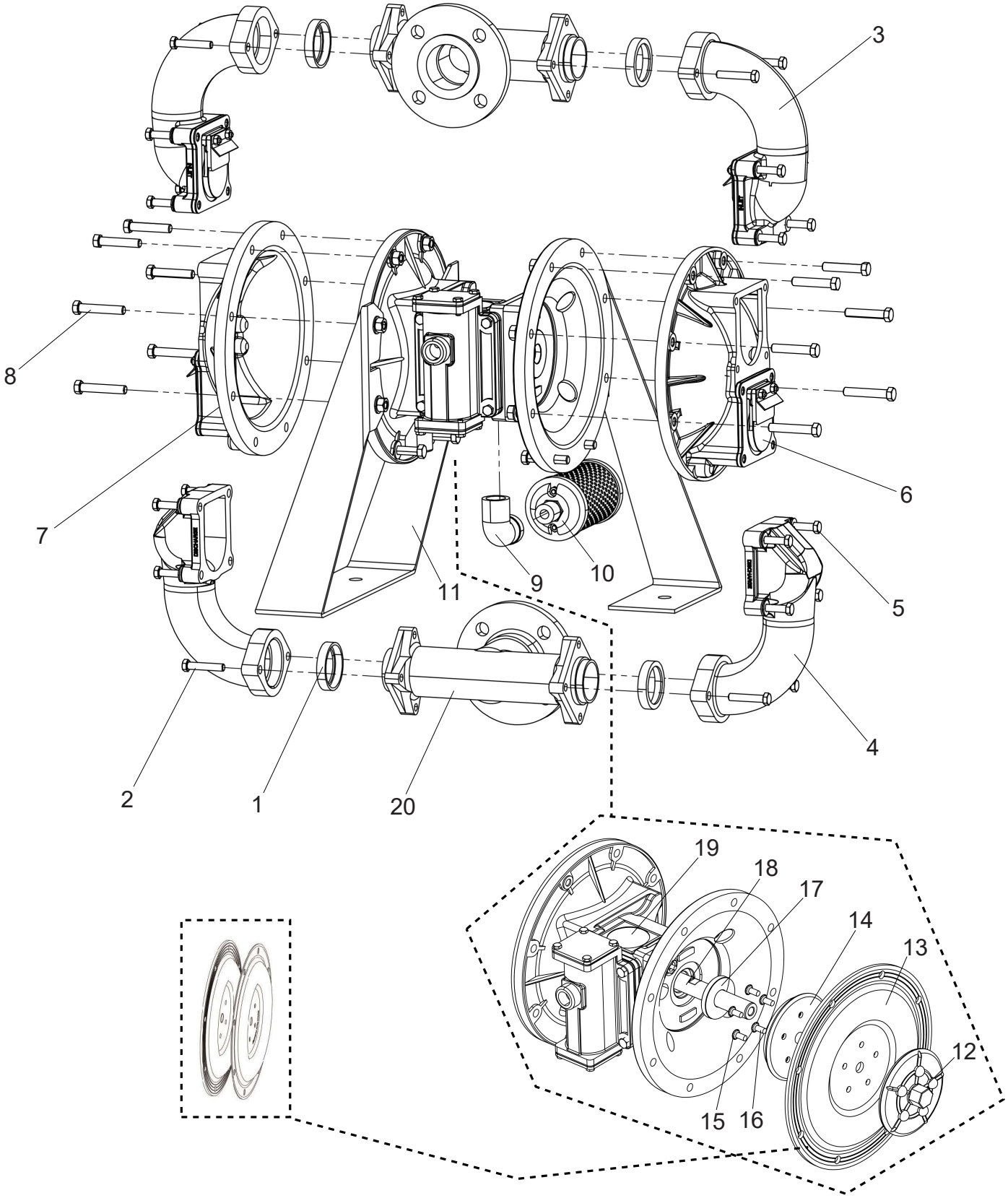




| Flange | A | B | C | Blot type | Air inlet (D) |
|---|---|---|---|---|---|
| GB | 160(6.3) | 125(5.7) | 4-18 | M16 | 3/4"-14BSPT |
| ANSI | 150(5.94) | 120(5.12) | 4-18 | M16 | 3/4"-14NPT |
| JIS | 155(6.1) | 120(4.72) | 4-19 | M16 | 3/4"-14BSPT |

* The dimensions on this drawing are for reference only A certified drawing can be requested if physical are needed.

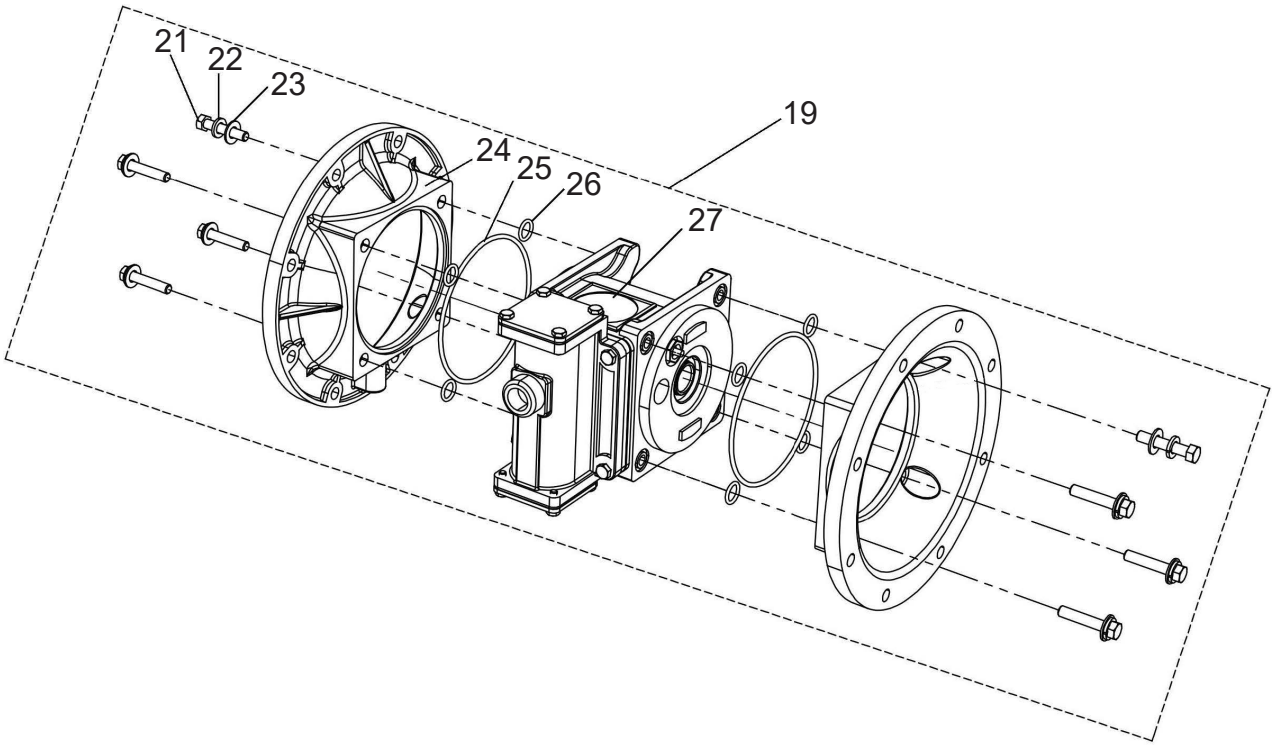
■ **Figure 1 SA80 Diaphragm Pump Exploded View**



