

Operations & Maintenance Manual



Original Version

Pneumatic Wall Decant Unit PWDU

Edition 2021




» All about your flow

www.tapflo.com

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1. EC Declaration of Conformity

EC DECLARATION OF CONFORMITY			
Name and Address of the manufacturer:			
Description of Equipment:		Pneumatic Wall Decant Unit (PWDU)	
Model / Type:		TPUK-PWDU-XX	
Directives / Conformity Assessment Procedures:		Machinery Directive 2006/2/EC	
Declaration:		The person signing below declares that the above named equipment fulfils all the relevant provisions of the stated directives.	
Place of Declaration		Tapflo (UK) Limited, SO53 4AR, UK	
Date:		01/01/2023	
Signed:			
Printed Name of Authorised Signatory:		Mr. M. Barnes	
Position in Company:		Managing Director	

2. Introduction

This is an operations & maintenance manual for Tapflo UKs Pneumatic Wall Decant Unit (PWDU). In this manual it will detail the unit itself and the variations as well as the dimensions and connections for the system.

3. Warning Symbols

The following warning symbols are present in this instruction manual. The warning information should be observed when either of these symbols is present.



This symbol highlights all safety instructions in this manual where danger to persons may occur. Observe these instructions carefully and proceed with the utmost caution in these situations. Inform all users of all safety instructions. In addition to the instructions in this manual, the general safety and accident prevention regulations must be observed.



This symbol highlights points in the instruction manual of particular importance for compliance with regulations and directives, for correct workflow and the prevention of damage to, or destruction of the system or its associate equipment.

3.1. Receiving Inspection

Although every precaution is taken when packing and shipping, please carefully check goods on receipt, ensuring all parts listed on the packing note are accounted for. Report any damage or shortages to the delivery company and Tapflo (UK) within 24 hours of receipt.

3.2. Storage



If the equipment is to be stored prior to installation, place in a clean dry location ensuring it is not exposed to extreme temperature or humidity, ideally in original packaging to prevent contaminants entering the system.

3.3. Mounting



Tapflo (UK) systems will operate properly without being mounted unless otherwise stated. If the system is to be mounted please ensure the surface is suitable for the load detailed in the specifications and appropriate to the system and application.

3.4. Health and Safety



Systems must be installed according to local and national safety rules. The system must be suitable for the application. Failure to do so could result in poor performance and a risk to plant and personnel. Consult Tapflo (UK) if in doubt.

3.5. Protection



In the interest of health and safety it is essential to wear appropriate PPE when operating and/or working in the vicinity of the application.

3.6. Explosive Environments



Tapflo (UK) Ltd systems are not for use in explosive environments. Consult Tapflo (UK) for further information. Incorrect installation or use may cause injury or death to personnel in the vicinity of the installation!

4. Principle of Operation

Tapflo (UK)'s Pneumatic Wall Decant Unit (PWDU) has been designed to be a self-contained batching solution that utilises our T50 PTT Air Operated Double Diaphragm (AODD) pump. To control the batching of the media, we utilise our pneumatic batcher which enables us to monitor and control the pump based off the pump strokes.

There are 2x variants of the PWDU with the batcher, one has the batcher mounted externally; allowing for the batched quantity to be changed as required. The other variant has the batcher mounted internally and with a start & stop button on the front of the panel, this is for those process' that require the same volume to be batched every time.

The pump speed & pumping pressure can be adjusted using the needle valve and filter regulator, more detail is available in Appendix A – AODD Pump Manual as to how to properly set this up for the application.

The batch volume is set using the stroke counter inside the pneumatic batcher. This counts the pumps strokes and stops the pump after the set amount of strokes are reached. Please see Appendix B – Predetermining Batcher Manual for more detail on how the batcher works.

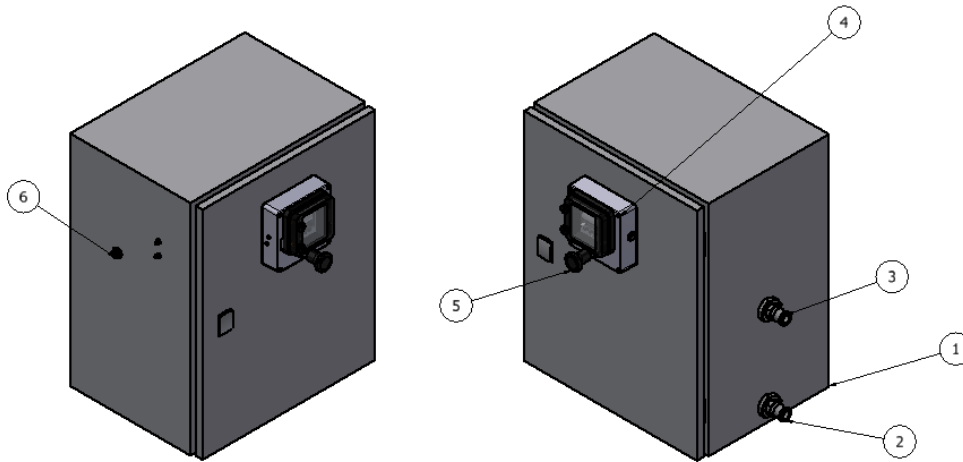
The system utilises camlock connections for the main suction & discharge connections on the enclosure to allow for quick & simple hose connections, negating the requirement to do up threads and introduce leaks in the system.

The PWDU has integrated safety features which include a stainless steel shroud for the pump to cover the suction & discharge connections which protects the operator from chemical sprays as well as keeping the inside of the door & other components safe from chemical spray; when the door is opened we have installed a pneumatic valve which shuts off the air supply to the pump, this provides the operator a safe way to access the system even if the system is still receiving pneumatic power. The internal filter regulator also has a manual isolation valve for the pneumatic supply providing a 2nd layer of safety in the system.

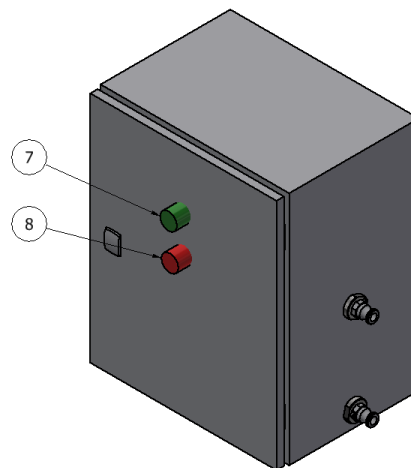
The PWDU is supplied with a ½" x 500mm Suction lance, ½" x 1.5m of PTFE convoluted suction hose with suitable camlock connections at both ends to connect to the PWDU & suction lance. The PWDU can also be supplied with a 3m, 5m or 10m; ½" PTFE convoluted hose with a camlock connection for the PWDU & a male BSPT threaded connection on the other end.

Other hose types can be supplied please contact sales@tapflopumps.co.uk for a quote.

4.1. Key Components



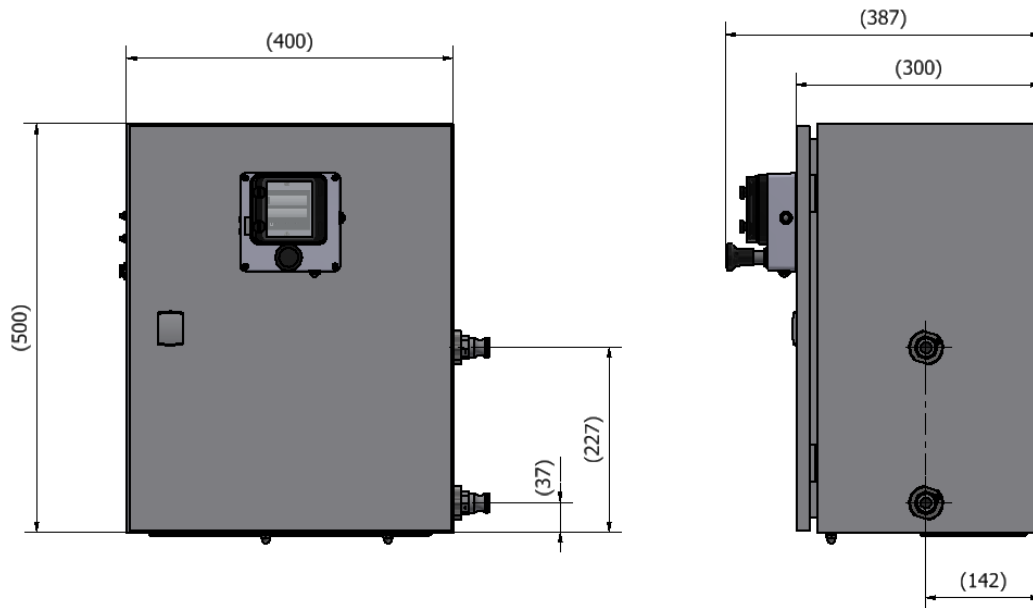
PWDU-BE (Batcher External Renders)



PWDU-BI (Batcher Internal Render)

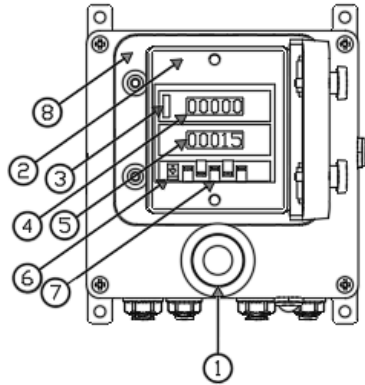
Item No.	Description
1	PWDU Enclosure
2	Suction Camlock Connection
3	Discharge Camlock Connection
4	Batch Controller
5	Batch Push / Pull Valve
6	Pneumatic Connection
7	Batcher Internal Start Button
8	Batcher Internal Stop Button

5. Technical Data



Connections		
Port Type	Description	Connection Types
Suction	Suction hose connection	1/2" Male Camlock
Discharge	Discharge hose connection on 3 way ball valve	1/2" Male Camlock
Pneumatic hose size	Air connection for system	Ø8mm Push fit connection

6. Setting the predetermining counter



Item No.	Description
1	Start/stop-push/pull valve and visual indicator
2	Predetermining counter
3	Counter reset button
4	Actual value (pump strokes)
5	Preset value (pump strokes)
6	Preset value adjustment lever
7	Individual digit preset adjustment push buttons (x5)
8	Counter Window

To program the lower 'preset value' (5) to the required number strokes, each digit of the 'predetermining counter' (2) can be set independently.

1. Push the white preset value adjustment lever (6) as shown by the arrow and hold it.
2. Set the desired value with the corresponding preset push buttons (7). Release white preset value adjustment lever (6).

The below formula should be used to set the number of strokes required for a given batch size. The below formula already has the volume per stroke inputted for a T50 PTT which is the standard pump inside the PWDU.

$$\text{Number of Strokes} = \frac{\text{Batch Volume (litres)}}{0.116 \left(\frac{\text{litres}}{\text{stroke}} \right)}$$

Once the batch has been set it is recommended that you run 5 test cycles to check that the correct volume of fluid is being dispensed per batch. The stroke count can then be adjusted until you get the correct volume batched each time. (Due to compound errors, it is often necessary to adjust the number of strokes to give the exact dispensed volume for larger batch sizes.

More information is available in Appendix B – Predetermining Batcher Manual
)

7. Routine Maintenance

- Pump should be maintained as per the pump specific documentation as per the pump manual in Appendix A – AODD Pump Manual.
- Routinely check the function and calibration, as normal wear can affect performance. To re-calibrate; follow the instructions in the application specific sections of this manual.
- Check the suction & discharge hose for any signs of damage/leakage, replace as necessary.

8. Troubleshooting

Check the system is configured as shown in the recommended configuration then see possible solutions below. If the problem persists consult Tapflo (UK).

Please refer to the pump manual for more detail specific to pump issues.

Symptom	Cause	Remedy
System inoperative	No Air to the pump	Ensure air supply is functional
		Ensure the door is properly closed
		Ensure the manual valve is open on the filter regulator
		Ensure the batcher is receiving ≥ 4 bar air pressure
	Damaged hose	Check and replace any damaged hoses
	Batcher issue	See batcher O&M Manual
	Pump issue	See pump O&M Manual
Batch volume incorrect	Incorrect setting	Follow the instructions in Section 6 or in the batcher O&M to set the correct batch volume.

9. Spare Parts



- Pump are detailed in the pump specific documentation as per the Tapflo website www.tapflopumps.co.uk
- There are no user serviceable parts within the Batcher - Please consult Tapflo (UK) for service.
- Other spares are detailed below

Quantity	Description	Part Number
1	Pneumatic Batcher	TPUK-BP
1	Modified Muffler	TPUK-MU-1/2"
1	Blocking Needle Valve	TPUK-B/NV-1/4"
1	Pump Shroud	T-001609
1	Safet Switch Bracket	T-001611
4	1/2" Fully Encapsulated Silicone Camlock Seal	050GSK-FEPSIL
1	Batcher gasket	ZCSP3-T-002011
1	Door Pneumatic Safety Switch	VM230-F02-01SA

10. How to order parts

When ordering parts for Tapflo (UK) system, please provide the model number and serial number of the system, position number and quantity of items required.

11. Returning parts

To return parts to Tapflo (UK) please follow this procedure.



- Consult Tapflo (UK) for shipping instructions
- Cleanse, neutralise and rinse the part making sure the part is completely free from media
- Provide a certificate of decontamination, where appropriate
- Complete the Warranty / Returns form on following page and return articles carefully to prevent any damage during transport

12. Warranty

Tapflo UK warrants products under conditions as below for a period of not more than 12 months from installation and not more than 24 months from date of manufacture.

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

Except as expressly stated above, Tapflo UK 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, bushings, etc..);
 - b. Damage to the product resulting from:
 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 UK 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;
 2. Repairs performed by non-skilled personnel or use of non-original Tapflo UK parts
 3. Accidents or any cause beyond the control of Tapflo UK, including but not limited to lightning, water, fire, earthquake, and public disturbances, etc.;
 - 4.
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 UK in written within the mandatory term of 8 days from the discovery.
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 UK 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 UK
7. The products are built in accordance with standard CE normative and are tested (where applicable) by Tapflo UK. Approval and tests by other control authority are for the customers 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 UK
8. Installation, including electric and other connections to utility mains according to Tapflo UK drawings, is for the cost and responsibility of the customer, unless otherwise agreed in writing.
9. Tapflo UK 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.

Notwithstanding the above, Tapflo UK 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.

Pneumatic Wall Decant Unit
PWDU

Warranty / return form			
Company			
Address			
Country			
Contact Name			
Telephone		Fax	
E-mail			
Delivery Date		Install Date	
System Type		Serial No.	
Description of fault			
Media			
Temperature (°C)		viscosity (cPs)	
Spec. grav (Kg/m ³)		pH (Value)	
Particle content (%)		Particle Size (mm)	
Duty (h/day)		Starts per day (No.)	
Media Pressure (bar)			
Air Pressure (bar)		Air Quality	
Notes			

Sketch of Installation

Whilst every effort has been made to ensure that all the information contained in this document is correct at the time of publication, due to our policy of continuous product improvement, the company reserves its right to change any information contained herein without notice.

13. Appendices

13.1. Appendix A – AODD Pump Manual



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



Pump models:

TR/TXR9

TR/TXR20

T/TX50

T/TX100

T/TX200

T/TX400

T/TX800



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EC DECLARATION OF CONFORMITY 01/EC/PLA/2022

Series:

T(...)9...; T(...)20...; T(...)50...; T(...)100...; T(...)200...; T(...)400...; T(...)800...;

Manufactured by Tapflo Sp. z o.o., Poland for:

Tapflo Group AB

Filaregatan 4

442 34 Kungälv, Sweden

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

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

The object of the declaration described above is in conformity with the relevant Union harmonisation 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., Poland

ul. Czatkowska 4b

83-110 Tczew



Signed for and on behalf of Tapflo Group AB

A handwritten signature in black ink, appearing to read 'Per Antonsson', written in a cursive style.

Per Antonsson
Chief Executive Officer

Kungälv, 16.12.2022

EU DECLARATION OF CONFORMITY 01/ATEX/AODD/2022

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...;**

Manufactured by Tapflo Sp. z o.o., Poland for:

Tapflo Group 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 DESIGNED FOR USE IN POTENTIALLY EXPLOSIVE ATMOSPHERES**



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

- Directive **2006/42/EC** of European Parliament and of the Council of 17 May 2006 on machinery
- 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

Applied harmonised standards:

- **EN ISO 80079-36:2016-07**
- **EN ISO 80079-37:2016-07**

ATEX marking:

  **II 2G Ex h IIC T6...T4 Gb**
II 2D Ex h IIIC T54°C...T124°C Db

Notified body **J.S. Hamilton Poland Sp. z o.o.** performed **type examination** and issued certificate **JSHP 19 ATEX 0018X**.

Signed for and on behalf of Tapflo Group AB



Per Antonsson

Chief Executive Officer

Kungälv, 16.12.2022

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.

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

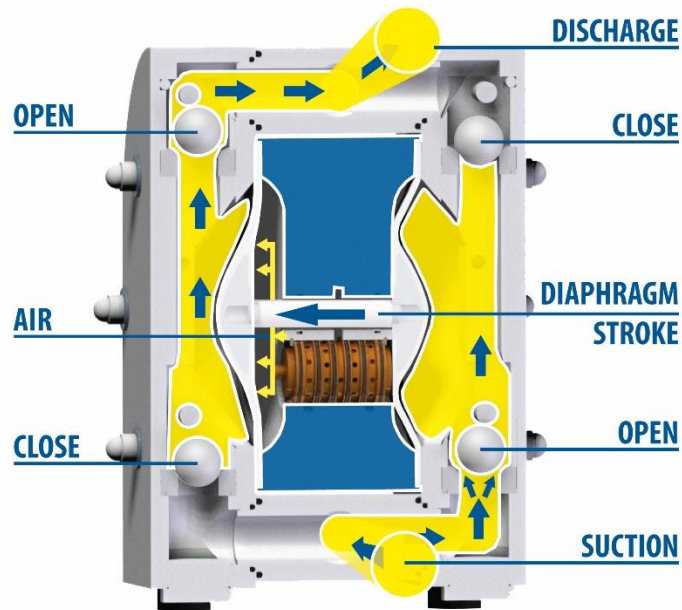


The personnel in charge of installation, operation and maintenance of the pumps we produce must be qualified to carry out the operations described in this manual. Tapflo shall not be held responsible for the training level of personnel and for the fact that they are not fully aware of the contents of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

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

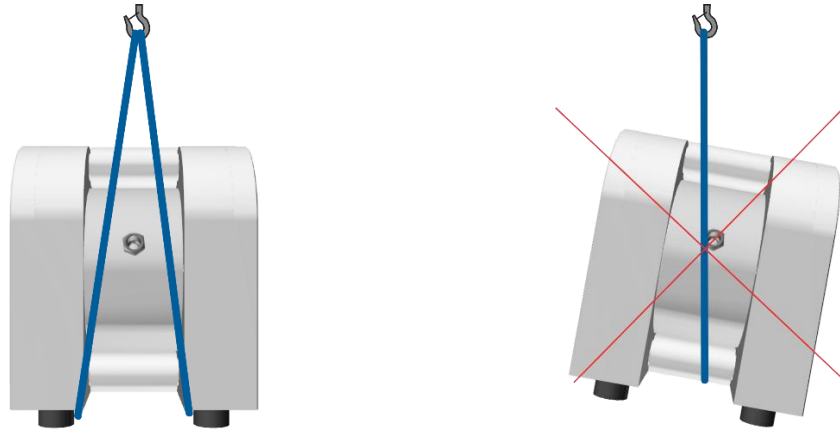
Although precaution is taken by us when packing and shipping, we urge you to carefully check the shipment on receipt. Make sure that all parts and accessories listed on the packing list are accounted for. Immediately report any damage or shortage to the transport company and to us.

1.3. 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 is equipped with vibration absorbing rubber feet. 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 1.9. *“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.

1.6.1. Rotary connections

The suction and discharge connections can be rotated 180°. This simplifies the assembly and installation of the pump. To rotate the connections, the housing nuts must be slightly loosen to ease the manifold rotation and avoid damage on the housing O-rings.

NOTE! Remember to re-torque the housing nuts after this procedure.

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. If the diameter of a hose is smaller, it will affect the pump's performance or cause its malfunction.
- 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 tested with water. If the pumped product can come into reaction with water, please make sure the pump is dry before putting it into operation.



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.

1.7.2. Explosion hazardous environments – ATEX



The standard PE & PTFE series 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. 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 T54°C...T124°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.



Temperature classes and allowable temperatures

The temperature class of the pump depends on the temperature of the pumped medium and ambient temperature. Ambient temperature range depends on pump configuration, follow pump nameplate for allowable range. Contact Tapflo for more information.

Medium temp.	Temperature class / Surface temperature	Temperature class / Surface temperature	Temperature class / Surface temperature
	-20°C ≤ Ta ≤ +40°C	-20°C ≤ Ta ≤ +50°C	-20°C ≤ Ta ≤ +60°C
40°C	T6 / T54°C	T6 / T64°C	T6 / T74°C
50°C	T6 / T64°C	T6 / T64°C	T6 / T74°C
60°C	T6 / T74°C	T6 / T74°C	T6 / T74°C
70°C	T6 / T84°C	T6 / T84°C	T6 / T84°C
80°C	T5 / T94°C	T5 / T94°C	T5 / T94°C
90°C	T4 / T104°C	T4 / T104°C	T4 / T104°C
100°C	T4 / T114°C	T4 / T114°C	T4 / T114°C
110°C	T4 / T124°C	T4 / T124°C	T4 / T124°C



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.



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

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.

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.

1.7.4. 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 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. See chapters 3.2 "Routine inspection", 6.5 "Tightening torques".



- 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 liquids.



- Bear in mind that the viscosity of the product changes with temperature. This has to be taken into consideration when selecting the pump.
- The fluid remaining in the connected piping, as well as in the pump itself, may expand because of freezing or heat, which may cause damage to the pump or/and piping, and lead to leakage of the fluid.

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.

1.8.1. 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), 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:

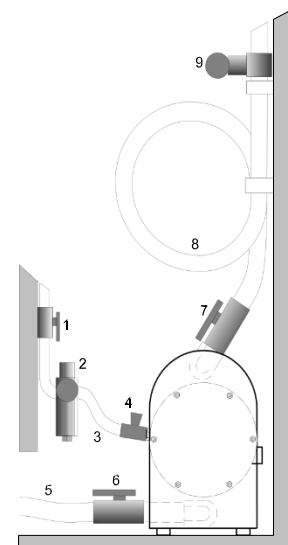
- 1) Regulator to adjust the air pressure;
- 2) Manometer to read the actual pressure;
- 3) Needle valve to adjust the air flow (especially when operating the pump in the lower range of performance);
- 4) Filter.

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



1.10. Recommended installations

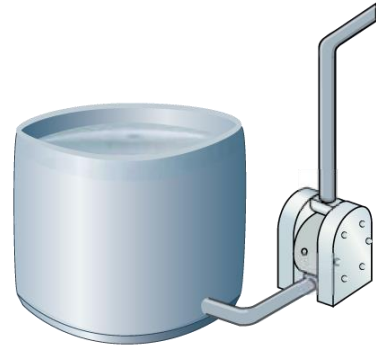
The Tapflo pump is flexible in the way you are able to install it. The in- and outlet ports can be rotated more than 180° to fit various piping systems.

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.

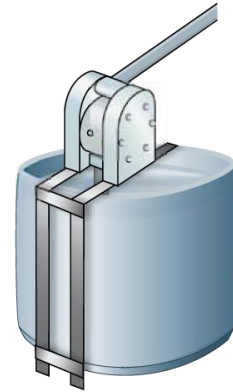


NOTE! Do not exceed 0,7 bar suction pressure! Higher pressure may cause premature diaphragm failure and irregular pump operation.



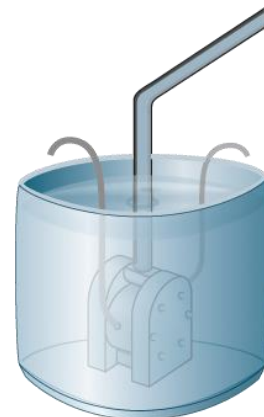
1.10.2. Self-priming

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

2.1. Before starting the pump



- Make sure the pump is installed according to the installation instruction (chapter 1).



- 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.



- Fully open all valves on suction line. Leaving the suction valve closed leads to premature diaphragm failure.



- 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.

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 T100 pump should run continuously at maximum 50 l/min.



- As stated in chapter 1.8.1 Tapflo recommends to use an appropriate air treatment system in order to extend the pump's lifetime.



- 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.



- When the pump is shut down while pumping a liquid containing particles, the particulate matter contained in the liquid will be deposited and get stuck inside the pump chamber. Therefore after finishing work the pump must be emptied of the remaining fluid. Otherwise, when starting the pump again, the diaphragm may get damaged and the shaft may bend leading to grub screw fracture.

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 of the expected lifetime



Pump components can be recycled, it 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

3.1. When the pump is new or reassembled



If the pump is new or reassembled after maintenance it is important to retighten the pump housing 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 pump. The characteristics of the liquid, temperature, materials used in the pump and running time decide how often a complete inspection is necessary.

Nevertheless, Tapflo recommend to inspect the pump at least once a year and change parts from **KIT AIR** and **KIT LIQ** during this inspection. Tapflo recommend **KIT VAL** to be changed once per 2 years. See chapter 5.11 “Stocking recommendation” for detailed KIT content.

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 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 1.8.1 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 1.8.1 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

3.5. TR9 / TR20 – 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

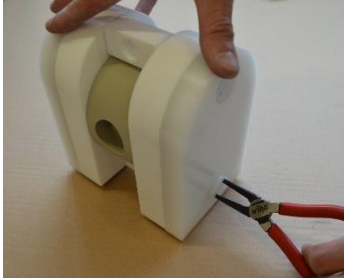


Fig. 3.5.1 PTFE only

Using a pair of pliers unscrew the plugs [571] and lift the PE covers [1181].

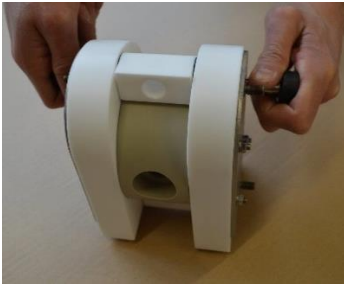


Fig. 3.5.2

Unscrew the housing nuts [37] and carefully remove the pin screws [14].



Fig. 3.5.3

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



Fig. 3.5.4

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



Fig. 3.5.5

Screw a pin screw into the hole of the spacer sleeve [19].

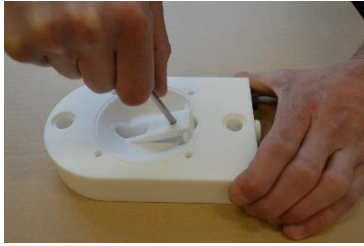


Fig 3.5.6

Lift and pull out the spacer sleeve [19].



Fig 3.5.7

Take out the valve rods [20] and [21],



Fig 3.5.8

Unscrew the diaphragms [15] from the air valve [61].



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.

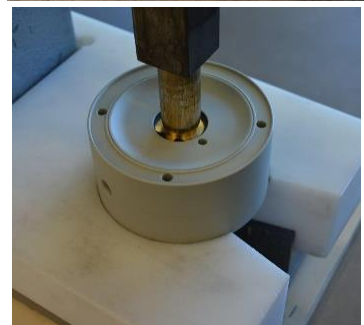


Fig 3.5.10

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.

3.6. TR9 / TR20 – 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

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.

NOTE! When inserting the TR9 / TR20 size air valve, replace the shaft with a screw and a nut to make sure the air valve assembly remains properly fastened.



Fig. 3.6.2

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.

NOTE! Never try to tighten up the diaphragm to align the holes (like in bigger pump size) because this can lead to breaking of the diaphragm pin.



Fig. 3.6.3

When putting in the pin screws [14] take extra care not to damage the diaphragms [15] with the pin screw thread.

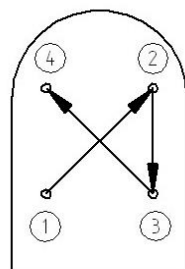


Fig. 3.6.4

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

NOTE! Keep in mind to periodically retighten pin screw's nuts.

3.6.1. Test run



We recommend you to conduct a test run of the pump before installing it in the system, to check if pump does not start or detect possible leaks due to wrong assembly.

3.7. T50-T800 – 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

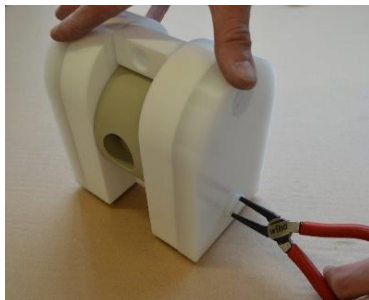


Fig. 3.7.1 PTFE only

Using a pair of pliers unscrew the plugs [571] and lift the PE covers [1181].



Fig. 3.7.2

Unscrew the housing nuts [37] and carefully remove the pin screws [14].



Fig. 3.7.3

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



Fig. 3.7.4

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



Fig. 3.7.5

To remove the spacer sleeve [19], use a plastic rod and a hammer to knock it out.

NOTE! Be careful not to deform the spacer sleeve.



Fig. 3.7.6

Insert our special tool or pin screw [14] into the orifice in the spacer sleeve [19], rotate it.



Fig. 3.7.7

Pull out the spacer sleeve [19].



Fig. 3.7.8

Pull out the lower sleeve [212], valve seat [222] and O-ring [43].



Fig. 3.7.9

Pull out the upper sleeve [202] alongside with the valve seat [222], O-ring [43] and the blocking pin [2021].



Fig. 3.7.10

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



Fig. 3.7.11

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

a) Circlip mounted air valve – T/TX50, T100 and T800



Fig. 3.7.12

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. 3.7.13

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 – T/TX100, T/TX200, T/TX400 from s/n 1106



Fig. 3.7.14

Unscrew plate screws [2711] from both sides of the centre body [122] and take out the left and right plate [271].



Fig. 3.7.15

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

c) Threaded air valve – T200 from s/n 0803-... until 1105-... and T400 from s/n 0801-... until 1105-...

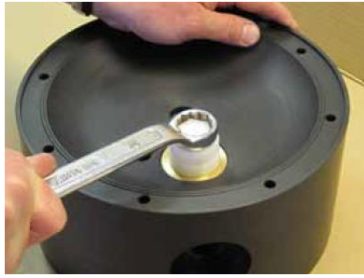


Fig. 3.7.16

Carefully unscrew both air valve end caps by means of a mounting tool [282].



Fig. 3.7.17

Push out by hand the air valve shaft and piston.



Fig. 3.7.18

To push out the cylinder, use the other side of the mounting tool. Use a pressing device to remove the air valve cylinder from the centre body [123].

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. T50-T800 – 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

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. 3.8.2

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.



Fig. 3.8.3

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.

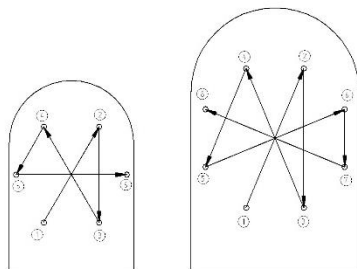


Fig. 3.8.4

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

NOTE! Keep in mind to periodically retighten pins crew's nuts.

3.8.1. Test run



We recommend you to conduct a test run of the pump before installing it in the system, to check if pump does not start or detect possible leaks due to wrong assembly.

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:

- TDR20, TD50 and TD100

Note! For spare parts list see chapter 5. "Spare parts".



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:

- TRT9, TRT20, TT50, TT100, TT200 and TT400

Note! For spare parts list see chapter 5. "Spare parts".



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 reinforcement plates and special air valve with PET piston (6-xxx-61-318).

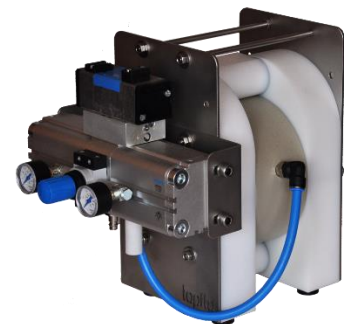
We also recommend to use aluminium centre body (-6A option) instead of standard PP for better durability.

Available for pump sizes:

- TF50, TF100, TF200 and TF400

Note! For spare parts list see chapter 5. "Spare parts".

Note! Maximum pressure may vary, when selecting optional pressure booster



4.4. Barrier pump – TB...

With its special construction and a fully pneumatic control system („Guardian”) 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:

- TRB20, TB50, TB100, TB200 and TB400

Note! For spare parts list see chapter 5. "Spare parts".



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. