



**JOHNSON PUMP**  
AN SPX BRAND

# Instruction Manual

## TopAir TA-10

### Air operated diaphragm pumps



Read and understand this manual prior to operating or servicing this product.

A.0200.301 – IM-TA/03.00 EN (03/2007)

**SPX**<sup>®</sup>

## EC Declaration of conformity

(Directive 98/37/EC, Annex IIA)

### Manufacturer

SPX Process Equipment BE NV  
Evenbroekveld 2-6  
BE-9420 Erpe-Mere, Belgium

We declare under our sole responsibility that the product:

### TopAir

#### Air Operated Diaphragm Pumps

Type: TA-10

is in conformity with COUNCIL DIRECTIVE on the approximation of the laws of the Member States relating to Machinery 98/37/EG.

## Declaration of incorporation

(Directive 98/37/EC, Annex IIB)

The TopAir, Air Operated Diaphragm Pumps, must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive.

Erpe-Mere, 1 July 2007



Gerwin Schaafsma  
Operational Manager Europe

## ATEX 95

(Directive 94/9/EC)

### Manufacturer

SPX Process Equipment BE NV  
Evenbroekveld 2-6  
BE-9420 Erpe-Mere, Belgium

We declare under our sole responsibility that the product:

### TopAir

#### Air Operated Diaphragm Pumps

Type: TA-10 BAN, BAC, BAE, BAH, BAS, BAT  
TA-10 BSN, BSC, BSE, BSH, BSS, BST

all serial numbers

are compliant with ATEX 95 regulations and may be used in potentially explosive atmospheres – Directive 94/9/EC

Compliance with the essential health and safety requirements has been assured by conformation with the following standards or directives:

- European Standard EN 13463-1:2001
- European Standard EN 809/ October 1998
- Directive 98/37/EC

The marking of the equipment includes the following:

 || 2 GD ||B||C 95°C

The producer will keep on file for review the technical file YE ATEXJPV01X. The Assessment is registered at the notified body KEMA, Arnhem, the Netherlands.

Erpe-Mere, 1 July 2007



Gerwin Schaafsma  
Operational Manager Europe

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## 1.0 Introduction

Thank you for purchasing a TopAir Diaphragm Pump. This product is a positive-displacement pump that transfers fluids by movement of diaphragms driven by compressed air through a unique switching mechanism. The casing that comes in contact with the fluid is made of aluminium, stainless steel, forged iron, polypropylene or fluorine resin, depending on the model you have selected, according to the type of fluid to be pumped. The diaphragms are made of a plastic material suitable for the model.

## 2.0 For safe operation

This document contains information vital for safe and efficient operation of this product. Before using the pump, be sure to read this document carefully, particularly the “warnings and cautions”, and be fully familiar with the operating procedures. Be sure to keep this document handy for future reference.

## 3.0 Principles of operation

There are two diaphragms fixed to the center rod, one at each end. When compressed air is supplied to air chamber B (right side, see Fig. 1.1.), the center rod moves to the right, the material in material chamber B is pushed out, and at the same time material is sucked into material chamber A.

When the center rod is moved full-stroke to the right, the air switch valve is switched, compressed air is sent to air chamber A (left side, see Fig. 1.1.), and the center rod moves to the left. The material in material chamber A is pushed out, and at the same time material is sucked into material chamber B.

Through repetition of this operation, material is repeatedly taken in and discharged out.

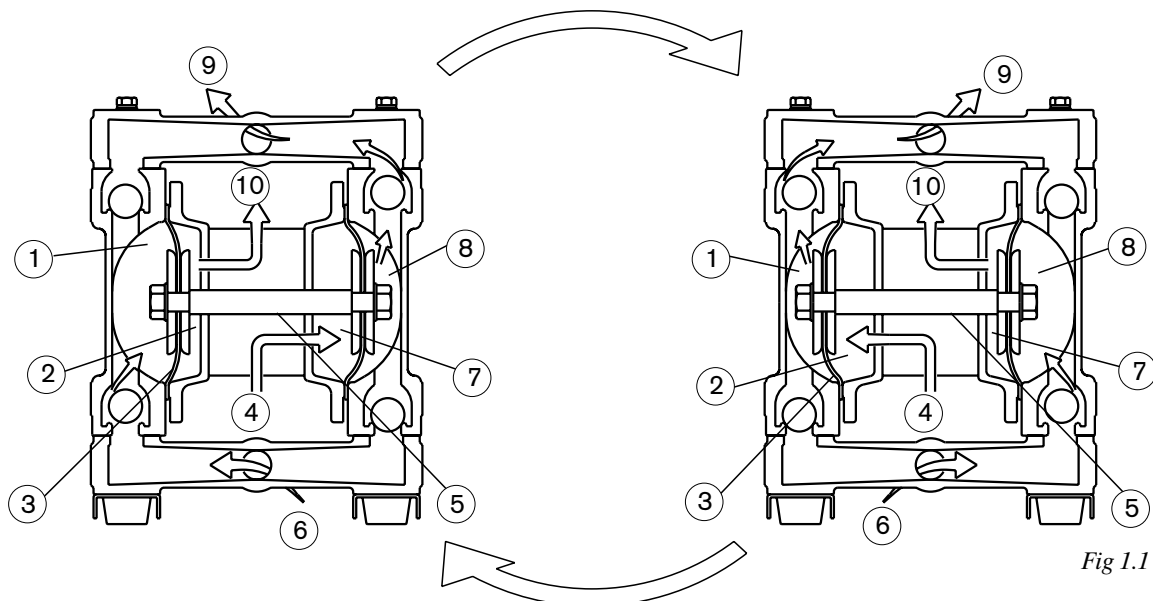


Fig 1.1

- |                       |                         |                            |
|-----------------------|-------------------------|----------------------------|
| 1. Material Chamber A | 4. Air Supply           | 7. Air Chamber B           |
| 2. Air Chamber A      | 5. Center Rod           | 8. Material Chamber B      |
| 3. Diaphragm          | 6. Material Intake Port | 9. Material Discharge port |
|                       |                         | 10. Exhaust Vent           |

## 4.0 Ordering replacement parts

For accurate and speedy shipment of parts, be sure to order the right parts for your model to your dealer or one of our regional offices. Indicate the part number, descriptions, quantities and reasons for replacement, in as much detail as possible.

## 5.0 Operating caution

*Before using this product*

### **Warning**

- When using compressed gas (hereinafter called “compressed air”) to drive this pump, be sure it is one of the following:

- Compressed air supplied from an air compressor
- Nitrogen (N<sub>2</sub>) gas

Use of compressed air other than the above may cause air pollution, damage to the pump, or even an explosion.

- The maximum permissible pressure for the compressed air, and the fluid pumped by one of these pumps, depending upon the casing material of the model you are using, is as follows:

- Metal casing (aluminium, stainless steel, forged iron): 0.7 MPa
- Plastic casing (polypropylene, fluorine resin): 0.5 MPa

If the pressure of the compressed air and fluid exceeds the applicable maximum permissible pressure specified above, there may be leakage of fluid, damage to the casing, or even a severe, possibly even fatal, accident.

- When moving this product, make sure that the internal pressure is released. If the pump is moved while under pressure, any shock imparted by droppage, etc, may damage the pump or even cause an explosion.
- Hazardous fluids (with strong acid or alkali, flammable or toxic) or gas bubbles generated by such fluids may cause serious injury or even death if accidentally inhaled or consumed or if they come into contact with the eyes or adhere to skin. Therefore, the following precautions are strongly advised:
  - Be fully familiar with the properties of the fluid to be pumped and work in strict accordance with the operating instructions provided by the suppliers of such fluids (such as wearing goggles, gloves, mask or work clothes).
  - When storing a hazardous fluid, strictly comply with the regulatory procedures (such as using proper containers, storage conditions, etc).
  - Always install the piping and exhaust port of this pump away from human and animal traffic. When a diaphragm is damaged, fluid will gush out together with air through the exhaust port. Provide protective measures in consideration of possible leakage of fluid (see Notes: Arranging outside exhaust). When you use the hose and pit etc, be sure you are using a model with appropriate corrosion resistance for the fluid to be pumped.
- When installing this product, be sure to connect a ground wire from the specified position of this product. When this product is installed and operated without the ground wire properly connected, friction between parts, as well as abrasion caused by the flow of some fluids inside the casing, may generate static electricity. Also, depending on the type of fluid being pumped and the installation environment (such as gases in the air and type of surrounding fixtures), static electricity could become a cause of fire or electric shock.

- Improper grounding, poor ventilation, or unshielded fire or spark can create a danger of fire or explosion. Therefore, the following precautions are strongly advised:
  - All peripheral equipment and piping connected to this product should be properly grounded.
  - To pump flammable liquids, use a model with an aluminium or stainless-steel casing.
  - Whenever you notice any spark while operating this product, immediately stop its operation, and do NOT start using it again unless you are sure of the cause and corrective actions have been taken.
  - Depending upon the type of fluid being pumped, bubbles of flammable gas may be generated. Make sure that ventilation is satisfactory.
  - This product itself, its piping and exhaust ports should be kept away from unshielded fire, spark and other causes of ignition. If a diaphragm is damaged, fluid will gush out together with air from the exhaust port.
  - Do NOT leave gasoline or solvent etc, that contains waste at the work site.
  - Machinery and other equipment near the place of installation of this product should be properly insulated to prevent conduction with each other.
  - Do NOT operate heating devices that create flames or have heating filaments anywhere near the pump or its piping.
  - If there are flammable gases in the air while the pump is operating, do NOT switch electric appliance on and off.
  - Do NOT operate a gasoline engine at the work site.
  - Restrict smoking at the work site.
- After you shut down the pump and disconnect the piping, some fluid may remain inside the pump. Also, if the pump is left unused for a prolonged period, some fluid may remain inside the pump and connected piping. Therefore, be sure to purge the system of fluid and clean the pump before prolonged disuse. If the product is left unused for a prolonged period with fluid remaining in the connected piping as well as the pump itself, the fluid may expand, depending on the ambient temperature (because of freezing or heat), which may cause damage to the pump and/or piping and possible leakage of fluid.
- Always use genuine TopAir parts when replacing component parts of this product. Do NOT attempt to modify the components parts or replace them with other than genuine TopAir parts.
- Torque of all tightening parts must be inspected before operation. Designated torque are mentioned in maintenance manual.
- When pumping a hazardous fluid (hot, flammable, strong acid, etc) with this product, provide protective measures (install a pit, a protection box, sensors, etc) in consideration of possible leakage of fluid, and post warning signs at necessary places. Leakage of fluid may cause fire, air pollution or a serious accident. When pumping a hot fluid, the casing and piping will become hot, which may burn the skin when touched.

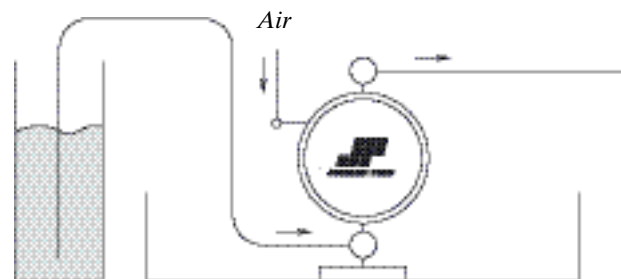


Fig. 2.1

- Before using this product, be sure you are familiar with the precautions regarding the fluid to be pumped, and verify the corrosion resistance of the parts that will come into contact with the fluid. NEVER use the product with any fluid against which it does not have sufficient corrosion resistance or with a fluid that poses a risk of explosion. If you are unsure of the corrosion resistance, contact your dealer or our regional office. If you use this product with any fluid against which the parts that will come in contact with the fluid do not have sufficient corrosion resistance, it may result in damaging the product or leakage of fluid.
- When working in the vicinity of pumping of fluid with this product, be sure to wear protective gear (goggles, mask, etc).
- When using this product, observe the relevant regulatory rules concerning fire prevention, labour safety standards, etc.
- If you have any questions on the operation of this product (method of connection or installation), contact your dealer or our regional office.

### **Caution**

- When operating this product, it may generate loud operating noise, depending upon the condition of use (fluid pumped, supply air pressure and discharge pressure). If regulatory rules apply, provide appropriate acoustic measures where necessary. (For the noise value of this product, see 15.0 Main specifications)
- To drive this product, use supply air with minimum moisture content.
- If a diaphragm of this product is damaged, supply air may mix with the fluid or the fluid may flow into the main body (air-switching portion). If air supply is inadequate or contaminated, do NOT operate the pump.
- While operating this product, do NOT cover the intake port by hand.
- If more than two years have elapsed since this product was shipped from the factory, notify your dealer or our regional office, and do NOT operate it without assurance from the dealer or our regional office that the pump may be operated safely.

## 6.0 Tools, etc.

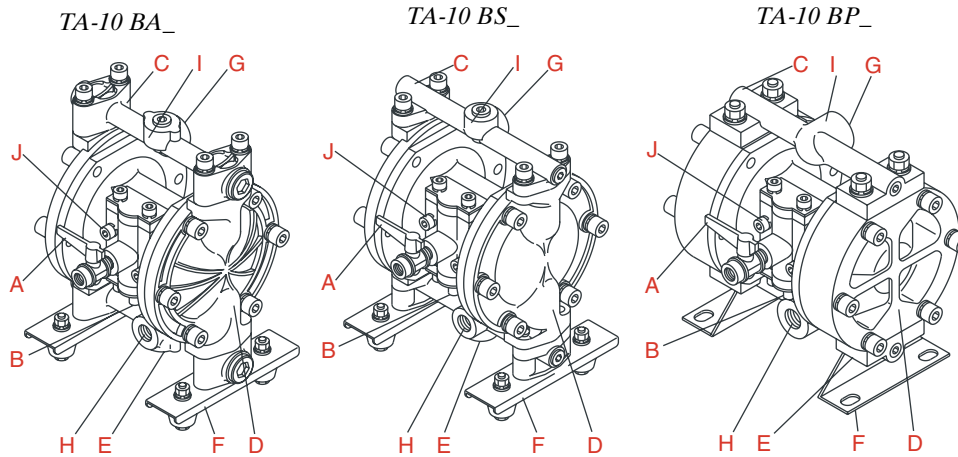
### 6.1 General tools

- Socket wrenches: 13 mm
- Hexagonal box wrenches: 5 mm, 6 mm
- Open-end wrenches: 21 mm (BP\_)
- Snap ring pleyer

### 6.2 Misc.

- Lubricating oil: Turbine oil equivalent to #32
- Nuts: M8x1.25 (BA\_, BS\_)

## 7.0 Names of parts and materials



A: Air Valve  
 B: Reset Button  
 C: Out Manifold  
 D: Out Chamber  
 E: In Manifold  
 F: Pump Base  
 G: Discharg Port  
 H: Intake Port  
 I: Lift Point  
 J: Ground Connection Point

