

IOM manual

tapflo®

# HVS

## High Viscosity System

### Drum unloading machine

Original Instruction

2021 | 1



Read this instruction manual carefully,  
before you install and operate the device



» All about your flow™

[www.tapflo.com](http://www.tapflo.com)

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## EC DECLARATION OF CONFORMITY 01/EC/HVS/2021

Series:

**HVS ...**

Serial numbers:

**2021 - ...**

Manufactured by:

**Tapflo AB**

**Filaregatan 4**

**442 34 Kungälv, Sweden**

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of declaration: **HVS High Viscosity System**

The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

- Directive 2006/42/EC of European Parliament and of the Council of 17 May 2006 on machinery, amending Directive 95/16/EC;
- Directive 2014/35/UE of the European Parliament and of the Council of 14 February 2014 on harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits;
- 

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Signed for and on behalf of Tapflo AB

A handwritten signature in purple ink, appearing to read 'Håkan Ekstrand'.

Håkan Ekstrand  
**Managing director**  
Kungälv, 28.10.2020

# 0. GENERAL

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## 0. GENERAL

### 0.1. Introduction

The HVS Drum unloading machine is designed for handling high viscous liquids in industrial as well as hygienic applications. The device is designed to be safe, simple and easy to use and maintain. The construction is seal-less and without rotating parts. The device is suitable for a variety of duties in industrial and hygienic installations.

With proper attention to maintenance, Tapflo Products will give efficient and trouble free operation. This instruction manual will familiarise operators with detailed information about installing, operating and maintaining of the pump.

### 0.2. Warning symbols

The following warning symbols are present in this instruction manual.



This symbol stands next to all safety instructions in this instruction manual where danger to life and limb may occur. Observe these instructions and proceed with utmost caution in these situations. Inform also other users of all safety instructions. In addition to the instructions in this instruction manual, the general safety and accident prevention regulations must be observed.



This signal stands at points in this instruction manual of particular importance for compliance with regulations and directives, for correct work flow and for the prevention of damage to and destruction of the complete unit or its subassemblies.

### 0.3. Qualification and training of personnel



The personnel in charge of installation, operation and maintenance of the units must be qualified to carry out the operations described in this manual. Tapflo shall not be held responsible for the training level of personnel and for the fact that they are not fully aware of the contents of this manual. In case any instructions in this manual are unclear or any information is lacking, please contact Tapflo before handling the pump.

# 1. INSTALLATION

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## 1. INSTALLATION

### 1.1. Operation principle

The HVS Drum Unloading machine is a fully pneumatic device. The actuators move the pump up and down, while the AODD pump works due two diaphragms connected by a diaphragm shaft. The shaft is pushed back and forth by alternately pressurising the air chambers behind the diaphragms using an automatically cycling air valve system.

### 1.2. Receiving inspection

Although precaution is taken by us when packing and shipping, we urge you to carefully check the shipment on receipt. Make sure that all parts and accessories listed on the packing list are accounted for. Immediately report any damage or shortage to the transport company and to us.

### 1.3. Lifting and transportation



Before handling the device check the total weight (see 6.4. *Technical data*). Refer to Your local standards on how to handle the unit. If the weight is excessive to transport by hand it must be lifted using slings and a suitable lifting device e.g. a crane or forklift.



Never lift the unit while running.

Be careful that nobody passes under when lifted.

Never try to lift the unit by the hoses attached to the HVS.

As an option pumps can be equipped with lifting eyebolts connected with the pump housing.

Tapflo recommends HVS Based stand option to be transported with use of Euro-pallet.

Wheeled stand is designed to provide mobility of the HVS. To transport HVS equipped with wheeled stand on palette, wheels must be removed before.

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## 1.4. Storage



If the equipment is to be stored prior to installation, place it in a clean location. The unit should be stored in an ambient temperature of 15°C (59°F) to 25°C (77°F) and relative humidity below 65%. It should not be exposed to any heat source e.g. radiator, sun as this could result in a negative way on the tightness of the pump. Do not remove the protective covers from the suction, discharge and air connections which have been fastened to keep unit internals free of debris. Clean the device thoroughly before installation.

## 1.5. Foundation

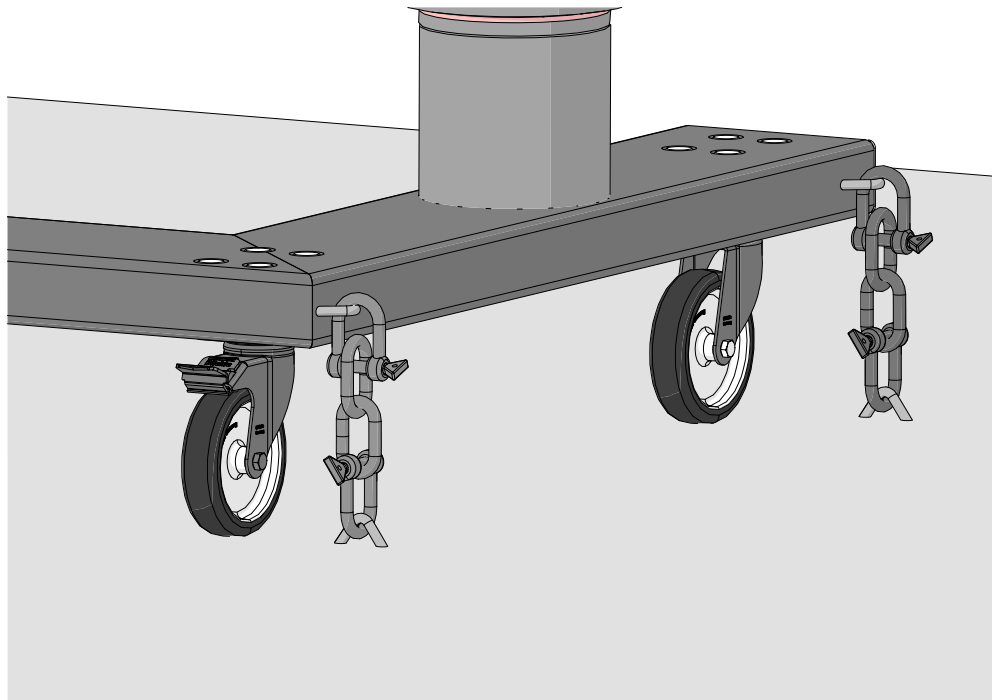


Make sure that the system is standing on a firm, flat and horizontal foundation. Make sure that the base is placed evenly on the foundation to eliminate risk of tilting and falling off.

In wheeled option, make sure that the wheels are locked, before operating the system. For certain applications, unit must be additionally stabilised.



Install the system in a way that the controls are easily accessible. What is more, make sure there is enough space above the system to ensure full lifting of the pump.



The pump with wheeled base stand must be attached to the ground with the chains, that are enclosed to machine. This prevents any unwanted movements and it is important for the safe process of unloading the barrel.



# 1. INSTALLATION

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## 1.6. Environment



There should be enough space in the vicinity of the system in order to operate, maintain and repair it. The area in which the system is operated, must be sufficiently ventilated. Excessive temperature, humidity or dirt may affect the system's operation.

## 1.7. Discharge piping



The HVS is generally part of a piping system that can include a number of components such as valves, fittings, filters, expansion joints, instruments, etc. The way the piping is arranged and the positioning of the components has a great influence on the operation and the lifetime of the system. The system cannot be used as a support for the components connected to it.

### 1.7.1. Connection of discharge pipe



For this connection it is only recommended a simple and positive flow connection. Use a hose or flexible piping (minimum one meter) between the discharge connection and any rigid fixed piping. Coil the hose at least one turn. All components (hose, pipe, valves etc.) on the discharge piping must be designed for minimum PN 10.

## 1.8. Health and safety

The unit must be installed according to local and national safety rules.



Read instruction before operating the machine.



Pay attention to warning signs – danger of damaging hands.



**The system is constructed for particular applications. Do not use it on applications different from that for which it was sold without consulting us to ascertain its suitability.**

### 1.8.1. Protection



In the interest of health and safety it is essential to wear protective clothing and safety goggles when operating, and/or working in the vicinity of Tapflo products.

# 1. INSTALLATION

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## 1.8.2. Chemical hazard



Whenever the system is to be used for a different liquid, it is essential to clean it beforehand in order to avoid any possible reaction between the products. Before the system disassembly clean it thoroughly.

## 1.8.3. Noise level



At tests, the noise level from a Tapflo pump has not exceeded 85 dB(A). Under some circumstances, for example if the pump is operating under high air pressure at low discharge head, the noise can be inconvenient or hazardous for personnel staying for long periods in the vicinity of the pump. This hazard can be prevented by:

- using suitable ear protection;
- lowering the air pressure and/or raising the discharge head;
- leading out the outgoing air from the room by connecting a hose to the muffler connection of the pump;
- using elastomer valve balls (EPDM, NBR or polyurethane) instead of PTFE, ceramic or stainless steel, provided that the elastomer is compatible with the pumped liquid.

## 1.8.4. Air pressure



The maximum air pressure for Tapflo HVS unit is 8 bar. Higher air pressure than 8 bar can damage the pump and may cause injury to personnel in vicinity of the device.

If you intend to apply a higher air pressure than 8 bar, please consult us.  
All other components than the pump are restricted to 6 bar air pressure.  
Make sure not to exceed 1,6 bar pressure for the seal.

## 1.8.5. Temperature hazards



- Raised temperature can cause damage on the pump and/or piping and may also be hazardous for personnel in the vicinity of the pump/piping. Avoid quick temperature changes and do not exceed the maximum temperature specified when the pump was ordered. See also general max temperatures based on water in chapter 6. "DATA".



- When the pump is exposed to ambient temperature variations or if there is big difference between the temperature of the product and the surrounding, the tightening torques of the housing nuts should be checked periodically as part of preventive maintenance. **Please contact Tapflo for tightening intervals recommendation.**

# 1. INSTALLATION

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- If a hot product is pumped, the pump should not stand still when filled for a longer period of time. This could cause leakage from the valves and contamination and/or damage of the air valve.
- Below 0°C (32°F) plastic materials become more fragile what can cause accelerated wear of parts made of these materials. This is a hazard that has to be accepted when pumping such cold products. Also in such case, when a pump is not operational it should be drained of all liquid.
- Bear in mind that the viscosity of the product changes with temperature. This has to be taken into consideration when selecting the pump.

## 1.9. Moving parts



Do not tamper with the moving parts of the system, do not touch or approach when parts are in movement.  
Always use personal protective equipment for safety.

## 1.10. Explosive environment



Tapflo HVS *is not* certified for use in explosive environments. Consult Tapflo for further information. Incorrect installation or use may cause injury or death to personnel in the vicinity of the installation!

## 1.11. Air connection

Connect the air hose into the air intake on the centre block of the pump with for example a bayonet coupling. For best efficiency, use the same hose diameter as the internal diameter of the connection on the air intake.

### 1.11.1. Air treatment system



The air valve is constructed for oil-free air. Lubrication of the air is **not allowed**. However, if the air is **very dry** (laboratory air), we recommend to use a plastic air valve. Maximum air pressure is 8 bar. As prevention purpose, a filtration of the air by means of a 5 micron filter or finer is recommended. Recommended air quality according to PN-ISO8573-1:2010 is particles class 6, water class 4 and oil class 4. Dirt in the air can under unfortunate circumstances be the cause of a breakdown. To facilitate the operation of the pump we recommend an air treatment system connected to the air supply. These components should be included:  
1) Regulator to adjust the air pressure;

# 1. INSTALLATION

- 2) Manometer to read the actual pressure;
- 3) Needle valve to adjust the air flow (especially when operating the pump in the lower range of performance);
- 4) Filter.

These components are included in Tapflo's **Air treatment system** which can be ordered.

## 1.11.2. Air quality classes

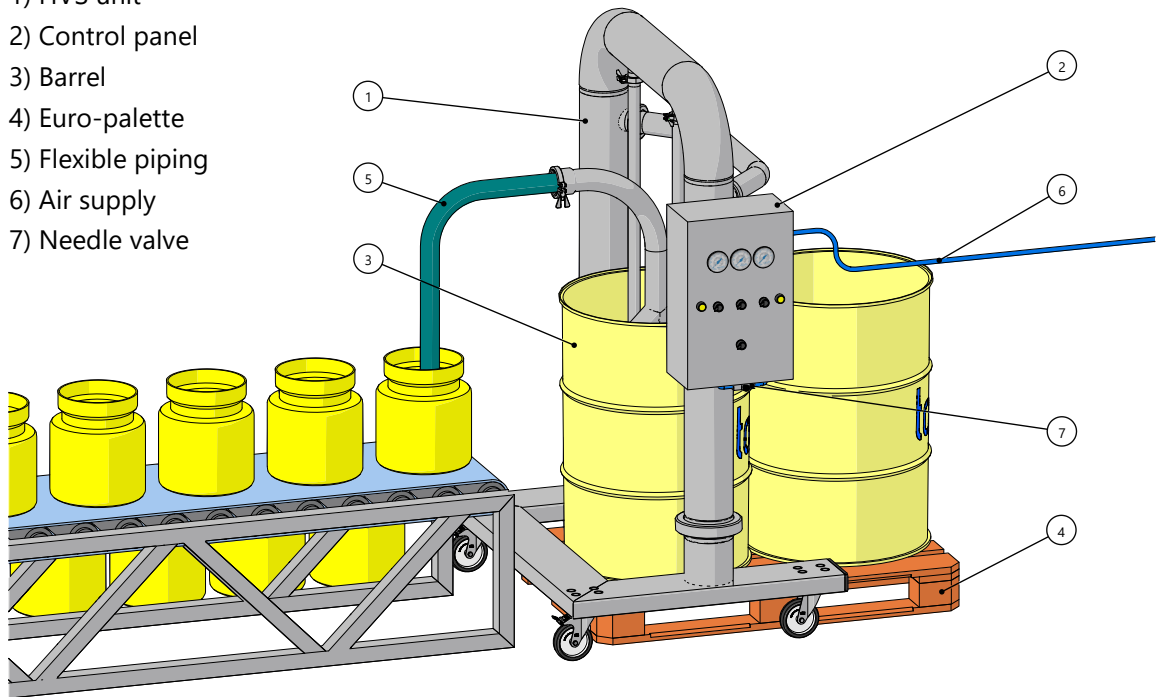
ISO 8573-1:2010 Compressed Air Contaminants and Purity Classes

Class	Solid particles			Mass concentration [mg/m <sup>3</sup> ]	Water		Oil Total oil content (liquid, aerosol and vapour) [mg/m <sup>3</sup> ]
	Maximum number of particles per m <sup>3</sup>				Pressure dew point [°C]	Liquid [g/m <sup>3</sup> ]	
	0.1 – 0.5 µm	0.5 – 1 µm	1 – 5 µm				
0	As specified by the equipment user or supplier and more stringent than class 1						
1	≤ 20,000	≤ 400	≤ 10	-	≤ -70	-	0.01
2	≤ 400,000	≤ 6,000	≤ 100	-	≤ -40	-	0.1
3	-	≤ 90,000	≤ 1,000	-	≤ -20	-	1
4	-	-	≤ 10,000	-	≤ +3	-	5
5	-	-	≤ 100,000	-	≤ +7	-	-
6	-	-	-	≤ 5	≤ +10	-	-
7	-	-	-	5 – 10	-	≤ 0.5	-
8	-	-	-	-	-	0.5 – 5	-
9	-	-	-	-	-	5 – 10	-
X	-	-	-	> 10	-	> 10	> 10

# 1. INSTALLATION

## 1.12. Installation example

- 1) HVS unit
- 2) Control panel
- 3) Barrel
- 4) Euro-palette
- 5) Flexible piping
- 6) Air supply
- 7) Needle valve



## 1.13. Recommended installation

The Tapflo HVS unit is flexible in the way you are able to install it.



### **NOTE!**

Even if all above safety instructions are met and complied with, there still exists a minor danger in the event of a leakage or mechanical damage of the equipment. In such case the pumped product can emerge on sealing areas and connections.

## 2. OPERATION

### 2. OPERATION

#### 2.1. Before starting the HVS

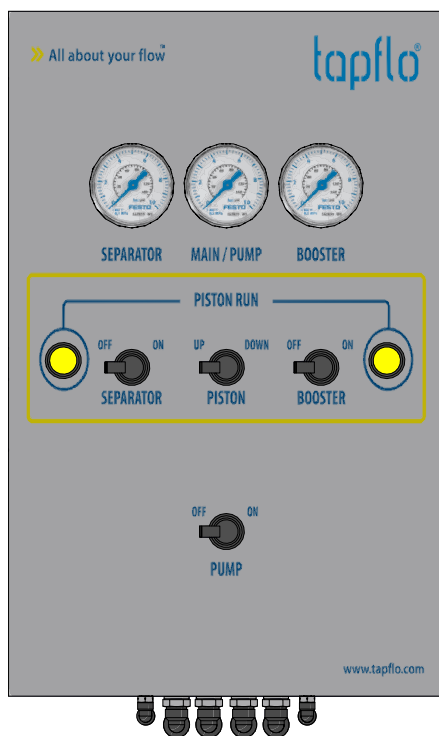


- Make sure the device is installed according to the installation instruction (chapter 1).
- When installation is new or reinstalled, a test run with water should be conducted to make sure that the unit operates normally and does not leak.



- When installation is new or reinstalled, check the pump housing nuts tightening torque (see chapter 6.5 "Tightening torques"). After approximately one week of operation, the torque should be checked again. **Contact Tapflo for further tightening intervals recommendation.** This is important to prevent possible leakage.
- NOTE! Refer to the pump IOM manual to operate it in proper manner. The performance of the pump can be adjusted through the air supply by using a needle valve and a pressure regulator. The performance can also be adjusted by normal flow.

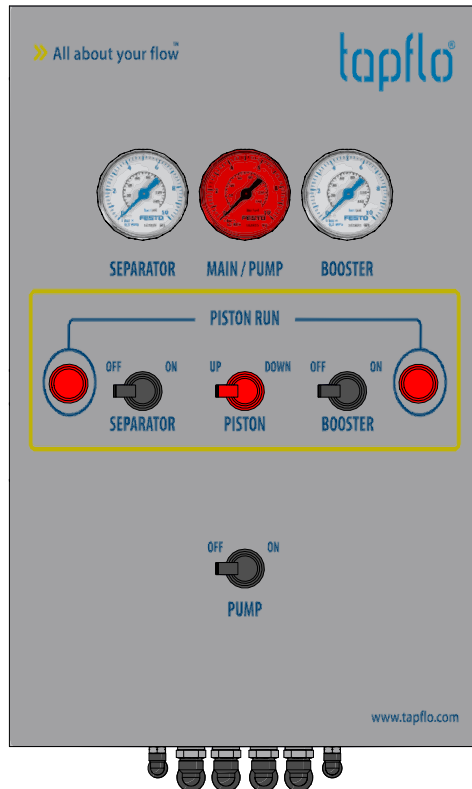
#### 2.2. Control box



Control box is a fully pneumatic unit developed to provide easy and convenient control of the HVS system. It includes three pressure gauges, **MAIN/PUMP** – air supply pressure, **SEPARATOR** – for the injection of air below lip seal (HVS I version) / inflating the seal (HVS L version) and **BOOSTER** – additional power for the actuators. Modes are being controlled by four switches – **PUMP**, **SEPARATOR**, **PISTON** and **BOOSTER**. To run the actuators up and down two yellow buttons **PISTON RUN** must be pressed simultaneously.

