

Metal Series Diaphragm Pumps

Original Instruction
edition 2020



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



Pump models:

TX25

T/TX70

T/TX120

T/TX220

T/TX420

T/TX820



CONTENTS

0. GENERAL	7
0.1. Introduction	7
0.2. Warning symbols	7
0.3. Qualification and training of personnel	7
1. INSTALLATION	8
1.1. Operation principle	8
1.2. Receiving inspection	8
1.3. Lifting and transportation	9
1.4. Storage	9
1.5. Foundation	9
1.6. Suction and discharge piping	9
1.6.1. Rotary connections	10
1.6.2. Connection of suction pipe	10
1.6.3. Connection of discharge pipe	10
1.7. Health and safety	10
1.7.1. Protection	10
1.7.2. Explosion hazardous environments – ATEX	11
1.7.3. Air pressure	11
1.7.4. Noise level	12
1.7.5. Temperature hazards	12
1.8. Air connection	12
1.8.1. Air treatment system	13
1.9. Example of installation	13
1.10. Recommended installations	14
1.10.1. Flooded	14
1.10.2. Self-priming	14
1.10.3. Submerged	14
2. OPERATION	15
2.1. Before starting the pump	15
2.2. Starting and operation	15
2.2.1. Dry running	15
2.2.2. Optimization of the pump lifetime	15
2.3. Pump stopping	16
2.4. Residual risks	16
2.5. Disposal after expiration	16

CONTENTS

2.6. Actions in emergency	16
3. MAINTENANCE	17
3.1. When the pump is new or reassembled	17
3.1.1. Performance test	17
3.2. Routine inspection	17
3.3. Complete inspection	17
3.4. Location of faults	18
3.5. Aluminium and cast iron – Disassembly of the pump	19
3.5.1. Before the disassembly procedure	19
3.5.2. Disassembly procedure	19
3.6. Aluminium and cast iron – Assembly of the pump	21
3.6.1. Test run	22
3.7. Stainless steel – Disassembly of the pump	23
3.7.1. Before the disassembly procedure	23
3.7.2. Disassembly procedure	23
3.8. Stainless steel – assembly of the pump	25
3.8.1. Test run	26
4. OPTIONS	27
4.1. Drum pump – TD...	27
4.2. Twin connections – TT...	27
4.3. Filter press pump – TF...	28
4.4. Barrier pump – TB...	28
4.4.1. Guardian calibration procedure	29
4.5. Ball lifters – TL...	29
4.6. Pump with integrated pulsation dampener – TXK...	30
5. SPARE PARTS	31
5.1. Aluminium and cast iron pumps	31
5.1.1. TX25 - Spare parts drawing	31
5.1.2. TX25 – Spare parts list	31
5.1.3. TX70-TX420 – Spare parts drawing	32
5.1.4. TX70-TX420 – Spare parts list	33
5.1.5. TX70-TX420 – Spare parts - Options	34
5.1.6. TX820 – Spare parts drawing	36
5.1.7. TX820 – Spare parts list	37
5.2. Stainless steel pumps	38
5.2.1. T70 – T120 - Spare parts drawing	38

CONTENTS

5.2.2.	T70 – T120 – Spare parts list	39
5.2.3.	T220 – T420 - Spare parts drawing	40
5.2.4.	T220 – T420 – Spare parts list	41
5.2.5.	Spare parts - Options	42
5.2.6.	T820 - Spare parts drawing	44
5.2.7.	T820 – Spare parts list	45
5.3.	Stocking recommendation	46
5.4.	How to order parts.....	47
5.5.	Pump code	47
6.	DATA	48
6.1.	Capacity curves.....	48
6.2.	Capacity changes.....	48
6.3.	Technical data	49
6.4.	Dimensions	50
6.5.	Tightening torques	52
6.6.	Permitted loads on manifolds.....	52
7.	WARRANTY	53
7.1.	Warranty form.....	53
7.2.	Returning parts	54
7.3.	Warranty	54

EC DECLARATION OF CONFORMITY 01/EC/MET/2017

Series:

T(...)25...; T(...)70...; T(...)120...; T(...)220...; T(...)420...; T(...)820...;

Serial numbers:

2013 - ... (from 1301-...)

Manufactured by:

Tapflo AB
Filaregatan 4
4434 Kungälv, Sweden

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

Object of declaration: **AIR OPERATED DIAPHRAGM PUMPS**

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;

Mr Michał Śmigiel is authorized to compile the technical file.

Tapflo Sp. z o.o.
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Signed for and on behalf of
Tapflo AB



Håkan Ekstrand
Managing Director

Tapflo AB, 02.03.2017r

EU DECLARATION OF CONFORMITY 02/ATEX/AODD/2019

Series:

TX(...)9...; TX(...)20...; TX(...)50...; TX(...)100...; TX(...)200...; TX(...)400...; TX(...)800...;
TX(...)25...; TX(...)70...; TX(...)120...; TX(...)220...; TX(...)420...; TX(...)820...;
TX(...)30...; TX(...)80...; TX(...)125...; TX(...)225...; TX(...)425...; TX(...)825...;
TX(...)94...; TX(...)144...; TX(...)244...; TX(...)444...;

Serial numbers:

2019 - ... (from 1911-...)

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: **CONDUCTIVE AIR OPERATED DIAPHRAGM PUMPS**

EU Type Examination Certificate was carried out by J.S. Hamilton Poland Sp. z o.o. (**Notified Body No. 2057**) and as a result a certificate No: **JSHP 19 ATEX 0018X** was issued.

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

- Directive 2014/34/EU of the European parliament and of the council of 26 February 2014 on Equipment or Protective System intended for use in potentially explosive atmospheres
- EN ISO 80079-36:2016-07
- EN ISO 80079-37:2016-07

and is intended for operation in potentially explosive atmospheres according to:

-  **II 2G Ex h IIC T6...T4 Gb**
-  **II 2D Ex h IIC T60°C...T125°C Db**

Signed for and on behalf of Tapflo AB



Håkan Ekstrand
Managing Director

Tapflo AB, 30.10.2019r

0. GENERAL

0. GENERAL

0.1. Introduction

The Tapflo Air Operated Diaphragm Pump range is a complete series of pumps for industrial applications. The pumps are designed to be safe, simple and easy to use and maintain. The construction is seal-less and without rotating parts. The pumps are suitable for almost all different chemicals used by the industry today.

With proper attention to maintenance, Tapflo Pumps will give efficient and trouble free operation. This instruction manual will familiarise operators with detailed information about installing, operating and maintaining of the pump. AODD pump materials must be selected carefully for each application. For more information, please contact Tapflo Group.

0.2. Warning symbols

The following warning symbols are present in this instruction manual. This is what they say:



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 pump or its subassemblies.

0.3. Qualification and training of personnel



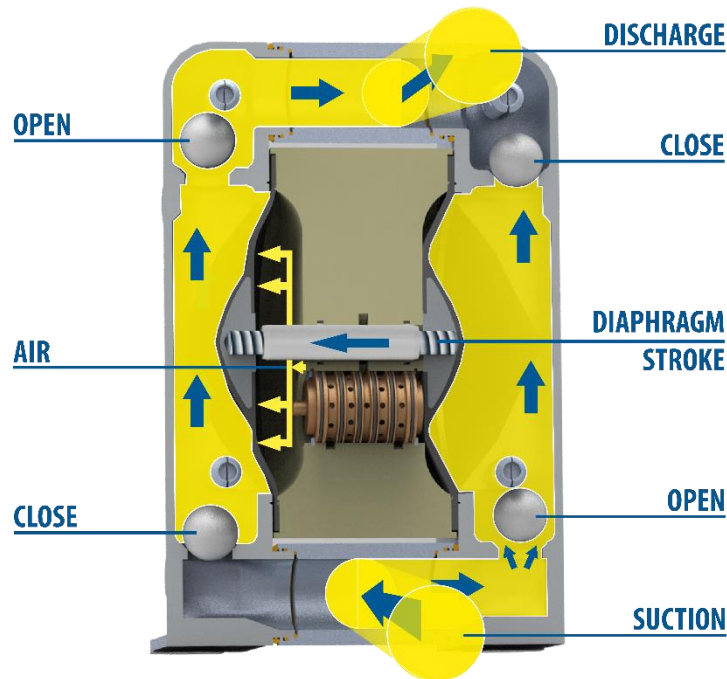
The personnel in charge of installation, operation and maintenance of the pumps we produce must be qualified to carry out the operations described in this manual. Tapflo shall not be held responsible for the training level of personnel and for the fact that they are not fully aware of the contents of this manual.

1. INSTALLATION

1. INSTALLATION

1.1. Operation principle

The Tapflo diaphragm pump is driven by compressed air. The two diaphragms are connected by a diaphragm shaft and pushed back and forth by alternately pressurising the air chambers behind the diaphragms using an automatically cycling air valve system.



The Suction Cycle:

➤ **Suction**

One diaphragm creates a suction action in one chamber (on the right) when being pulled back from the housing.

➤ **Discharge**

The other diaphragm simultaneously transmits the air pressure to the liquid in the second chamber (on the left) of the housing, pushing it towards the discharge port.

During each cycle the air pressure on the back of the discharging diaphragm is equal to the head pressure on the liquid side. Tapflo diaphragm pumps can therefore be operated against a closed discharge valve with no negative effect to the life of the diaphragms.

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. INSTALLATION

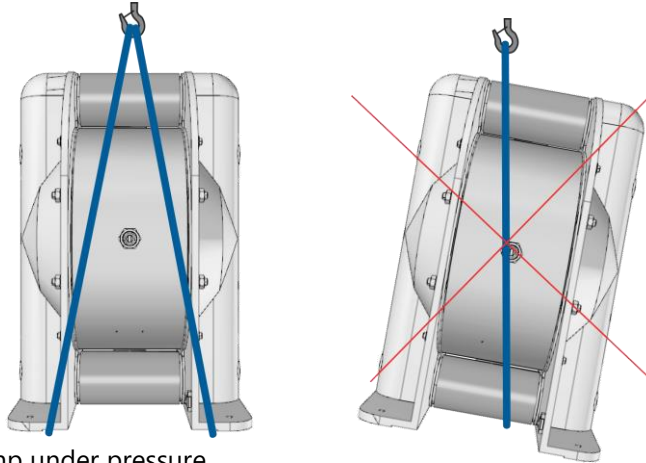
1.3. Lifting and transportation



Before handling the pump check the weight of the pump (see 6.3. *Technical data*). Refer to Your local standards on how to handle the pump. 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.

Always use at least two slings and make sure they are secured in such a way to prevent the pump from slipping and that the pump unit is hanging straight.

Never lift the pump with only one sling. Incorrect lifting can cause serious injury and/or damage to the pump.



Never lift the pump under pressure.

Be careful that nobody passes under the pump when lifted.

Never try to lift the pump by the manifolds or hoses attached to the pump.

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

1.4. Storage



If the equipment is to be stored prior to installation, place it in a clean location. The pump 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 pump internals free of debris. Clean the pump thoroughly before installation.

1.5. Foundation



The pump will operate properly without being fixed to a foundation. If fixation is needed for installation purposes, make sure the foundation is able to absorb vibrations. It is essential for the operation of the pump to mount the pump with the feet in a downward direction (see sketch in chapter 1.8 "Example of installation").

1.6. Suction and discharge piping

Suction and discharge piping should be fully supported and anchored near to but independent of the pump. The piping connected to the pump should be a hose, to prevent undue stress and strain on the pump connections and the piping.

1. INSTALLATION

1.6.1. Rotary connections

The suction and discharge connections can be rotated 180°. This simplifies the assembly and installation of the pump. If you wish to rotate the connections, screw a threaded nipple into the connection and rotate it. On the larger models T220, T420 and T820 it will be easier if the housing nuts are slightly released while turning the connections.

1.6.2. Connection of suction pipe

Remember that the suction pipe/connection is the most critical point, especially if the pump is priming. Just a small leakage will dramatically reduce the suction capability of the pump. When connecting the suction pipe, the following is recommended:

- 1) For satisfactory operation, use a reinforced hose (the suction power may otherwise shrink the hose) or other flexible piping. The internal diameter of the hose should be the same as on the suction connection (at the bottom of the pump) to have best suction capability.
- 2) Make sure that the connection between the hose and the pump is completely tight, otherwise the suction capability will be reduced.
- 3) Always use as short suction pipe as possible. Avoid air pockets which can emerge with long piping.

1.6.3. Connection of discharge pipe

For this connection it is only recommended to have 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.

1.7. Health and safety

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



The pumps are constructed for particular applications. Do not use the pump on applications different from that for which it was sold without consulting us to ascertain its suitability.

1.7.1. 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 pumps.

1. INSTALLATION

1.7.2. Explosion hazardous environments – ATEX



The standard stainless steel pumps are not allowed to operate in environments where there is danger of explosion. Static electricity may occur in the pump under operation, which may cause explosion and injury. Special conductive TX pumps are available for such applications. All our aluminium and cast iron pumps are by standard ATEX approved, having model names TX... Follow below instructions and local/national rules for safe use.

ATEX (directive 2014/34/EU) classification of Tapflo TX pumps:

II 2G Ex h IIC T6...T4 Gb

II 2D Ex h IIIC T60°C...T125°C Db

Equipment group: **II** – all other explosive areas than mines;
Category group: **2** – high level of protection (can be used in zone 1);
Atmosphere: **G** – gas;
D – dust;
Explosion group: **IIC** – gas group (such as acetylene, hydrogen);
IIIC – dust group (conductive dusts);
Type of protection: **h** – control of ignition sources;
Temperature class: **T4, T6** – in the event of a malfunction, the maximum temperature of a surface that may be exposed to gas **T4** = 135°C, **T6** = 85°C;
EPL protection level: **Gb, Db** – high protection.