## 4.2 Housing Parts List

| Number | Part Number | Description | Quantity |
|---|---|---|---|
| 1 | 7080.7751 | Seal ring (Buna) SA80 | 4 |
| | 7080.7754 | Seal ring (Teflon) SA80 | |
| | 7080.7753 | Seal ring (Vition) SA80 | |
| 2 | 0080.1199 | Capscrew (Cast Iron) | 8 |
| | 0080.1190 | Capscrew (Stainless Steel) | |
| 3 | 7080.1491 | Elbow,Suction (Acrylic coated Aluminium) SA80 | 2 |
| | 7080.1493 | Elbow,Suction (Stainless Steel(316L) ) SA80 | |
| | 7080.1490 | Elbow,Suction (Stainless Steel(304) ) SA80 | |
| | 7080.1495 | Elbow,Suction (Acrylic coated Cast Iron) SA80 | |
| 4 | 7080.1791 | Elbow,Discharge (Acrylic coated aluminium) SA80 | 2 |
| | 7080.1793 | Elbow,Discharge (Stainless Steel(316L) )SA80 | |
| | 7080.1790 | Elbow,Discharge (Stainless Steel(304) ) SA80 | |
| | 7080.1795 | Elbow,Discharge (Acrylic coated Cast Iron) SA80 | |
| 5 | 0080.0699 | Capscrew (Cast Lron) | 16 |
| | 0080.0690 | Capscrew (Stainless Steel) | |
| 6 | | Tablet valve (Teflon) SA80 | 4 |
| 7 | 7080.1991 | Chamber,Outer (Acrylic coated Aluminium) SA80） | 2 |
| | 7080.1993 | Chamber,Outer (Stainless Steel (316L) ) SA80 | |
| | 7080.1990 | Chamber,Outer (Stainless Steel (304) ) SA80 | |
| | 7080.1995 | Chamber,Outer (Acrylic coated Cast Iron) SA80 | |
| 8 | 0080.1999 | Capscrew (Cast Lron) | 16 |
| | 0080.1990 | Capscrew (Stainless Steel) | |
| 9 | 1458.5389A | Muffler Transfer 1.5-3 | 1 |
| 10 | 1458.5390 | Muffler 1.5-3 | 1 |
| 11 | | Foot SA80 | 2 |
| 12 | 1080.3291 | Plate,Outer (Acrylic Coated Aluminium) 3 | 2 |
| | 1080.3293 | Plate,Outer (Stainless Steel) 3 | |
| | 1080.3295 | Plate,Outer (Acrlic Coated Cast Iron) 3 | |
| 13 | 1080.8668 | Diaphragm backup(Santoprene/Teflon) 3 | 2 |
| | 1080.8662 | Diaphragm backup(Neoprene/Teflon) 3 | |
| | 1080.8658 | Diaphragm (Santoprene) 3 | |
| | 1080.8652 | Diaphragm (Neoprene) 3 | |
| | 1080.8654 | Diaphragm (PTFE) 3 | |
| 14 | 1080.3391 | Plate,Inner Diaphragm 3 | 2 |
| 15 | 1080.0190B | Capscrew 3 | 10 |
| 16 | 1080.0190 | Gasket 3 | 10 |
| 17 | 1080.6351 | Bumper,Diaphragm 3 | 2 |
| 18 | 1080.3400 | Rod,Diaphragm 3 | 1 |
| 19 | 1080.3701 | Gracket,Intermediate assembly 3 | 1 |
| 20 | 7080.1591 | Tee BSPT (Aluminium) 3 | 2 |
| | 7080.0Z91 | Tee NPT (Aluminium) 3 | |
| | 7080.0W91 | Flange Tee DIN (Aluminium) 3 | |
| | 7080.0V91 | Flange Tee ANSI (Aluminium) 3 | |
| | 7080.0X91 | Flange Tee JIS (Aluminium) 3 | |
| | 7080.1593 | Tee BSPT (316L) 3 | |
| | 7080.0Z93 | Tee NPT (316L) 3 | |
| | 7080.0W93 | Flange Tee DIN (316L) 3 | |
| | 7080.0V93 | Flange Tee ANSI (316L) 3 | |
| | 7080.0X93 | Flange Tee JIS (316L) 3 | |
| | 7080.1595 | Tee BSPT (CI) 3 | |
| | 7080.0Z95 | Tee NPT (CI) | |
| | 7080.0W95 | Flange Tee DIN (CI) 3 | |
| | 7080.0V95 | Flange Tee ANSI (CI) 3 | |
| | 7080.0X95 | Flange Tee JIS (CI) 3 | |

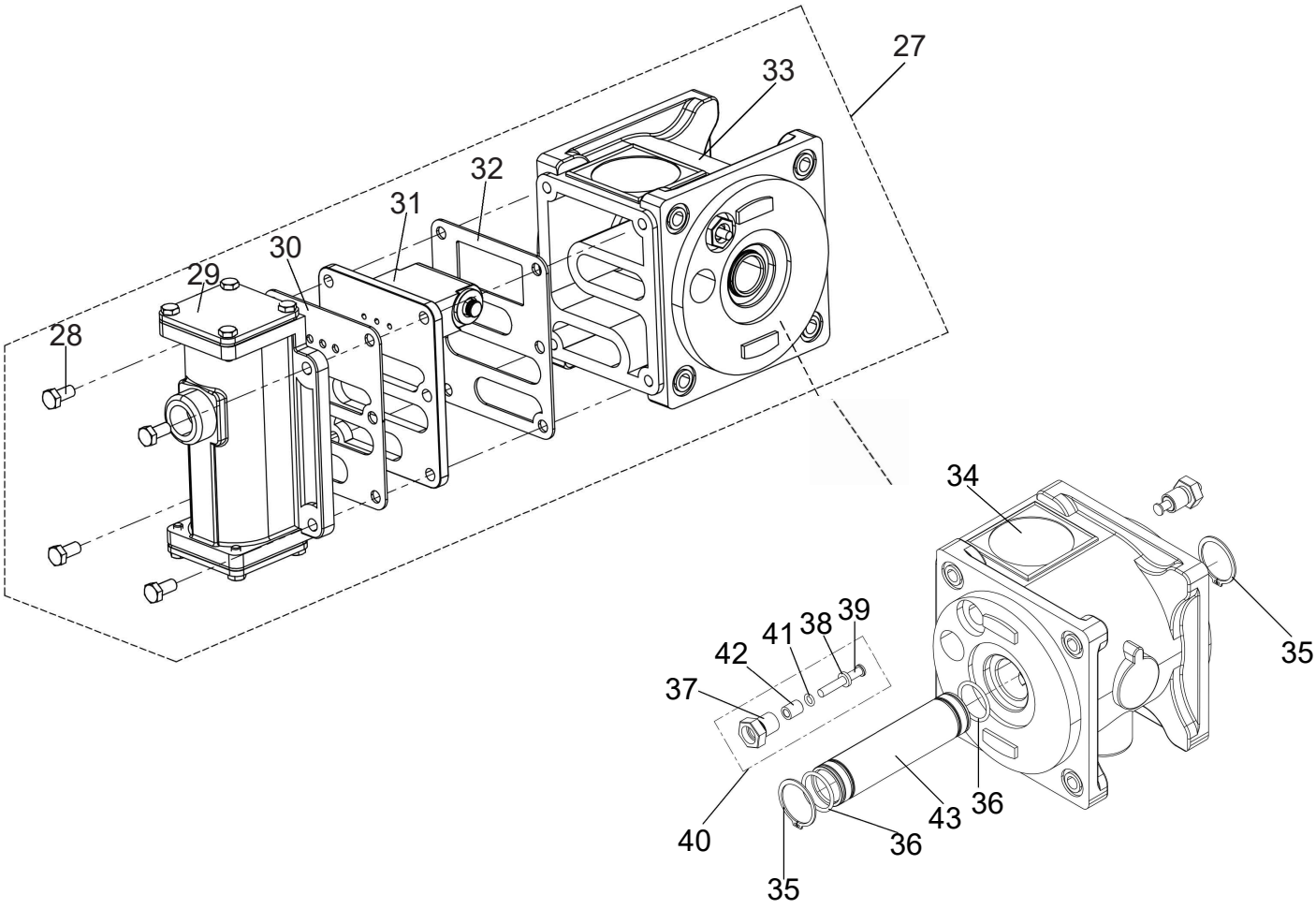
## ■ Figure 2 Center intermediate Exploded View