### Aluminum type

| Type                  |       | BAC     | BAN      | BAT   | BAH      | BAS       |
|-----------------------|-------|---------|----------|-------|----------|-----------|
| Switching Portion     |       | ADC12   | ADC12    | ADC12 | ADC12    | ADC12     |
| Fluid contact Portion | ADC12 | ADC12   | ADC12    | ADC12 | ADC12    |           |
| Diaphragm             |       | CR      | NBR      | PTFE  | TPEE     | TPO       |
| Ball/O Ring           |       | CR/PTFE | NBR/PTFE | PTFE  | NBR/PTFE | EPDM/PTFE |
| Valve Seat            |       | A5056   | A5056    | A5056 | A5056    | A5056     |
| Center Disk           |       | A5056   | A5056    | A5056 | A5056    | A5056     |

### Stainless-steel type

| Type                  |       | BSC    | BSN    | BST    | BSH    | BSS    |
|-----------------------|-------|--------|--------|--------|--------|--------|
| Switching Portion     |       | ADC12  | ADC12  | ADC12  | ADC12  | ADC12  |
| Fluid contact Portion | SCS14 | SCS14  | SCS14  | SCS14  | SCS14  |        |
| Diaphragm             |       | CR     | NBR    | PTFE   | TPEE   | TPO    |
| Ball/O Ring           |       | CR/NBR | NBR    | PTFE   | NBR    | EPDM   |
| Valve Seat            |       | SUS316 | SUS316 | SUS316 | SUS316 | SUS316 |
| Center Disk           |       | SUS316 | SUS316 | SUS316 | SUS316 | SUS316 |

### Polypropylene type

| Type                  |     | BPC             | BPN             | BPT             | BPH             | BPS             |
|-----------------------|-----|-----------------|-----------------|-----------------|-----------------|-----------------|
| Switching Portion     |     | ADC12           | ADC12           | ADC12           | ADC12           | ADC12           |
| Fluid contact Portion | PPG | PPG             | PPG             | PPG             | PPG             |                 |
| Diaphragm             |     | CR              | NBR             | PTFE            | TPEE            | TPO             |
| Ball/O Ring           |     | CR/NBR          | NBR             | PTFE            | NBR             | EPDM            |
| Valve Seat            |     | CR              | NBR             | PPG             | PPG             | PPG             |
| Center Disk           |     | PPG<br>(SUS304) | PPG<br>(SUS304) | PPG<br>(SUS304) | PPG<br>(SUS304) | PPG<br>(SUS304) |

### PTFE = BTT, PVC = BXT

| Type                  | BTT   | BXT   |
|-----------------------|-------|-------|
| Switching Portion     | ADC12 | ADC12 |
| Fluid contact Portion | PTFE  | PVC   |
| Diaphragm             | PTFE  | PTFE  |
| Ball/O Ring           | PTFE  | PTFE  |
| Valve Seat            | PTFE  | PVC   |
| Center Disk           | PFA   | PFA   |

## 8.0 Assembly

### 8.1 Installation of accessories

1. Remove all packing materials immediately after reception. Check the consignment for damage immediately on arrival and make sure that the name plate/type designation is in accordance with the packing slip and your order.
2. Attach the air valve and the silencer (nipple) (see 7.0 and 20.0).



#### **Caution**

- All of the connection parts are capped or taped for shipment. Remove the caps and tapes.
- When installing accessories, make sure that no foreign matter falls into the product, as it could cause malfunction of the switching portion.
- Cover each screw with sealing tape to prevent leakage.
- See 15.0 Main specifications. Remember that the pump is heavy, so extreme care must be taken when lifting it.

## 9.0. Installation

### 9.1 Method of transport

- When lifting the pump using a chain hoist or crane before transporting it, be sure to lift it by the specified lift point (see 7.0 Names of parts and materials).



#### Warning

- Be careful that nobody will pass under the pump when you lift it. It would be very dangerous if the pump should fall.



#### Caution

- See 15.0 Main specifications. Remember that the pump is heavy, so extreme care must be taken when lifting it.
- When moving the pump with a forklift or truck, make sure that the pump will not fall. If it does, it may be damaged and/or cause bodily injury.
- NEVER try to move the pump by pulling the hose connected to the pump. The hose or the pump may be damaged.

### 9.2 Installing the pump

- 1) Decide where the pump should be installed in a secure and suitable space (see Fig 4.1 A to D).

#### Note:

- Try to keep the suction lift as short as possible. Protect diaphragm from abnormal breakage, inlet pressure must be kept below the following values:
  - PTFE diaphragm:
    - 0.02 MPa (height 2 m) during operation
    - 0.05 MPa (height 5 m) not in operation
  - Other diaphragms: 0.1 MPa (height 10 m)  
(Condition with fresh water under ambient temperature)
- Remember to provide sufficient space around the pump for maintenance.
- The direction of fluid intake port and the discharge port can be changed so that they are opposite from each other. (For switching, see the maintenance manual).
- The exhaust from the pump will contain some sludge. When operating the pump where it would have an impact on the environment, the exhaust should be directed to a place where there will be no environmental impact.

- 2) Remove the pump from the package and install it in the designated location.

- 3) When fixing the pump in place, use the flexible mount on the pump base, and secure the pump by tightening the tied-down bolts a little at a time.

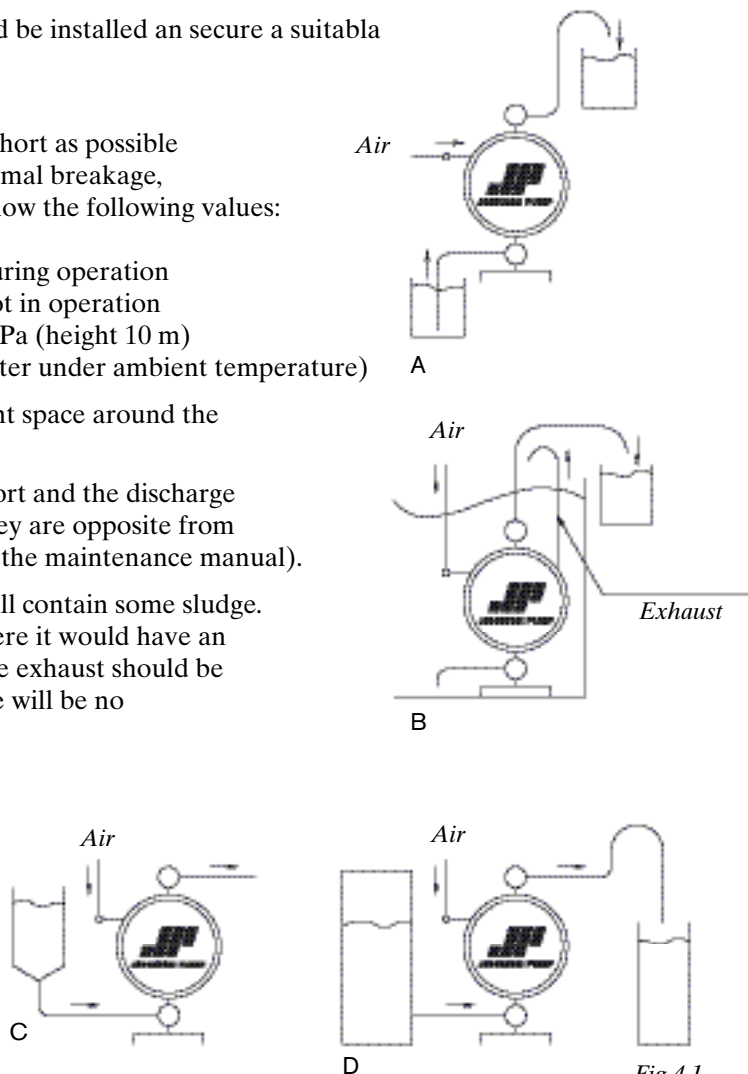


Fig 4.1



### Caution

- Even if you do not use the flexible mount to secure the pump in place, mount it in such a way that vibration generated by pump will be absorbed.
- If the pump will be submerged during operation, follow the steps below:
  - Verify the corrosion resistance of each component of the pump, and do NOT expose the pump to any fluid for which it does not have proper corrosion resistance.
  - Exhaust should be directed outside, not into the fluid in which the pump is submerged. For information on how to arrange the exhaust, see Note: Arranging outside exhaust and Fig. 4.2 below.
  - Make sure that you can reach all of the valves without submerging your hand.
- When operating the pump, operation noise may be generated, depending upon conditions of use (kind of fluid being pumped, supply air pressure and discharge pressure). If any regulatory rules apply, provide appropriate acoustic measures. (For the noise level of this product, see 15.0 Main specifications)
- When pumping a hazardous fluid (hot, flammable, strong acid, etc) provide protective measures (installation of a pit or sensors, etc) in consideration of possible leakage of fluid, and post warning signs at necessary places. For details, see 5.0 the applicable operating caution.



### Warning

- If using the pump with a flammable fluid or in a flammable environment, read 5.0 Operating caution.

### Notes: Arranging outside exhaust

- Remove the silencer.
- Connect a hose with a ground wire to the pump's exhaust port, and attach the silencer to the tip of the hose. Use a hose of the same diameter as the exhaust port. (If the hose is longer than 5 metres, consult your dealer or our regional office).
- Have a pit, a protection box, etc. at the end of the hose.

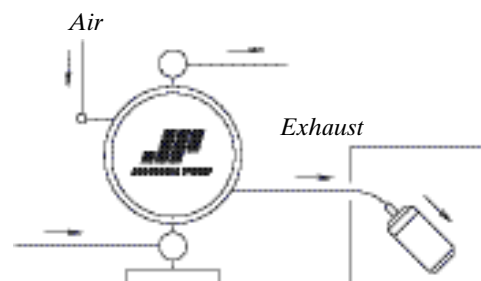


Fig 4.2



### Warning

- Be sure to have a pit, a protection box, etc, at the end of the hose in preparation for the flow of fluid in case of damage to a diaphragm. For details, see 5.0 Operating caution.
- Pump exhaust should be directed to a safe place, away from people, animals and food.

## 9.3 Connecting the ground wire

- When installing the pump, be sure to connect the ground wire at the specified position. For the specified position for connecting the ground wire, see 7.0. Names of parts and materials.
- Also connect ground wires to peripheral equipment and piping.
- Use 2.0 mm<sup>2</sup> minimum ground wire.

Position for connecting the ground wire

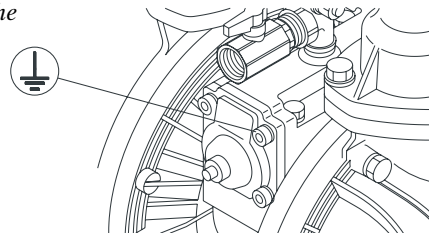


Fig. 4.3



### Caution

- Be sure to connect ground wires to the connected piping and any other connected equipment. For details, see 5.0 Operating caution. When the pump is operated without a ground wire or otherwise not properly grounded, friction between parts and abrasion caused by some fluids flowing inside the casing may generate static electricity. Also, depending on the type of fluid being pumped and the installation environment (such as gases in the air or the surrounding fixtures), it may be a cause of fire or electric shock.

## 9.4 Use in potentially explosive atmospheres (for pumps specified in the ATEX 95 declaration)

- Your pump can be used in potentially explosive atmospheres if the symbol of fig. 4.4. is visible on the name plate. Below the symbol is indicated what zones and equipment group is applicable. The maximum allowable surface temperature is indicated on the name plate fig. 4.5.



Fig. 4.4

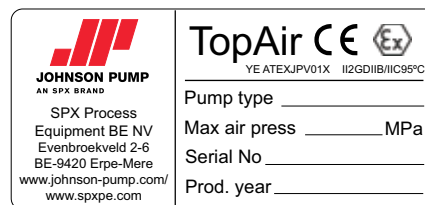


Fig. 4.5

- Always connect the ground wire, which is attached to the pump. When removing the pump from the system, remove the ground wire last. When installing the pump to the system, install the ground wire first.
- Use 2.0 mm<sup>2</sup> minimum ground wire.
- The equipment can be used for group II gases (above ground, group I is applicable for mining) in Zones 1 and 2. For use in combination with group IIC gases, the media must be conductive to prevent built up of static electricity. For group IIA and IIB gases and for Dust, there are no limitations other than the maximum allowable media temperature of 95°C.
- Make sure that the pump is serviced according the appropriate service instructions, by a qualified repair station. Use only original parts for servicing. Use of non-original parts will make the EX approval invalid.
- No modifications or changes to the pump are allowed, this will make the EX approval invalid.



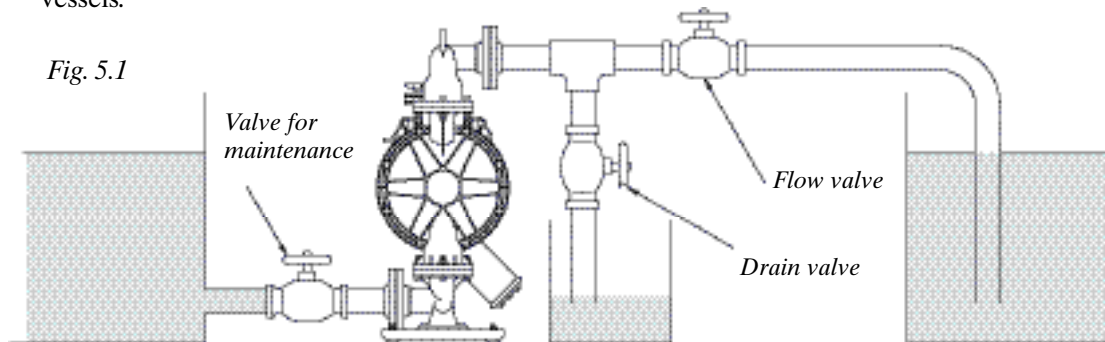
### Caution

- Be sure to connect ground wires to the connected piping and any other connected equipment. For details, see the applicable 5.0 Operating caution. Do not operate the pump without a ground wire or otherwise not properly grounded, friction caused by some fluids flowing inside the casing may generate static electricity. Also, depending on the type of fluid being pumped and the installation environment (such as gases in the air or the surrounding fixtures), it may become an ignition source, resulting in a possible explosion.
- Be careful when using tools at or in the environment of the pump. Dropping of metal objects or tools on the pump can cause impact sparks, resulting in an explosion if explosive gas is present.
- Make sure that the pump is serviced according the appropriate service instruction, by a qualified repair station. Use only original parts for servicing. Use of non-original parts will make the EX-approval invalid. Doing so can result in dangerous situations, resulting in an explosion if explosive gas is present.
- No modifications or changes to the pump are allowed, this will make the EX- approval invalid. Doing so can result in dangerous situations, resulting in an explosion if explosive gas is present.

## 10.0 Connection

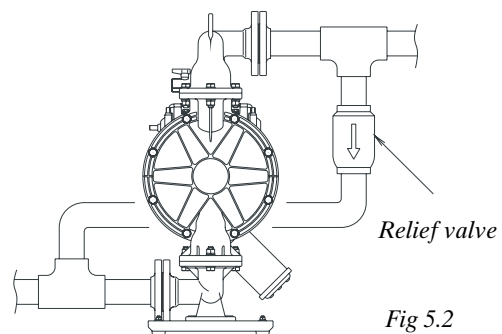
### 10.1 Connecting fluid piping

- 1) Connect a flow valve and a drain valve to the fluid discharge port of the pump.
- 2) Connect a valve for maintenance to the fluid suction intake port of the pump.
- 3) Connect a hose to the valve on the suction-port side and the valve of the discharge-port side of the pump.
- 4) Connect a hose on the suction-side intake and the discharge-port side to the respective vessels.



#### **Caution**

- Use a flexible hose to absorb pump vibration, and ground the hose.
- Make sure that there will be no external force on any connection part of the pump. Be especially careful not to have the pump support part of the weight of the hose and the piping.
- Use a sturdy hose that will not collapse under the strong suction of the pump. Also, make sure the hose is of more than sufficient pressure rating.
- Use a hose of a diameter the same as or larger than the pump's ports. If you use a hose of smaller diameter, the pump's performance will be adversely affected, and it may even malfunction.
- When pumping a fluid that contains slurry, verify that the particle size is below the slurry limitation (15.0 Main specifications). If it exceeds the limitations of slurries indicated in the main specifications, attach a strainer to the pump to stop larger particles. Otherwise, such particles may cause a malfunction.
- If, depending upon the place of pump installation, the volume of the pumped fluid changes drastically, install a relief valve on the discharge side, and bring the pressure down below the maximum permissible value. If, owing to a change in the volume of fluid, the pressure inside the pump exceeds the maximum permissible pressure, it may cause damage.
- Keep a vessel below the relief valve to catch any drain off.
- When testing piping for leakage, do NOT apply pressure to the pump's inlet and outlet sides with compressed air from outside. It may cause abnormal breakage to the diaphragm or the switching portion. When testing the piping, either install a valve between the pump's suction inlet and the discharge outlet and piping, or disconnect the pump from the piping and install plugs so that there will be no pressure from outside.
- In our product inspection, clear water is used. To prevent mixture of dirty water into the fluid to be pumped, clean the inside of the pump before finishing installation work.



## 10.2 Connecting air piping



### **Warning**

Before starting work, make sure that the air compressor is shut off.

- 1) Connect an air valve, air filter, regulator and if necessary lubricator (hereinafter called the “peripheral equipment”) to hose which connected to compressor. Refer (NOTE) for detail information.
- 2) Install these peripheral items supported by brackets, etc, near the pump.
- 3) Connect the hose from the peripheral equipment to the air valve of the pump’s supply port.

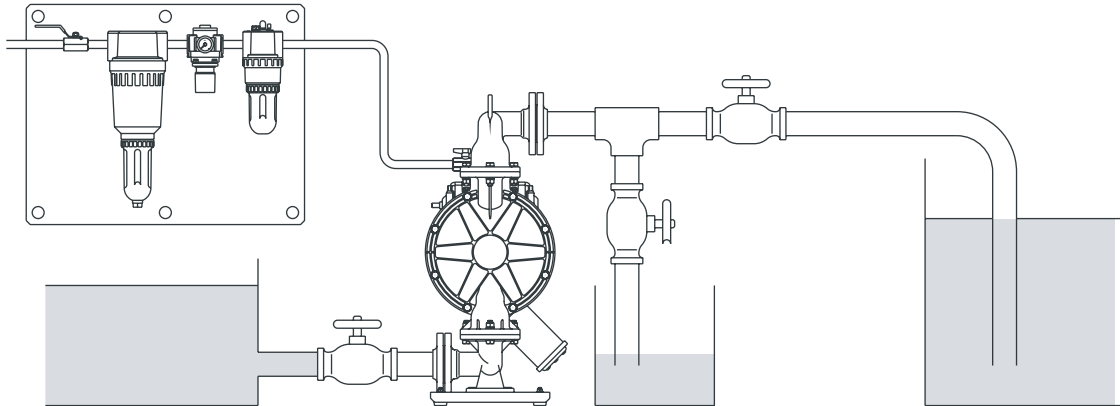


Fig 5.3



### **Caution**

- Use a flexible hose to absorb pump vibration, and ground the hose.
- Make sure that there will be no external force on any connection part of the pump. Be especially careful not to have the pump support part of the weight of the hose and the piping.
- The piping and the peripheral equipment may become clogged with sludge. Clean the inside of the piping for 10 to 20 seconds before connecting it to the pump.
- Be sure to sufficiently ground the piping and peripheral equipment.

### **Note:**

- So that sufficient air can be supplied to meet the needs of the pump, the diameter of the piping should be the same as the diameter of the supply port of the pump. Also choose peripheral equipment with sufficient airflow to meet the requirement of air consumption of the pump. Usage and stability of air pressure must be considered. Also must be installed at nearest position of pump unit.
- If you use a solenoid valve as the air valve, be sure it is a three-way valve. When the valve is closed, the internal compressed air of the pump will be released, and this will switch the spool to its normal position.
- Use of a coupler for the connection part of each hose will make operation and maintenance easier.
- In case of intermittent operation, lubrication is not required during operation. However, when pump is operating by dry air and in case of continuous operation and/or transferring high temperature liquid (exceeded 70°C), lubrication must be required. Must be used turbine oil (Equivalent VD32 grade) for lubricants. Adjust lubricator to supply minimum amount of oil to pump unit.

## 11.0 Operation

### 11.1 Method of operation



#### **Caution**

- Before starting the pump, make sure that all piping is properly connected.
- Also, before starting the pump, make sure that all the bolts are securely tightened. (Refer to the maintenance manual for the bolts that a regulation torque are explained).
- Make sure that the air valve, regulator and the drain valve on the discharge side are closed. Also, make sure that the valve on the suction side is opened.

- 1) Start the air compressor
- 2) Open the air valve in front of each piece of peripheral equipment, and adjust the supply air pressure with a regulator to within the permissible range (see 15.0 Main specifications).
- 3) Open the flow valve on the discharge side.
- 4) Press the reset button, and then slowly open the air valve of the pump.
- 5) First, verify that fluid is flowing inside the piping and is being pumped to the discharge side, and then fully open the air valve.



#### **Caution**

- Do not open the valve suddenly.
- Turbine oil (equivalent VD 32 grade) must be used for lubricants. Do not apply lubricants more than required and also do not use any other lubricants, which is designated on this instruction manual. This maybe the cause of pump problem and there is danger of serious bodily damage.

### 11.2 Flow Adjustment

- Adjust the flow valve on the discharge side. For the relationship among the flow, supply air pressure and discharge pressure, see 22.0 Performance curves.



#### **Caution**

- As you start closing the flow valve, the supply air pressure may rise. Make sure that the pressure is kept within the normal operating range (see 15.0 Main specifications).
- Depending upon the viscosity and specific gravity of the fluid, the suction stroke and other conditions, the permissible suction flow speed of fluid into the pump will vary; however, if the pump speed (flow speed of fluid) increases greatly, cavitation will occur, and this will not only reduce pump performance, but it may cause a malfunction. Adjust the supply air pressure as well as the flow in order to prevent cavitation.
- If fluid is not discharged after you start the pump, or if you hear an abnormal noise or notice any irregularity, shut down the pump immediately (see 14.0 Trouble shooting).

## 11.3 Shutdown

Close the air valve of the pump and shut off the supply air.



### **Caution**

- There is no problem in shutting down the pump with the flow valve closed while air is being supplied; however, if this condition continues for many hours while there is nobody watching the pump, it may continue running when there is a leak from the pump or piping, and fluid may continue flowing out of the position of leakage. Upon finishing your work, release the internal pressure from the pump and close the air valve (see 11.4 Releasing the pressure).
- When the pump is shut down while pumping slurry, particulate matter contained in the slurry will be deposited and get stuck inside the out chamber. If the pump is started again as-is, the diaphragm may be damaged or the centre disk may be overloaded, and this may cause damage such as bending of the centre rod. After finishing your work, purge the remaining fluid from the pump (see 12.0 Method of cleaning).

## 11.4 Releasing the pressure

- 1) Make sure that the air valve of the pump is closed.
- 2) Shut down the air compressor or close the valve on the air-supply side of the peripheral equipment.
- 3) Close the flow valve on the discharge side, start slowly opening the drain valve, and discharge the fluid under pressure.
- 4) Open the air valve of the pump, start running the pump, and discharge the remaining air.
- 5) After making sure that the pump has been shut down and the pressure has been released, fully open the regulator, and close the air valve and drain valve of the pump.



### **Caution**

- Keep a vessel below the relief valve to catch any drain off.
- Fluid under pressure will gush out as soon as you open the valve, so be careful.
- If the pump will be unused for a prolonged period, purge and clean the pump (see 5.0 Operating caution).

## 12.0 Method of cleaning



### **Caution**

- Before starting operation, make sure that compressed air is not supplied to the pump.
  - Before starting operation, make sure that the pump is not pressurised.
- 1) Remove the hose from the suction side of the pump.
  - 2) Close the flow valve on the discharge side, open the drain valve, and then operate a pump by starting air pressure for a while to discharge any fluid remaining inside the pump as much as possible.
  - 3) Remove the hose from the discharge side, and attach different hoses to the suction side and the discharge side for cleaning.
  - 4) Be ready with a vessel with cleaning solution, select cleaning solution appropriate for the type of fluid pumped, and then connect the suction-side and the discharge-side hoses of the pump.
  - 5) Operate a pump by starting air pressure slowly, and let the cleaning solution circulate for sufficient cleaning.
  - 6) Finally, flush with clean water.
  - 7) Remove the hose from the suction side of the pump, run the pump for a while and purge the pump of remaining fluid as much as possible.



### **Caution**

- Be careful when removing piping. Fluid will gush out.
- After cleaning with clean water, turn the pump upside-down to drain out the water.

## 13.0 Daily check

- Before starting pump operation, be sure to conduct the following check every day. If any irregularity is found, do NOT start running the pump until the cause of the irregularity has been found and corrective measures have been taken.
  - a) Verify the drain flow through the air filter.
  - b) In the case of using a lubricator, verify the quantity of lubricating oil.
  - c) Make sure that there is no leakage of fluid from any connection part or the pump.
  - d) Make sure that there are no cracks in the pump casing or piping.
  - e) Check the tightness of every bolt of the pump.
  - f) Make sure that the connection parts of the piping and peripheral equipment are not loose.
  - g) Make sure that the time has not elapsed for replacing any parts of the pump that are to be replaced at regular intervals.

## 14.0 Trouble shooting

| <b>Cause</b>   | <b>Action to be taken</b>   |
|--|---|
| <b><i>Pump does not run</i></b>  |   |
| The exhaust port (silencer) of pump is clogged with sludge.                      | Check and clean the exhaust port and silencer.  |
| Air is not supplied.   | Start the compressor and open the air valve and air regulator.  |
| The supply air pressure is low.  | Check the compressor and the configuration of air piping.   |
| Air leaks from connection parts.   | Check the connection parts and tightness of bolts.  |
| Air piping or peripheral equipment is clogged with sludge.                       | Check and clean the air piping.   |
| The flow valve on the discharge side is not open.                                | Open the flow valve on the discharge side.  |
| The spool stopped in neutral position.   | Press the reset button.   |
| The fluid piping is clogged with sludge.   | Check and clean the fluid piping.   |
| The pump is clogged with sludge.   | Disassemble the casing, check and clean.  |
| <b><i>Pump runs, but fluid does not come out</i></b>                             |   |
| The suction lift or discharge head is long.                                      | Confirm the piping configuration and shorten the length.  |
| The discharge-side fluid piping (including the strainer) is clogged with sludge. | Check and clean the fluid piping.   |
| The valve on the suction side is not open.                                       | Open the valve on the suction.  |
| The pump is clogged with sludge.   | Disassemble the casing, check and clean.  |
| The ball and valve seat are worn out or damaged.                                 | Disassemble the manifold, check and replace parts.  |
| <b><i>Flow (discharge volume) decreased</i></b>                                  |   |
| The supply air pressure is low.  | Check the compressor and configuration of air piping.   |
| Air piping or peripheral equipment is clogged with sludge.                       | Check and clean the air piping.   |
| The discharge-side flow valve opens differently.                                 | Adjust the discharge-side flow valve.   |
| Air is taken in together with fluid.   | Replenish fluid and check the configuration of the suction-side piping.   |
| Cavitation occurs.   | Adjust the supply air pressure and discharge pressure, and shorten the suction lift.                                    |
| Chattering occurs.   | Adjust the supply air pressure and discharge pressure. Reduce inlet flow valve to adjusting liquid pressure and volume. |

| <b>Cause</b>  | <b>Action to be taken</b>  |
|---|--|
| <b><i>Flow (discharge volume) decreased</i></b>   |  |
| Icing on air-switching portion.   | Eliminate ice from air-switching valve and check and clean the air filter. Use external exhaust hose to control exhaust air speed. (Refer Fig 4.2) |
| The fluid piping (including the strainer) is clogged with sludge.                       | Check and clean the fluid piping and strainer.   |
| The exhaust port (silencer) of the pump is clogged with sludge.                         | Check and clean the exhaust port and silencer.   |
| The pump is clogged with sludge.  | Disassemble the casing, check and clean.   |
| <b><i>Liquid leakage from exhaust port (silencer)</i></b>                               |  |
| The diaphragm is damaged.   | Disassemble and check the pump and replace the diaphragm.  |
| The fastening nuts for the centre disk are loose.                                       | Disassemble and check the pump. Tighten the nuts.  |
| <b><i>High air consumption during operation</i></b>                                     |  |
| The seal ring and sleeve are worn out.  | Disassemble the air-switch portion, check and clean. Replace parts as necessary.   |
| <b><i>Irregular noise</i></b>   |  |
| The supply air pressure too high.   | Adjust the supply air pressure.  |
| The spool oscillates/balls chattering.  | Adjust the supply air pressure and discharge pressure. Reduce inlet flow valve to adjusting liquid pressure and volume.                            |
| The pump is clogged with sludge with particles of larger than the permissible diameter. | Disassemble the casing, check and clean.   |
| <b><i>Irregular vibration</i></b>   |  |
| The supply air pressure is too high.  | Adjust the supply air pressure.  |
| The spool oscillates and occur ball chattering.   | Adjust the supply air pressure and exhaust pressure.   |
| Connection part and pump mounting are loose.  | Check each connection part and tighten the bolts.  |

- If disassembly is required, see Chapter 16.0 and following chapters.
- If any of the above mentioned causes does not apply to your problem, contact SPX Process Equipment.

## 15.0 Main specifications

| Type                                       | BA                                | BS     | BP           | BTT    | BXT    |
|--|-----------------------------------|--------|--------------|--------|--------|
| Nominal Diameter                           | 3/8"                              |        |              |        |        |
| <b>Fluid Connection</b>                    |                                   |        |              |        |        |
| Suction Port                               | BSP 3/8"                          |        |              |        |        |
| Discharge Port                             |                                   |        |              |        |        |
| <b>Air Connection</b>                      |                                   |        |              |        |        |
| Supply Port                                | Rc 1/4"                           |        |              |        |        |
| Exhaust Port                               | Rc 3/8"                           |        |              |        |        |
| Nominal Air Pressure                       | 0.2~0.7 MPa                       |        | 0.2~0.5 MPa  |        |        |
| Maximum Discharge Pressure                 | 0.7 MPa                           |        | 0.5 MPa      |        |        |
| Discharge Volume/Stroke                    | 50 ml                             |        |              |        |        |
| Maximum Discharge Volume                   | 20 l/min                          |        | 17 l/min     |        |        |
| Maximum Air Consumption                    | 300 NI/min                        |        | 200 NI/min   |        |        |
| Slurry Limitation                          | 1 mm or less                      |        | 1 mm or less |        |        |
| Limitation of Viscosity 1)                 | --                                |        |              |        |        |
| <b>Operating Ambient Temperature range</b> |                                   |        |              |        |        |
| Temperature                                | 0~70°C                            |        |              |        |        |
| Fluid Temp.                                | Diaphragm – NBR/CR: 0~70°C        |        | 0~60°C       |        | 0~70°C |
|  | Diaphragm – TPEE/EPDM: 0~80°C     |        |              |        |        |
|  | Diaphragm – FPM/TPO/PTFE: 0~100°C |        |              |        |        |
| Operating Noise                            | 82 dB                             |        |              |        |        |
| Weight                                     | 3.6 kg                            | 5.3 kg | 3.1 kg       | 6.1 kg | 4.6 kg |

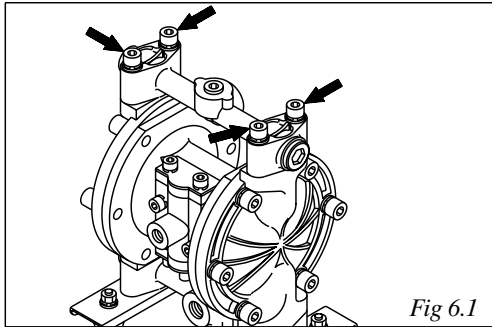
1) Limitation of viscosity is highly dependent on application. Contact SPX Process Equipment for more information.

## 16.0 Balls and Valve seats

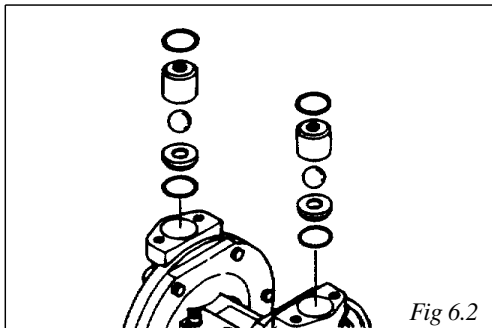
### 16.1 Disassembly

#### 16.1.1 BA\_, BS\_ types – See 20.0 Exploded View

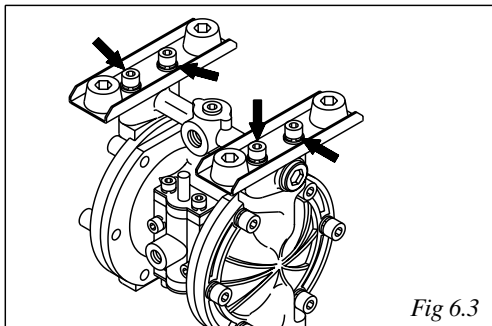
(Fig. 6.1, 6.2, 6.3 and 6.4 show the BA\_)



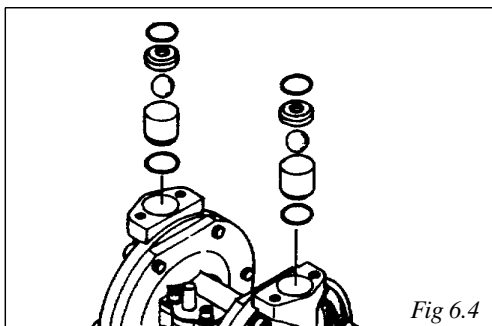
- Remove the 4 retainer bolts from the “out” manifold, and remove the “out” manifold.



- Remove the O ring, ball guide, ball and valve seat.

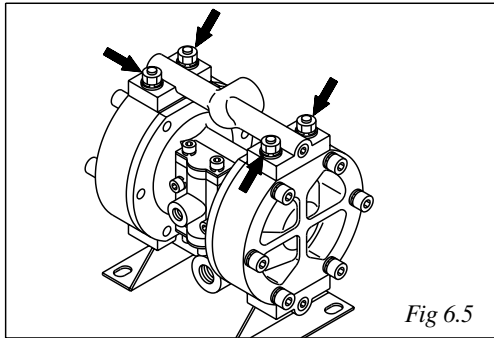


- Turn over the main body assembly.
- Remove the 4 retainer bolts from the “in” manifold, and remove the “in” manifold.

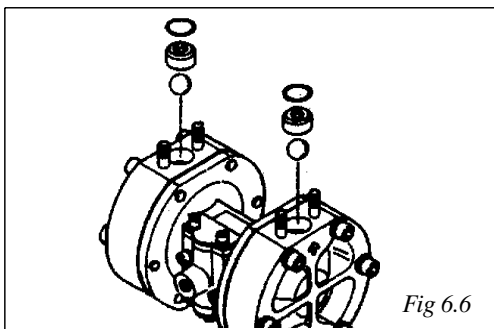


- Remove the O ring, valve seat, ball and ball guide.

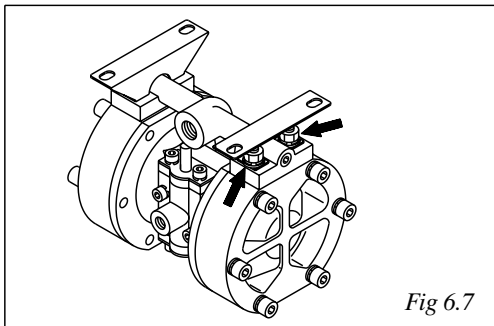
### 16.1.2 BP\_type – See 20.0 Exploded View



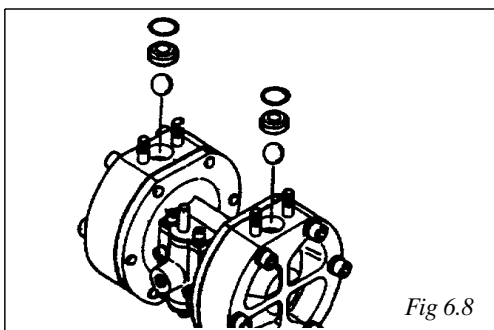
- Remove the 4 retainer nuts from the “out” manifold, and remove the “out” manifold.



- Remove the O ring, ball guide, ball and valve seat.

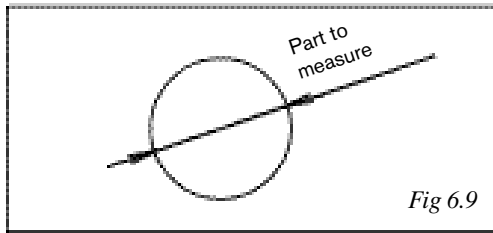


- Turn over the main body assembly.
- Remove the 4 retainer nuts from the “in” manifold, and remove the “in” manifold.



- Remove the O ring, ball and valve seat.

## 16.2 Checking

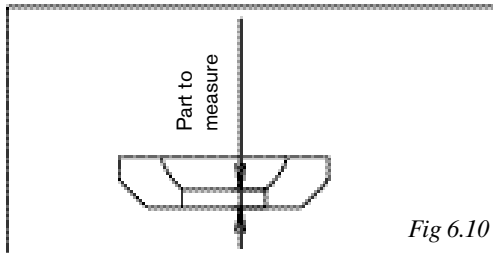


- Ball

Measure the outside diameter, and if it is outside the usable range, replace the ball.

**Usable range of ball**

S ø 14.3 ~ S ø 16.3 mm



- Valve seat

Measure the dimension shown at left, and if it is outside the usable range, replace the valve seat.

**Usable range of valve seat**

|                    |              |
|--------------------|--------------|
| BA_, BS_, BPH, BPT | 2.0 ~ 5.1 mm |
| BPC, BPN, BPE, BPS | 2.0 ~ 6.5 mm |

- O ring (other than PTFE)

If O rings are worn out or cracked, replace them.

## 16.3 Assembly

*Assemble in the reverse order of disassembly.*

**Tightening torque for manifold retainer bolts**

|           |       |
|-----------|-------|
| BA_, BS_: | 12 Nm |
| BP_:      | 6 Nm  |

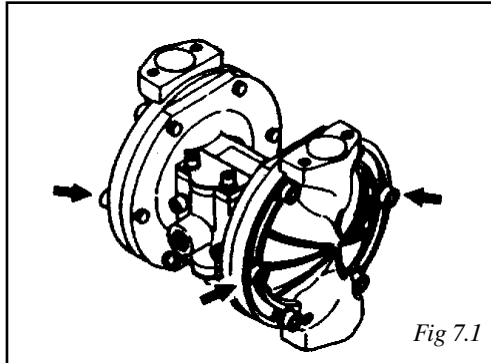
- Make sure there is no dust on the seal surface and the seal is not damaged.
- Replace the PTFE O ring regardless of its condition.

## 17.0 Diaphragm and Center rod

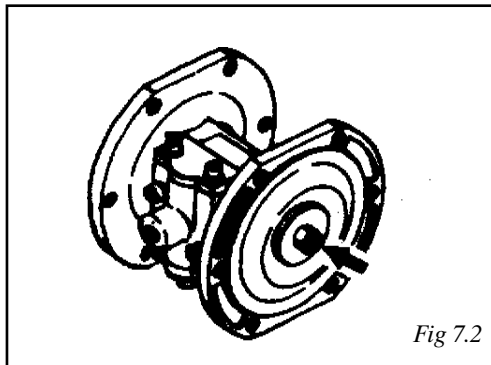
### 17.1 Disassembly

#### 17.1.1 BA\_, BS\_ types - See 20.0 Exploded View

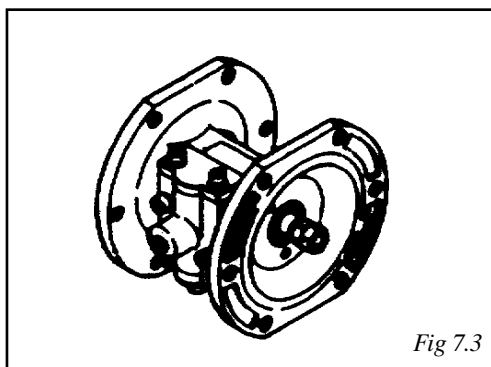
(Fig. 7.1 and 7.2 show the BA\_)



- Remove the ball and valve seat etc.  
(see 16.1.1 Disassembly BA\_, BS\_ types)
- Remove the 6 retainer bolts from the “out” chamber, and remove the “out” chamber.

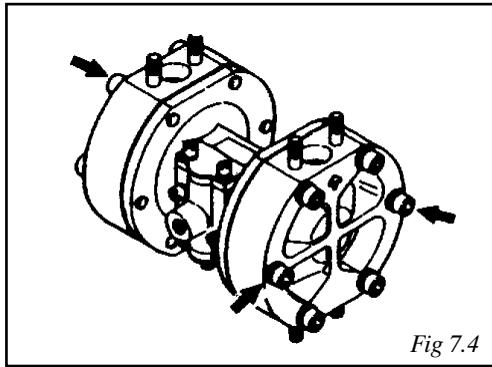


- Remove the nuts on both sides of the center rod.
- After the nuts on one side have been removed, remove the center disk and diaphragm.

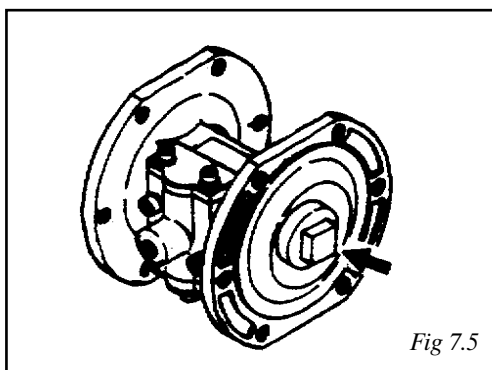


- Remove the nuts on the opposite side using the double nut.
- Remove the coned disk spring, center disk and diaphragm.

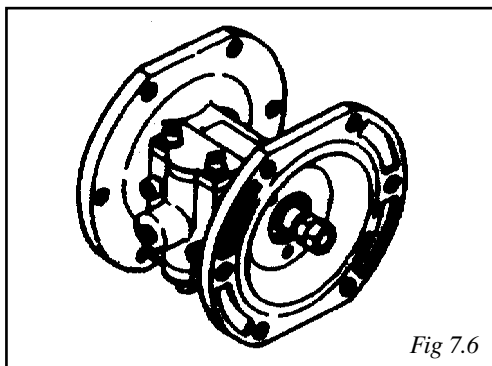
### 17.1.2 BP\_ type – See 20.0 Exploded View



- Remove the ball and valve seat etc.  
(see 16.1.2 Disassembly BP\_ types)
- Remove the 12 retainer bolts from the “out” chamber, and remove the “out” chamber.



- Remove the center disk from one side.
- After the center disk (outside) has been removed, remove the diaphragm and the center disk (inside).



- Remove the center disk and diaphragm from the opposite side using the double nut.

## 17.2 Checking

- Diaphragm

If the diaphragm is worn out or damaged, replace it.

### Guideline of diaphragm life

CR, NBR, PTFE, EPDM: 10,000,000 strokes

TPEE, TPO: 15,000,000 strokes

*(When used with clean water at room temperature)*

## 17.3 Assembly

### 17.3.1 B\_H, B\_S types – See 20.0 Exploded View

*Assemble in the reverse order of disassembly.*

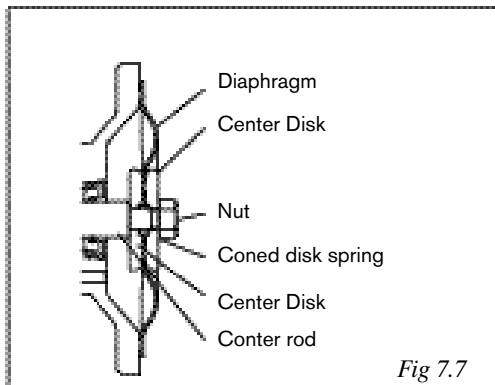


Fig 7.7

- Apply lubricating oil to the center rod, and insert it into the main body.
- Keep the convex side to the outside.
- Tighten the center disk using the open-end wrenches for the TA-10 BP\_. (No coned disk springs and nuts are needed.)
- Tighten the bolts temporarily at first.
- After installation of the “out” chambers on both sides, place the pump on a flat surface and stand the pump upright for further assembly.

**Tightening torque for center rod and out chamber**

12 Nm

**Note**

- Make sure there is no dust on the seal surface in order to prevent seal damage.
- Tighten the bolts so that the balance is equal from both sides on diagonal line with even torque.

### 17.3.2 B\_C, B\_N, B\_T, B\_E types – See 20.0 Exploded View

*Assemble in the reverse order of disassembly.*

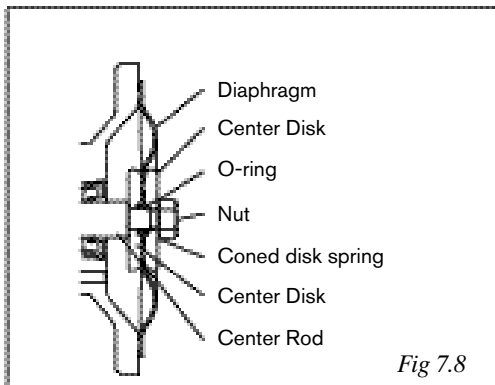


Fig 7.8

- Apply lubricating oil to the center rod, and insert it into the main body.
- Keep the marking “LIQUID” to liquid end for CR, NBR diaphragms.
- Keep the convex side to the outside for PTFE diaphragm.
- Install the O ring.
- Tighten the center disk using the open-end wrenches for the TA-10 BP\_.
- After installation of the “out” chambers on both sides, place the pump on a flat surface and stand the pump upright for further assembly.

**Tightening torque for center rod and out chamber**

12 Nm

**Note**

- Make sure there is no dust on the seal surface in order to prevent seal damage.
- Replace the PTFE O ring by new one.
- Tighten the bolts so that the balance is equal from both sides on diagonal line with even torque.

## 18.0 Center rod, Body and Guide Bush

### 18.1 Disassembly – See 20.0 Exploded View

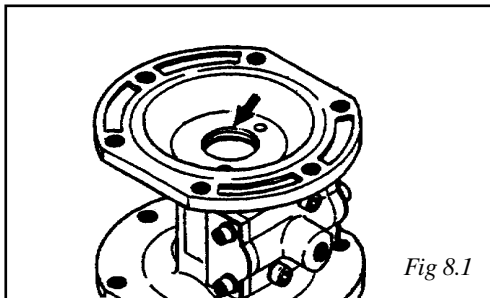


Fig 8.1

- Remove the diaphragm etc. (see 17.1 Disassembly)
- Remove the snap ring, and remove the guide bush and center rod assembly using the snap ring plyer.

### 18.2 Checking

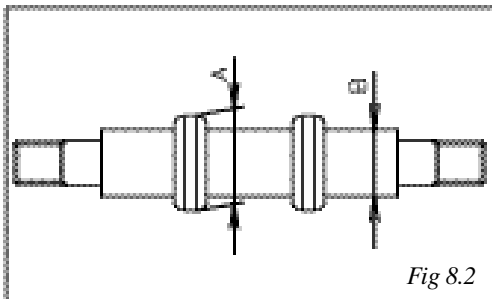


Fig 8.2

- Center rod assembly (Fig. 8.2)
- Measure the outside diameter (A), and if it is outside the usable range, replace the slipper seal.

**Usable range of slipper seal (A)**

ø 19.09 ~ ø 20.0mm

Measure the outside diameter (B), and if it is outside the usable range, replace the center rod Slipper seal.

**Usable range of center rod (B)**

ø 13.09 ~ ø 14.0mm

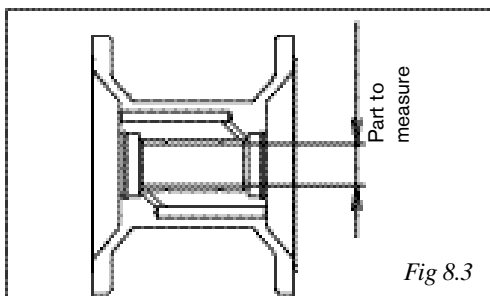


Fig 8.3

- Body (Fig. 8.3)

Measure the inside diameter, and if it is outside the usable range, replace the body.

**Usable range of body**

ø 20.00 ~ ø 20.08mm

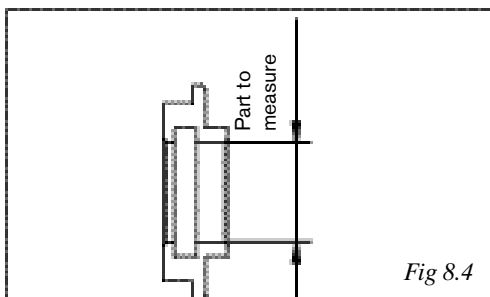


Fig 8.4

- Guide bush (Fig. 8.4)

Measure the inside diameter, and if it is outside the usable range, replace the guide bush.

**Usable range of guide bush**

ø 14.02 ~ ø 14.08mm

- O ring

If the O ring is worn out or cracked, replace it.

### 18.3 Assembly – See 20.0 Exploded View

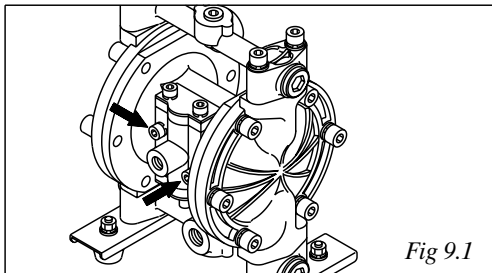
Assemble in the reverse order of disassembly. **Note**

- Make sure there is no dust on the seal surface and the seal is not damaged.

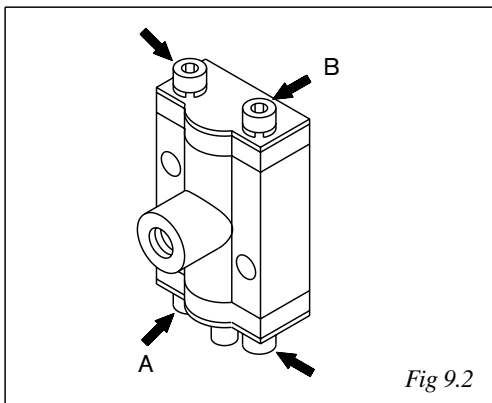
## 19.0 Seal ring and Sleeve

### 19.1 Disassembly – See 20.0 Exploded View

(Fig 9.1 shows the BA\_)

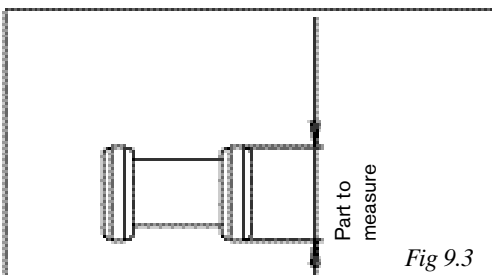


- Remove the 4 retainer bolts from the spool valve case, and remove the spool valve case.



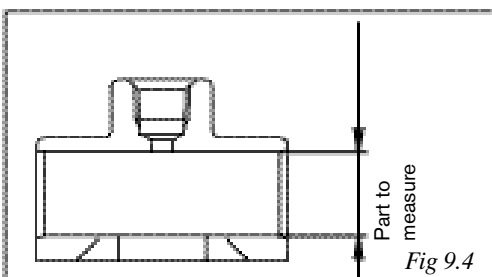
- Remove the 2 retainer bolts from the cap, and remove the reinforcement plate A, cap and reset button.
- Remove the 2 retainer bolts from the cap, and remove the reinforcement plate B, and cap.
- Remove the spool valve assembly from the spool valve case.

### 19.2 Checking



- Spool valve assembly.  
Measure the outside diameter, and if it is outside the usable range, replace the slipper seal.

**Usable range of spool valve assembly**  
 $\varnothing 19.9 \sim \varnothing 20.0 \text{ mm}$



- Spool valve case.  
Measure the inside diameter, and if it is outside the usable range, replace the spool valve case.

**Usable range of spool valve case**  
 $\varnothing 20.00 \sim \varnothing 20.08 \text{ mm}$

### 19.3 Assembly - See 20.0 Exploded View

Assemble in the reverse order of disassembly.

**Tightening torque for installation cap**  
 6 Nm

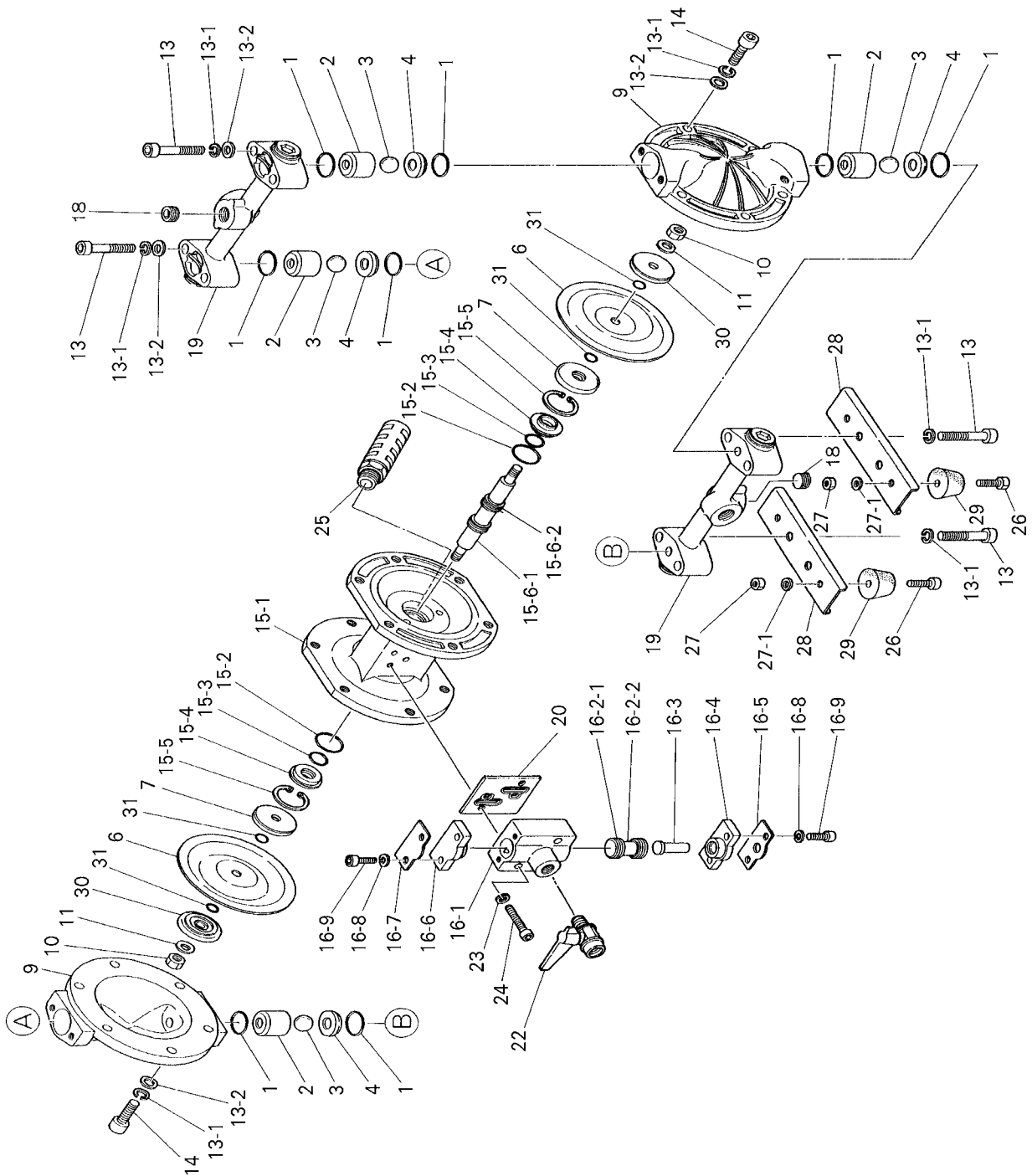
**Tightening torque for installation spool valve case**  
 6 Nm

**Note**

- Make sure there is no dust on the seal surface and it is not damaged.

## 20.0 Exploded view

### 20.1 TA-10 BA\_



Parts list – TA-10 BAC, BAN, BAH, BAT, BAS (*Kits see page 32*)

| No.    | Qty | BAC, BAN, BAH   | BAT, BAS    | Description        |
|--------|-----|---|-------------|--------------------|
| 1      |     | <i>Included in Diaphragm Kits and Valve Kits</i>      |             | O-RING             |
| 2      |     | <i>Included in Valve Kits</i>                         |             | BALL GUIDE         |
| 3      |     | <i>Included in Valve Kits</i>                         |             | BALL               |
| 4      |     | <i>Included in Valve Kits</i>                         |             | VALVE SEAT         |
| 6      |     | <i>Included in Diaphragm Kits</i>                     |             | DIAPHRAGM          |
| 7      | 2   | 272-709-512   | 272-709-512 | CENTRE DISC        |
| 9      | 2   | 272-710-572   | 272-710-572 | PUMP CHAMBER       |
| 10     |     | <i>Included in Diaphragm Kits</i>                     |             | NUT                |
| 11     |     | <i>Included in Diaphragm Kits</i>                     |             | WASHER             |
| 13     | 8   | 272-681-295   | 272-681-295 | BOLT               |
| 13-1   | 20  | 272-681-300   | 272-681-300 | SPRING WASHER      |
| 13-2   | 16  | 272-631-329   | 272-631-329 | WASHER             |
| 14     | 12  | 272-682-944   | 272-682-944 | BOLT               |
| 15-1   | 1   | 272-710-571   | 272-710-571 | BODY               |
| 15-2   |     | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | O-RING             |
| 15-3   |     | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | O-RING             |
| 15-4   |     | <i>Included in Airmotor Kit</i>                       |             | GUIDE BUSH         |
| 15-5   | 2   | 272-630-611   | 272-630-611 | STOP RING          |
| 15-6   | 1   | 272-801-785   | 272-801-785 | CENTRE ROD ASSY    |
| 15-6-1 | 1   | 272-708-501   | 272-708-501 | CENTRE ROD         |
| 15-6-2 | 2   | <i>Included in Airmotor Kit</i>                       |             | SLIPPER SEAL       |
| 16     | 1   | 272-000-500   | 272-000-500 | SPOOL CASE ASSY    |
| 16-1   | 1   | 272-710-574   | 272-710-574 | SPOOL CASE         |
| 16-2   | 1   | 272-801-404   | 272-801-404 | SPOOL ASSY         |
| 16-2-1 | 1   | 272-770-718   | 272-770-718 | SPOOL              |
| 16-2-2 | 1   | 272-681-294   | 272-681-294 | SLIPPER SEAL       |
| 16-3   | 1   | 272-706-798   | 272-706-798 | RESET BUTTON       |
| 16-4   |     | <i>Included in Airmotor Seal Kit</i>                  |             | SPOOL COVER BOTTOM |
| 16-5   | 1   | 272-710-587   | 272-710-587 | SPOOL PLATE BOTTOM |
| 16-6   | 1   | <i>Included in Airmotor Seal Kit</i>                  |             | SPOOL COVER TOP    |
| 16-7   | 1   | 272-710-636   | 272-710-636 | SPOOL PLATE TOP    |
| 16-8   | 4   | 272-681-855   | 272-681-855 | SPRING WASHER      |
| 16-9   | 4   | 272-682-917   | 272-682-917 | BOLT               |
| 18     | 2   | 272-682-279   | 272-682-279 | PLUG               |
| 19     | 2   | 272-802-559   | 272-802-559 | MANIFOLD ASSY      |
| 20     |     | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | GASKET             |
| 22     | 1   | 272-681-292   | 272-681-292 | BALL VALVE         |
| 23     | 2   | 272-681-855   | 272-681-855 | SPRING WASHER      |
| 24     | 2   | 272-682-918   | 272-682-918 | BOLT               |
| 25     | 1   | 272-681-293   | 272-681-293 | MUFFLER            |
| 26     | 4   | 272-000-550   | 272-000-550 | BOLT               |
| 27     | 4   | 272-000-549   | 272-000-549 | NUT                |
| 27-1   | 4   | 272-000-548   | 272-000-548 | WASHER             |
| 28     | 2   | 272-710-586   | 272-710-586 | BASE               |
| 29     | 4   | 272-000-551   | 272-000-551 | STAND RUBBER       |
| 30     | 2   | 272-708-770   | 272-708-770 | CENTRE DISC        |
| 31     |     | <i>Included in Diaphragm Kits</i>                     |             | O-RING             |

## Diaphragm Kits – TA-10 BAC, BAN, BAH, BAT, BAS

(See drawing on page 30)

**For pump:**

| No. | TA-10 BAN   |     | TA-10 BAH   |     | TA-10 BAC   |     | TA-10 BAS   |     | TA-10 BAT   |     |
|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|
|     | 272-K10D-MN | Qty | 272-K10D-MH | Qty | 272-K10D-MC | Qty | 272-K10D-MS | Qty | 272-K10D-MT | Qty |
| 6   | Diaphragm   | 2   | Diaphragm   | 2   | Diaphragm   | 2   | Diaphragm   | 2   | Diaphragm   | 2   |
| 31  | O-ring      | 4   | –           |     | O-ring      | 4   | –           |     | O-ring      | 4   |
| 1   | O-ring      | 4   | O-ring      | 4   | O-ring      | 4   | O-ring      | 4   | O-ring      | 4   |
| 11  | Washer      | 2   | Washer      | 2   | Washer      | 2   | Washer      | 2   | Washer      | 2   |
| 10  | Nut         | 2   | Nut         | 2   | Nut         | 2   | Nut         | 2   | Nut         | 2   |

## Valve Kits – TA-10 BAC, BAN, BAH, BAT, BAS

(See drawing on page 30)

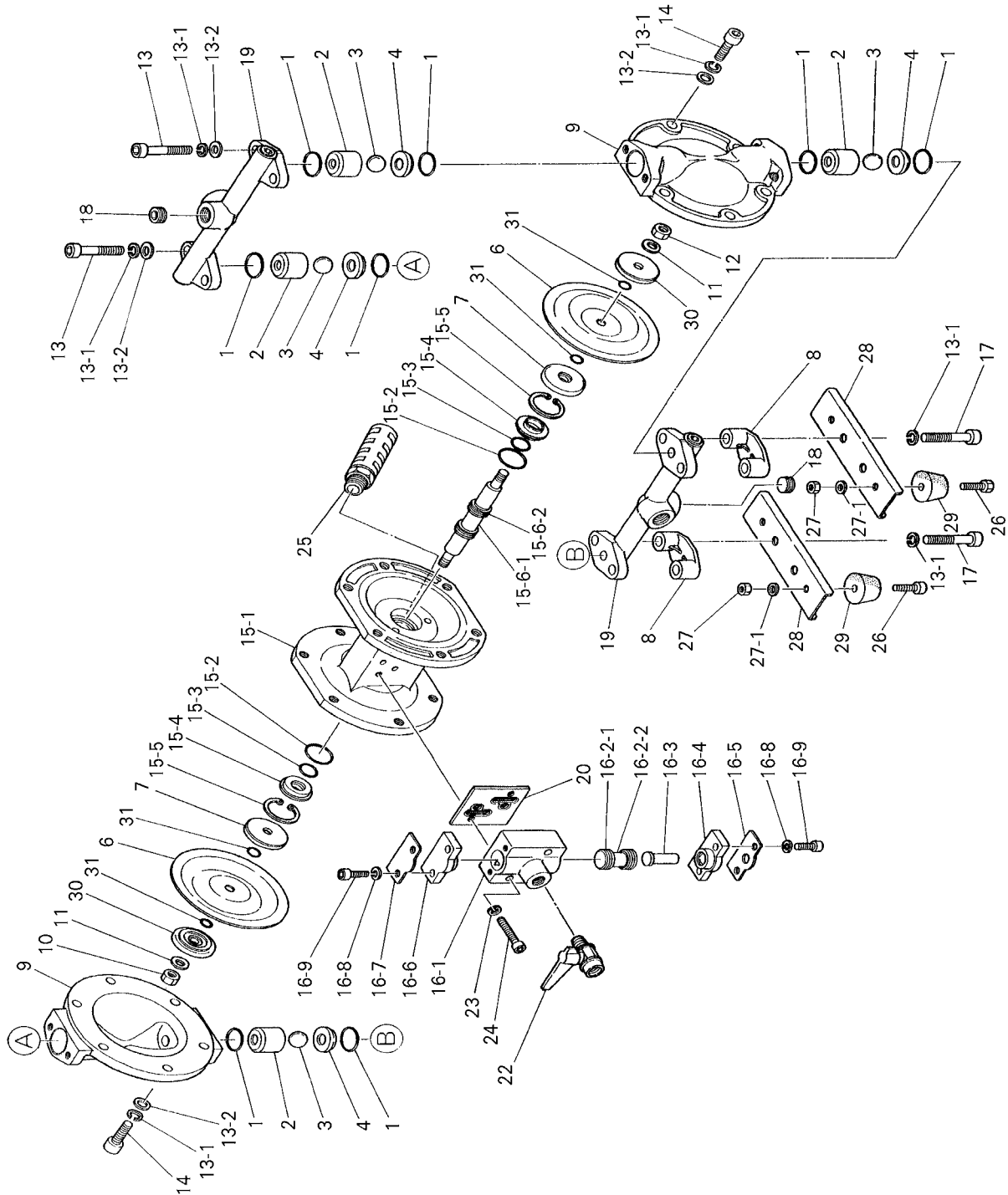
**For pump:**

| No. | TA-10 BAN   |     | TA-10 BAH, BAT |     | TA-10 BAC   |     | TA-10 BAS   |     |
|-----|-------------|-----|----------------|-----|-------------|-----|-------------|-----|
|     | 272-K10V-AN | Qty | 272-K10V-AT    | Qty | 272-K10V-AC | Qty | 272-K10V-AE | Qty |
| 3   | Ball        | 4   | Ball           | 4   | Ball        | 4   | Ball        | 4   |
| 4   | Valve seat  | 4   | Valve seat     | 4   | Valve seat  | 4   | Valve seat  | 4   |
| 2   | Ball guide  | 4   | Ball guide     | 4   | Ball guide  | 4   | Ball guide  | 4   |
| 1   | O-ring      | 8   | O-ring         | 8   | O-ring      | 8   | O-ring      | 8   |

## Airmotor Kit and Airmotor Seal Kit – TA-10

See section 20.5 on page 42

20.2 TA-10 BS\_



Parts list – TA-10 BSC, BSN, BSH, BPST, BSS (*Kits see page 35*)

| No.    | Qty. | BSC, BSN, BSH   | BST, BSS    | Description        |
|--------|------|---|-------------|--------------------|
| 1      |      | <i>Included in Diaphragm Kits and Valve Kits</i>      |             | O-RING             |
| 2      |      | <i>Included in Valve Kits</i>                         |             | BALLGUIDE          |
| 3      |      | <i>Included in Valve Kits</i>                         |             | BALL               |
| 4      |      | <i>Included in Valve Kits</i>                         |             | VALVE SEAT         |
| 6      |      | <i>Included in Diaphragm Kits</i>                     |             | DIAPHRAGM          |
| 7      | 2    | 272-709-512   | 272-709-512 | CENTRE DISC        |
| 8      | 2    | 272-771-380   | 272-771-380 | SPACER             |
| 9      | 2    | 272-710-660   | 272-710-660 | PUMP CHAMBER       |
| 10     |      | <i>Included in Diaphragm Kits</i>                     |             | NUT                |
| 11     |      | <i>Included in Diaphragm Kits</i>                     |             | WASHER             |
| 13     | 4    | 272-682-944   | 272-682-944 | BOLT               |
| 13-1   | 20   | 272-681-300   | 272-681-300 | SPRING WASHER      |
| 13-2   | 16   | 272-631-329   | 272-631-329 | WASHER             |
| 14     | 12   | 272-000-547   | 272-000-547 | BOLT               |
| 15-1   | 1    | 272-710-571   | 272-710-571 | BODY               |
| 15-2   |      | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | O-RING             |
| 15-3   |      | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | O-RING             |
| 15-4   |      | <i>Included in Airmotor Kit</i>                       |             | GUIDE BUSH         |
| 15-5   | 2    | 272-630-611   | 272-630-611 | STOP RING          |
| 15-6   | 1    | 272-801-785   | 272-801-785 | CENTRE ROD ASSY    |
| 15-6-1 | 1    | 272-708-501   | 272-708-501 | CENTRE ROD         |
| 15-6-2 |      | <i>Included in Airmotor Kit</i>                       |             | SLIPPER SEAL       |
| 16     | 1    | 272-000-500   | 272-000-500 | SPOOL CASE ASSY    |
| 16-1   | 1    | 272-710-574   | 272-710-574 | SPOOL CASE         |
| 16-2   |      | <i>Included in Airmotor Kit</i>                       |             | SPOOL ASSY         |
| 16-2-1 | 1    | 272-770-718   | 272-770-718 | SPOOL              |
| 16-2-2 | 1    | 272-681-294   | 272-681-294 | SLIPPER SEAL       |
| 16-3   | 1    | 272-706-798   | 272-706-798 | RESET BUTTON       |
| 16-4   |      | <i>Included in Airmotor Seal Kit</i>                  |             | SPOOL COVER BOTTOM |
| 16-5   | 1    | 272-710-587   | 272-710-587 | SPOOL PLATE BOTTOM |
| 16-6   |      | <i>Included in Airmotor Seal Kit</i>                  |             | SPOOL COVER TOP    |
| 16-7   | 1    | 272-710-636   | 272-710-636 | SPOOL PLATE TOP    |
| 16-8   | 4    | 272-681-855   | 272-681-855 | SPRING WASHER      |
| 16-9   | 4    | 272-682-917   | 272-682-917 | BOLT               |
| 17     | 4    | 272-681-295   | 272-681-295 | BOLT               |
| 18     | 2    | 272-709-340   | 272-709-340 | PLUG               |
| 19     | 2    | 272-831-529   | 272-831-529 | MANIFOLD ASSY      |
| 20     |      | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | GASKET             |
| 22     | 1    | 272-681-292   | 272-681-292 | BALL VALVE         |
| 23     | 2    | 272-681-855   | 272-681-855 | SPRING WASHER      |
| 24     | 2    | 272-682-918   | 272-682-918 | BOLT               |
| 25     | 1    | 272-681-293   | 272-681-293 | MUFFLER            |
| 26     | 4    | 272-000-550   | 272-000-550 | BOLT               |
| 27     | 4    | 272-000-549   | 272-000-549 | NUT                |
| 27-1   | 4    | 272-000-548   | 272-000-548 | WASHER             |
| 28     | 2    | 272-710-586   | 272-710-586 | BASE               |
| 29     | 4    | 272-000-551   | 272-000-551 | STAND RUBBER       |
| 30     | 2    | 272-708-506   | 272-708-506 | CENTRE DISC        |
| 31     |      | <i>Included in Diaphragm Kits</i>                     |             | O-RING             |

## Diaphragm Kits – TA-10 BSC, BSN, BSH, BST, BSS

(See drawing on page 30)

*For pump:*

| No. | TA-10 BSN   |     | TA-10 BSH   |     | TA-10 BSC   |     | TA-10 BSS   |     | TA-10 BST   |     |
|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|
|     | 272-K10D-MN | Qty | 272-K10D-MH | Qty | 272-K10D-MC | Qty | 272-K10D-MS | Qty | 272-K10D-MT | Qty |
| 6   | Diaphragm   | 2   | Diaphragm   | 2   | Diaphragm   | 2   | Diaphragm   | 2   | Diaphragm   | 2   |
| 31  | O-ring      | 4   | –           |     | O-ring      | 4   | –           |     | O-ring      | 4   |
| 1   | O-ring      | 4   | O-ring      | 4   | O-ring      | 4   | O-ring      | 4   | O-ring      | 4   |
| 11  | Washer      | 2   | Washer      | 2   | Washer      | 2   | Washer      | 2   | Washer      | 2   |
| 10  | Nut         | 2   | Nut         | 2   | Nut         | 2   | Nut         | 2   | Nut         | 2   |

## Valve Kits – TA-10 BSC, BSN, BSH, BST, BSS

(See drawing on page 30)

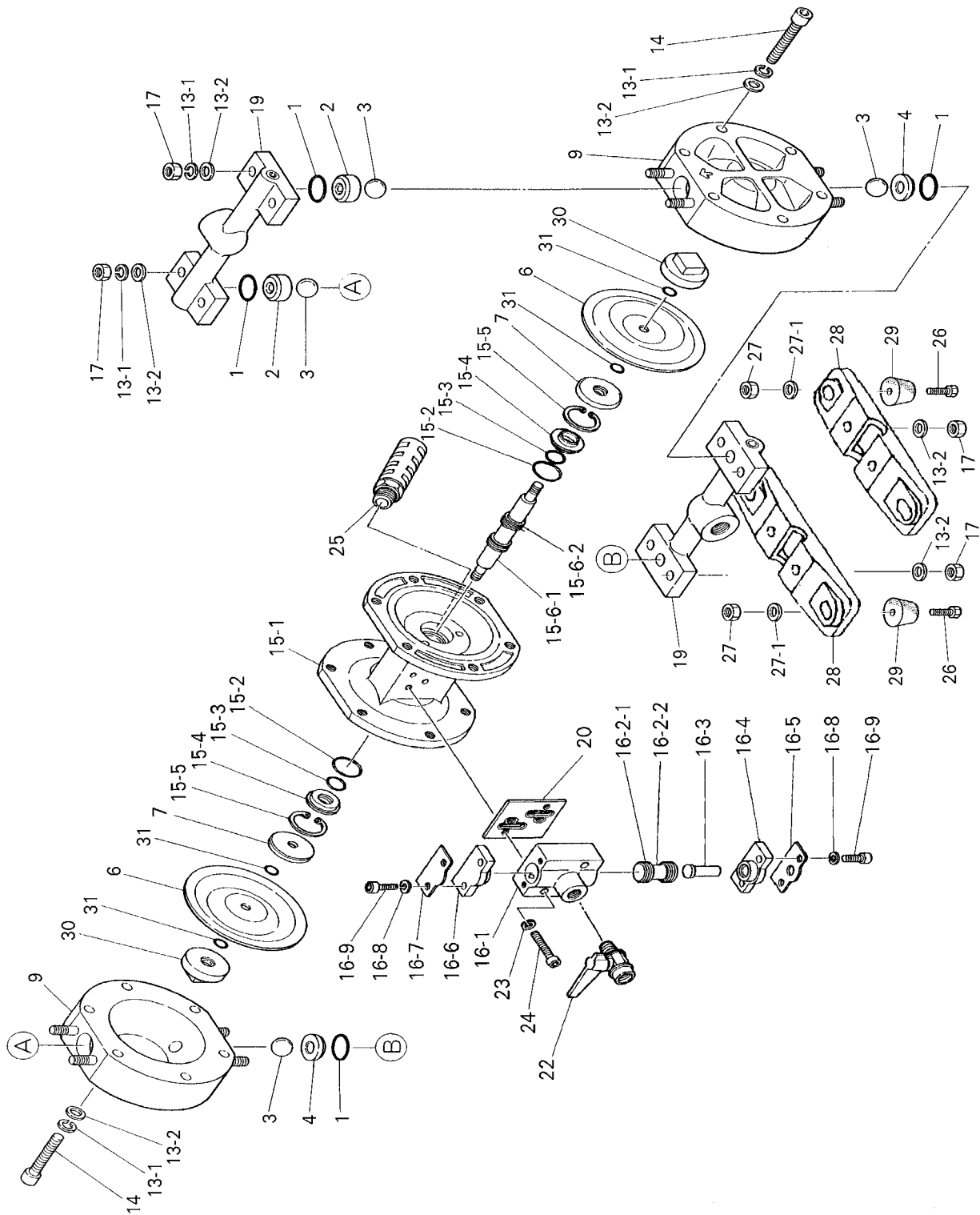
*For pump:*

| No. | TA-10 BSN   |     | TA-10 BSH, BST |     | TA-10 BSC   |     | TA-10 BSS   |     |
|-----|-------------|-----|----------------|-----|-------------|-----|-------------|-----|
|     | 272-K10V-SN | Qty | 272-K10V-ST    | Qty | 272-K10V-SC | Qty | 272-K10V-SE | Qty |
| 3   | Ball        | 4   | Ball           | 4   | Ball        | 4   | Ball        | 4   |
| 4   | Valve seat  | 4   | Valve seat     | 4   | Valve seat  | 4   | Valve seat  | 4   |
| 2   | Ball guide  | 4   | Ball guide     | 4   | Ball guide  | 4   | Ball guide  | 4   |
| 1   | O-ring      | 8   | O-ring         | 8   | O-ring      | 8   | O-ring      | 8   |

## Airmotor Kit and Airmotor Seal Kit – TA-10

See section 20.5 on page 42

20.3 TA-10 BP\_



Parts list – TA-10 BPC, BPN, BPH, BPT, BPS (*Kits see page 38*)

| No.    | Qty | BPC, BPN, BPH   | BPT, BPS    | Description        |
|--------|-----|---|-------------|--------------------|
| 1      |     | <i>Included in Diaphragm Kits and Valve Kits</i>      |             | O-RING             |
| 2      |     | <i>Included in Valve Kits</i>                         |             | BALL GUIDE         |
| 3      |     | <i>Included in Valve Kits</i>                         |             | BALL               |
| 4      |     | <i>Included in Valve Kits</i>                         |             | VALVE SEAT         |
| 6      |     | <i>Included in Diaphragm Kits</i>                     |             | DIAPHRAGM          |
| 7      | 2   | 272-708-770   | 272-708-770 | CENTRE DISC        |
| 9      | 2   | 272-770-967   | 272-770-967 | PUMP CHAMBER       |
| 13-1   | 16  | 272-681-300   | 272-681-300 | SPRING WASHER      |
| 13-2   | 20  | 272-631-329   | 272-631-329 | WASHER             |
| 14     | 12  | 272-682-945   | 272-682-945 | BOLT               |
| 15-1   | 1   | 272-710-571   | 272-710-571 | BODY               |
| 15-2   |     | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | O-RING             |
| 15-3   |     | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | O-RING             |
| 15-4   |     | <i>Included in Airmotor Kit</i>                       |             | GUIDE BUSH         |
| 15-5   | 2   | 272-630-611   | 272-630-611 | STOP RING          |
| 15-6   | 1   | 272-801-785   | 272-801-785 | CENTRE ROD ASSY    |
| 15-6-1 | 1   | 272-708-501   | 272-708-501 | CENTRE ROD         |
| 15-6-2 |     | <i>Included in Airmotor Kit</i>                       |             | SLIPPER SEAL       |
| 16     | 1   | 272-000-500   | 272-000-500 | SPOOL CASE ASSY    |
| 16-1   | 1   | 272-710-574   | 272-710-574 | SPOOL CASE         |
| 16-2   |     | <i>Included in Airmotor Kit</i>                       |             | SPOOL ASSY         |
| 16-2-1 | 1   | 272-770-718   | 272-770-718 | SPOOL              |
| 16-2-2 | 1   | 272-681-294   | 272-681-294 | SLIPPER SEAL       |
| 16-3   | 1   | 272-706-798   | 272-706-798 | RESET BUTTON       |
| 16-4   |     | <i>Included in Airmotor Seal Kit</i>                  |             | SPOOL COVER BOTTOM |
| 16-5   | 1   | 272-710-587   | 272-710-587 | SPOOL PLATE BOTTOM |
| 16-6   |     | <i>Included in Airmotor Seal Kit</i>                  |             | SPOOL COVER TOP    |
| 16-7   | 1   | 272-710-636   | 272-710-636 | SPOOL PLATE TOP    |
| 16-8   | 4   | 272-681-855   | 272-681-855 | SPRING WASHER      |
| 16-9   | 4   | 272-682-917   | 272-682-917 | BOLT               |
| 17     | 8   | 272-628-012   | 272-628-012 | NUT                |
| 19     | 2   | 272-832-361   | 272-832-361 | MANIFOLD           |
| 20     |     | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | GASKET             |
| 22     | 1   | 272-681-292   | 272-681-292 | BALL VALVE         |
| 23     | 2   | 272-681-855   | 272-681-855 | SPRING WASHER      |
| 24     | 2   | 272-682-918   | 272-682-918 | BOLT               |
| 25     | 1   | 272-681-293   | 272-681-293 | MUFFLER            |
| 26     | 4   | 272-621-153   | 272-621-153 | BOLT               |
| 27     | 4   | 272-628-012   | 272-628-012 | NUT                |
| 27-1   | 4   | 272-631-329   | 272-631-329 | WASHER             |
| 28     | 2   | 272-000-979   | 272-000-979 | BASE               |
| 29     | 4   | 272-770-551   | 272-770-551 | STAND RUBBER       |
| 30     | 2   | 272-770-968   | 272-770-968 | CENTRE DISC        |
| 31     |     | <i>Included in Diaphragm Kits</i>                     |             | O-RING             |

## Diaphragm Kits – TA-10 BPC, BPN, BPH, BPT, BPS

(See drawing on page 36)

*For pump:*

| No. | TA-10 BPN   |     | TA-10 BPH   |     | TA-10 BPC   |     | TA-10 BPS   |     | TA-10 BPT   |     |
|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|
|     | 272-K10D-PN | Qty | 272-K10D-PH | Qty | 272-K10D-PC | Qty | 272-K10D-PS | Qty | 272-K10D-PT | Qty |
| 6   | Diaphragm   | 2   | Diaphragm   | 2   | Diaphragm   | 2   | Diaphragm   | 2   | Diaphragm   | 2   |
| 31  | O-ring      | 4   | –           |     | O-ring      | 4   | –           |     | O-ring      | 4   |
| 1   | O-ring      | 2   | O-ring      | 4   | O-ring      | 2   | O-ring      | 4   | O-ring      | 4   |

## Valve Kits – TA-10 BPC, BPN, BPH, BPT, BPS

(See drawing on page 36)

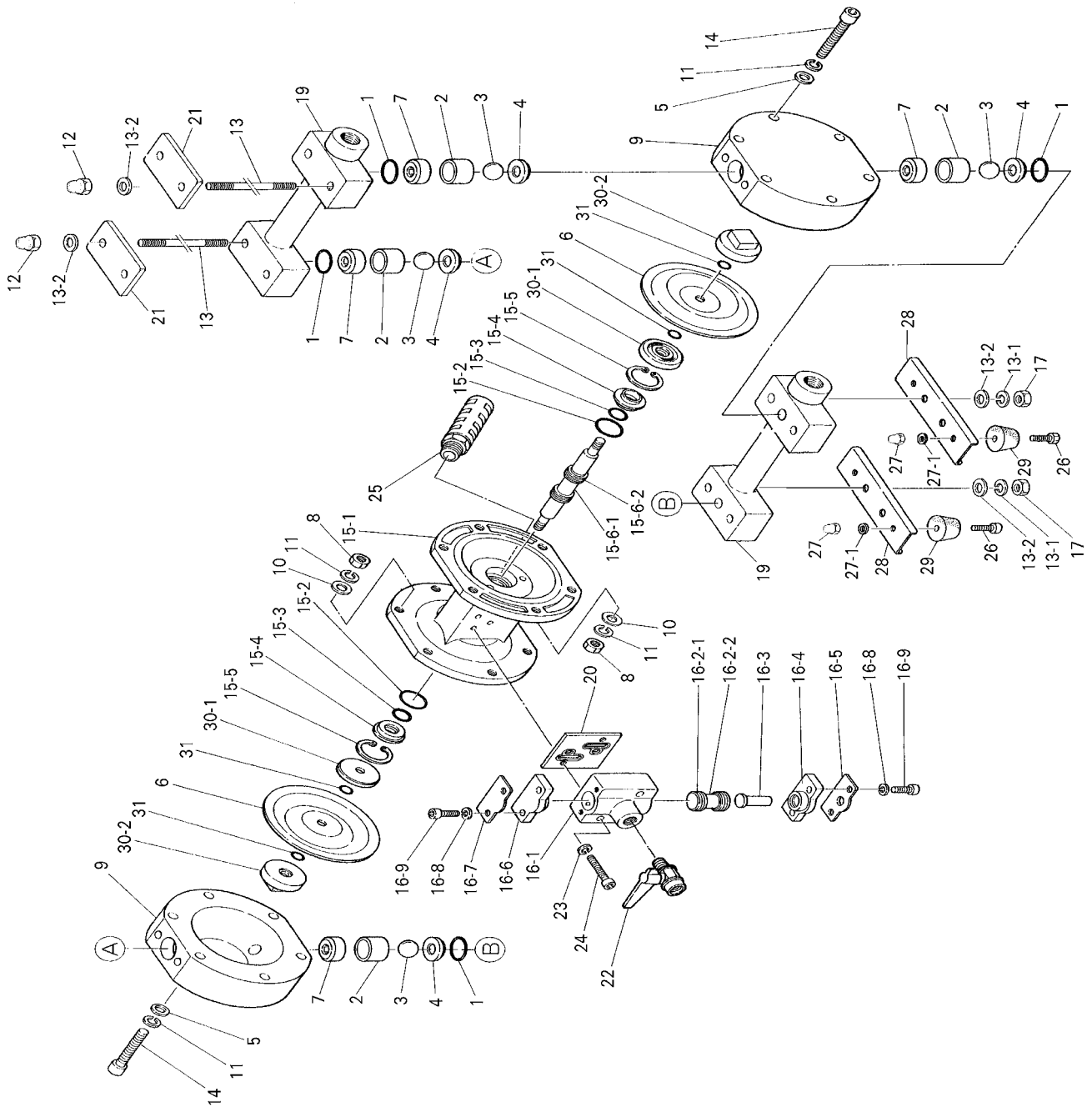
*For pump:*

| No. | TA-10 BPN   |     | TA-10 BPH, BPT |     | TA-10 BPC   |     | TA-10 BPS   |     |
|-----|-------------|-----|----------------|-----|-------------|-----|-------------|-----|
|     | 272-K10V-PN | Qty | 272-K10V-PT    | Qty | 272-K10V-PC | Qty | 272-K10V-PE | Qty |
| 3   | Ball        | 4   | Ball           | 4   | Ball        | 4   | Ball        | 4   |
| 4   | Valve seat  | 2   | Valve seat     | 2   | Valve seat  | 2   | Valve seat  | 2   |
| 2   | Ball guide  | 2   | Ball guide     | 2   | Ball guide  | 2   | Ball guide  | 2   |
| 1   | O-ring      | 2   | O-ring         | 4   | O-ring      | 2   | O-ring      | 4   |

## Airmotor Kit and Airmotor Seal Kit – TA-10

See section 20.5 on page 42

## 20.4 TA-10 BTT, BXT



## Parts list – TA-10 BTT, BXT (*Kits see page 41*)

| No.    | Qty | BTT   | BXT         | Description        |
|--------|-----|---|-------------|--------------------|
| 1      |     | <i>Included in Diaphragm Kits and Valve Kits</i>      |             | O-RING             |
| 2      |     | <i>Included in Valve Kits</i>                         |             | VALVE GUIDE        |
| 3      |     | <i>Included in Valve Kits</i>                         |             | BALL               |
| 4      |     | <i>Included in Valve Kits</i>                         |             | VALVE SEAT         |
| 5      | 12  | 272-000-076   | 272-000-076 | WASHER             |
| 6      |     | <i>Included in Diaphragm Kits</i>                     |             | DIAPHRAGM          |
| 7      | 4   | 272-770-985   | 272-000-093 | RETAINER           |
| 8      | 12  | 272-628-012   | –           | NUT                |
| 9      | 2   | 272-770-987   | 272-000-095 | PUMP CHAMBER       |
| 10     | 12  | 272-631-329   | –           | WASHER             |
| 11     | 12  | 272-681-300   | 272-681-300 | SPRING WASHER      |
| 12     | 4   | 272-000-091   | 272-000-091 | CAP NUT            |
| 13     | 2   | 272-000-803   | 272-000-803 | THREAD END         |
| 13-1   | 4   | 272-681-855   | 272-681-855 | SPRING WASHER      |
| 13-2   | 8   | 272-631-328   | 272-631-328 | WASHER             |
| 14     | 12  | 272-621-159   | 272-682-945 | BOLT               |
| 15-1   | 1   | 272-710-571 EC  | 272-710-571 | BODY               |
| 15-2   |     | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | O-RING             |
| 15-3   |     | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | O-RING             |
| 15-4   |     | <i>Included in Airmotor Kit</i>                       |             | GUIDE BUSH         |
| 15-5   | 2   | 272-630-611   | 272-630-611 | STOP RING          |
| 15-6   | 1   | 272-801-785   | 272-801-785 | CENTRE ROD ASSY    |
| 15-6-1 | 1   | 272-708-501   | 272-708-501 | CENTRE ROD         |
| 15-6-2 |     | <i>Included in Airmotor Kit</i>                       |             | SLIPPER SEAL       |
| 16     | 1   | 272-000-500   | 272-000-500 | SPOOL CASE ASSY    |
| 16-1   | 1   | 272-710-574   | 272-710-574 | SPOOL CASE         |
| 16-2   |     | <i>Included in Airmotor Kit</i>                       |             | SPOOL ASSY         |
| 16-2-1 | 1   | 272-770-718   | 272-770-718 | SPOOL              |
| 16-2-2 | 1   | 272-681-294   | 272-681-294 | SLIPPER SEAL       |
| 16-3   | 1   | 272-706-798   | 272-706-798 | RESET BUTTON       |
| 16-4   |     | <i>Included in Airmotor Seal Kit</i>                  |             | SPOOL COVER BOTTOM |
| 16-5   | 1   | 272-710-587   | 272-710-587 | SPOOL PLATE BOTTOM |
| 16-6   |     | <i>Included in Airmotor Seal Kit</i>                  |             | SPOOL COVER TOP    |
| 16-7   | 1   | 272-710-636   | 272-710-636 | SPOOL PLATE TOP    |
| 16-8   | 4   | 272-681-855   | 272-681-855 | SPRING WASHER      |
| 16-9   | 4   | 272-682-917   | 272-682-917 | BOLT               |
| 17     | 4   | 272-628-010   | 272-628-010 | NUT                |
| 19     | 2   | 272-000-813   | 272-000-096 | MANIFOLD           |
| 20     |     | <i>Included in Airmotor Kit and Airmotor Seal Kit</i> |             | GASKET             |
| 21     | 2   | 272-000-800   | 272-000-800 | PROTECTOR PLATE    |
| 22     | 1   | 272-681-292   | 272-681-292 | BALL VALVE         |
| 23     | 2   | 272-681-855   | 272-681-855 | SPRING WASHER      |
| 24     | 2   | 272-682-918   | 272-682-918 | BOLT               |
| 25     | 1   | 272-681-293   | 272-681-293 | MUFFLER            |
| 26     | 4   | 272-000-550   | 272-000-550 | BOLT               |
| 27     | 4   | 272-000-091   | 272-000-091 | CAP NUT            |
| 27-1   | 4   | 272-000-548   | 272-000-548 | WASHER             |
| 28     | 2   | 272-710-586   | 272-710-586 | BASE               |
| 29     | 4   | 272-000-551   | 272-000-551 | STAND RUBBER       |
| 30-1   | 2   | 272-708-770   | 272-708-770 | CENTRE DISC        |
| 30-2   | 2   | 272-780-122   | 272-780-122 | CENTRE DISC        |
| 31     |     | <i>Included in Diaphragm Kits</i>                     |             | O-RING             |

Diaphragm Kits – TA-10 BTT, BXT (See drawing on page 39)

**For pump:**

| <b>TA-10 BXT, BTT</b> |                    |            |
|-----------------------|--------------------|------------|
| <b>No.</b>            | <b>272-K10D-PT</b> | <b>Qty</b> |
| 6                     | Diaphragm          | 2          |
| 31                    | O-ring             | 4          |
| 1                     | O-ring             | 4          |

Valve Kits – TA-10 BTT, BXT (See drawing on page 39)

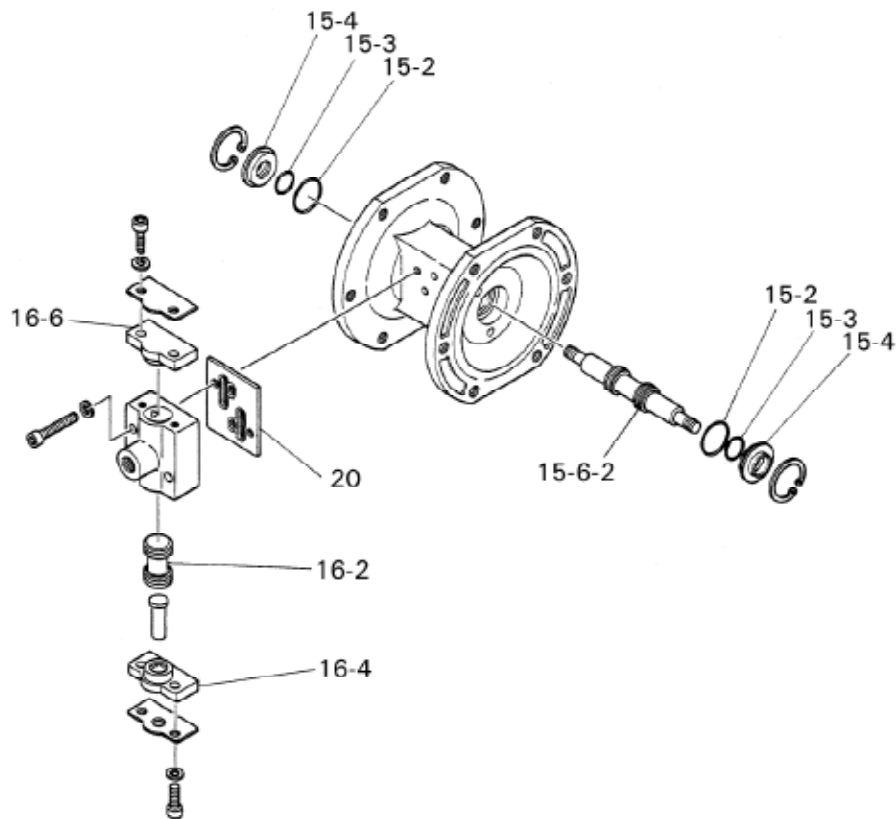
**For pump:**

| <b>No.</b> | <b>TA-10 BXT</b>   |            | <b>TA-10 BTT</b>   |            |
|------------|--------------------|------------|--------------------|------------|
|            | <b>272-K10V-XT</b> | <b>Qty</b> | <b>272-K10V-TT</b> | <b>Qty</b> |
| 3          | Ball               | 4          | Ball               | 4          |
| 4          | Valve seat         | 4          | Valve seat         | 4          |
| 2          | Ball guide         | 4          | Ball guide         | 4          |
| 1          | O-ring             | 4          | O-ring             | 4          |

**Airmotor Kit and Airmotor Seal Kit – TA-10**

**See section 20.5 on page 42**

## 20.5 Airmotor Kit and Airmotor Seal Kit



### Airmotor Kit for TA-10 – 272-K10-AM

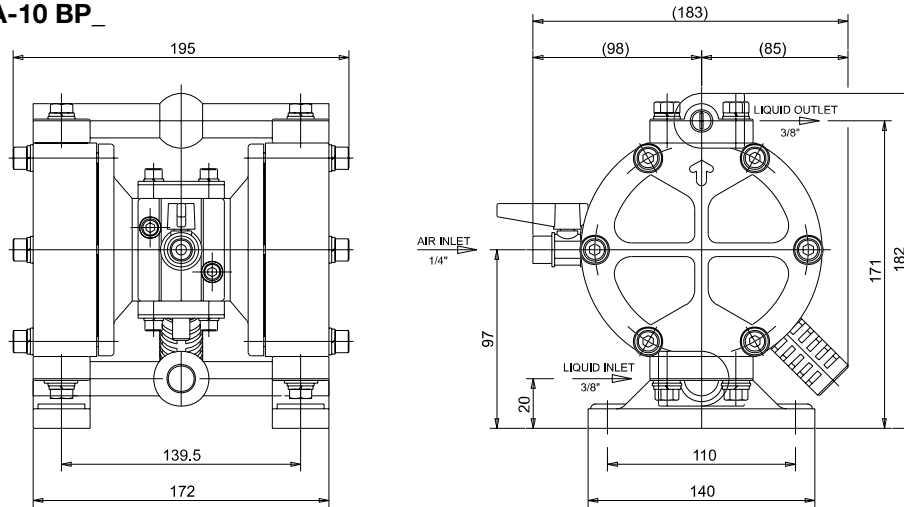
| No.    | Description  | Qty |
|--------|--------------|-----|
| 15-3   | O-ring       | 2   |
| 15-2   | O-ring       | 2   |
| 15-6-2 | Slipper seal | 2   |
| 15-4   | Guide bush   | 2   |
| 20     | Gasket       | 1   |
| 16-2   | Spool assy   | 1   |

### Airmotor Seal Kit for TA-10 – 272-K10-AMS

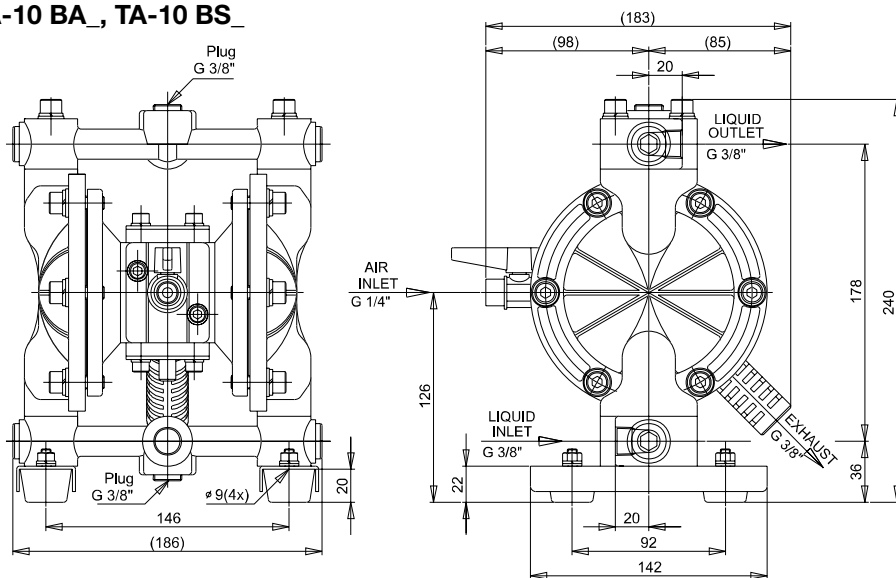
| No.  | Description          | Qty |
|------|----------------------|-----|
| 15-3 | O-ring               | 2   |
| 15-2 | O-ring               | 2   |
| 16-6 | Spool cover (top)    | 2   |
| 16-4 | Spool cover (bottom) | 2   |
| 20   | Gasket               | 1   |

## 21.0 Dimensions

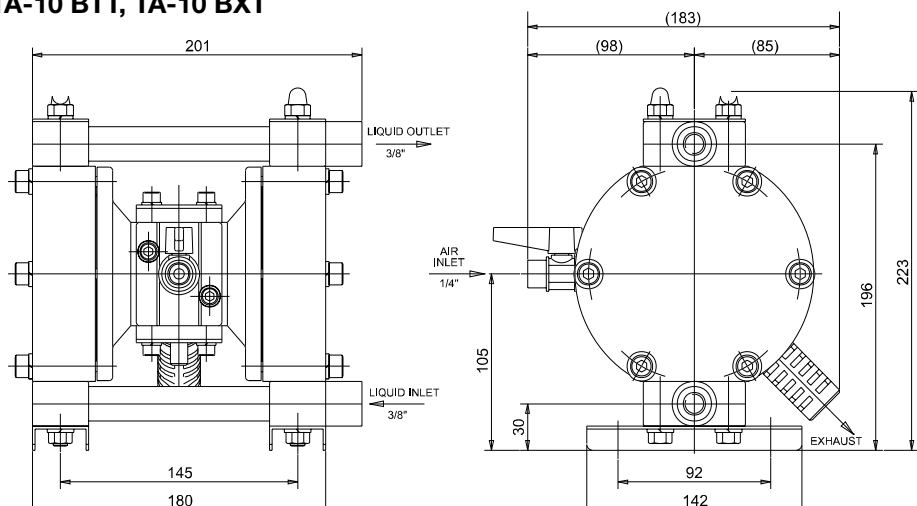
**TA-10 BP\_**



**TA-10 BA\_ , TA-10 BS\_**

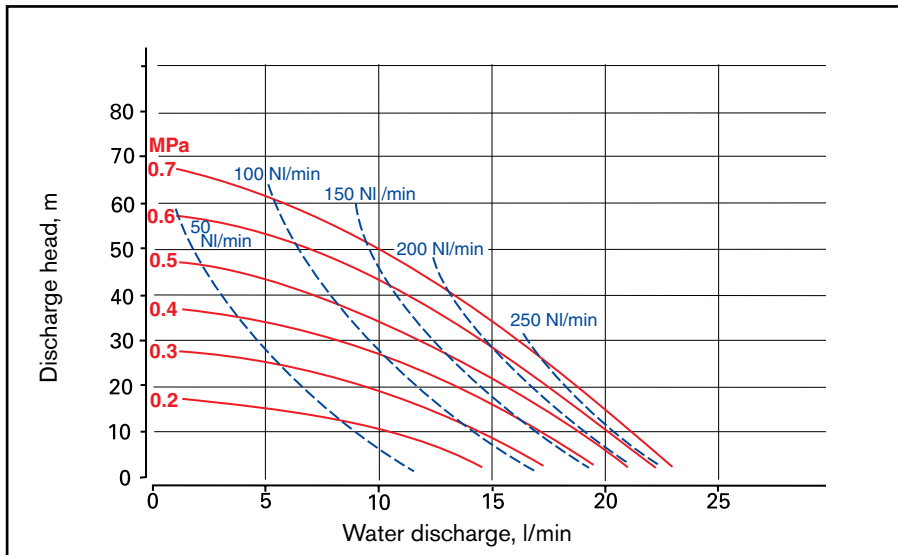


**TA-10 BTT, TA-10 BXT**

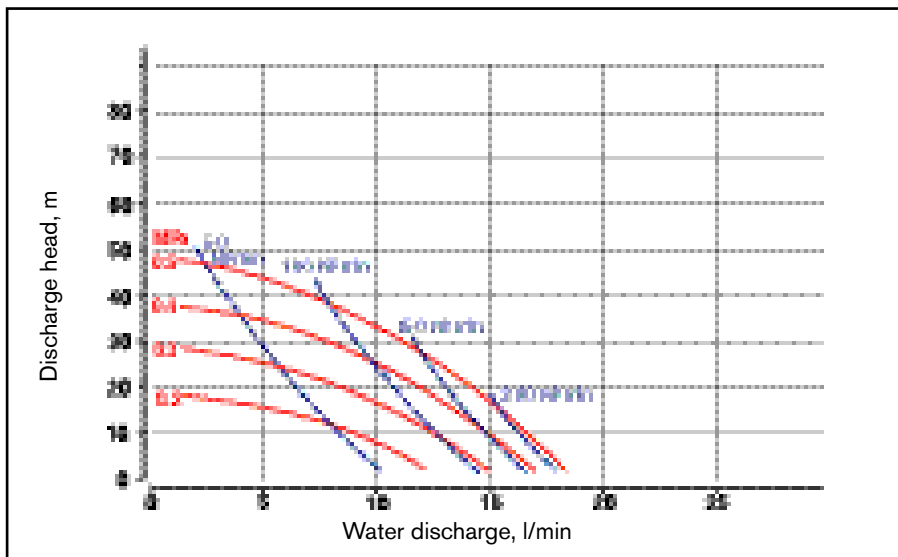


## 22.0 Performance curves

TA-10 BA\_, TA-10 BS\_



TA-10 BP\_, TA-10 BTT, TA-10 BXT



To achieve the best diaphragm lifetime and the most efficient air consumption, select a pump 1.5 times the required capacity.

**Caution:** Supplied air pressure must be kept below 0.5 MPa for Polypropylene, PTFE and PVDF pumps.