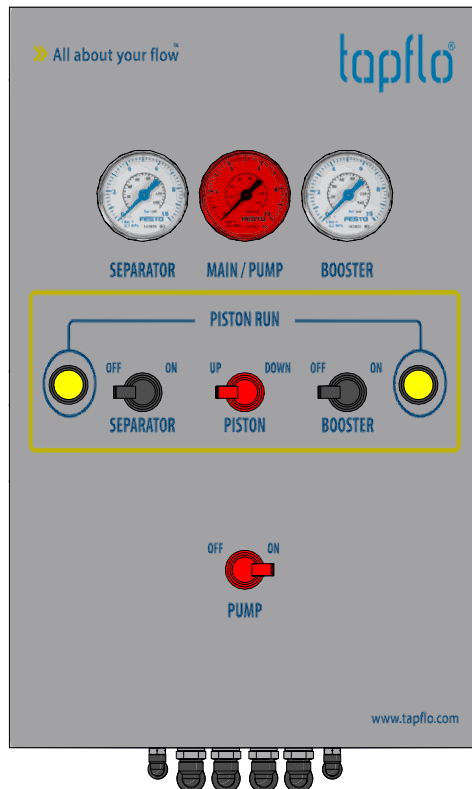
## 2. OPERATION

### 2.3. Operating modes



**Fig. 2.3.1 Moving up (manual mode)**

To move the drum up, switch "PISTON" lever on **UP** position and press **PISTON RUN** buttons. Observe **MAIN/PUMP** pressure gauge.

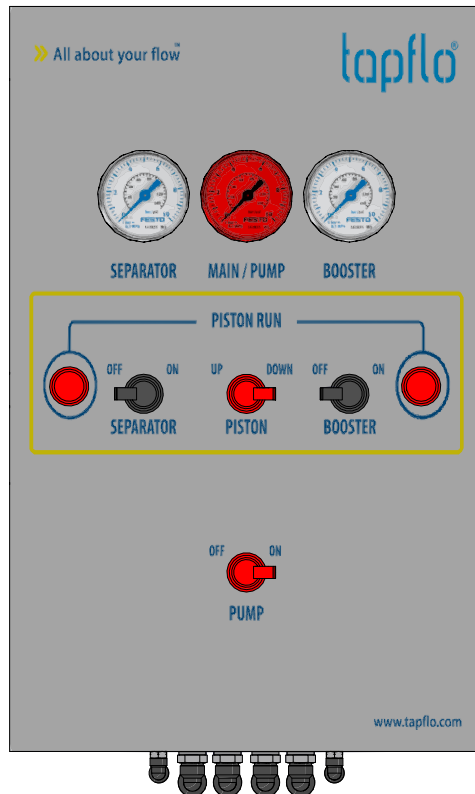


**Fig. 2.3.2 Moving up (auto mode)**

To move the drum up, switch "PISTON" lever on **UP** position and switch "PUMP" lever on **ON** position and press **PISTON RUN** buttons. Observe **MAIN/PUMP** pressure gauge and pistons moving up automatically.

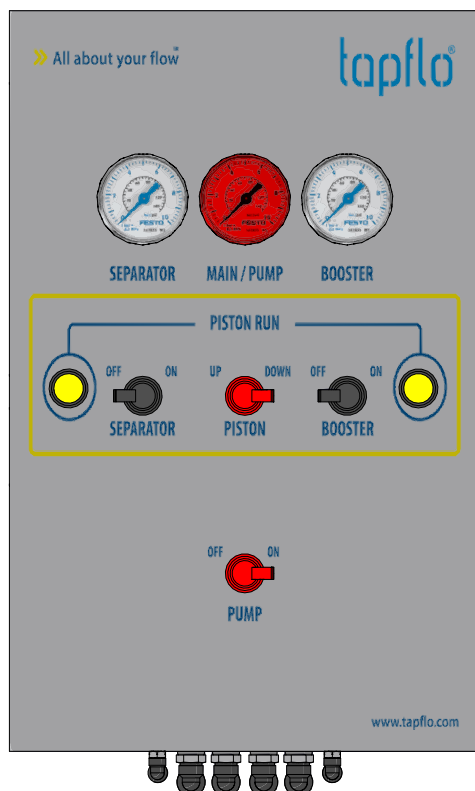
Note! This mode is slower than manual mode, and requires additional amount of air.

## 2. OPERATION



**Fig. 2.3.3 Moving down and pumping (manual mode)**

To move the drum down and operate the pump, switch "PISTON" lever on **DOWN** position, switch "PUMP" lever on **ON** position and press **PISTON RUN** buttons. Observe **MAIN/PUMP** pressure gauge and pistons moving down.

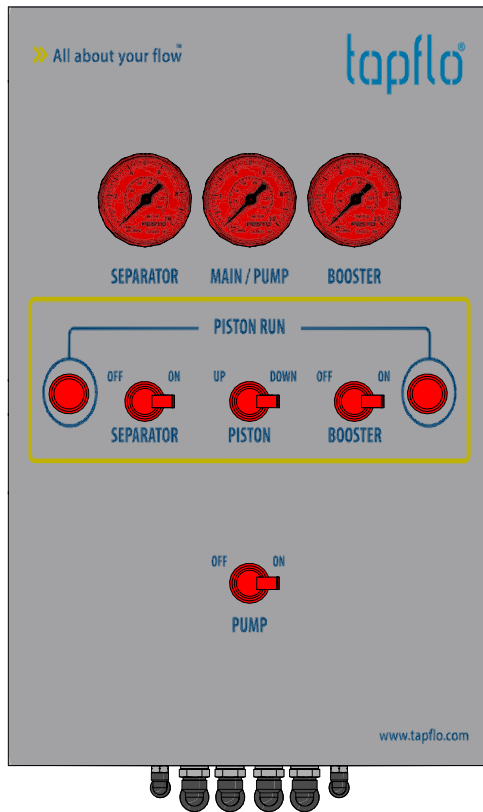


**Fig. 2.3.4 Moving down and pumping (auto mode)**

To move the drum down and operate the pump, switch "PISTON" lever on **DOWN** position, and switch "PUMP" lever on **ON** position. Observe **MAIN/PUMP** pressure gauge and pistons moving down.

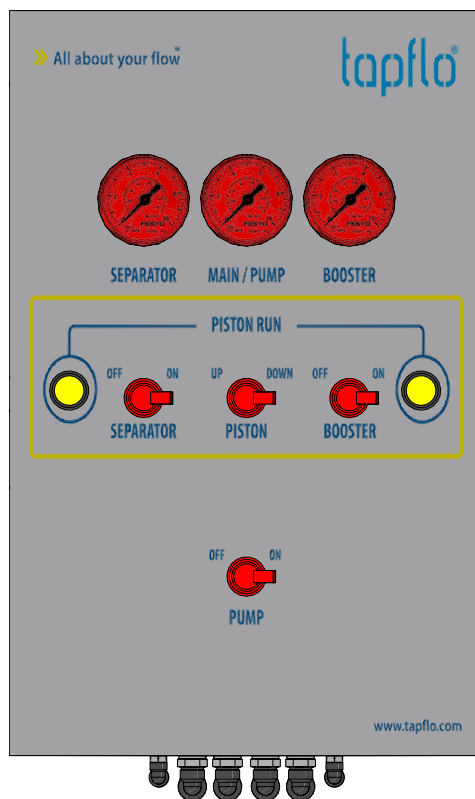


## 2. OPERATION



**Fig 2.3.5 Moving down with booster (manual mode)**

To move the drum down and operate the pump, switch "PISTON" lever on **DOWN** position, switch "PUMP" lever on **ON** position, switch "SEPARATOR" lever on **ON** position, switch "**BOOSTER**" lever on **ON** position and press **PISTON RUN** buttons. Observe **MAIN/PUMP** pressure gauge and pistons moving down.



**Fig. 2.3.6 Moving down with booster (auto mode)**

To move the drum down and operate the pump, switch "PISTON" lever on **DOWN** position, and switch "PUMP" lever on **ON** position, , switch "SEPARATOR" lever on **ON** position, switch "**BOOSTER**" lever on **ON** position. Observe **MAIN/PUMP** pressure gauge and pistons moving down.

## 2. OPERATION

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### 2.4. Starting and operation

- Open the discharge valve.
- **Note! Considering the suction capacity when air is still in the suction pipe, it is recommended to start with low air pressure/flow (slowly) at the beginning.**
- When the pump has been filled with liquid, the air pressure/flow may be raised in order to increase the suction capacity of the pump.
- The performance of the pump can be adjusted through the air supply by using a needle valve and a pressure regulator. The performance can also be adjusted by normal flow control on the discharge side of the system.

#### 2.4.1. Dry running

Although the pump is prepared for dry running it is important to have in mind that long periods of dry run may cause damage to the air valve and circlips. Also an empty pump should operate at low speeds – controlled by a needle-valve.

#### 2.4.2. Optimization of the unit lifetime



- Running at full frequency (maximum air pressure/flow) continuously will cause premature wear of the components. When there is possibility of the pump running dry or/and at full frequency it is recommended to use an air valve with a PET piston. As a general rule, we recommend to run at half of the maximum capacity of the pump.
- If the air humidity is high, use of a water separator or air dryer is recommended. Otherwise on the air discharge side due to decompression, icing on the muffler can appear causing it to shrink and eventually it can shoot out of its socket.
- If the ambient air is humid, icing can occur outside of the muffler. In such case it is recommended to use a longer exhaust of the compressed air (ca. 500 mm / 19,7").
- If icing / freezing is still a problem with the standard muffler, we recommend using our heavy duty metal muffler. Contact us for more information.

## 2. OPERATION

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### 2.5. Unit stopping

The system can be stopped in two ways:

1) By closing of the discharge valve. The pressure from the system will stop the pump automatically. The pump restarts easily when the valve is opened again.

**NOTE!** When using this method keep in mind that air must be supplied to the pump. This is essential to keep the diaphragms in balance what protects them from premature failure.

2) By cutting off the air supply

**NOTE!** When using this method make sure that the discharge valve is opened to relief the pumps pressure.

### 2.6. Cleaning of the pump

#### 2.6.1. CIP – Cleaning In Place



The importance of easy cleaning is essential in hygienic applications. Tapflo aseptic pumps are designed for CIP (Cleaning In Place) and SIP (Sterilization In Place). This allows the pump to be internally cleaned without disassembly. The pump can be cleaned by flushing through with a CIP fluid (usually a mild solution of sodium hydroxide and a sanitizing additive) or by injection of hot steam (SIP). Despite the general temperature restriction (see 6.4. "Technical data"), a brief operation (max. 30 minutes) at 130°C (266°F) for sterilization process is permitted. Make sure that the CIP fluid is compatible with the materials in the pump/piping.

During CIP and SIP pump must run slowly (1-2 strokes per second) to obtain pressure balance on both sides of the diaphragm. Lack of pressure balance will have influence on the pump's lifetime. Direction of the forced flow should be, the same as during normal operation, from the inlet to the outlet. Contact us for more information.

### 2.7. Residual risks

Even with proper application and observance of all points listed in this operating manual, there is still an estimable and unexpected residual risk when using the pumps. It may leak, fail due to wear, application-related causes or system-related circumstances.

## 2. OPERATION

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### 2.8. Disposal after expiration of the expected lifetime

The metallic components like aluminium, stainless steel and carbon steel can be recycled. Plastic parts are not recyclable and must be disposed of as residual waste. The pump must be disposed of properly, according to local regulations. It should be noted that potentially dangerous fluid residues may remain in the pump and can create a hazard to the operator or the environment, therefore the pump has to thoroughly cleaned before disposal.

### 2.9. Actions in emergency



In the event of a leak during fluid transfer, the air supply have to be closed and the pressure released. During spillage of an aggressive liquid, local and national safety rules must be followed.

## 3. MAINTENANCE

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### 3. MAINTENANCE

#### 3.1. When the unit is new or reassembled



**If the unit is new or reassembled after maintenance it is important to retighten the pump housing nuts (pos. 37) after approximately one week of operation.** Make sure to use the right torque – see chapter 6.5 *"Tightening torques"*.

##### 3.1.1. Performance test

When installation is new, a test run of the pump should be conducted. Gauge the capacity at specific air pressure/flow. This information is useful for checking performance in the future as wear takes place. You will be able to set schedules for maintenance of the pump and to select spare parts to be kept on stock.

#### 3.2. Routine inspection



Frequent observation of the pump operation is recommended to detect problems. Leaking air or liquid from the pump and changes of performance, as well as abnormal noises, can be indication of worn parts or pump malfunction (see chapter 3.4 *"Location of faults"*).

We recommend to conduct a daily check and keep records of the following:

- Any leakage from the pump
- Tightness of all pump fasteners
- Complete inspection in regular intervals has been done

In case any of the above is not fulfilled, do not start the pump and implement corrective actions. Establish a preventive maintenance schedule based on the pump's service history. Scheduled maintenance is especially important to prevent spills or leakage due to diaphragm failure.

#### 3.3. Complete inspection



The intervals for a complete inspection depend upon the operation conditions of the system. The characteristics of the liquid, temperature, materials used in the pump and running time decide how often a complete inspection is necessary. If a problem has occurred, or if the system is in need of a complete inspection, refer to chapters 3.4 *"Location of faults"* and 3.5, *"Dismantling of the system"*. You are of course warmly welcome to consult us for further help.

Parts that are subject to wear should be kept in stock, see our recommendations in chapter 3.5 *"Recommended spare parts"*.

### 3. MAINTENANCE

#### 3.4. Location of faults

PROBLEM	POSSIBLE FAULT	POSSIBLE SOLUTION
<b>The unit does not lift or lower</b>	Lack of air in the system Air pressure too low  Worn or damaged actuators Actuator piston sealing damage Air leakage in pneumatic system Damaged pressure regulator Ram in max upper or lower position Broken air valve (with manipulator lever) Drum piston is sucked to the bottom of the barrel Seal pressure is too high Solid element caught under upper ram bar, discharge pipe or piston	Check if air supply is connected and not clogged Check pump/piston pressure setting and increase if needed Check and replace if necessary Check pressure setting at Piston regulator Locate leakage and replace damaged item Replace damaged regulator Check if piston is not in the max upper position Replace air valve  Inject air under piston  Release pressure from the seal Stop the ram and check for clearance of moving parts
<b>The ram unit operates too fast</b>	Air pressure setting too high Wrong setting of choke valve at lower actuator port	Decrease piston pressure setting Check settings of needle valve
<b>Pump does not prime / no product pumped</b>	Air pressure too low Clogged air supply line Air leakage between seal valve and pressure regulator on shut-off valve	Increase MAIN/PUMP air pressure Check and clean if necessary Locate leakage and replace damaged item
<b>Liquid leaks around the inflatable seal</b>	MAIN air pressure too high Worn or damaged seal SEPARATOR air pressure too low	Decrease air pressure Check seal and replace if necessary Increase seal pressure
<b>Pushing system does not help to detach the drum</b>	Too small pushing air pressure Air supply clogged	Increase air pressure Check air supply line and clean if necessary



For more troubleshooting regarding the pump itself please see IOM manual of the pump.

# 3. MAINTENANCE

## 3.5. HVS – pump disassembly

The numbers put in brackets, refer to the part numbers in the spare part drawings and spare part lists in chapter 5 "SPARE PARTS".

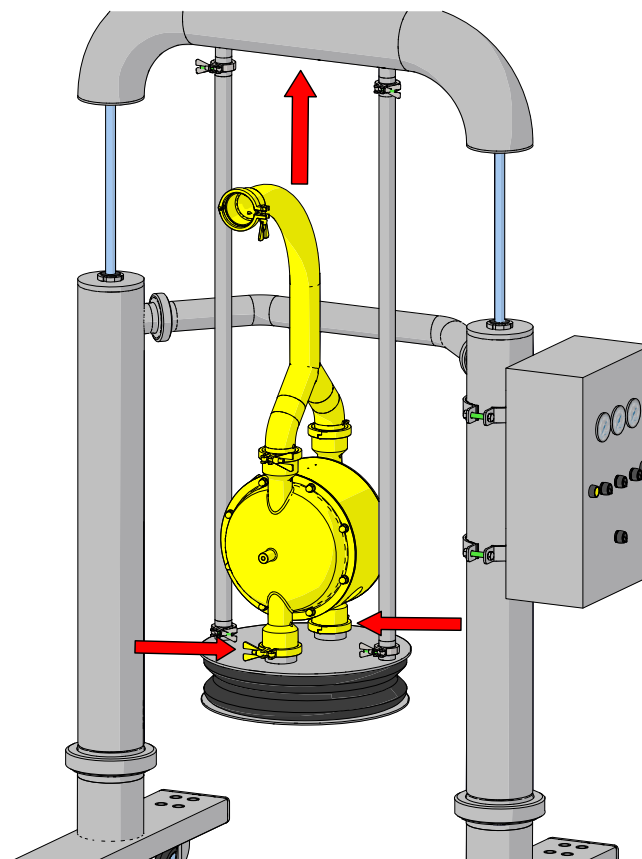
### 3.5.1. Before the disassembly procedure



Be sure to switch off main valve, disconnect air supply and drain all liquid from the pump. Cleanse or neutralize the unit thoroughly.

Disconnect the air supply and then the suction and discharge connections.

### 3.5.2. Disassembly procedure



**Fig. 3.5.1**

Unscrew and remove clamps [25].

**Fig. 3.5.2**

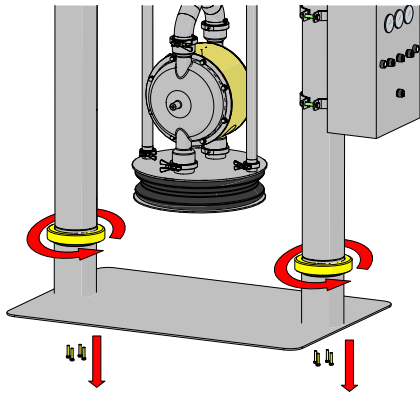
Carefully lift the pump.

Check all components for wear or damage and replace if necessary. The pump disassembly procedure can be found in the pump IOM manual.

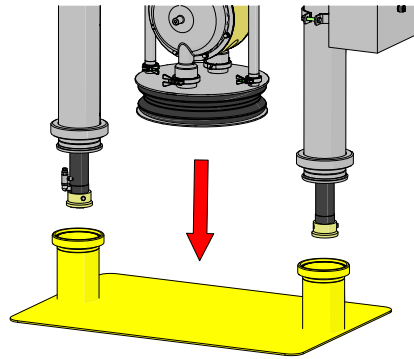
# 3. MAINTENANCE

## 3.6. HVS – base plate disassembly/assembly

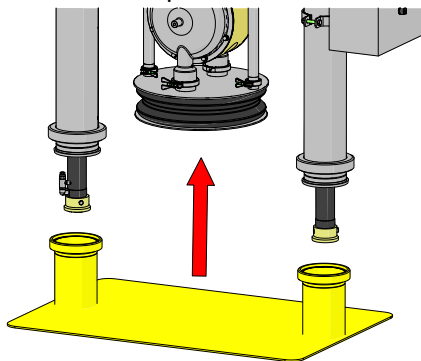
The assembly procedure is done in the reverse order to the disassembly. Nevertheless there are a few things that you have to remember in order to assemble the unit correctly.



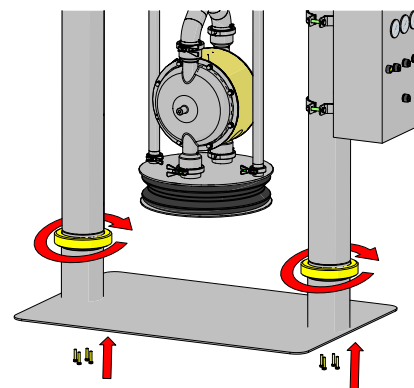
**Fig. 3.6.1**  
Dismount the nuts with use of copper hammer. Unscrew 8 pcs. Allen screws from the base plate.



**Fig. 3.6.2**  
Gently lift up the device in order to remove base plate.



**Fig. 3.6.3**  
Gently lift up the device and place actuator bushing in the baseplate.

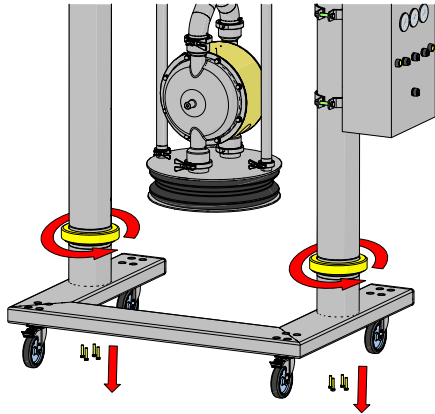


**Fig. 3.6.4**  
Mount the device to the plate using 8pcs. Allen keys. Mount the nut with use of copper hammer.  
**NOTE!** Keep in mind to check the nut tightness.

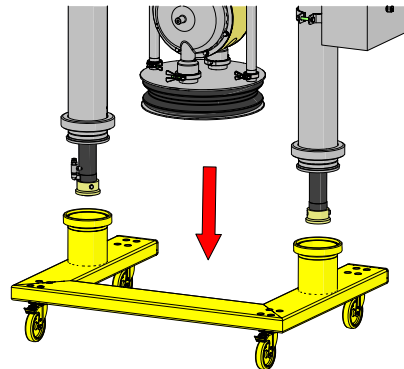


# 3. MAINTENANCE

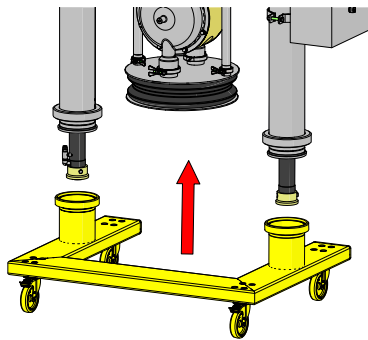
## 3.7. HVS – wheeled base disassembly/assembly



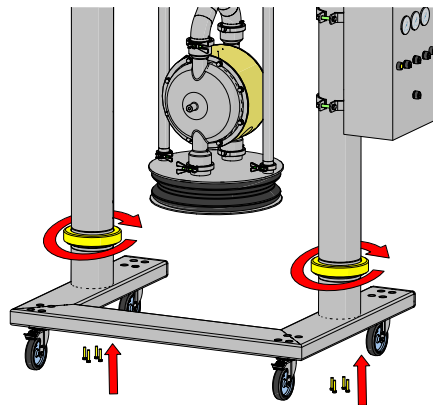
**Fig. 3.7.1**  
Lock the wheels, dismount the nuts with use of copper hammer. Unscrew 8 pcs. Allen screws from the base plate.



**Fig. 3.7.2**  
Unlock the wheels, gently lift up the device in order to remove base plate.



**Fig. 3.7.3**  
Gently lift up the device and place actuator bushing in the wheeled baseplate. Lock the wheels.



**Fig. 3.7.4**  
Mount the device to the base using 8pcs. Allen keys. Mount the nut with use of copper hammer.  
**NOTE!** Keep in mind to check the nut tightness.

### 3.7.1. Test run



We recommend you to conduct a test run of the pump before installing it in the system, so no liquid gets wasted if the pump leaks or perhaps does not start accordingly to wrong assembly of the pump.

**After one week of operation retighten the nuts with appropriate torque.**

# 3. MAINTENANCE

## 3.8. HVS – Seal disassembly



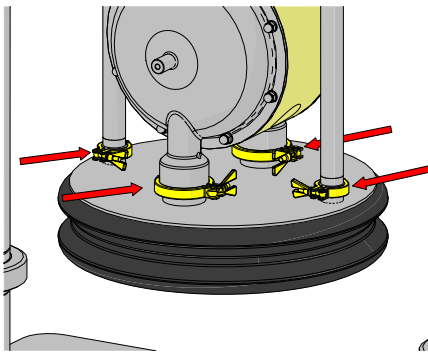
The numbers put in brackets, refer to the part numbers in the spare part drawings and spare part lists in chapter 5 "SPARE PARTS".

### 3.8.1. Before the disassembly procedure

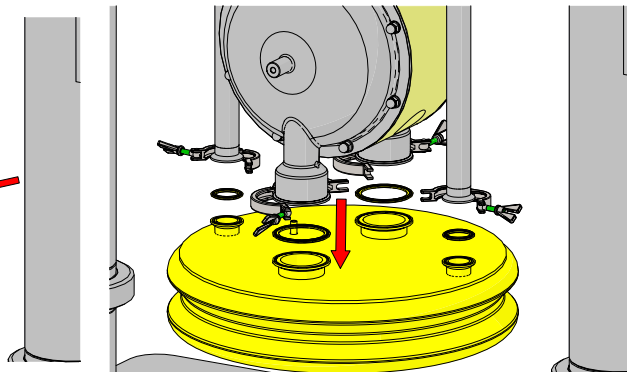
Be sure to drain all liquid from the pump. Cleanse or neutralize the pump thoroughly.

Disconnect the air supply and then the suction and discharge connections. Due to size and weight, two persons are required to conduct service.

### 3.8.2. Seal disassembly

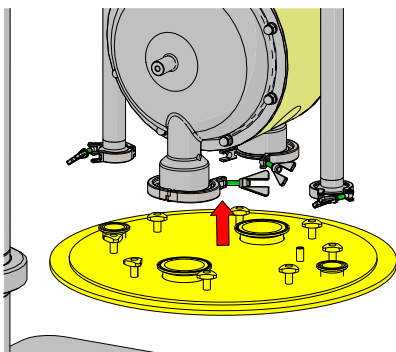


**Fig. 3.8.1**  
Unmount support clamps. Unmount the pump clamps while keeping the drum on the support.

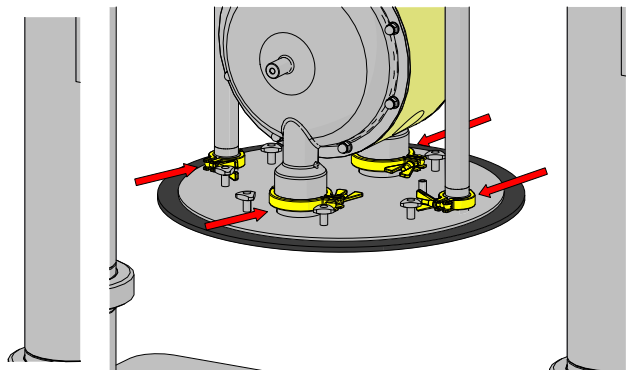


**Fig. 3.8.2**  
Gently lift up the drum and put it in safe place. Put the Tri Clamp seals on the drum grooves.

### 3.8.3. Seal assembly



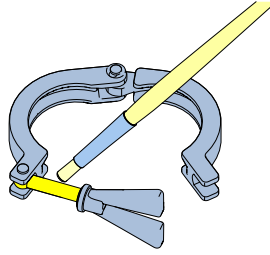
**Fig. 3.8.3**  
Place the gaskets on the support connection. Fit the seal assembly to the tri clamp connections on the pipe support. Lock the support clamps.



**Fig. 3.8.4**  
Place the PTFE gaskets on the pump connections. Carefully mount the pump on the tri clamp connections of the seal assembly. Tighten the pump clamps.

## 3. MAINTENANCE

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**Fig. 3.8.5**

Before mounting the clamps, it is recommended to put FDA marked grease on the thread.

### 3.8.4. Test run



We recommend you to conduct a test run of the pump before installing it in the system, so no liquid gets wasted if the pump leaks or perhaps does not start accordingly to wrong assembly of the pump.

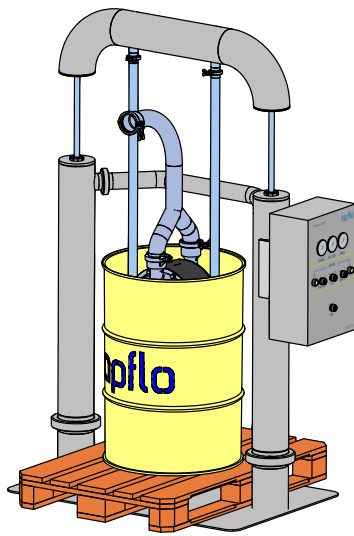
**After one week of operation retighten the nuts with appropriate torque.**

# 4. OPTIONS

## 4. OPTIONS

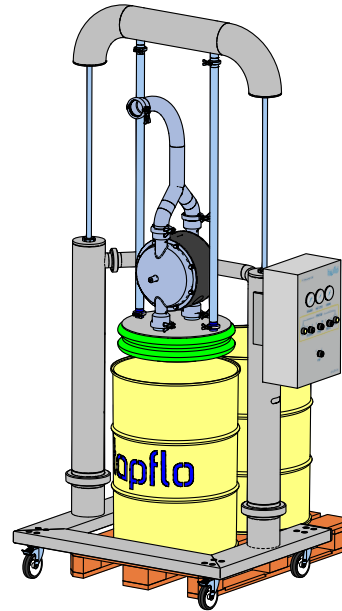
### 4.1. Base options

There are two base options available.



**Fig 4.1.1 Static base plate**

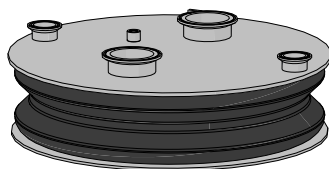
Static base plate option is used mainly for industrial execution. The pallet with barrels is transported with use of pallet truck.



**Fig. 4.1.2 Wheeled base**

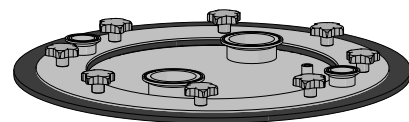
Wheeled base allows mobility of the unit. It is recommended especially for the food industry.

### 4.2. Seal options



**Fig 4.2.1 Inflated seal**

Inflated seal is filled with the air pressurized max. to 1,7 bar. This solution is recommended, whenever there is need of tight sealing between the drum and the barrel.



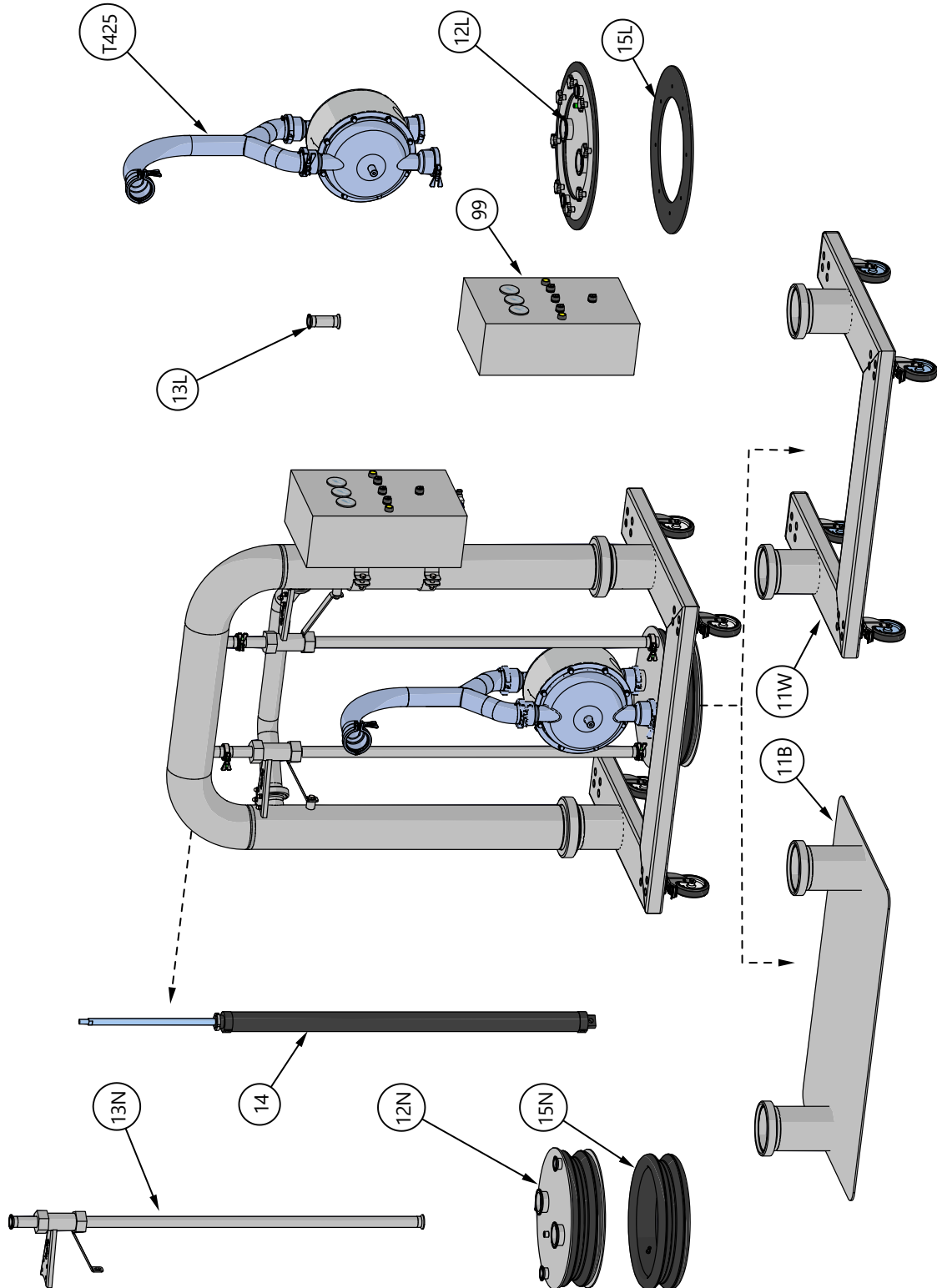
**Fig. 4.2.2 Lip seal**

Lip seal is recommended when there is need of easy maintenance and operation. The seal could be serviced and replaced swiftly, without dismantling the pump.

# 5. SPARE PARTS

## 5. SPARE PARTS

### 5.1. HVS – Spare parts drawing



## 5. SPARE PARTS

### 5.2. HVS – Spare parts list

Pos.	Q-ty	Description	Material	HVS-I	HVS-L
11B	2	Static base plate	AISI 316L	X	X
11W	1	Wheeled base	AISI 316L	X	X
12L	1	Lip seal assembly	AISI 316L / NBR / EPDM		X
12N	1	Inflated seal assembly	AISI 316L / NBR / EPDM	X	
13L	4	Pipe support (lip seal)	AISI 316L		X
13N	4	Pipe support (inflated seal)	AISI 316L	X	
14	2	Pneumatic actuator	AISI 304L	X	X
15L	1	Lip seal	NBR, EPDM		X
15N	4	Inflated seal	NBR, EPDM	X	
T425	4	Pump	AISI 316, PTFE, PP	X	X
99	1	Control box	AISI 304L	X	X

### 5.3. Stocking recommendation

Even at normal operation some details in the pump will be worn. In order to avoid expensive breakdowns we recommend having a few spare parts in stock.

Depending on the severity of the operation and the importance of assuring continuous work we offer two different spare part **KITS** – **KIT LIQ** includes parts on pump wetted side and **KIT AIR** includes parts on the pump air side that are subject to wear.

	Pos.	Description	Q-ty
<b>KIT LIQ</b>	15	Diaphragm	2
	18	Sealing	4
	23	Valve ball	4
	Pos.	Description	Q-ty
<b>KIT AIR</b>	18	Sealing	4
	61	Air valve complete	1
	16	Diaphragm shaft	1
	36	Centre block seal	2
	47	O-ring(back up for 36)	2
	25	Muffler	1

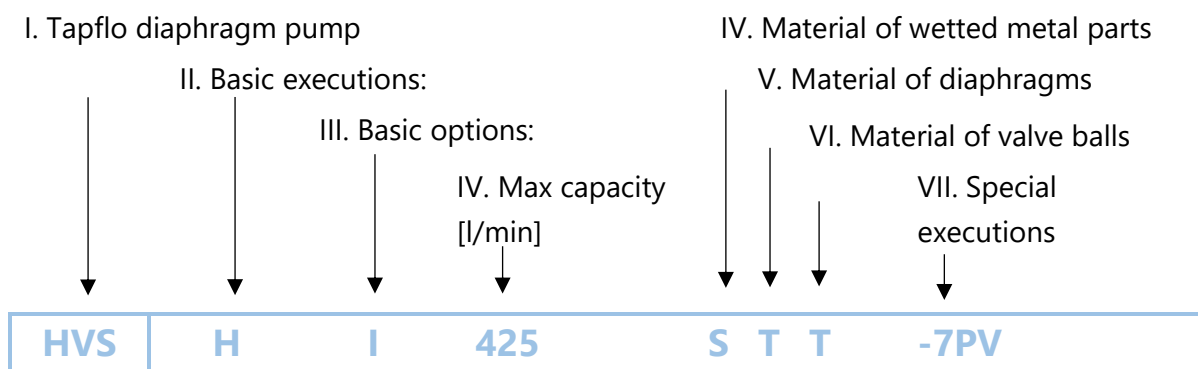
# 5. SPARE PARTS

## 5.4. How to order parts

When ordering spare parts for Tapflo pumps, please let us know what is the **model number** and **serial number** from the pump centre body. Then just indicate the part numbers from the spare parts list and quantity of each item.

## 5.5. Device code

The model number on the pump and on the front page of this instruction manual tells the pump size and materials of the pump.



I. HVS = Tapflo HVS unit

II. Basic executions:

H = Hygienic

I = Industrial

III. Basic options:

I = Inflated seal

L = Lip seal

IV. Material of wetted metal parts:

F = 1.4435 Stainless steel (Bassler norm)

H = Hastelloy

S = stainless steel AISI 316L

V. Material of diaphragms:

E = EPDM

W = White (food grade) EPDM

N = NBR (nitrile rubber)

T = PTFE

Z = PTFE with white back (food grade)

B = PTFE TFM 1705b

VI. Material of valve balls:

E = EPDM

N = NBR (nitrile rubber)

T = PTFE

S = AISI 316 stainless steel

P = PU (polyurethane)

K = Ceramic

B = PTFE TFM 1635

blank = flap valve version

VII. Special executions:

1 = Optional in/outlet

3 = Optional connection type

4 = Backup diaphragm system configuration

5 = Other special executions

6 = Optional material of centre body

7 = Optional material of air valve

8 = Optional material of pos. 18 seals

9 = Optional material of housing stud bolts

14 = Optional pump feet

15 = Flap valve execution

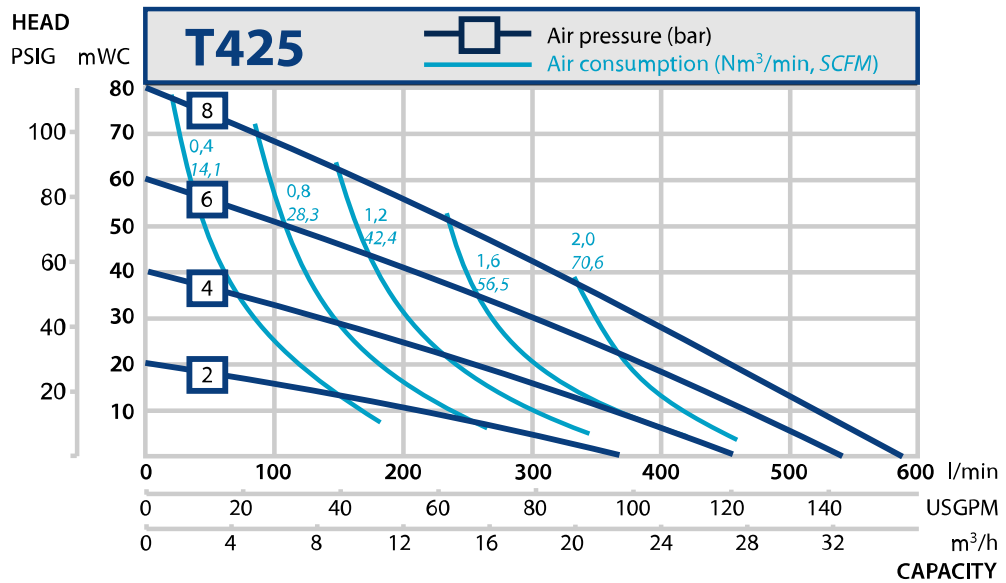
16 = Optional clamp type

# 6. DATA

## 6. DATA

### 6.1. Capacity curves

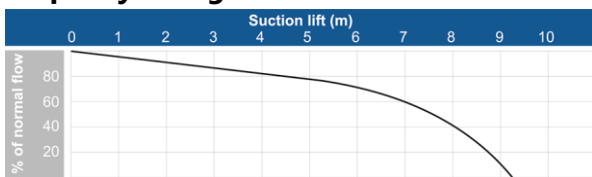
The performance curves are based on water at 20°C. Other circumstances might change the performance. See below how the capacity will change at different viscosities and suction lifts.



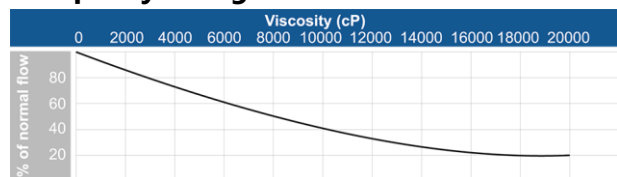
Recommended flow is half of the max flow, e.g. recommended flow for a T425 is 300 l/min.

### 6.2. Capacity changes

Capacity changes at different suction lifts



Capacity changes at different viscosities

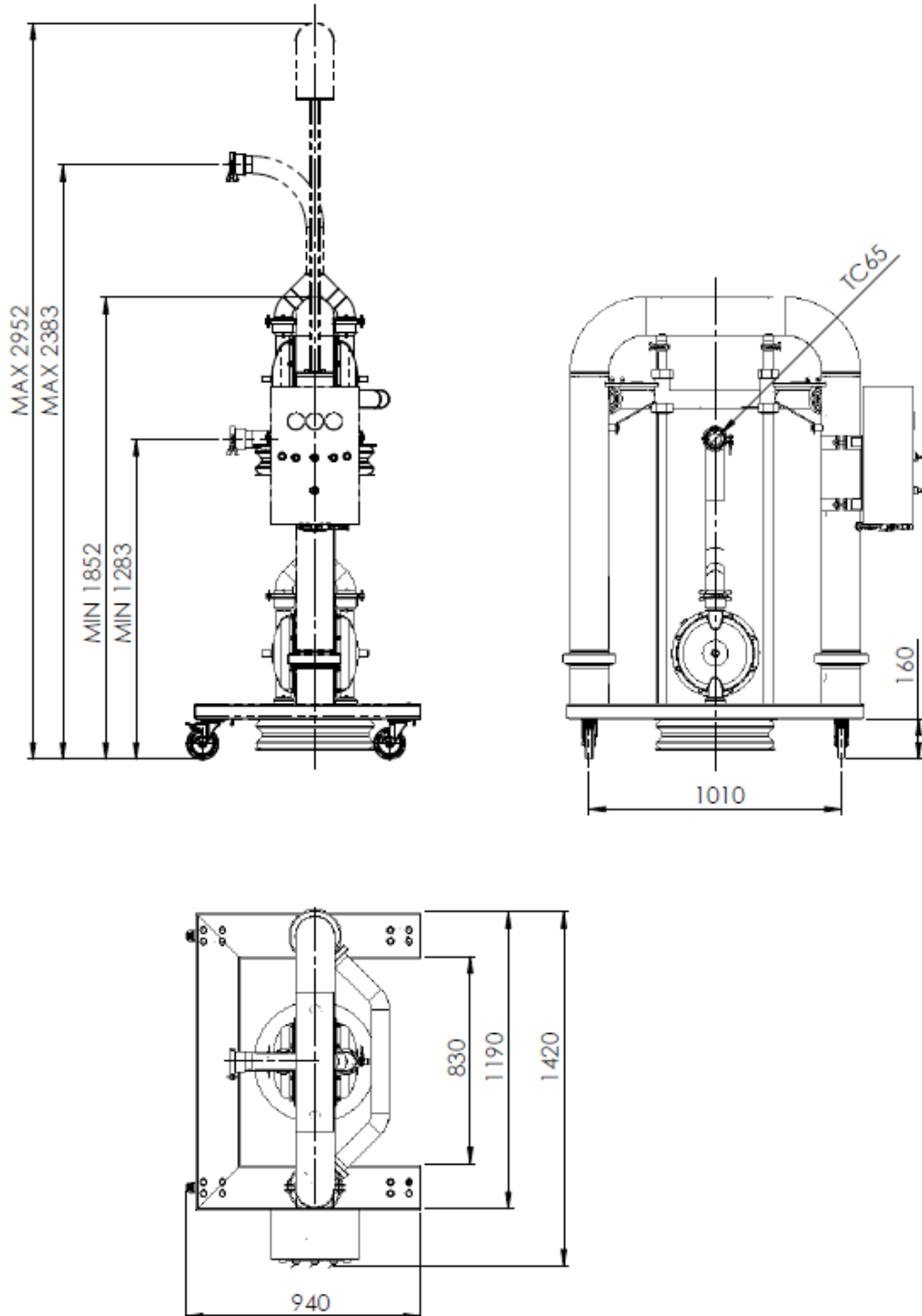




# 6. DATA

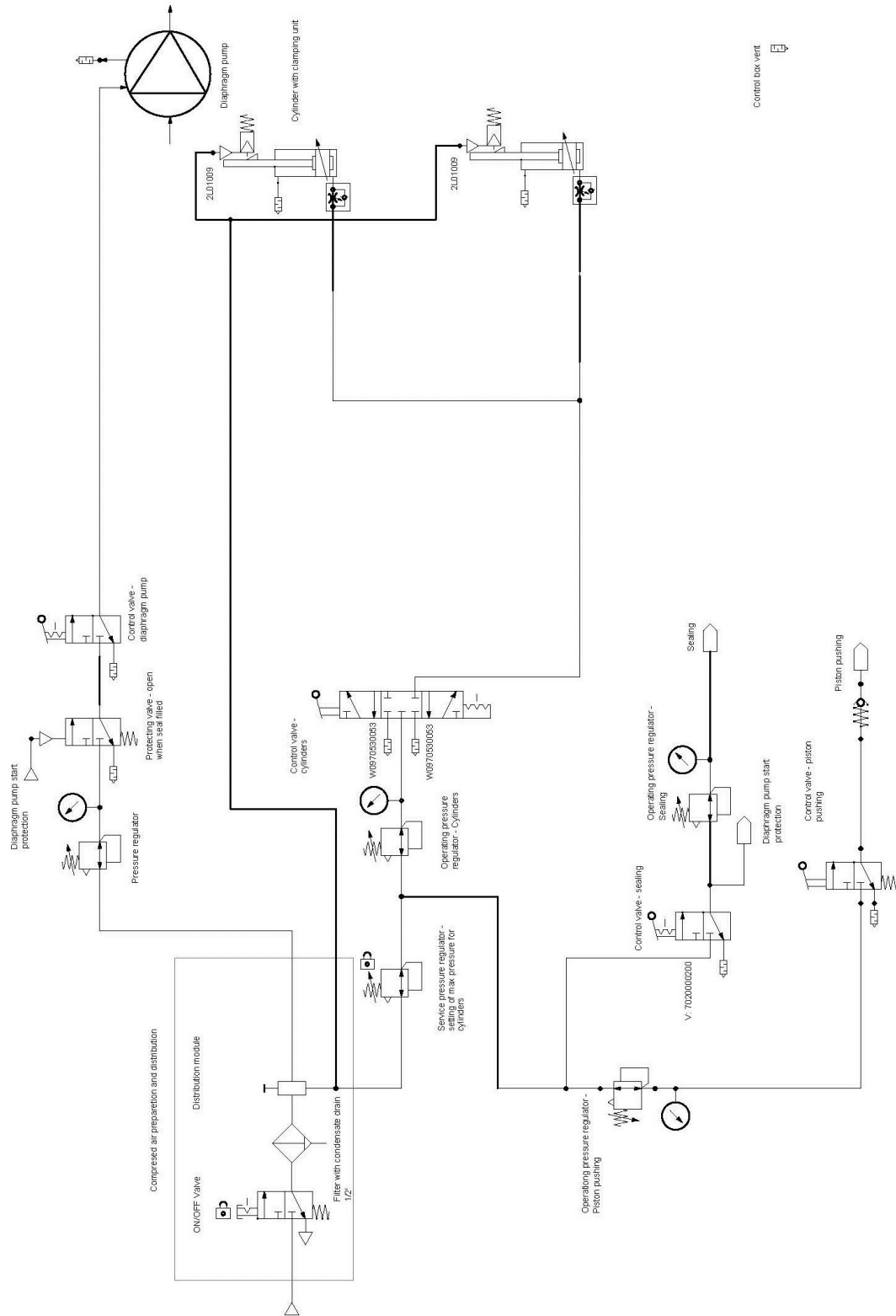
## 6.3. Dimensions

General dimensions only, ask us for detailed drawings. Changes reserved without notice.



# 6. DATA

## 6.4. Pneumatic diagram



## 6. DATA

### 6.5. Technical data

TECHNICAL DATA	HVS SIZE
	425
Max capacity [l/min] / [US GPM]	590 / 156
Volume per stroke [ml] / [cu in]	2300 / 140
Max discharge pressure [bar] / [psi]	8 / 116
Max air pressure [bar] / [psi]	8 / 116
Max size of solids $\varnothing$ in [mm] / [in]	15 / 0.59
Max temp. with EPDM [°C] / [°F]	90 / 194
Max temp. with NBR [°C] / [°F]	70 / 158
Max temp. with PTFE [°C] / [°F]	110 / 230
Weight [kg] / [lb]	200 / 77

COMPONENT	MATERIAL
Wetted metal details	Stainless steel AISI 316L electro polished
Liquid contact surfaces roughness	Ra < 1.6(Standard) Ra < 0.8 and 0.5 as option
Centre block (not wetted)	PP, PP conductive, aluminium
Diaphragms	PTFE, PTFE with white back, EPDM, white EPDM, NBR white, NBR (non FDA)
Valve balls	PTFE, AISI 316, Ceramic, SiC, EPDM (non FDA, NBR (non FDA))
Air valve	Brass (std.), stainless steel AISI 316L or PET with NBR (std.), EPDM or FKM O-rings
Housing stud bolt	A4-80
Diaphragm shaft	Stainless steel AISI 316L (T30, T825) / 304L (T80 – T425)

# 6. DATA

## 6.6. Tightening torques

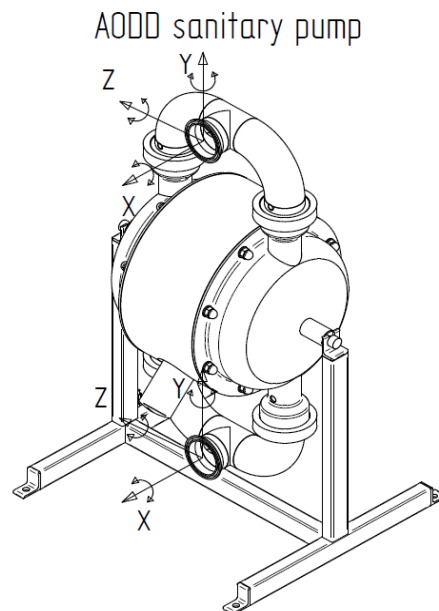
Checking of the tightening torques is necessary after periods of stoppage, when temperature variations are a factor or after transport and maintenance of the pump. What is more for proper operation and safety the torque values should be checked frequently as part of preventive maintenance (contact Tapflo for interval proposals). Although pump applications vary, a general guideline is to re-torque the pump every two weeks.

Tightening torque [Nm]		
HVS SIZE	Pos. 37 - Nut	Pos. 16 – Diaphragm screw
T425	23	22

## 6.7. Permitted loads on manifolds

We recommend not to exceed the following loads and forces reacting on the manifolds.

T425		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	56	11,5
Y	56	11,5
Z	56	11,5



# 7. WARRANTY

## 7. WARRANTY

### 7.1. Warranty form

Company:	_____		
Telephone:	_____	Fax:	_____
Address:	_____		
Country:	_____	Contact Name:	_____
E-mail:	_____		
Delivery Date:	_____	Date of pump installation:	_____
Pump type:	_____		
Serial No (see name plate or stamped on pump housing):	_____		
Description of the fault:	_____ _____ _____		
<b>The installation:</b>			
Liquid:	_____		
Temperature [°C]:	_____	Viscosity[cPs]:	_____
Spec grav. [kg/m <sup>3</sup> ]:	_____	pH-value:	_____
Content of particles:	_____	% of max size [mm]:	_____
Flow [l/min]:	_____	Duty [h/day]:	_____
No of starts per day:	_____		
Discharge head [mWC]:	_____	Suction head / lift [m]:	_____
Air pressure [bar]:	_____	Quality of the air (filter, micron, lubrication):	_____
Other:	_____ _____		
<b>Place for sketch of installation:</b>			

# 7. WARRANTY

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## 7.2. Returning parts

When returning parts to Tapflo please follow this procedure:

- Consult Tapflo for shipping instructions.
- Cleanse or neutralize and rinse the part/pump. Make sure the part/pump is completely empty from liquid.
- Pack the return articles carefully to prevent any damage during transportation.

***Goods will not be accepted unless the above procedure has been complied with.***

## 7.3. Warranty

Tapflo warrants products under conditions as stated below for a period of not more than 5 years from installation and not more than 6 years from date of manufacturing.

1. The following terms and conditions apply to the sale of machinery, components and related services and products, of Tapflo (hereinafter "the products").
2. Tapflo (the manufacturer) warrants that:
  - a. its products are free of defects in material, design and workmanship at the time of original purchase;
  - b. its products will function in accordance with Tapflo operative manuals; Tapflo does not guarantee that the product will meet the precise needs of the Customer, except for those purposes set out in any invitation to render documents or other documents specifically made available to Tapflo before entering into this agreement;
  - c. high quality materials are used in the construction of the pumps and that machining and assembly are carried out to the highest standards.

Except as expressly stated above, Tapflo makes no warranties, express or implied, concerning the products, including all warranties of fitness for a particular purpose.

3. This warranty shall not be applicable in circumstances other than defects in material, design, and workmanship. In particular warranty shall not cover the following:
  - a. Periodic checks, maintenance, repair and replacement of parts due to normal wear and tear (seals, O-rings, rubber items, diaphragms, air valves etc..);
  - b. Damage to the product resulting from:
    - b.1. Tampering with, abuse or misuse, including but not limited to failure to use the product for its normal purposes as stated at the time of purchase or in accordance with Tapflo instructions for use and maintenance of the

## 7. WARRANTY

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- product, or the installation or improper ventilation or use of the product in a manner inconsistent with the technical or safety standard in force;
- b.2. Repairs performed by non-skilled personnel or use of non-original Tapflo parts;
  - b.3. Accidents or any cause beyond the control of Tapflo, including but not limited to lightning, water, fire, earthquake, and public disturbances, etc.;
4. The warrantee shall cover the replacement or repairing of any parts, which is documented faulty due to construction or assembling, with new or repaired parts free of charges delivered by Tapflo. Parts subjected to normal tear and wear shall not be covered by the warranty. Tapflo shall decide as to whether the defective or faulty part shall be replaced or repaired.
  5. The warrantee of the products shall be valid for a period in accordance to the current law from the date of delivery, under the condition that notice of the alleged defect to the products or parts thereof be given to Tapflo in written within the mandatory term of 8 days from the discovery. Repair or replacement under the terms of this warranty shall not give a right to an extension to, or a new commencement of, the period of warranty.
  6. Repair or replacement under the terms of this warranty shall not give a right to an extension to, or a new commencement of, the period of warranty. Repair or replacement under the terms of this warranty may be fulfilled with functionally equivalent reconditioned units. Tapflo qualified personnel shall be solely entitled to carry out repair or replacement of faulty parts after careful examination of the pump. Replaced faulty parts or components will become the property of Tapflo.
  7. The products are built in accordance with standard CE normative and are tested (where applicable) by Tapflo. Approval and tests by other control authority are for the customer's account. The products shall not be considered defective in materials, design or workmanship if they need to be adapted, changed or adjusted to conform to national or local technical or safety standards in force in any country other than that for which the unit was originally designed and manufactured. This warranty shall not reimburse such adaptations, changes or adjustments, or attempt to do so, whether properly performed or not, nor any damage resulting from them, nor any adaptation, change or adjustments to upgrade the products from their normal purpose as described in the products operative manual without the prior written consent of Tapflo.

## 7. WARRANTY

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8. Installation, including electric and other connections to utility mains according to Tapflo drawings, is for the cost and responsibility of the customer, unless otherwise agreed in writing.
9. Tapflo will not be liable on any claim, whether in contract, tort, or otherwise, for any indirect, special, incidental, or consequential damages, caused to the customer or to third parties, including loss of profits, arising by any possible infringement of par. 3 above or by the customer or third parties being in the impossibility of using the products.

Steady the above, Tapflo liability to the customer or third parties from any claim, whether in contract, tort, or otherwise, shall be limited to the total amount paid by the customer for the product that caused the damages.



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Tapflo is represented worldwide by own Tapflo Group Companies and carefully selected distributors assuring highest Tapflo service quality for our customers' convenience.

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