## ■ Center intermediate Parts List

| Number | Part Number | Description | Quantity |
|---|---|---|---|
| | | **Center intermediate Assembly** | |
| 19 | 1080.3701 | Gracket,Intermediate assembly 1.5 | 1 |
| 21 | 1458.1390 | Screw 1.5-3 | 8 |
| 22 | 4050.1490B | Flat Pad | 8 |
| 23 | 4050.1490C | Spring Washer | 8 |
| 24 | 1080.2691 | Chamber,Inner 1.5 | 2 |
| 25 | 1458.7251 | “O”ring 1.5-3 | 2 |
| 26 | 1458.7551 | “O”ring 1.5-3 | 8 |
| 27 | | Bracket,Intermediate Assembly 1.5-2 | 1 |

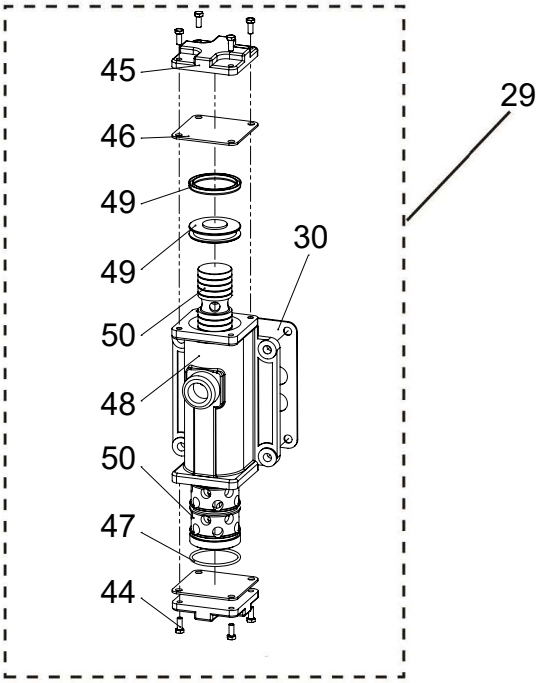
## ■ Figure 3 Center intermediate Exploded View




## ■ Center intermediate Parts List

| Number | Part Number | Description | Quantity |
|---|---|---|---|
| | | **Center intermediate Assembly** | |
| 27 | | Bracket,Intermediate Assembly 1.5-2 | 1 |
| 28 | 0458.0790 | Screw | 4 |
| 29 | 1458.4600 | Sliding Style Main Valve 1.5-3 | 1 |
| 30 | 1458.7039 | Main Gasket.Cap 1.5-3 | 1 |
| 31 | 1458.4100 | Pilot Valve 1.5-3 | 1 |
| 32 | 1458.6639 | Gasket.Cap 1.5-3 | 1 |
| 33 | 1080.3700 | Bracket,Intermediate 1.5-2 | 1 |
| 34 | 1080.3791G | Bracket,Intermediate 1.5-2 | 1 |
| 35 | 1080.9789 | Snap rings 1.5-2 | 2 |
| 36 | 1080.9651 | O-ring 1.5-2 | 2 |
| 37 | 1458.8092 | Bumper,plung 1.5-3 | 2 |
| 38 | 1458.5651 | O-Ring 1.5-3 | 2 |
| 39 | 1458.3593 | Pin,Actuator 1.5-3 | 2 |
| 40 | 1458.8000 | Bumper,plung 1.5-3 | 2 |
| 41 | 1458.7351 | Oring 1.5-3 | 2 |
| 42 | 1458.3642 | Bush 1.5-3 | 2 |
| 43 | 1080.9540 | Bush 1.5-2 | 1 |

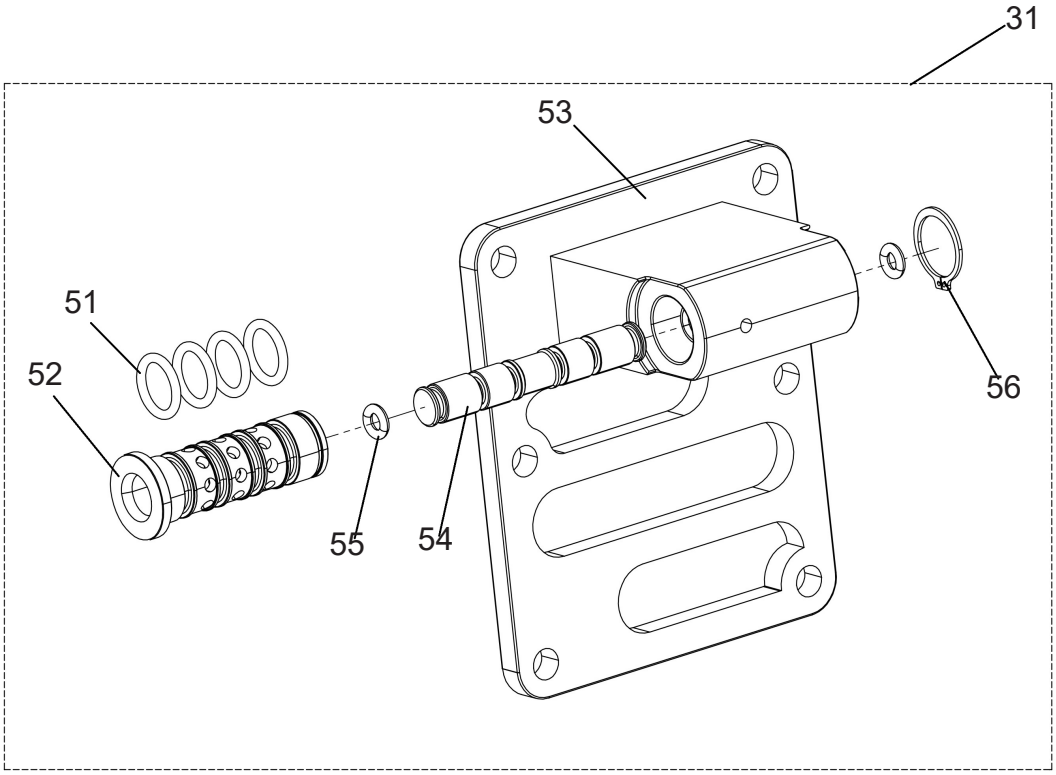
## Figure 4 Sliding Style Main Valve




## Air Valve List

| Number | Part Number | Description | Quantity |
|---|---|---|---|
| | | **Sliding Style Main Valve** | |
| 29 | 1458.4600 | Sliding Style Main Valve 1.5-3 | 1 |
| 44 | 1458.0891 | Screw 1.5-3 | 8 |
| 45 | 1148.4899 | Cap,End 1.5-3 | 2 |
| 46 | 1458.7151 | Gasket,Cap 1.5-3 | 2 |
| 47 | 1458.6751 | O-Ring outside 1.5-3 | 6 |
| 48 | 1458.4791 | Air valve 1.5-3 | 1 |
| 49 | 1458.9000 | Piston 1.5-3 | 1 |
| 50 | 1458.5291 | Spool Assembly 1.5-3 | 1 |

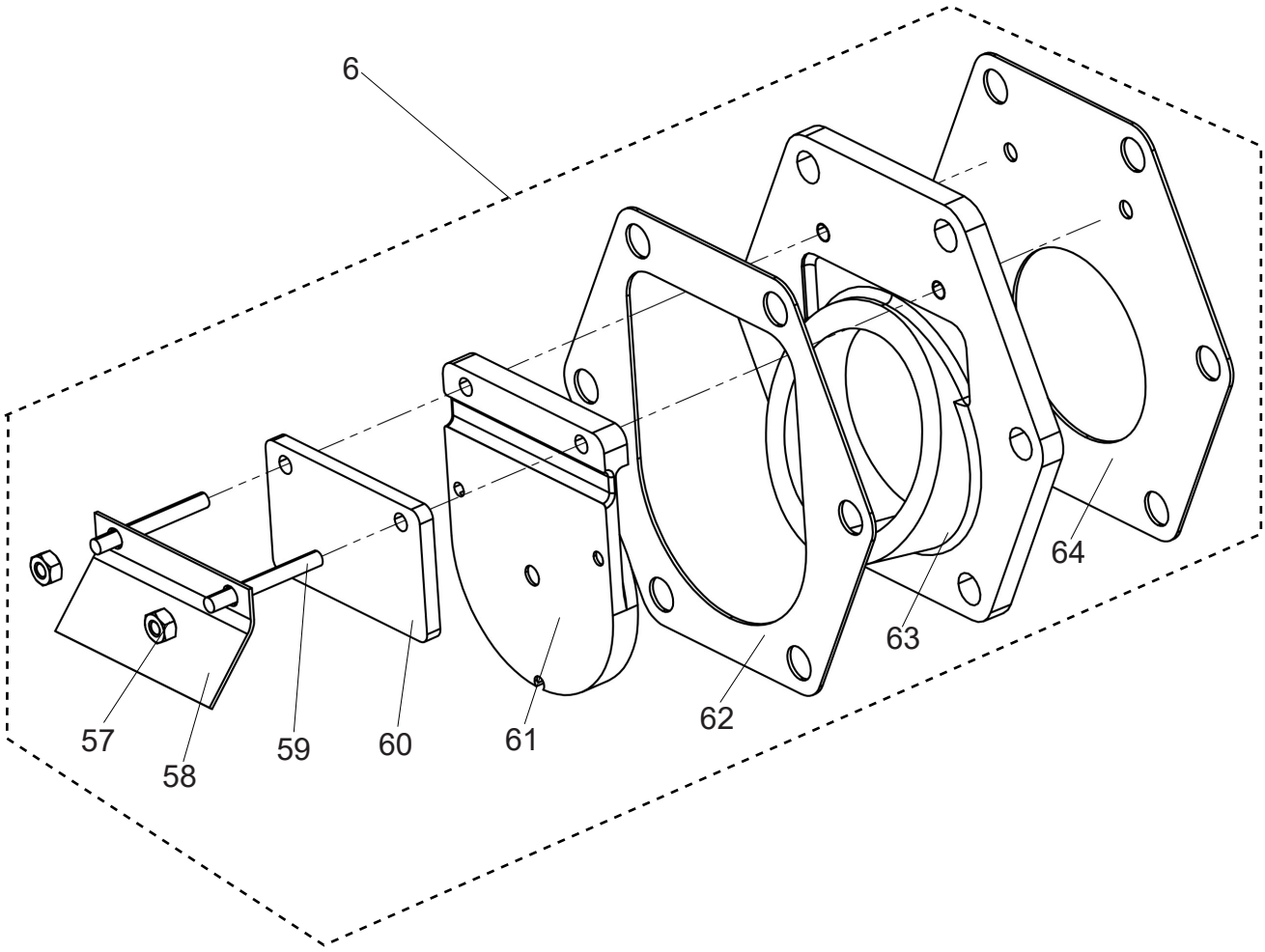
## Figure 5 Pilot Valve Exploded View




## Pilot Valve List

| Number | Part Number | Description | Quantity |
|---|---|---|---|
| | | **Pilot Valve** | |
| 31 | 1458.4100 | Pilot Valve 1.5-3 | 1 |
| 51 | 1258.6851 | O-Ring 1-3 | 4 |
| 52 | 1458.4291 | Spool Bush 1.5-3 | 1 |
| 53 | 1458.4391 | Pilot Valve 1.5-3 | 1 |
| 54 | 1458.4400 | Spool 1.5-3 | 1 |
| 55 | 1258.8451 | O-Ring 1-3 | 2 |
| 56 | 1258.4589 | Snap rings 1-3 | 1 |

## ■ Figure 6 Tabular Valve Assembly Exploded View




## ■ Tabular Valve Assembly

| Number | Part Number | Description | Quantity |
|---|---|---|---|
| | | **Tabular Valve Assembly** | |
| 6 | | Tabular Valve Assembly SA80 | 4 |
| 57 | | Fasten The Screw Nut | 8 |
| 58 | 7080.5993 | Tablet Valve Limit SA80 | 4 |
| 59 | | Double Head Stud | 8 |
| 60 | 7080.5851 | Packed Valve Protection Pad SA80(NBR75) | 4 |
| | 7080.5853 | Packed Valve Protection Pad SA80(FKM75) | |
| | 7080.5858 | Packed Valve Protection Pad SA80 | |
| 61 | 7080.6151 | Tabular Valve SA80(NBR80) | 4 |
| | 7080.6153 | Tabular Valve SA80 (FKM80) | |
| | 7080.6158 | Tabular Valve SA80 | |
| 62 | 7080.7851 | Gasket,After SA80(NBR80) | 4 |
| | 7080.7853 | Gasket,After SA80(FKM80) | |
| 63 | 7080.6091 | Tablet Seat SA80(AL) | 4 |
| | 7080.6093 | Tablet Seat SA80(316L) | |
| 64 | 7080.7651 | Gasket,Before SA80(NBR80) | 4 |
| | 7080.7653 | Gasket,Before SA80(FKM80) | |

| Part Package | Part Number | Description | Quantity |
|---|---|---|---|
| **SA80 Fluid Space Part Package** | | | |
| 3"Buna fluid spare part package | 7080.0151 | 3" NBR75 Tabular Valve 3 | 2 |
| | | 3" BN Diaphragm 3 | 4 |
| | | 3" NBR75 Protection Pad 3 | 4 |
| 3"Viton fluid spare part package | 7080.0153 | 3" FKM80 Tabular Valve 3 | 2 |
| | | 3" VT Diaphragm 3 | 2 |
| | | 3" FKM80 Protection Pad 3 | 4 |
| 3"Santoprene fluid spare part package | 7080.0158 | 3" Santoprene Tabular Valve 3 | 4 |
| | | 3" Santoprene Diaphragm 3 | 2 |
| | | 3" Santoprene Protection Pad 3 | 4 |
| **SA80 Air Spare Part Package** | | | |
| 3"Air spare part package | 7080.0003 | External "O" ring of 1.5-3"main valve 1.5-3 | 6 |
| | | "O" ring of 3"main shaft 3 | 2 |
| | | "O" ring of 1.5"-3"pilot shaft 1.5-3 | 4 |
| | | Piston 1.5-3 | 1 |
| | | Spool Assembly 1.5-3 | 1 |
| | | Gsaket.cap 1.5-3 | 1 |
| | | Main Gasket.cap 1.5-3 | 1 |

## Recommended Installation

SKYLINK AODD pumps are able to fulfill different requirements of most demanding fluid transfer, they are designed as well as manufactured in such high quality, in order to satisfy our clients' various demands. SKYLINK provides diaphragms which are made of different elastomeric materials to be suitable for different environments according to clients' requirements.

**Piping:**

The pipes which are connected to the inlet and outlet must be incompressible material, so that those pipes are able to bear a high vacuum. All piping should be equivalent size or larger than the diameter of the inlet and outlet, which will improve pump's performance.

**Installation:**

Engineer and installation personnel shall propose an integrated installation plan, which will make pumps perform better, meet fluid transfer requirement and easier to maintain in the future.

**Location:**

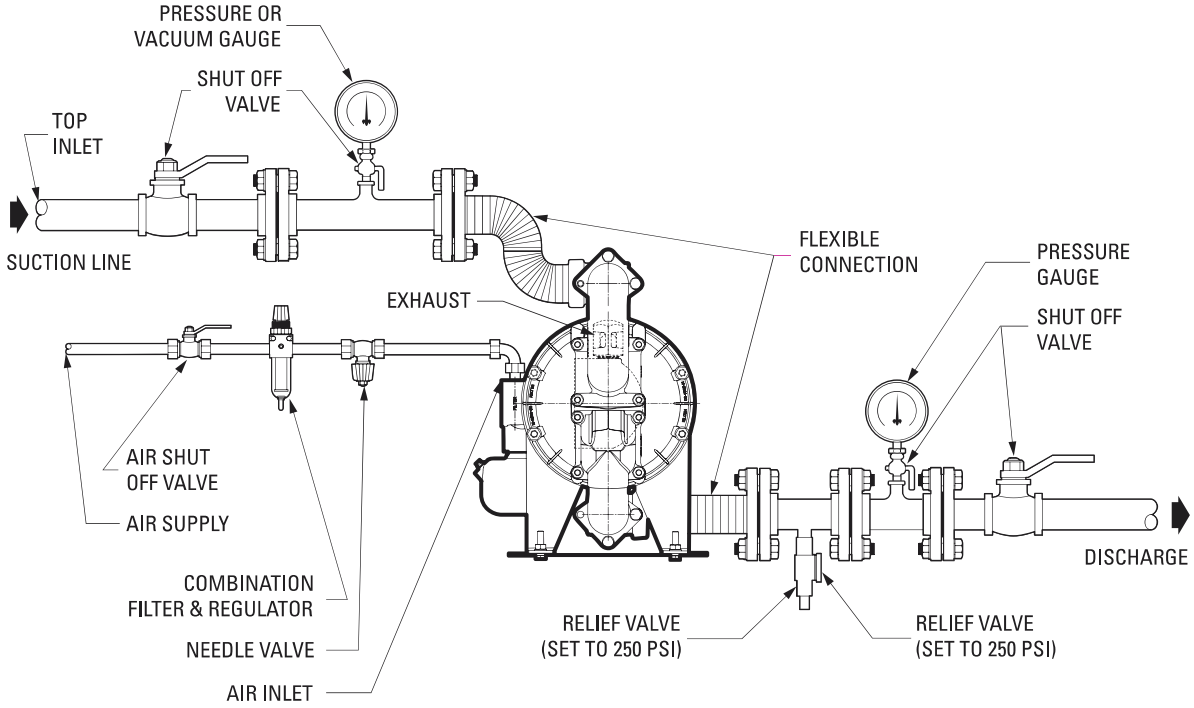
When install pumps, enough space shall be left for maintenance personnel to do maintenance or even rebuild your system, such as add a pressure gauge or a valve on the pump in the future.

**Air supply:**

Each pump must have a sufficient air supply to meet pump's air demand, if air supply is not powerful enough, the pump will not reach its best performance. Use air pressure up to 8.6 bar (125 Psig) according to different pumps.
In addition, proper air filter and regulator are also important for pump to its performance, so SKYLINK recommends that a 5μ(micron)air filter shall be applied before pump's air inlet.

**Solenoid control**

If air supply of pump is controlled by solenoid valve, a three-way valve shall be applied in order to release the air which is stuck between the pump and valve.




**Operation:**

Do not lubricate the pump before operate, because it is pre lubricated, additional lubrication will not damage the pump, however if the pump is heavily lubricated by an external source, the pump's internal lubrication may be washed away. If the pump is over-lubricated, when the pump is moved to a non-lubricated location, it shall be dismantled and re-lubricated as disassembly/reassembly section.

The flow rate of the pump can be adjusted according how powerful the air supply is, an air regulator is used to regulate air pressure, and the needle valve is to regulate volume.

**Maintenance:**

Different working condition (Frequency of use, air pressure, viscosity of fluid and abrasiveness of process fluid) affects parts life of pumps, so each pump must have its own maintenance schedule. Before operating the pump, a visual inspection shall be taken, check all fasteners, tighten if they are loose.

**Records:**

Each maintenance shall be recorded, those records will become a useful tool to predict and avoid some potential issues which would happen in the future. Furthermore, an elaborate record can identify if the pump is truly suitable for such application as well.

## 6.1 Disassembly of inlet/outlet

Tools: 5/8,11/16 wrenches

Dismantle 16 bolts (5) which connect elbow (3,4) and outer chamber (7) by certain wrenches.

**Caution:** Before changing outer chamber,air supply must be cut and disconnect from air source. It may cause injury, damage of pump or loss of property if disassembly with pressure. Finally,drain out all material in the chamber,assure there is no material in the chamber.

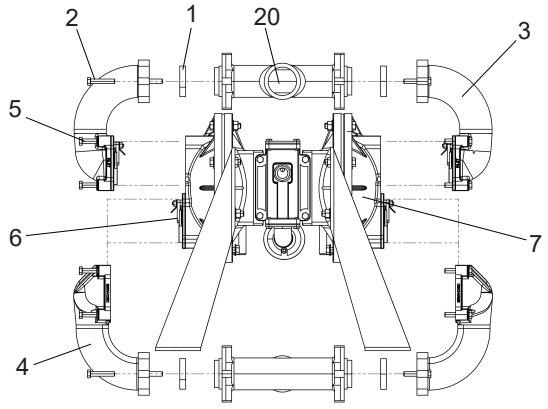



**Figure 6.1 Disassembly of Inlet/Outlet**

## 6.2 Disassembly of outer chamber

Tools: 3/4 wrenches

Dismantle 16 bolts (8) which connect internal chamber (24) and outer chamber (7) by certain wrenches.

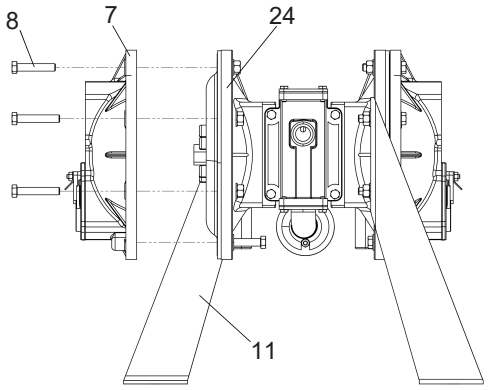



**Figure 6.2-1 Disassembly of Outer Chamber**

**Caution**:

Please strictly follow the sequence to tighten bolts.

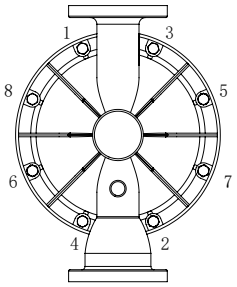



**Figure 6.2-2 Disassembly Sequence of Bolts on Outer Chamber**

## 6.3 Disassembly of Diaphgram

1 Tool: monkey wrench, 3/16 allen wrench

2. Bench clamp.

**Caution:** Before changing diaphragm, air supply must be cut and disconnect from air source. It may cause injury, damage of pump or loss of property if disassembly with pressure. Finally, drain out all material in the chamber, assure there is no material in the chamber.

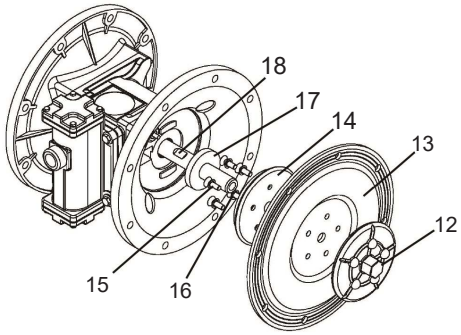



**Figure 6.3 Disassembly of Diaphgram**

1.Follow steps to disassemble inlet/outlet on page 20.

2.Follow steps to disassemble outlet chamber on page 20.

3.Using monkey wrench to turn diaphragm components (including outer washer (12),diaphragm(13)) out of mid shaft (18) in CCW.

4.Screwing off 5 bolts (16) on inner washer (15) by 3/16 allen wrench, separate outer washer (12),diaphragm (13) and inner washer(14).

## 6.4 Disassembly of air chamber

Tool: 5/8 socket wrench

Lift away air chamber from center section and remove center block gasket. Replace gasket if necessary.

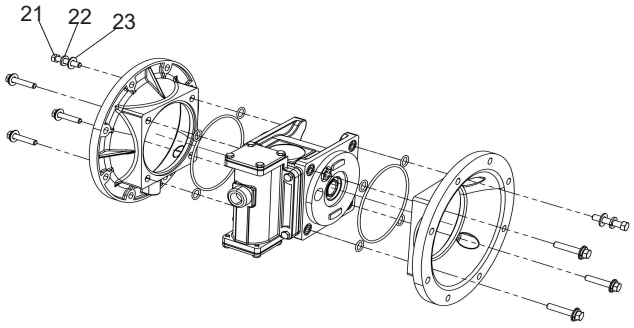



**Figure 6.4 Disassembly of air chamber**

## 6.5 Disassembly of center block Assembly

Tools: 1/2 wrenches
Lift away main valve (29) pilot valve(31) from center block.

Inspect for wear and replace if necessary. Lift away air valve assembly and remove air valve gasket. Inspect the gasket and replace if necessary.

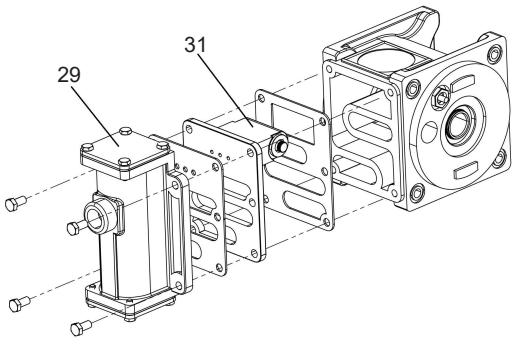



**Figure 6.5 Disassembly of center block assembly**

## 6.6 Disassembly of U ring & bumper plung

Tools: 20mm socket wrench

Disassemble bumper plung assembly (40)which internal chamber and pick out O ring (41),replace if the O ring is damage. Check the brush (43) ,replace if brush is abrade.

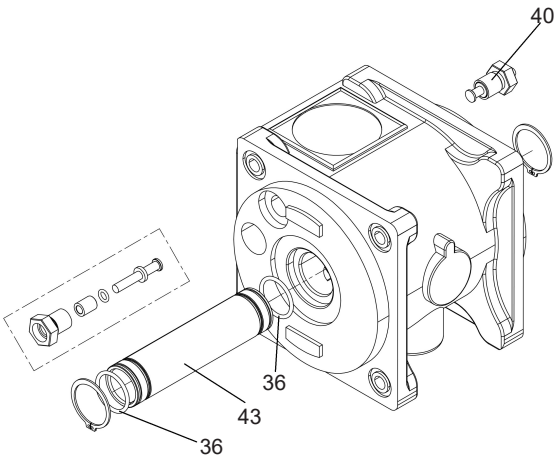



**Figure 6.6 Disassembly of O ring & Bumper plung**

## 6.7 Disassembly of Main Valve

Tools: 1/2 , 7/16 wrenches

Using 1/2 wrench to disassemble 4 bolts (44) on main valve (29) , take off main valve (29) and disassemble both upper and lower end caps(45) , by using 7/16 wrench, then remove end gaskets(46). Finally, push spool valve(52) out of it.

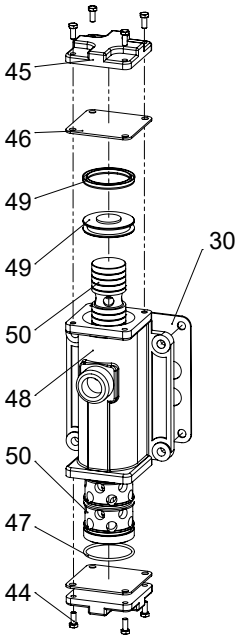



**Figure 6.7 Disassembly of main Valve**

**Caution:** before disassembling main valve, air supply must be cut and disconnect from air source. It may cause injury, damage of pump or loss of property if disassembly with pressure.

## 6.8 Disassembly of Pilot Valve

Tools: circlip plier outer

Take off poilt vavle (31) from center intermediate , extract out spool valve (54) , disassemble vavle bush (52) by using circlip plier outer.

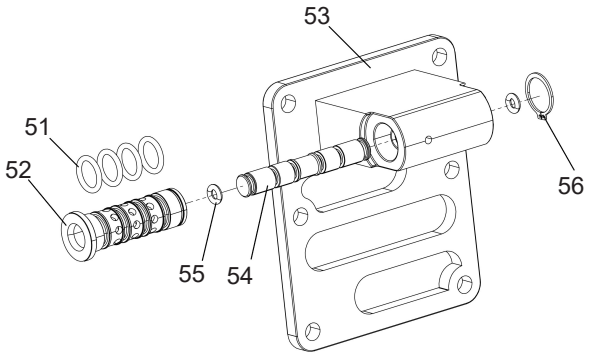



**Figure 6.8 Disassembly of Pilot Valve**

## 6.9 Maintenace of air vavle(sliding style)

Tools: 7/16, 1/2 wrenches

**Caution**: Before disassembling main valve, air supply must be cut and disconnect from air source. It may cause injury, damage of pump or loss of property if disassembly with pressure.

Using 1/2 wrench to disassemble 4 bolts (44) on main valve (29) , take off main valve (29) and disassemble both upper and lower end caps(45) , by using 7/16 wrench, then remove end gaskets(46). Finally, push spool valve(50) out of it.

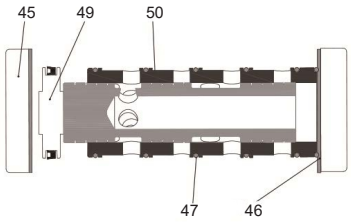



**Figure 6.9-1 Section View OF Sliding Style Main Valve**

*Spool valve and valve bush share one part(50), if one of those is damaged, the other one must be change as well.

a. If spool valve (50) is too loose, it drops itself without pushing, please observe if there is scratch, change both spool valve (50) and valve bush (50) together if scratch occurs.

b. If spool valve (50) is too tight to push, the valve is stuck, also, change both spool valve (50) and valve bush (50) together.

c. Install end caps(45), bolts (44) back to their original position.

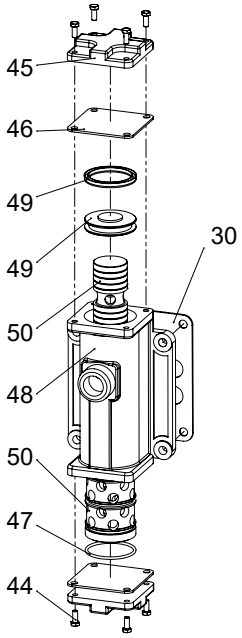



**Figure 6.9-2 Sliding Style Main Valve**

## 6.10 Maintenace of pilot vavle

Tool: circlip plier outer

1.Take off pilot valve (31) from center intermediate , extract out spool valve (54), disassemble valve bush (52) using circlip plier outer.

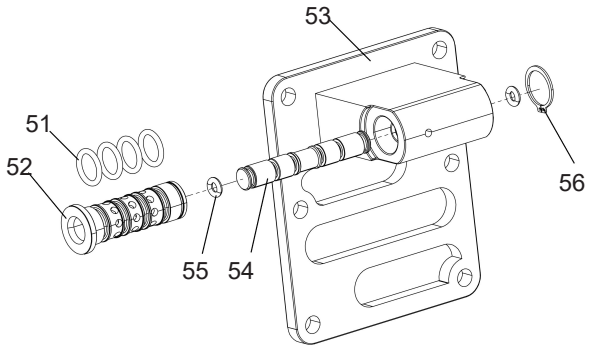



**Figure 6.10 Pilot Valve**

1.Follow steps to disassemble inlet/outlet on page 20. After disassemble inlet/outlet, you may see tablet valve

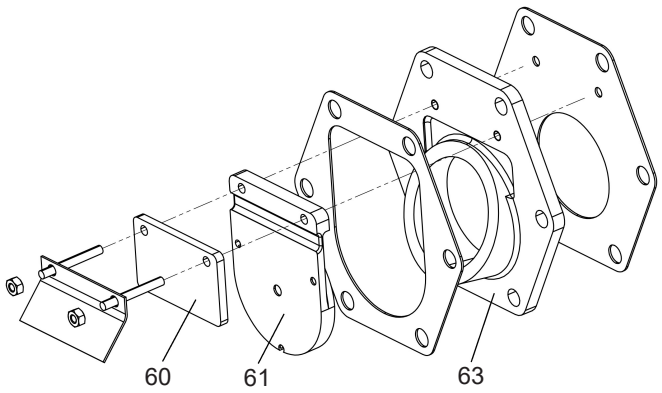



**Figure 6.11 Tablet valve assembly disassembly**

2.Check the surface of the disc valve (61) for damage, wear or cutting, and check the disc valve protective pad (60) in the same way. The disc valve (61) and disc valve seat (63) must fit tightly without obvious clearance. In order to obtain the best performance, please replace the damaged parts in time.

3. Reinstall check tablet valve parts.

**Caution**:

- Please make sure all bolts are fully tightened after a period time of running.

- While removing the disc valve assembly, check the disc valve (61) and disc seat (63) for any damage.

## 6.11 Tablet valve assembly repair

Tool: 7/16 wrench

**Caution**: Before changing tablet valve(6), air supply must be cut and disconnect from air source. It may cause injury, damage of pump or loss of property if disassembly with pressure. Finally, drain out all material in the chamber, assure there is no material in the chamber.

## 6.12 Maintenance of diaphragms

Suitable for SA40/50/80

Tools:

1.monkey wrench, 3/16 allen wrench.

2.Bench clamp

**Caution**: Before changing diaphragm, air supply must be cut and disconnect from air source. It may cause injury,damage of pump or loss of property if disassembly with pressure. Finally, drain out all material in the chamber, assure there is no material in the chamber.

1.Follow steps to disassemble inlet/outlet on page 20.

2.Follow steps to disassemble outer chamber on page 20.

3.Using monkey wrench to turn diaphragm components (including outer washer (12), diaphragm (13)) out of mid shaft (18) in CCW.

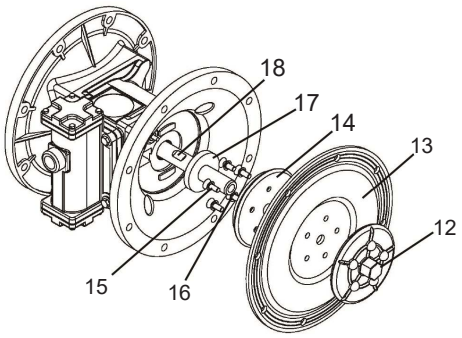



**Figure 6.12-1 Disassembly of Diaphragm Assembly**

4.Screwing off 5 bolts (16) on inner washer (14)by 3/16allen wrench, separate outer washer (12), diaphragm(13) and inner washer (14).

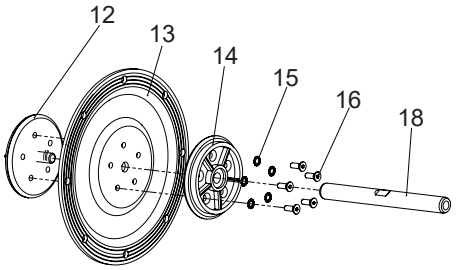



**Figure 6.12-2 Parts of Diaphragm**

5.Installation steps in reverse order.

**Caution**:

- Please make sure all bolts are fully tightened after a period time of running.
- Spring washer cannot be reused.
- One side which with words must be facing inside.
- PTFE graphragm must be applied together with rubber diaphragm, which is installed outside of rubber diaphragm.

PTFE in White

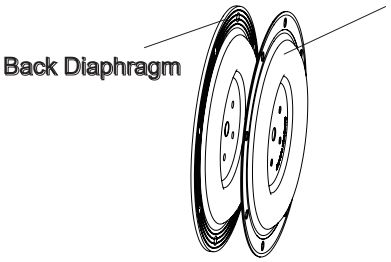



**Figure 6.12-3 Installation of Double Diaphragms**

## 6.13 Assembly:

Upon performing applicable maintenance to the air distribution system, the pump can now be reassembled. Please refer to the disassembly instructions for photos and parts placement. To reassemble the pump, follow the disassembly instructions in reverse order. The air distribution system needs to be assembled first, then the diaphragms and finally the wetted path. Please find the applicable torque specifications on this page.The following tips will assist in the assembly process.

Torque sheet

| Description of Part | Torque |
|---|---|
| Air Valve & center Block(Aluminum) | 13.6 N·m(120 in-lb) |
| Air Valve & cap | 5.1 N m(45 in-lb) |
| Air Chamber/Center Block | 27.1 N m(20 ft-lb) |
| Liquid Chamber /Air Chamber, Aluminum Bolted Only | 27.1 N m(20 ft-lb) |
| Outer Pistons,Rubber & PTTE, Inner Pistons | 22 N m(16 ft-lb) |
| Center Shaft & Inner Pistons | 109 N m(16 ft-lb) |
| Bumper Plung & Center Block | 5 N m(45 in-lb) |

| Malfunction description | Reason | Solution |
|---|---|---|
| Pump is working, but no fluid is discharged or low outlet pressure, few fluid is discharged. | Due to serious damage of check valve(ball & seat), so that it is not able to seal properly | Dismantle both upper and bottom seat, if a huge gap between ball and seat, ball can be changed, seat can be continued using flip. 拆 |
| | Main valve serious damage, air leakage | Change spool valve & valve bush of main valve |
| | Fluid inlet or pipe are unsealed | Check if fluid inlet and pipe are sealed properly |
| | Exceed pump's performance | Adjust installation position of pump, as closer to fluid as possible. |
| | "O"ring of pilot valve damages | Check pilot valve |
| | Damage of internal spring or "O" ring of quick adapter which is connected to the pump. | Dismantle quick adapter, check if it works after connect to the air source |
| | Unsealing due to loosen bolts | Tightening all bolts |
| | Outlet is blocked | Check outlet and valve opening |
| | Ball is not able to fully return by its own weight and seal due to high viscosity of fluid | Change a heavier ball or stainless steel ball 更 |
| | Unsealing due to damage of "O" ring of shaft, "O" ring of thimble or gasket of pilot valve. | Check all rings, gaskets, change if damaged |
| | Fluid leaks out form muffler due to damage of diaphragm or washer. | Change diaphragm, tightening washer |
| | Insufficient air pressure or air flow | Increase air pressure or air flow |
| | Flow limit due to inflation of ball | Check chemical compatibility of ball material and fluid |
| Pump is not working | Main valve is stuck, unmovable by hand serious damage of spool valve of main valve, huge gap causes air leakage | Change spool valve & valve bush |
| | Pores of pilot valve are blocked, glyd ring of valve bush damages seriously, air leakage | Clean up valve casing, change Spool assembly |
| | Valves of inlet and outlet stay shut | Release valves |
| | Muffler is blocked, air suffocate | Change muffler |
| | Damage of thimble sealing, thimble socket; bend of thimble and other issue | Change thimble and socket |
| | Thimble falls into mid chamber | Change mid chamber |
| | Excessive lubrication | Decrease lubricating oil volume in oil-water separator |
| | Air leakage due to glyd ring of shaft damages seriously | Change glyd ring |

| | | |
|---|---|---|
| | Air valve stays shut | Solenoid valve fails or air source is shut |
| | Mid chamber occurs pores due to corrosion | Change mid chamber |
| | Air valve, pilot valve, air inlet gasket damage | Change damaged parts |
| | Material solidified in cjamber | Dismantle chamber and clean up |
| Pump is working after outlet valve is shut | Outlet valve is not totally sealed | Shut outlet valve totally or change it |
| | Check valve(ball & seat) is not totally sealed, sundries might be stuck between | Change check valve(ball & seat) of clean sundries |
| After a period of time works normally, the pump fails to work, then it back to normal again after a few hours in winter time | Pump is frozen | Keep air sorce dry and moisture percentage of air source as less as possible. release water in air compressor, air container air pipes on time |
| | | Change surrounding environment, keep warm in order to avoid freezing |
| | | Slow down working frequency, so that avoid freezing |
| | | Add a few lubricating oil, lower the freezing point |
| Noise or abnormal sound | Sound due to ball in the pump shell | No maintenance required; does not affect normal use. |
| | Mid chamber occurs a loud noise when release air | Change muffler |
| Outlet occurs bubble | Inlet or inlet pipes are not sealed properly | Check if fluid inlet and pipe are sealed properly |
| | Air leakage due to damage of diaphragm or looseness of washer | Change diaphragm, tightening washer |
| Fluid leaks from chamber | Leakage occurs around bolt | Retightening bolt |
| | Leakage occurs around muffler | Check diaphragm and washer |