Earth connection of the pump and other equipment

Connect a suitable earth wire to the stainless steel earth connection that is placed on the inside of one of the pump housings. Connect the other end of the earth wire to earth and also make sure that other equipment like hoses/pipes/containers etc. are properly earthed/connected.

Dry run in ATEX pump

ATEX approved pumps can run dry without increasing the risk of creating potential ignition sources. Nevertheless, dry run periods should be decreased to minimum as they increase the wear of parts inside of the pump. What is more, when running dry (e.g. during self-priming) the pump should run at a low speed controlled via a needle valve.



Antistatic surface

Pumps in ATEX execution should be cleaned in order to preserve antistatic properties. Layer of dust or other solid particles on the outer surfaces is unacceptable.

1.7.3. Air pressure

The maximum air pressure for Tapflo pumps is 8 bar. Higher air pressure than 8 bar can damage the pump and may cause injury to personnel in vicinity of the pump. If you intend to apply a higher air pressure than 8 bar, please consult us.

1. INSTALLATION

1.7.4. 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.

1.7.5. 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 5 "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.**

➤ 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.

1.8. Air connection

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

1. INSTALLATION

1.8.1. 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), the air may be lubricated with water. 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. If a compressor used to generate compressed air is not fitted with an air dryer it is recommended to use a water separator to remove the extent of water from the prepared air.

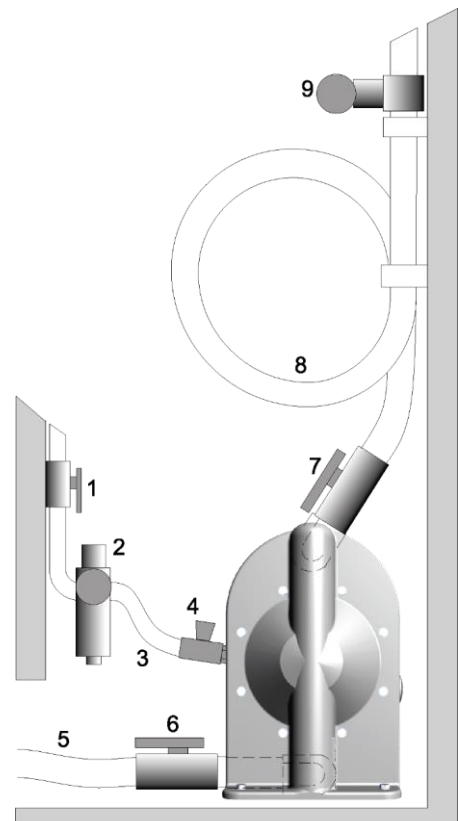
To facilitate the operation of the pump we recommend an air treatment system connected to the air supply. These components should be included:

- 1) Regulator to adjust the air pressure;
- 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 from us.

1.9. Example of installation

- 1) Gate valve compressed air
- 2) Filter and pressure regulator
- 3) Flexible hose
- 4) Needle valve
- 5) Flexible piping
- 6) Gate valve suction
- 7) Gate valve discharge
- 8) Coiled flexible piping
- 9) Flow gauge



1. INSTALLATION

1.10. Recommended installations

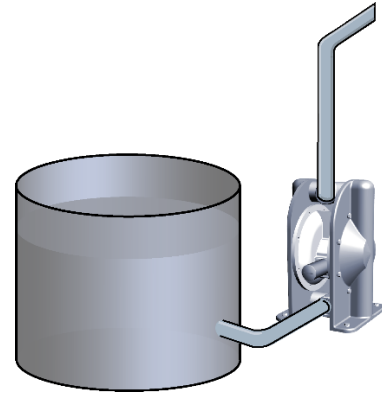
The Tapflo pump is flexible in the way you are able to install it. The in- and outlet ports can be rotated more than 180° to fit various piping systems.

1.10.1. Flooded

The piping system is designed with a positive suction head. This is the best way of installation where it is necessary to completely empty all liquid from the container, or where viscous (thick) products are transferred.

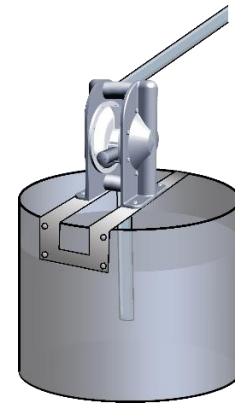


NOTE! Do not exceed 0,7 bar suction pressure! Higher pressure may cause premature diaphragm failure and irregular pump operation.



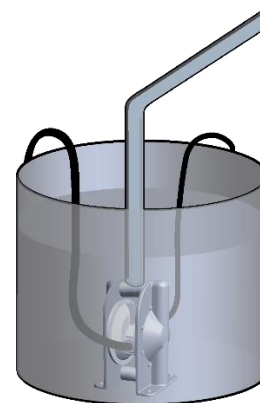
1.10.2. Self-priming

The Tapflo pump is designed to pull a high vacuum. It is able to evacuate an empty suction pipe without any damage to the pump. The suction lift is up to 5 meters (16.4 ft.) from an empty suction pipe and up to 8 meters (26.2 ft.) from a wetted pipe. The suction capability depends on the pump size (see chapter 6 "DATA").



1.10.3. Submerged

All Tapflo pumps may be submerged into the liquid. It is important to make sure that all components which are in contact with the liquid are chemically compatible. The air exhaust must be led to the atmosphere by means of a hose.



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 pump. In such case the pumped product can emerge on sealing areas and connections.

2. OPERATION

2. OPERATION

2.1. Before starting the pump



- Make sure the pump is installed according to the installation instruction (chapter 1).
- Before operating the pump, make sure that the valve on the suction side pos. 6 is opened.
- Filling of the pump with liquid before start is not necessary.



- When installation is new or reinstalled, a test run of the pump with water should be conducted to make sure that the pump 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. **Please contact Tapflo for further tightening intervals recommendation.** This is important to prevent possible leakage.

2.2. 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. This is not necessary if the pump is filled with liquid before start.**
- 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.

2.2.1. 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.

2.2.2. Optimization of the pump 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. For instance, a T120 pump should run continuously at maximum 80 l/min.
- As stated in chapter 0 Tapflo recommends to use an appropriate air treatment system in order to extend the pump's lifetime.

2. OPERATION

- 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 there is possibility of freezing at the air exhaust, it is good to pre-heat the air before it reaches the air intake in order to raise the dew point of the air.
NOTE! Make sure that the air temperature does not exceed 50°C (122°F).
- If icing / freezing is still a problem with the standard muffler, we recommend using our heavy duty metal muffler. Contact us for more information.

2.3. Pump stopping

The pump 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.

2.4. 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.

2.5. Disposal after expiration

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.

2.6. Actions in emergency

In case of transferred liquid leakage, 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

3. MAINTENANCE

3.1. When the pump is new or reassembled



If the pump is new or reassembled after maintenance it is important to retighten the pump housing screws / nuts (pos. 37) after a few days 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. A change in sound of the running pump can be an indication of wearing parts (see chapter 3.4 "*Location of faults*" below).

Leaking liquid from the pump and changes of performance may also be detected. Routine inspections should be conducted frequently.

3.3. Complete inspection



The intervals for a complete inspection depend upon the operation conditions of the pump. The characteristics of the liquid, temperature, materials used in the pump and running time decide how often a complete inspection is necessary.

Nevertheless, we recommend to inspect Tapflo pumps at least once a year by the end user. Parts from **KIT AIR** and **KIT LIQ** should be changed during inspection.

See paragraph 5.3 for detailed kits content.

If a problem has occurred, or if the pump is in need of a complete inspection, refer to chapters 3.4 "*Location of faults*" and 3.5, 3.7 "*Dismantling of the pump*". 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 5.3 "*Stocking recommendation*".

3. MAINTENANCE

3.4. Location of faults

PROBLEM	POSSIBLE FAULT	POSSIBLE SOLUTION
The pump does not run	The air pressure is too low The air connection is blocked Muffler is blocked Air valve is defective Dirt in the pump chamber Diaphragm breakdown	Increase air pressure via a filter-regulator Check / clean air supply connection Check / clean / replace muffler Clean / replace complete air valve Remove debris from the chambers Replace diaphragm
The suction is bad	Suction connection is not tight Suction connection is blocked Muffler is blocked Valve balls are blocked or damaged Valve seats are worn Pump starts with high pressure Air in suction / discharge line Dry suction against discharge pressure	Tighten the suction line Clean suction line Check / clean / replace muffler Check dimensions and shape of valve balls Check dimensions and shape of valve seats Start the pump slowly (see chapter 2.2) Vent suction / discharge line Wet the pump / start without discharge pressure
The pump runs irregular	Valve balls are blocked Sealing in centre block is worn Air valve is defective Diaphragm breakdown Valve seats are worn Icing on the muffler	Check dimensions and shape of valve balls Replace sealing Clean / replace air valve Replace diaphragm Check dimensions and shape of valve seats Improve air quality (see chapters 1.7.1 and 2.2.2)
Bad flow/pressure	Pressure fall in air supply Pressure losses on suction side Air supply / air valve leaking Suction or air connection blocked Muffler is blocked Valve ball worn or broken Valve seats are worn Air in liquid Diaphragm breakdown Icing on the muffler	Increase air pressure via a filter-regulator Check/change installation on suction side Check / repair / replace air supply / air valve Check / clean air supply / suction connection Check / clean / replace muffler Check dimensions and shape of valve balls Check dimensions and shape of valve seats Seal suction line; check / refill container Check / replace diaphragms Improve air quality (see chapters 1.7.1 and 2.2.2)
Liquid leaks from the pump	Screws on the housing not properly tightened O-rings on manifolds damaged Damaged diaphragm Tension / stress from the installation	Check tightening torques of the screws Replace O-rings Check / replace diaphragms Adjust installation, eliminate stress, when using a dampener provide separate support for it (see dampener IOM manual).
Liquid comes out of the muffler	Diaphragm breakdown	Replace diaphragm
Diaphragm breakdown	Wrong selection of material Too high pressure in the installation Long periods of dry running Too high pressure on suction side	Contact us for information on material selection Use air treatment system for protection When dry, run pump slowly (see chapter 2.2) Make sure there is pressure balance between the air and liquid side of the diaphragm

3. MAINTENANCE

3.5. Aluminium and cast iron – Disassembly of the pump

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 drain all liquid from the pump. Cleanse or neutralize the pump thoroughly. Disconnect the air supply and then the suction and discharge connections.

3.5.2. Disassembly procedure



Fig. 3.5.1

Unscrew the housing screws [37] on one side of the pump.



Fig. 3.5.2

Carefully lift the "loose" pump housing [11].



Fig. 3.5.3

Remove the manifolds [13].



Fig. 3.5.4

Unscrew one of the diaphragms [15] from the shaft [16].

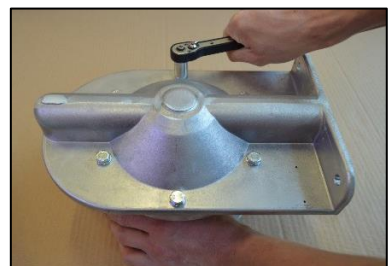


Fig. 3.5.5

Flip the pump and unscrew the second housing [11].

3. MAINTENANCE

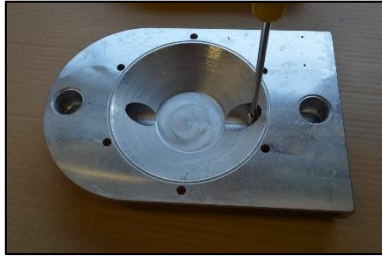


Fig. 3.5.6 For TX25 up to TX420

In order to take out the valve balls [23], unscrew the valve ball stop [22] from the housing [11].

ATTENTION! The stoppers are tightened with a small amount of glue. If unscrewing is difficult, heat up slightly the housing to loosen the glue. Make sure the allen key used is of good quality not to damage the stopper socket.



Fig 3.5.7

Push out the shaft [16] from the centre block [12] and unscrew the second diaphragm [15].



Fig 3.5.8 For TX70 up to TX820

If the shaft sealing [36] seems to be worn (internal leakage of air is present), remove them together with their back-up O-rings [47] by means of a pointing tool.

ATTENTION! Take extra care when carrying out of this operation. If any scratches are made on the inner surface of the centre body air leakage will occur. During this operation, the sealing and O-rings usually get destroyed so make sure you have spare parts at hand.



Fig 3.5.9

Using pliers remove both circlips [27] from the centre block [12].

ATTENTION! While doing this, cover yourself with your other hand, as the circlip easily flips away.



Fig 3.5.10

Press out the air valve [61] by means of a pressing device. Be careful not to damage the brass edges of the air valve.

The pump is now completely disassembled. Check all components for wear or damage and replace if necessary.

When air valve is removed from the centre body check the external O-rings (6 x pos. 30) condition and replace if necessary.

3. MAINTENANCE

3.6. Aluminium and cast iron – Assembly of the pump

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 pump correctly.



Fig. 3.6.1

Before inserting the air valve [61], insert the circlip [27] on one side of the centre block [12].

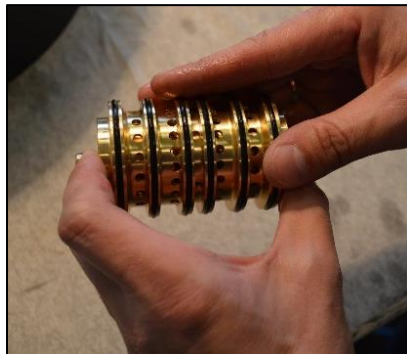


Fig. 3.6.2

When putting the air valve [61] into the centre block [12], apply some water or alcohol on the O-rings to provide smooth insertion of the air valve. It is recommended to use a pressing device for this operation.

ATTENTION! When inserting the TX25 size air valve, replace the shaft with a screw and a nut to make sure the air valve assembly remains properly fastened.



Fig. 3.6.3

When screwing in the diaphragms [15] on the shaft [16], the holes in the diaphragms must align with the holes in the centre block [12]. Sometimes it is necessary to turn the diaphragm back a little bit in order to align the holes.

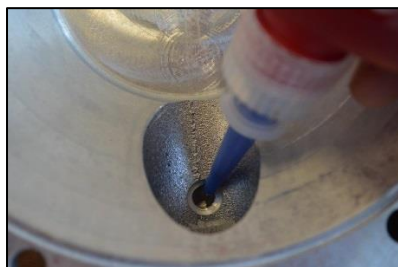


Fig. 3.6.4

Apply some Loctite 243 on the thread before screwing in of the valve ball stops [22].

ATTENTION! Make sure the glue is inserted on the thread and not only on the bottom surface of the orifice.



Fig. 3.6.5

When assembling the diaphragms [15], the first step is to screw the grub screw into one of the diaphragms as much as possible.

3. MAINTENANCE

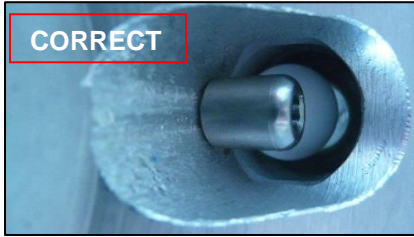


Fig. 3.6.6

Make sure that after screwing in of the valve ball stop [22] there is no free space between the stopper and the housing [11].

ATTENTION! If the valve ball stop is not correctly screwed in it may break and cause damage to the pump interiors.

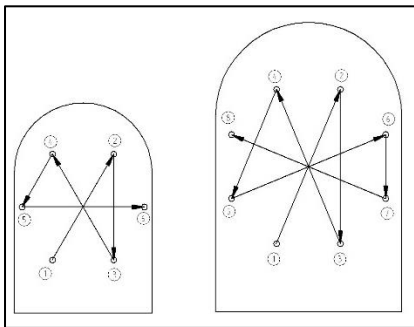


Fig. 3.6.7

When fastening the screws, remember to do it according to the tightening procedure and with the appropriate torque.

NOTE! After a few weeks of operation retighten the screws with the appropriate torque.

3.6.1. 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 a few weeks of operation retighten the screws with appropriate torque.

3. MAINTENANCE

3.7. Stainless steel – Disassembly of the pump

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

3.7.1. 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.

3.7.2. Disassembly procedure

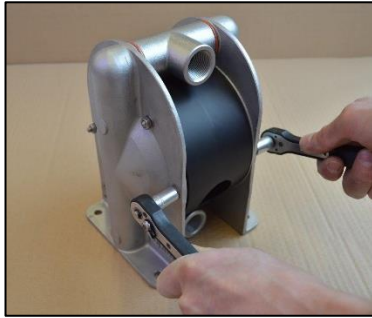


Fig. 3.7.1
Unscrew the housing nuts [37].



Fig. 3.7.2
Lay down the pump on one side and lift one of the housings [11].

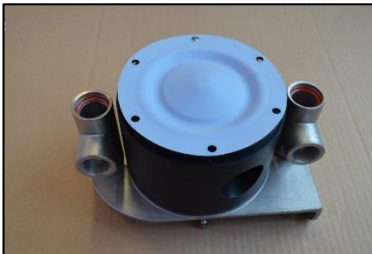


Fig. 3.7.3
Lift the loose manifolds [13] and centre block [12] from the second housing [11].

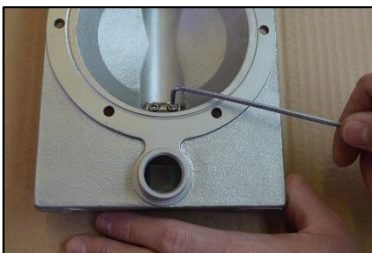


Fig. 3.7.4
Unscrew the allen screws [227] from the upper [22/22U*] and lower [22/22L*] ball stop assemblies. Remove the screws and the half-rods. If unscrewing is difficult, heat up slightly the housing to loosen the glue.
* T70 and T120 pumps have the same size of ball stopper pos. 22, whereas T220 and T420 had different lengths of ball stoppers pos. 22U and 22L.

3. MAINTENANCE



Fig. 3.7.5

Unscrew the diaphragm [15] from one side of the pump.

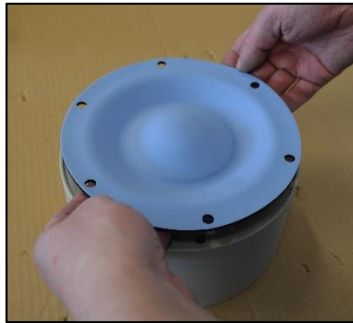


Fig. 3.7.6

Take out the second diaphragm [15] along with the shaft [16].

a) Circlip mounted air valve – T/TX70, T120, T820



Fig. 3.7.7

Using pliers remove both circlips [27] from the centre block [12].

ATTENTION! While doing this, cover yourself with your other hand, as the circlip easily flips away



Fig. 3.7.8

Press out the air valve [61] by means of a pressing device. Be careful not to damage the brass edges of the air valve.

b) Plate mounted air valve – TX120, T/TX220, T/TX420

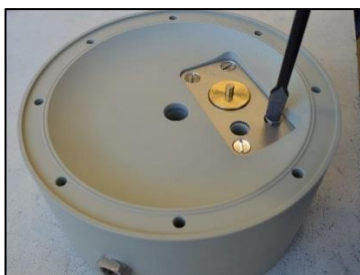


Fig. 3.7.9

Unscrew plate screws [2711] from both sides of the centre body [12] and take out the left and right plate [271].

3. MAINTENANCE



Fig. 3.7.10

Press out the air valve [61] by means of a pressing device. Be careful not to damage the brass edges of the air valve.

The pump is now completely disassembled. Check all components for wear or damage and replace if necessary.

When air valve is removed from the centre body check the external O-rings (6 x pos. 30) condition and replace if necessary.

3.8. Stainless steel – assembly of the pump

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 pump correctly.



Fig. 3.8.1

Before inserting the air valve [61], insert the circlip [27] on one side of the centre block.

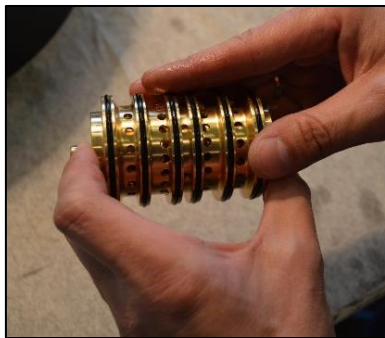


Fig. 3.8.2

When putting the air valve [61] into the centre block [12], apply some water or alcohol on the O-rings to provide smooth insertion of the air valve.

It is recommended to use a pressing device for this operation.



Fig. 3.8.3

When there is need to replace the diaphragm pin screw [1652], while screwing it into the diaphragm [15] make sure the pin screw goes all the way.

3. MAINTENANCE

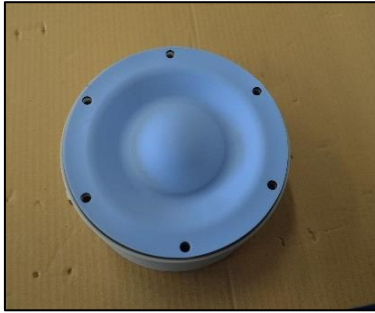


Fig. 3.8.4

When screwing in the diaphragms [15] on the shaft [16], the holes in the diaphragms must align with the holes in the centre block [12]. Sometimes it is necessary to turn the diaphragm back a little bit in order to align the holes.



Fig. 3.8.5

Apply Loctite on the stopper to secure the screws.



Fig. 3.8.6

For easier assembly of the stoppers you can use an allen key and pliers to aid yourself.

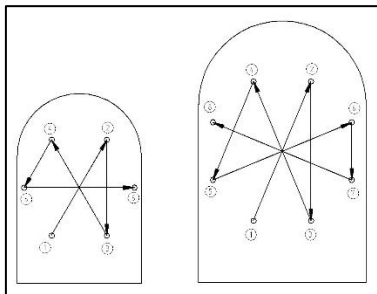


Fig. 3.8.7

When fastening the nuts, remember to do it according to the tightening procedure and with the appropriate torque.

NOTE! After a few weeks of operation retighten the nuts with the appropriate torque.

3.8.1. 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 a few weeks of operation retighten the nuts with appropriate torque.

4. OPTIONS

4. OPTIONS

4.1. Drum pump – TD...

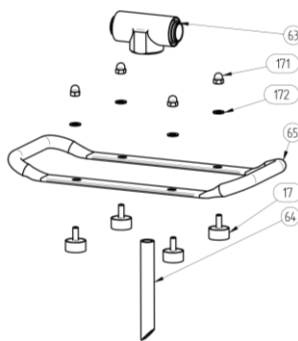
This solution is ideal if we want the pump to be mobile. It is equipped with a stainless steel carrying handle and a suction tube which is screwed in directly in to the inlet manifold. The standard tube length is 1200 mm. You can easily take the pump off a barrel or container and move it to another one.



Available for pump sizes:

- T/TXD25, T/TXD70 and T/TXD120

Additional / different parts:



Art. no	Q-ty	Description	Material
6-xxx-63*	1	Drum inlet	Alu, AISI 316L
6-xxx-64	1	Pump tube	Alu, AISI 316L
6-xxx-65	1	Handle	AISI 316L
6-xxx-171	4	Domed nut for pump feet	A4-70
6-xxx-172	4	Washer for pump feet	A4-70
6-xxx-17	4	Feet for drum pump	Rubber

* Only for TD70 and TD120 pump sizes

4.2. Twin connections – TT...

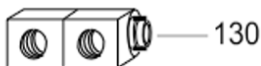
Tapflo pumps can be fitted with double inlet/outlet. This allows to have “two pumps in one”. It is used for blending, mixing or recirculation of liquids. Both pump chambers are separated so, the liquid does not mix.



Available for pump sizes:

- T/TXT25, T/TXT70, T/TXT120, T/TXT220 and T/TXT420

Additional / different parts:



Art. no	Q-ty	Description	Material
6-xxx-130	2	Twin inlet/outlet	Aluminium, AISI 316L

4. OPTIONS

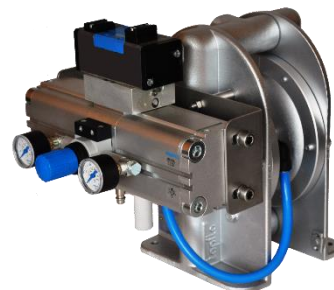
4.3. Filter press pump – TF...

The Tapflo filter press pump is a ready, compact product that can be installed directly on the filter press. The pump is equipped with a booster which amplifies the pressure in a 2:1 ratio. As a result we can achieve up to 16 bar on the discharge of the pump (depending on pump size). As a standard the booster is equipped with a pressure regulator and two manometers. In comparison to a standard pump the TF version is equipped with special pin screws and a special air valve with PET piston (6-xxx-61-318).

In stainless steel pump series we also recommend to use aluminium centre body (-6A option) instead of standard PP for better durability.

Available for pump sizes:

- TF70, TF120, TF220 and TF420



Additional / different parts:

Art. no	Q-ty	Description	Material
6-xxx-147	4	Pin screw with longer thread	A4-80 / AISI 316L*
6-xxx-37	4/8*	Additional nuts	A4-70
6-xxx-38	4	Additional washers	A4-70
6-xxx-99	1	Complete booster	-
6-xxx-990	1	Booster mounting plate	AISI 304
6-xxx-996	4	Booster mounting screws	A4-70
6-xxx-997	4	Booster mounting washers	A4-80

* Stainless steel series / Aluminium and cast iron series

4.4. Barrier pump – TB...

With its special construction and control system the barrier pump is perfect when diaphragm rupture has to be immediately detected in order to avoid product leak to the environment and the air distribution system. When rupture is detected the pump is automatically stopped and an alarm can be generated.

Available for pump sizes:

- TXB70, TXB120, TXB220 and TXB420



Additional / different parts:

Art. no	Q-ty	Description	Material
6-xxx-129	2	Spacer	PP, PE, AISI 316L, Aluminium
6-xxx-139	2	Long inlet/outlet	Aluminium, AISI 316L
6-xxx-149*	6/8**	Pin screw	AISI 304
6-xxx-151	2	Diaphragm – air side	EPDM, PTFE, NBR
6-xxx-152	2	Diaphragm – liquid side	EPDM, PTFE, NBR
6-xxx-153	4/8***	O-ring	FKM, NBR, EPDM
6-xxx-159	2****	Diaphragm spacer	PP, PE, AISI 316L, Aluminium
6-xxx-169	1	Diaphragm shaft	AISI 316L
6-xxx-339	2	Spacer plug	PP, PE

4. OPTIONS

- * Stainless steel series only
- ** 6 for TXB70 and TXB120, 8 for TXB220 and TXB420
- *** 4 for TXB70, TXB220 and TXB420, 8 for TXB120
- **** Only TXB220 and TXB420

4.4.1. Guardian calibration procedure

For calibration of Guardian you should perform the following steps:

1. Remove the M5 plug and connect an external pressure gauge to port described as "Set point O/P".
2. Turn the set point adjustment screw counter-clockwise until it turns freely.
3. Plug all other open ports (except reset) and turn the air supply on.
4. Adjust the set point adjustment screw clockwise until the pressure gauge indicates 0.5 bar below the required set point (i.e. 3.0 bar switching = 2.5 bar set).
5. Turn off the air supply.
6. Remove the pressure gauge, and re-install the M5 plug.
7. The calibration is now complete and the system is ready for use.

4.5. Ball lifters – TL...

This option is a great way to empty the pump of liquid if there is no possibility of pump disconnection from the installation. With this easy solution you can simply raise the ball from the valve seat and allow the liquid to flow out of the pump.

Available for pump sizes:

- T70, T120, T220 and T420



Additional / different parts:

Art. no	Q-ty	Description	Material
6-xxx-116	2	Housing for TL pump	Aluminium, AISI 316L, PTFE coated aluminium
6-xxx-95	4	Valve lifting system	AISI 316L



4. OPTIONS

4.6. Pump with integrated pulsation dampener – TXK...

The TK pump is a compact and ready to use integrated set of a Tapflo AOOD pump and DT pulsation dampener. This allows to obtain optimal pulsation dampening effect while minimizing space needed for pulsation dampener installation. All aluminium AOOD pumps with integrated pulsation dampener are ATEX rated.



Available only in **aluminium** version for pump sizes:

- TX25, TX70, TX120, TX220 and TX420

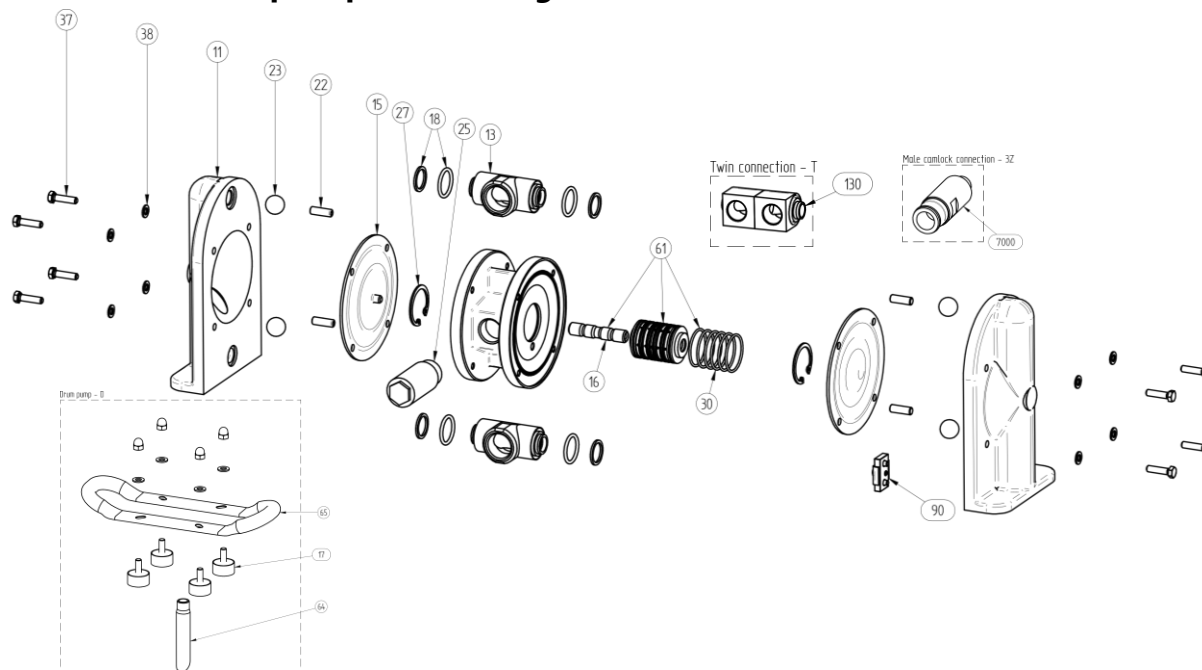
Art. no	Q-ty	Description	Material
6-xx1-112	1	Dampener housing/ pump outlet	Aluminium
6-xx1-12	1	Dampener centre body	Aluminium
6-xx0-15	1	Dampener diaphragm	EPDM*, PTFE, NBR*, PTFE 1705b
6-xx0-37	12	Dampener nut	A4-70
6-xx0-38	12	Dampener washer	A4-70
6-xx0-36	5	Dampener PE seal	PE
6-xx0-47	5*/10* *	Dampener O-ring	NBR, EPDM, FKM
6-xx1-16	1	Dampener shaft	AISI 316L
6-xx1-14	6	Dampener pinscrew	A4-80
6-xx1-25	1	Dampener muffler	PPM-F

5. SPARE PARTS

5. SPARE PARTS

5.1. Aluminium and cast iron pumps

5.1.1. TX25 - Spare parts drawing



5.1.2. TX25 – Spare parts list

Pos.	Q-ty	Description	Material	KIT LIQ	KIT AIR
11	2	Housing	AK9 aluminium, cast iron, PTFE coated aluminium		
12	1	Centre block	AK9 aluminium, cast iron, PTFE coated aluminium		
13	2	In/Outlet	PA6 aluminium, cast iron, AISI 316L		
15	2	Diaphragm	EPDM, PTFE, NBR or FKM	x	
18	4	O-ring set (in/outlet)	Klingerseal/NBR (std), Klingerseal/EPDM, Klingerseal/FKM	x	x
22	4	Stopper	AISI 316L		
23	4	Valve ball	EPDM, PTFE, AISI 316L. PU, NBR, ceramic, FKM	x	
25	1	Muffler	PP		x
27	2	Circlip	Cr3 coated steel		
30	6	O-ring	NBR (standard), EPDM, FKM		
37	8	Screw	Zinc plated steel / A4-70 *		
38	8	Washer	Zinc plated steel / A4-70 *		
61	1	Air valve complete	Body: brass (standard), AISI 316L or PET, O-rings: NBR (standard), EPDM or FKM		x
90	1	Grounding set	AISI 316L		

* = Aluminium / PTFE coated pump

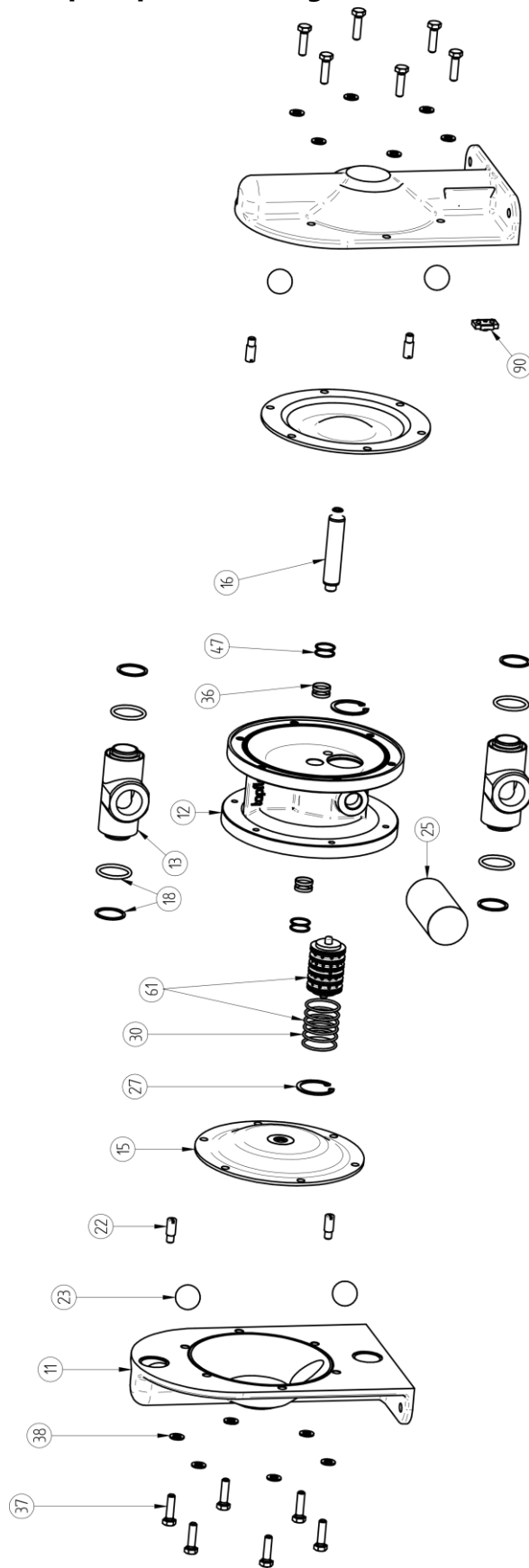
Twin connection			
130	2	Twin in/outlet	Aluminium, CI

Camlock connection			
7000	2	Male camlock	Aluminium

Drum pump			
64	1	Pump tube	Aluminium
65	1	Handle	AISI 316L
17	4	Rubber foot	NBR
172	4	Washer	A4-70
173	4	Domed nut	A4-70

5. SPARE PARTS

5.1.3. TX70-TX420 – Spare parts drawing



5. SPARE PARTS

5.1.4. TX70-TX420 – Spare parts list

Pos.	Q-ty	Description	Material	KIT LIQ	KIT AIR
11	2	Housing	AK9 aluminium, cast iron, PTFE coated aluminium		
12	1	Centre block	AK9 aluminium, cast iron, PTFE coated aluminium		
13	2	In/Outlet	PA6 aluminium, cast iron, AISI 316L		
15	2	Diaphragm	EPDM, PTFE, NBR or FKM	X	
16	1	Diaphragm shaft set	AISI 304L		X
18	4	O-ring set (in/outlet)	Klingerseal/NBR (std), Klingerseal/EPDM, Klingerseal/FKM	X	X
22	4	Stopper	AISI 316L		
23	4	Valve ball	EPDM, PTFE, AISI 316L. PU, NBR, ceramic, FKM	X	
25	1	Muffler	PP		X
27	2	Circlip	Cr3 coated steel		
30	6	O-ring	NBR (standard), EPDM, FKM		
36	4	Center block seal	PE		X
37	12/16**	Screw	Zinc plated steel / A4-70 *		
38	12/16**	Washer	Zinc plated steel / A4-70 *		
47	4/8***	O-ring (back-up 36)	NBR		X
61	1	Air valve complete	Body: brass (standard), AISI 316L or PET, O-rings: NBR (standard), EPDM or FKM		X
90	1	Grounding set	AISI 316L		

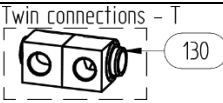
* = Aluminum / PTFE coated pump

** = 12 for TX70, TX120 / 16 for TX220, TX420

*** = 4 for TX70, TX220, TX420 / 8 for TX120

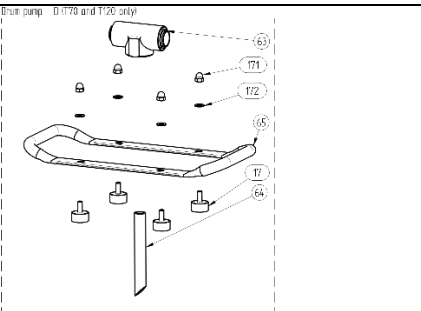
5. SPARE PARTS

5.1.5. TX70-TX420 – Spare parts - Options



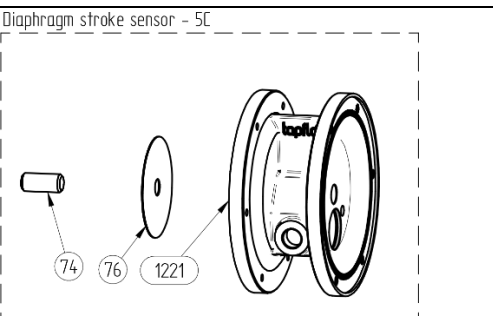
Twin connection - TT

130	2	Twin in/outlet	Aluminium, CI
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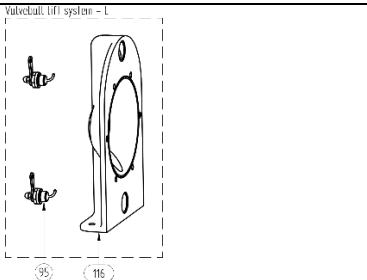
Drum pump - TD

63	1	Drum pump inlet	Aluminium, CI
64	1	Pump tube	Aluminium
65	1	Handle	AISI 316L
17	4	Rubber foot	NBR
172	4	Washer	A4-70
171	4	Domed nut	A4-70



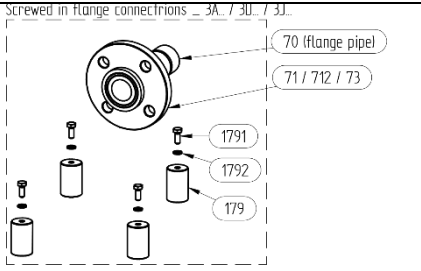
Diaphragm stroke sensor – 5C

121	1	Centerblock for stroke sensor	Aluminium, CI
74	1	Inductive sensor	CuZn
76	1	Sensing plate	AISI 316L

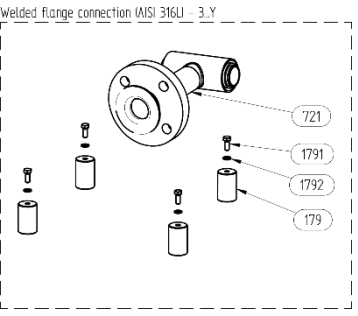


Diaphragm stroke sensor – 5C

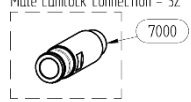
116	2	Pump housing for ball lifter	Aluminium
95	4	Ball lifter	AISI 316L



Screwed in flange connections – 3A, 7, 30, 7, 31



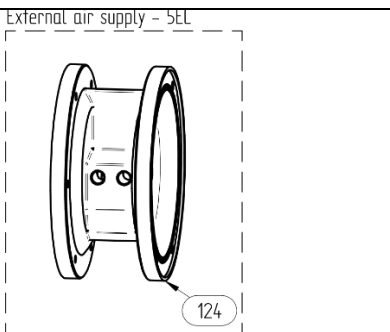
Welded flange connection (AISI 316L) – 3.Y



Male camlock connection – 3Z

Optional connections – 3...

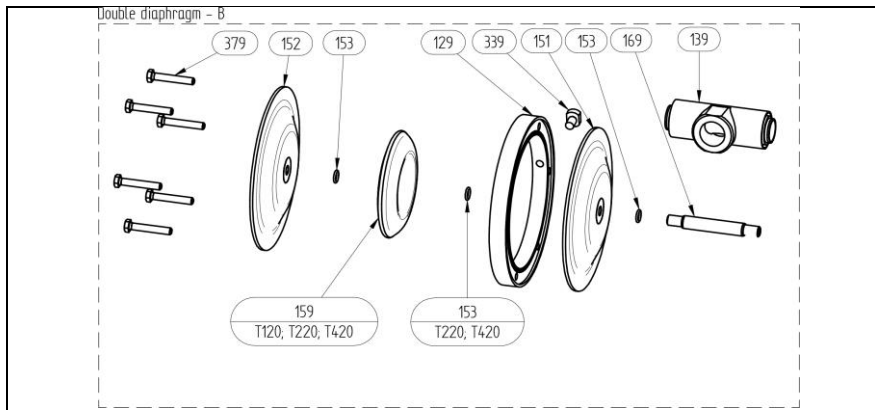
70	2	Flange pipe (thread)	AISI 316L
71	2	ANSI flange ring	AISI 316L
73	2	DIN flange ring	AISI 316L
712	2	JIS flange ring	AISI 316L
721	2	Integrated manifold with loose flange	AISI 316L
7000	2	Male camlock	Aluminium
179	4	Pump feet	AISI 316L
1791	4	Pump feet screw	A4-70
1792	4	Pump feet washer	A4-80



External air supply – 5EC

124	1	Centerblock	Aluminium, CI
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5. SPARE PARTS

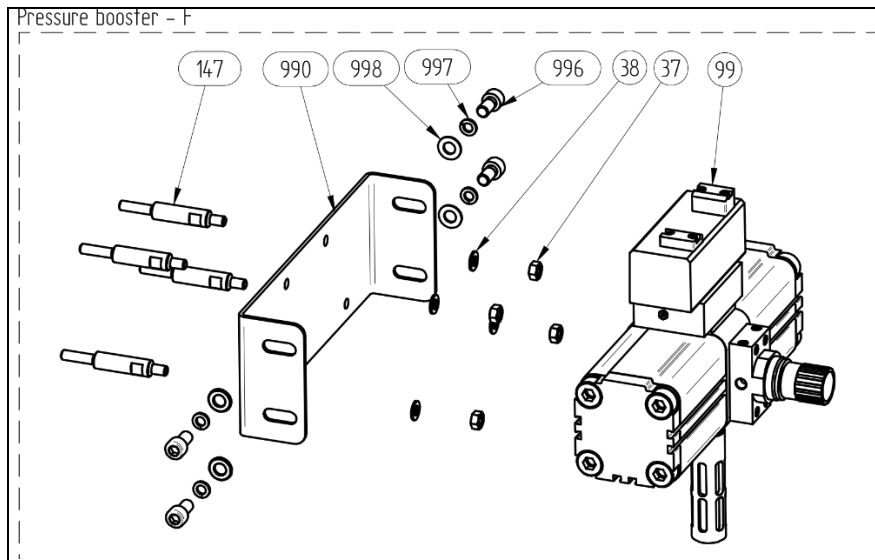


Double diaphragm system - TB			
129	1	Set of spacers (right + left)	PA6 Aluminium
139	2	In/outlet	AISI 316L
151	2	Air side diaphragm	EPDM, PTFE, NBR
152	2	Liquid side diaphragm	EPDM, PTFE, NBR
153	4/6*	Diaphragm O-ring	EPDM, FKM, NBR
159	2**	Diaphragm spacer	PA6 Aluminium
169	1	Diaphragm shaft	AISI 304L
339	2	Spacer plug	PE1000
379	12/16***	Screw for TB pump	Zinc plated steel

* 4 for TXB70, TXB120 / 6 for TX220, TXB420

** TXB120, TX220, TXB420 only

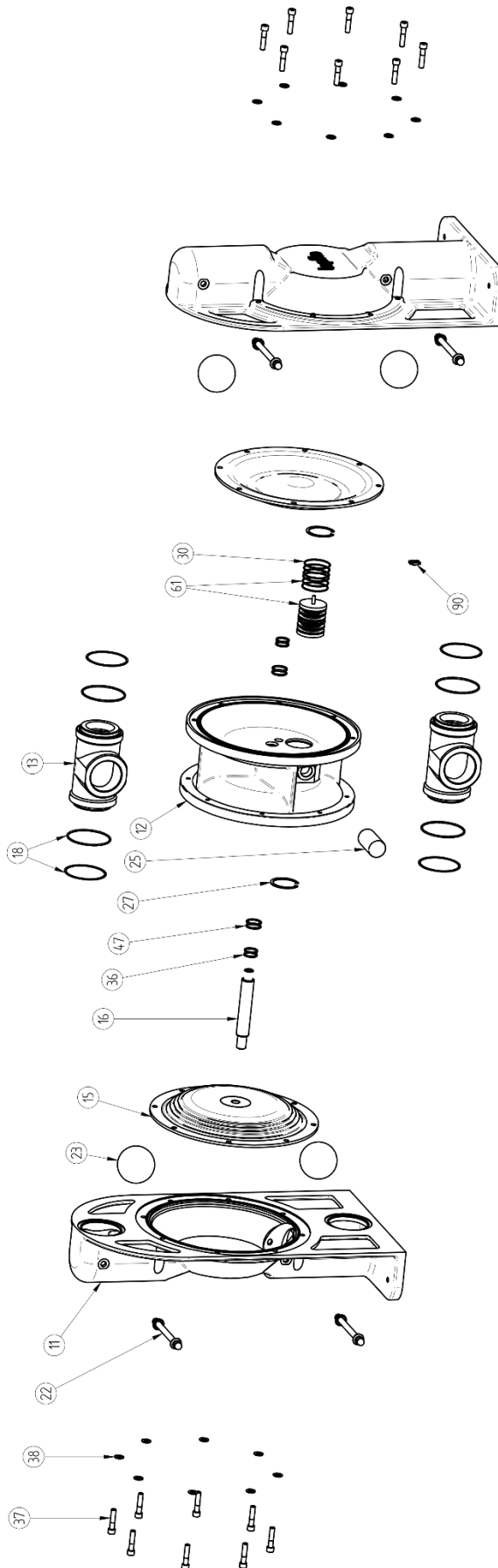
*** 12 for TXB70, TXB120 / 16 for TX220, TXB420



Pump with pressure booster - TF			
99	1	Booster	-
990	1	Booster mounting plate	AISI 304
996	4	Booster mounting screw	A4-70
997	4	Booster mounting washer	A4-80
147	4	Pin screw	AISI 316L
37	4	Additional nuts	AISI 304
38	4	Additional washers	AISI 304

5. SPARE PARTS

5.1.6. TX820 – Spare parts drawing



5. SPARE PARTS

5.1.7. TX820 – Spare parts list

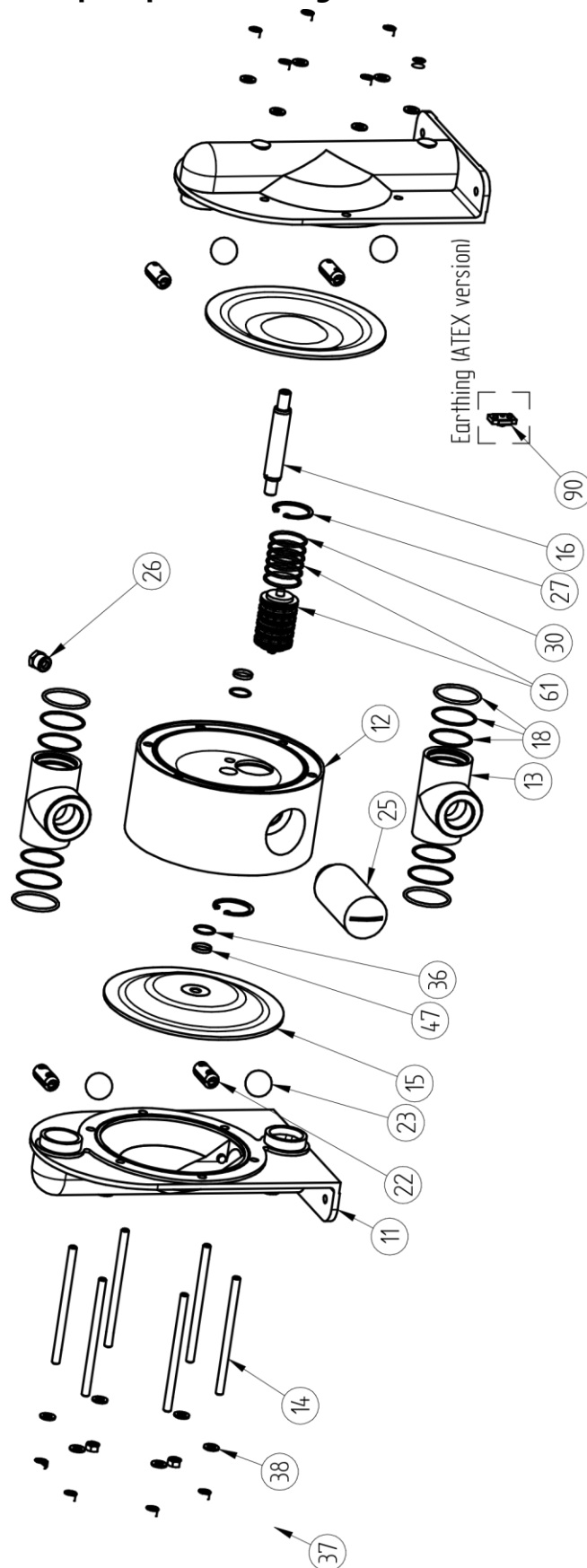
Pos.	Q-ty	Description	Material	KIT LIQ	KIT AIR
11	2	Housing	AK9 aluminium, PTFE coated aluminium		
12	1	Centre block	AK9 aluminium, PTFE coated aluminium		
13	2	In/Outlet	AK9 aluminium, AISI 316L		
15	2	Diaphragm	EPDM, PTFE, NBR	X	
16	1	Diaphragm shaft set	AISI 316L		X
18	4	O-ring set (in/outlet)	Klingerseal/NBR (std), Klingerseal/EPDM, Klingerseal/FKM	X	X
22	4	Stopper assembly	AISI 316L; NBR, EPDM O-ring		
23	4	Valve ball	EPDM, PTFE, PU, NBR	X	
25	1	Muffler	PP		X
27	2	Circlip	Cr3 coated steel		
30	6	O-ring	NBR (standard), EPDM, FKM		
36	4	Center block seal	PE		X
37	16	Screw	Zinc plated steel / A4-70 *		
38	16	Washer	Zinc plated steel / A4-70 *		
47	4	O-ring (back-up 36)	NBR		X
61	1	Air valve complete	Body: PET; O-rings: NBR, FKM, EPDM		X
90	1	Grounding set	AISI 316L		

* = Aluminium / PTFE coated pump

5. SPARE PARTS

5.2. Stainless steel pumps

5.2.1. T70 – T120 - Spare parts drawing



5. SPARE PARTS

5.2.2. T70 – T120 – Spare parts list

Pos.	Q-ty	Description	Material	KIT LIQ	KIT AIR
11	2	Housing	AISI 316L		
12	1	Centre block	PP		
13	2	In/outlet	AISI 316L		
14	6	Pin screw	A4-80		
15	2	Diaphragm	EPDM, PTFE, NBR	X	
16	1	Diaphragm shaft	AISI 304L		X
18	4	O-ring set (in/outlet)	FEP/Silicone, FEP/FKM (std.)	X	X
22	4	Valve ball stop	AISI 316L		
23	4	Valve ball	EPDM, PTFE, NBR, PU, AISI 316L, ceramic	X	
25	1	Muffler	PP		X
26	1	Air intake adapter	Brass		
27*	2	Circlip	Cr3 coated steel		
30	6	O-ring	NBR (standard), EPDM, FKM		
36	2	Centre block seal	PE		X
37	12	Nut	A4-70		
38	12	Washer	A4-70		
47	2/4**	O-ring (back up for 36)	NBR (standard), EPDM, FKM		X
61	1	Air valve complete	Body: brass (std.), PET, AISI316L O-rings: NBR (std.), FKM, EPDM		X
90***	1	Grounding set	AISI 316L		

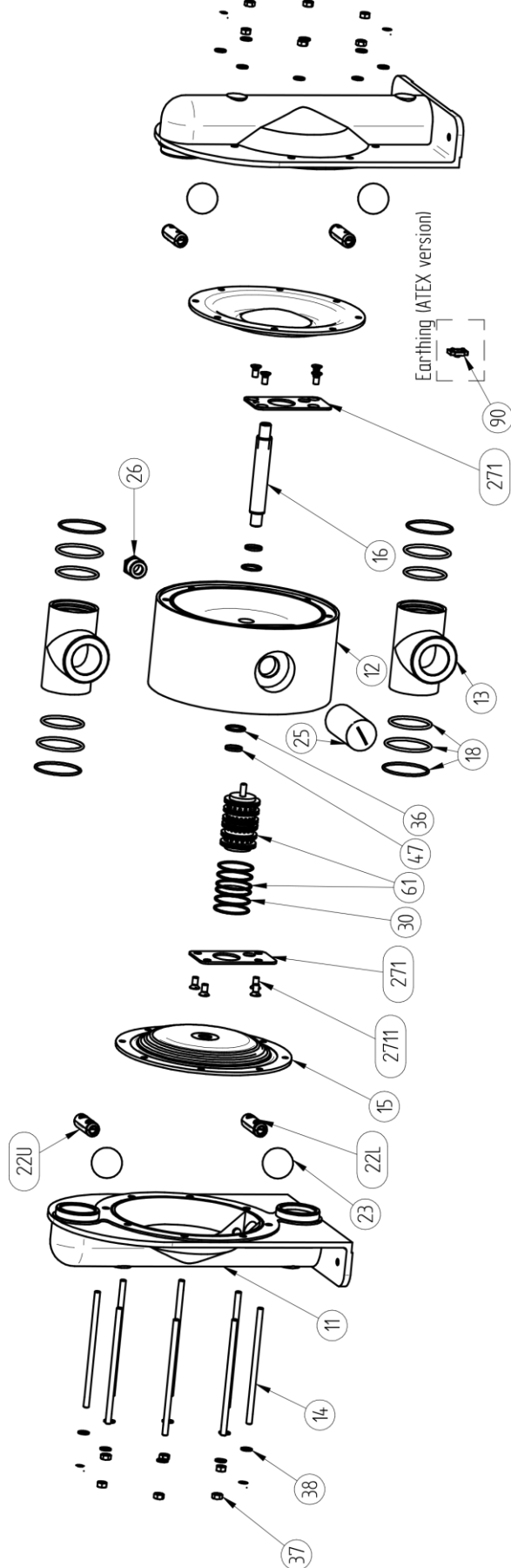
* = T70, TX70 and T120; TX120 plate mounted air valve – see option 5TS below

** = T70 / T120

*** = On ATEX pumps

5. SPARE PARTS

5.2.3. T220 – T420 - Spare parts drawing



5. SPARE PARTS

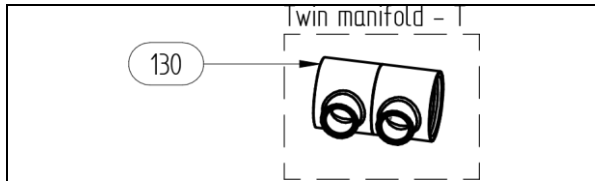
5.2.4. T220 – T420 – Spare parts list

Pos.	Q-ty	Description	Material	KIT LIQ	KIT AIR
11	2	Housing	AISI 316L		
122	1	Centre block	PP		
13	2	In/outlet	AISI 316L		
14	8	Pin screw	A4-80		
15	2	Diaphragm	EPDM, PTFE, NBR	X	
16	1	Diaphragm shaft	AISI 304L		X
18	4	O-ring set (in/outlet)	FEP/Silicone, FEP/FKM (std.)	X	X
22U	2	Valve ball stop (upper)	AISI 316L		
22L	2	Valve ball stop (lower)	AISI 316L		
23	4	Valve ball	EPDM, PTFE, NBR, PU, AISI 316L, ceramic	X	
25	1	Muffler	PP		X
26	1	Air intake adapter	Brass		
271	1	Set of mounting plates	AISI 316L		
2711	8	Mounting screws	A4-70		
30	6	O-ring	NBR (standard), EPDM, FKM		
36	2	Centre block seal	PE		X
37	16	Nut	A4-70		
38	16	Washer	A4-70		
47	2	O-ring (back up for 36)	NBR (standard), EPDM, FKM		X
61	1	Air valve complete	Body: brass (std.), PET, AISI316L O-rings: NBR (std.), FKM, EPDM		X
90*	1	Grounding set	AISI 316L		

*= On ATEX pumps

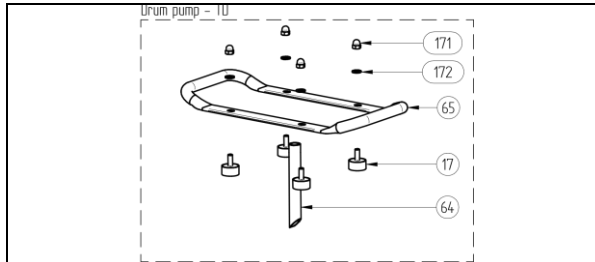
5. SPARE PARTS

5.2.5. Spare parts - Options



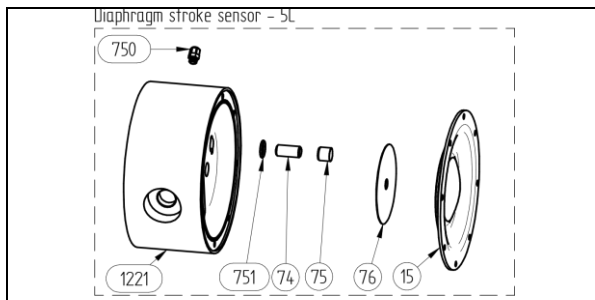
Twin connection - TT

130	2	Twin in/outlet	AISI 316L
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Drum pump - TD (only T70 and T120)

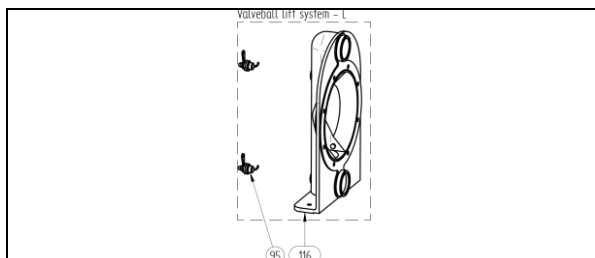
64	1	Pump tube	Aluminium
65	1	Handle	AISI 316L, PP
17	4	Rubber foot	NBR
172	4	Washer	A4-70
171	4	Domed nut	A4-70



Diaphragm stroke sensor - 5C

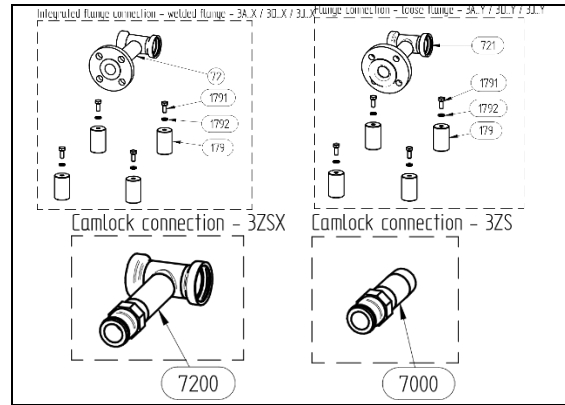
121 / 1221*	1	Centerblock for stroke sensor	PP
74	1	Inductive sensor	CuZn
75	1	Sensor cap	PP
750	1	Cable gland	PP
751	1	O-ring	NBR
76	1	Sensing plate	AISI 316L

*T70, T120 / T220, T420



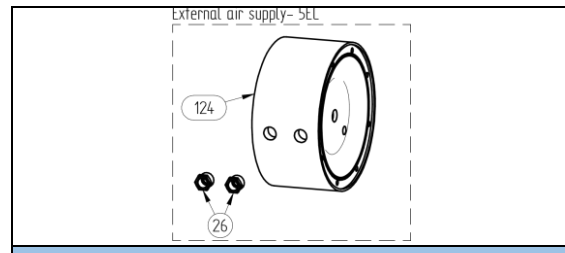
Ball lifters - 5L

116	2	Pump housing for ball lifter	AISI 316
95	4	Ball lifter	AISI 316L



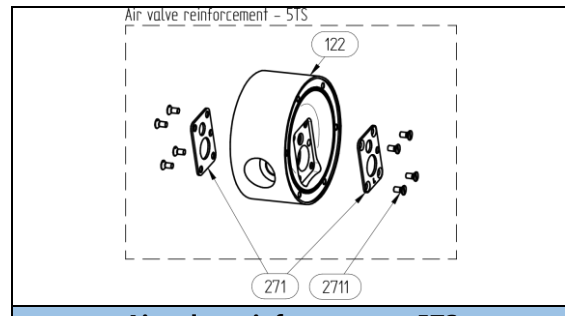
Optional connections - 3...

70	2	Flange pipe (thread)	AISI 316L
71	2	ANSI flange ring	AISI 316L
73	2	DIN flange ring	AISI 316L
712	2	JIS flange ring	AISI 316L
721	2	Integrated manifold with loose flange	AISI 316L
7000	2	Male camlock	AISI 316L
7200	2	Integrated manifold with camlock	AISI 316L
72	2	Integrated manifold with welded flange	AISI 316L
179	4	Pump feet	AISI 316L
1791	4	Feet mounting screw	A4-70
1792	4	Washer	A4-80



External air supply - 5EC

124	1	Centerblock	PP
26	2	Air intake adapter	Brass



Air valve reinforcement - 5TS (Std on TX120, T220 and T420)

122	1	Centerblock for plate mounted air valve	PP
271	1	Set of mounting plates	AISI 316L
2711	8	Mounting screws	A4-70

5. SPARE PARTS

Double diaphragm - B

Double diaphragm system - TB			
129	1	Set of spacers (right + left)	PP
139	2	In/outlet	AISI 316L
149	6/8*	Pin screw for TB pump	A4-80
151	2	Air side diaphragm	EPDM, PTFE, NBR
152	2	Liquid side diaphragm	EPDM, PTFE, NBR
153	4/6**	Diaphragm O-ring	EPDM, FKM, NBR
159	2***	Diaphragm spacer	PE
169	1	Diaphragm shaft	AISI 304L
339	2	Spacer plug	PP

* TB70, TB120 / TB220, TB420

** TB70 / TB120, TB220, TB420

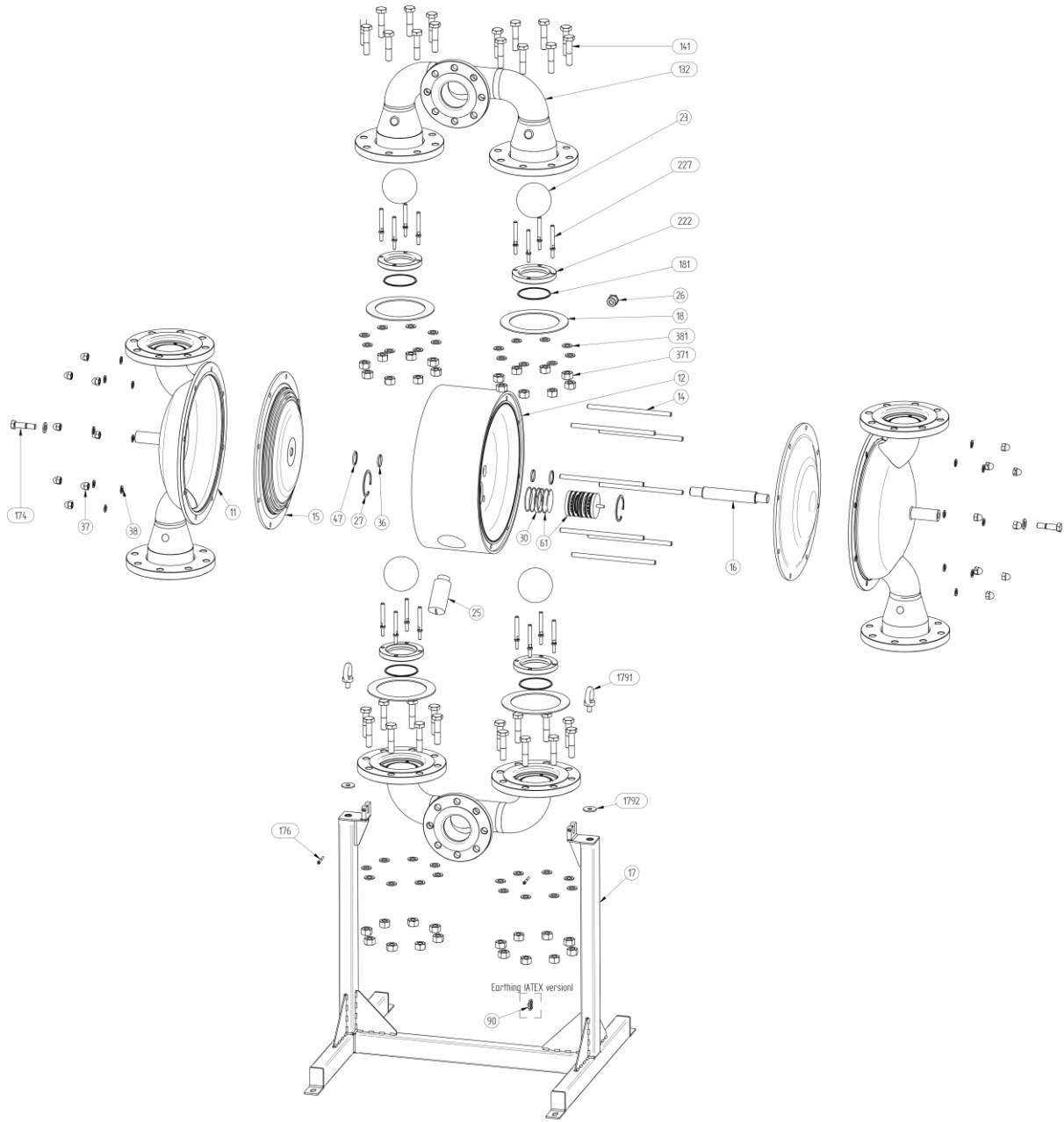
*** TB120, TB220, TB420 only

Pressure booster - TF

Pump with pressure booster - TF			
99	1	Booster	-
990	1	Booster mounting plate	AISI 304
996	4	Booster mounting screw	A4-70
997	4	Booster mounting washer	A4-80
998	4	Booster mounting washer	A4-80
147	4	Pin screw	AISI 316L
37	8	Additional nuts	AISI 304
38	4	Additional washers	AISI 304

5. SPARE PARTS

5.2.6. T820 - Spare parts drawing



5. SPARE PARTS

5.2.7. T820 – Spare parts list

Pos.	Q-ty	Description	Material	KIT LIQ	KIT AIR
11	2	Housing	AISI 316L		
12	1	Centre block	PP		
131	1	Manifold inlet	AISI 316L		
132	1	Manifold outlet	AISI 316L		
14	8	Pin screw	A4-80		
141	32	Hexagon bolt	A4-70		
15	2	Diaphragm	EPDM, PTFE, NBR	X	
16	1	Diaphragm shaft	AISI 316L		X
17	1	Stand	AISI 304		
174	2	Hexagon fit bolt	AISI 316L		
175	2	Washer	A2-70		
176	2	Hexagon socket head cap screw	A2-70		
1791	2	Lifting eye bolt	A2-70		
1792	2	Washer	A4		
18	4	Flat gasket	EPDM, PTFE	X	X
181	4	O-ring	FEP FKM	X	X
222	4	Valve seat	AISI 316L		
227	16	Leading screw	AISI 316L		
23	4	Valve ball	PTFE, EPDM, NBR, PU	X	
25	1	Muffler	PP		X
26	1	Air intake adapter	Brass		
27	2	Circlip	Cr3 coated steel		
30	6	O-ring	NBR, FKM, EPDM		
36	4	Centre block seal	PE		X
37	16	Cap nut	A4-70		
371	32	Hex nut	A4-70		
38	16	Spring washer	A4-80		
381	32	Spring washer	A4-70		
47	4	O-ring (back up for 36)	NBR		X
61	1	Air valve complete	Body: PET (std.), brass, AISI316L O-rings: NBR (std.), FKM, EPDM		X
90*	1	Grounding set	AISI 316L		

*= On ATEX pumps

5. SPARE PARTS

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 three different spare part **KITS** – **KIT LIQ** includes parts on pump wetted side and **KIT AIR** includes parts on the pump air side and that are subject to wear.

TX25 A/C:

	Pos.	Description	Q-ty
KIT LIQ	15	Diaphragm	2
	18	O-ring set in/outlet	4
	23	Valve ball	4

	Pos.	Description	Q-ty
KIT AIR	18	O-ring set in/outlet	4
	61	Air valve complete	1
	25	Muffler	1

TX70 A/C, TX120 A/C, TX220 A/C, TX420 A/C, TX820 A; T70 S, T120 S, T220 S, T420 S, T820 S:

	Pos.	Description	Q-ty
KIT AIR	18	O-ring set in/outlet	4
	61	Air valve complete	1
	16	Diaphragm shaft	1
	36	Centre block seal	2/4*
	47	O-ring(back up for 36)	2/4/8**
	25	Muffler	1

	Pos.	Description	Q-ty
KIT LIQ	15	Diaphragm	2
	18	O-ring set in/outlet	4
	23	Valve ball	4

* T70 S, T120 S, T220 S, T420 S / TX70 A/C, TX120 A/C, TX220 A/C, TX420 A/C, TX820 A, T820 S

** T70 S, T220 S, T420 S / TX70 A/C, T120 S, TX220 A/C, TX420 A/C, TX820 A, T820 S / TX120 A/C

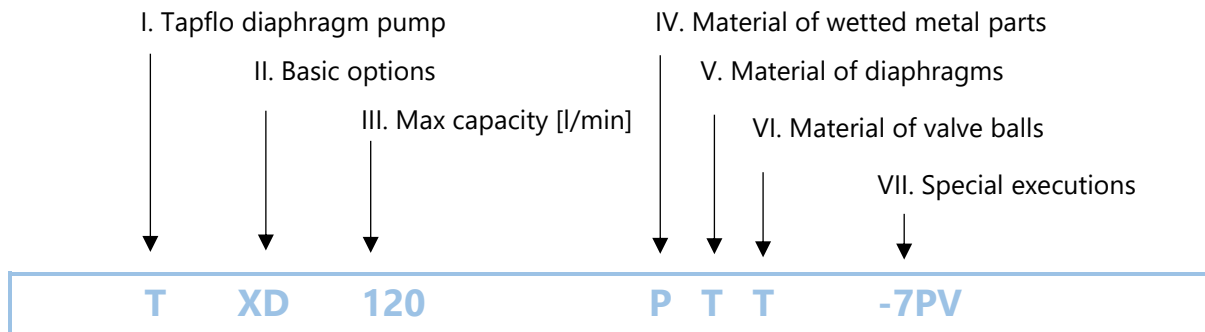
5. SPARE PARTS

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 housing. Then just indicate the part numbers from the spare parts list and quantity of each item.

5.5. Pump 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. T = Tapflo diaphragm pump

II. Basic options:

- B = Backup diaphragm pump
- D = Drum pump
- F = Filter-press pump
- L = Draining system
- T = Twin inlet/outlet pump
- X = ATEX approved, group II, cat. 2

IV. Material of wetted metal parts:

- A = Aluminium
- S = AISI 316L
- X = PTFE coated aluminium
- C = Cast iron

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
- V = FKM (T25 – T70 only)

VI. Material of valve balls:

- E = EPDM
- N = NBR (nitrile rubber)
- T = PTFE
- S = AISI 316 stainless steel
- U = PU (polyurethane)
- K = Ceramic
- V = FKM
- B = PTFE TFM 1635

VII. Special executions:

- 1 = Optional in/outlet material
- 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 pin screws
- 13 = Twin in-/outlet options
- 14 = Optional pump feet
- 17 = Plates for pump/dampener assembly

6. DATA

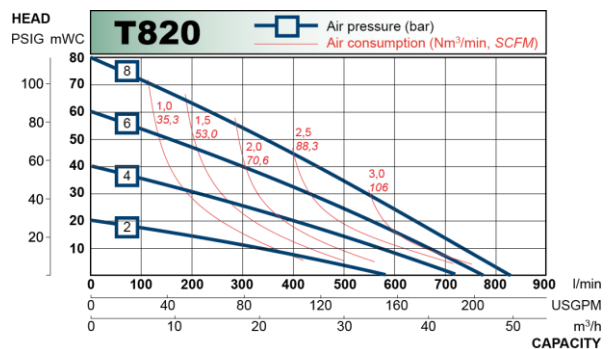
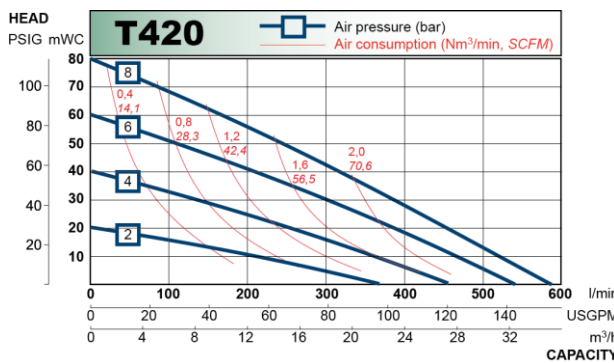
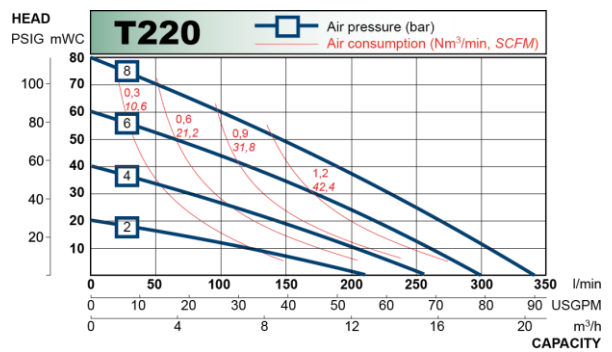
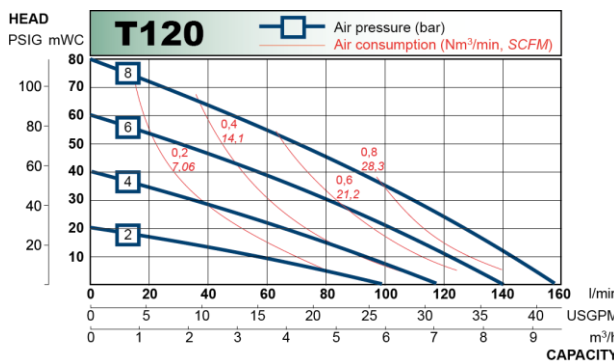
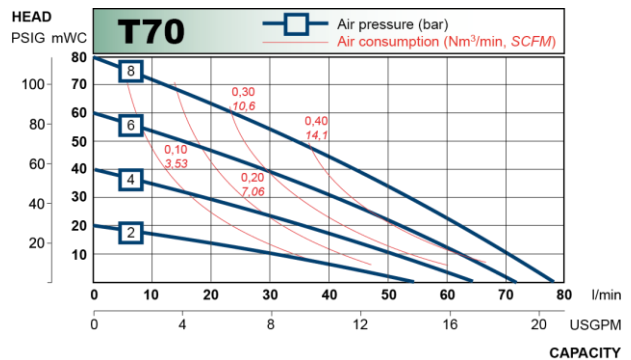
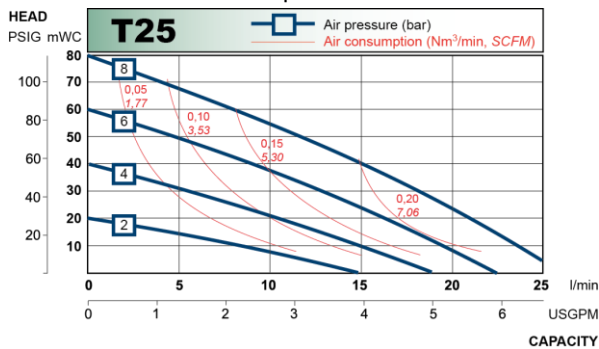
6. DATA

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.

Example:

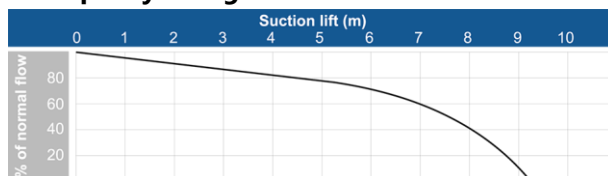
A flow of 30 litre/minute is desired. The discharge pressure is calculated to 25 mWC. We choose a T70 pump. It requires an air pressure of 4 bar and will consume approximately 0.20 Nm³ of air per minute.



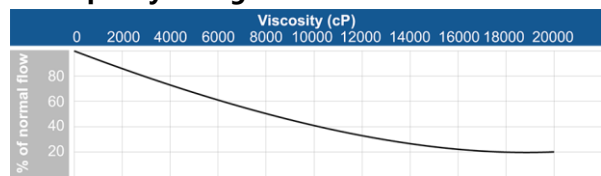
Recommended flow is half of the max flow, e.g. recommended flow for a T70 is 35 l/min.

6.2. Capacity changes

Capacity changes at different suction lifts



Capacity changes at different viscosities



6. DATA

6.3. Technical data

TECHNICAL DATA	PUMP SIZE					
	TX25 A/C	TX70 A/C	TX120 A/C	TX220 A/C	TX420 A/C	TX820 A
Max capacity* [l/min] / [US GPM]	26 / 6.8	78 / 20	158 / 41	330 / 87	570 / 150	820 / 216
Volume per stroke** [ml] / [cu in]	45 / 2.75	105 / 6.4	272 / 16.2	884 / 54	2440 / 149	4897 / 299
Max discharge pressure [bar] / [psi]	8 / 116	8 / 116	8 / 116	8 / 116	8 / 116	8 / 116
Max air pressure [bar] / [psi]	8 / 116	8 / 116	8 / 116	8 / 116	8 / 116	8 / 116
Max suction lift dry [m] / [Ft]	1.5 / 5	3 / 9.8	4 / 13	4 / 13	4 / 13	4 / 13
Max suction lift wet [m] / [Ft]	8 / 26	8 / 26	8 / 26	8 / 26	8 / 26	8 / 26
Max size of solids ø in [mm] / [in]	3 / 0.12	4 / 0.16	6 / 0.24	10 / 0.39	15 / 0.59	13 / 0.51
Max temp. pump with EPDM [°C] / [°F]	90 / 194	90 / 194	90 / 194	90 / 194	90 / 194	90 / 194
Max temp. pump with NBR [°C] / [°F]	70 / 158	70 / 158	70 / 158	70 / 158	70 / 158	70 / 158
Max temp. pump with PTFE [°C] / [°F]	110 / 230	110 / 230	110 / 230	110 / 230	110 / 230	110 / 230
Weight of pump in aluminium [kg] / [lb]	2 / 4.4	5 / 11	8.65 / 19.1	18.1 / 39.9	36.8 / 81.1	101.5 / 223.8
Weight of pump in cast iron [kg] / [lb]	4.1 / 9	9.9 / 21.8	17.6 / 38.8	33.4 / 73.6	71.4 / 157.4	-
Connection standard in aluminium and cast iron pumps	BSP female thread (G)	BSP female thread (G)	BSP female thread (G)	BSP female thread (G)	BSP female thread (G)	BSP female thread (G)
Connection standard in stainless steel pumps	-	BSP female thread (G)	BSP female thread (G)	BSP female thread (G)	BSP female thread (G)	DIN 2642 flange

TECHNICAL DATA	PUMP SIZE				
	T70 S	T120 S	T220 S	T420 S	T820 S
Max capacity* [l/min] / [US GPM]	78 / 20	158 / 41	330 / 87	570 / 150	820 / 216
Volume per stroke** [ml] / [cu in]	101 / 6.2	304 / 18.5	962 / 58.7	2480 / 151.3	3452 / 210.7
Max discharge pressure [bar] / [psi]	8 / 116	8 / 116	8 / 116	8 / 116	8 / 116
Max air pressure [bar] / [psi]	8 / 116	8 / 116	8 / 116	8 / 116	8 / 116
Max suction lift dry [m] / [Ft]	3 / 9.8	4 / 13	4 / 13	4 / 13	4 / 13
Max suction lift wet [m] / [Ft]	8 / 26	8 / 26	8 / 26	8 / 26	8 / 26
Max size of solids ø in [mm] / [in]	4 / 0.16	6 / 0.24	10 / 0.39	15 / 0.59	13 / 0.51
Max temp. pump with EPDM [°C] / [°F]	90 / 194	90 / 194	90 / 194	90 / 194	90 / 194
Max temp. pump with NBR [°C] / [°F]	70 / 158	70 / 158	70 / 158	70 / 158	70 / 158
Max temp. pump with PTFE [°C] / [°F]	110 / 230	110 / 230	110 / 230	110 / 230	110 / 230
Weight of pump in AISI 316L [kg] / [lb]	6.8 / 15	15.5 / 34.2	35.9 / 79.2	66.1 / 145.7	137 / 302
Connection standard in aluminium and cast iron pumps	BSP female thread (G)	BSP female thread (G)	BSP female thread (G)	BSP female thread (G)	BSP female thread (G)
Connection standard in stainless steel pumps	BSP female thread (G)	BSP female thread (G)	BSP female thread (G)	BSP female thread (G)	DIN 2642 flange

* = Recommended flow is half of the max flow, i.e. recommended flow for a T70 is 39 l/min

** = Based on pumps with PTFE diaphragms. Using rubber diaphragms will increase the volume per stroke.

6. DATA

6.4. Dimensions

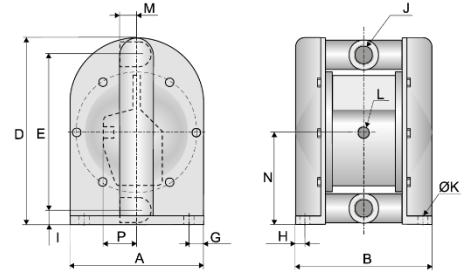
Dimensions in mm (where other is not indicated)

Dimensions in inch (where other is not indicated)

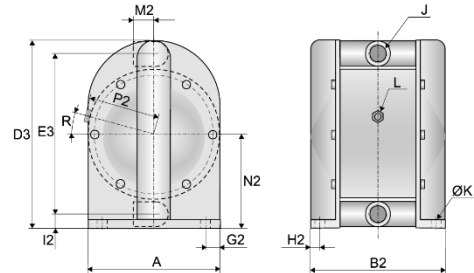
General dimensions only, ask us for detailed drawings. Changes reserved without notice.

Dim	PUMP SIZE						
	T25	T70	T120	T220	T420	T820 A	T820 S
A	105 4.13	150 5.91	200 7.87	275 10.83	356 14.02	470 18.50	760 29.92
B	117 4.61	167 6.57	198 7.80	267 10.51	342 13.46	488 19.21	-
B2	-	157 6.18	200 7.87	282 11.10	347 13.66	-	750 29.53
D	162 6.38	233 9.17	302 11.89	419 16.50	539 21.22	840 33.07	-
D2	173 6.81	249 9.80	322 12.68	-	-	-	-
D3	-	229 9.02	310 12.20	422 16.61	529 20.83	-	1341 52.80
E	132 5.20	190 7.48	252 9.92	346 13.62	448 17.64	688 27.09	-
E2	147 5.79	216 8.50	279 10.98	-	-	-	-
E3	-	192 7.56	257 10.12	348 13.70	443 17.44	-	1035 40.75
F	13 0.51	20 0.79	20 0.79	-	-	-	-
G	11 0.43	18 0.71	20 0.79	26 1.02	38 1.50	50 1.97	-
G2	-	17 0.67	20 0.79	31 1.22	36 1.42	-	25 0.98
H	12 0.47	19 0.75	20 0.79	29 1.14	30 1.18	53 2.09	-
H2	-	13.5 0.53	23.5 0.93	34 1.34	32 1.26	-	13 0.51
I	16 0.63	22 0.87	27 1.06	34 1.34	47 1.85	82 3.22	-
I2	-	19 0.75	27 1.06	38 1.50	44 1.73	-	206 8.11
J	1/2" 1/2	3/4" 3/4	1" 1	1 1/2" 1 1/2	2" 2	3" 3	DN80 (3") DN80 (3")
J2	3/8" 3/8	1/2" 1/2	3/4" 3/4	1" 1	2" 2	-	-
ØK	6.5 0.26	10 0.39	10 0.39	10 0.39	10 0.39	12.5 0.49	25x13 1x0.5
L	1/8" 1/8	1/4" 1/4	1/4" 1/4	1/2" 1/2	1/2" 1/2	3/4" 3/4	3/4" 3/4
M	19 0.75	29 1.14	33 1.30	45 1.77	57 2.24	84.5 3.33	-
M2	-	40 1.57	52 2.05	70 2.76	90 3.54	-	126 4.96
N	82 3.23	117 4.61	153 6.02	207 8.15	274 10.79	356 14.02	-
N2	-	115 4.53	155 6.10	212 8.35	266 10.47	-	724 28.50
P	30 1.18	47 1.85	39 1.54	59 2.32	59 2.32	72.5 2.85	-
P2	-	82 3.23	105 4.13	143 5.63	183 7.20	-	238 9.37
R	-	15° 15°	15° 15°	0° 0°	0° 0°	-	0° 0°
S	12.5 0.49	21 0.83	26 1.02	35 1.38	40 1.57	-	-
ØT	20 0.79	30 1.18	30 1.18	-	-	-	-
U	1170 46.06	1170 46.06	1170 46.06	-	-	-	-
V	286 11.26	374 14.72	400 15.57	-	-	-	-

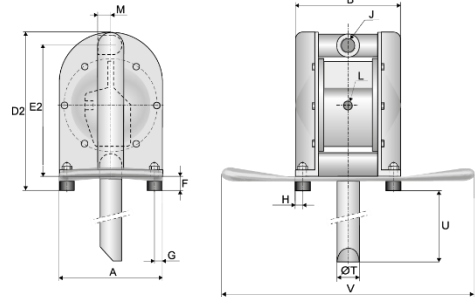
Aluminium and cast iron pumps T



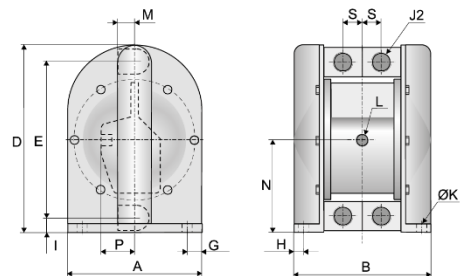
Stainless steel pumps T



Drum pumps TD

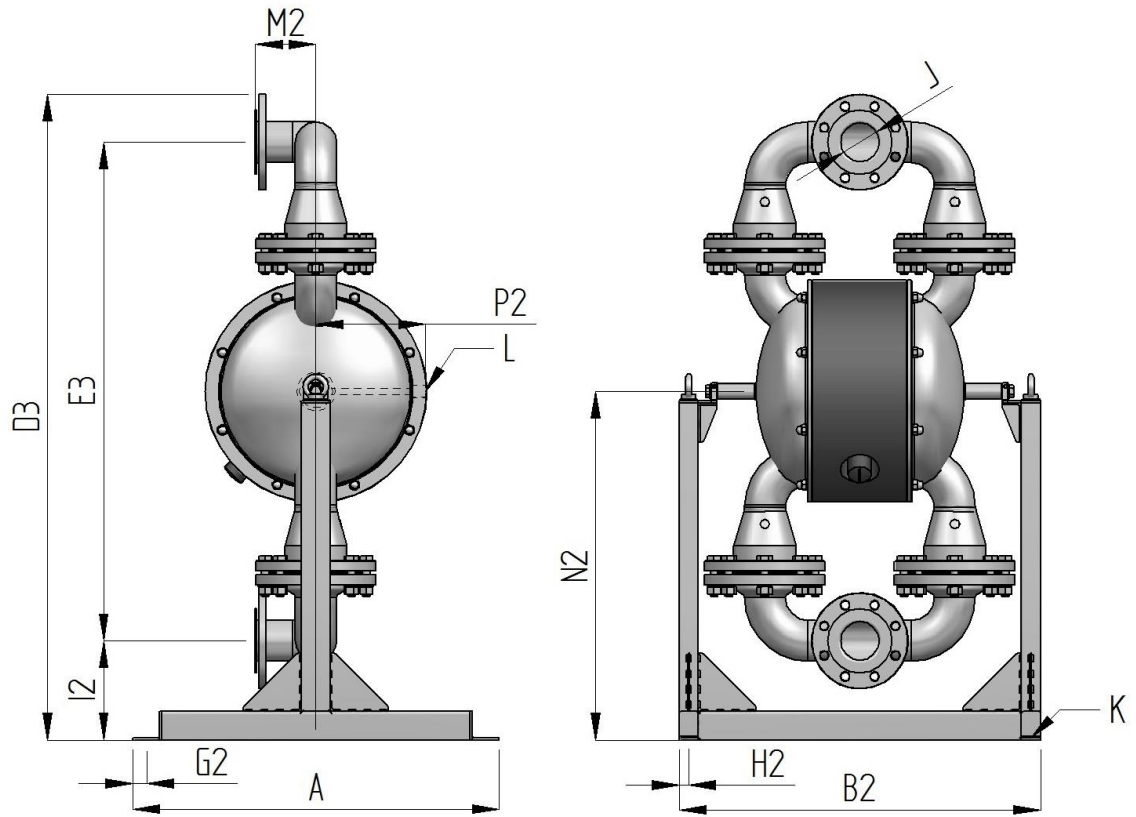


Twin pumps TT



6. DATA

Dimensions - T820 S



6. DATA

6.5. Tightening torques

The following tightening torques are recommended.

PUMP SIZE	MOUNTING TORQUE [Nm]	MOUNTING TORQUE [Nm]	GRUB SCREW TIGHTENING TORQUE [Nm]
	Aluminium and cast iron	Stainless steel	
T25	8	-	-
T70	12	8	10
T120	17	16	13
T220	18	20	20
T420	20	23	22
T820	30	33	26

6.6. Permitted loads on manifolds

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

T25		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	27	4.9
Y	27	4.9
Z	27	4.9

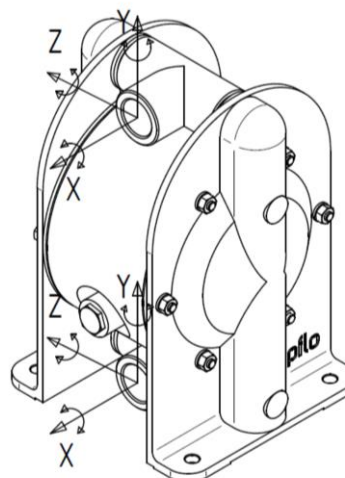
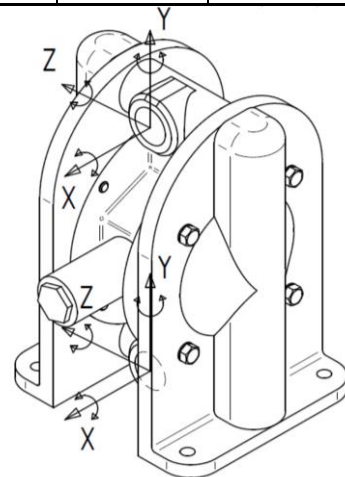
T70		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	31	6.3
Y	31	6.3
Z	31	6.3

T120		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	35	7.3
Y	35	7.3
Z	35	7.3

T220		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	43	8.8
Y	43	8.8
Z	43	8.8

T420		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	56	11.5
Y	56	11.5
Z	56	11.5

T820		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	93	13.2
Y	93	13.2
Z	93	13.2



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:	_____ _____ _____
The installation:	
Liquid:	_____
Temperature [°C]: _____	Viscosity [cPs]: _____ Spec grav. [kg/m ³]: _____ 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:	_____ _____
Place for sketch of installation:	

7. WARRANTY

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 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.;

7. WARRANTY

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.
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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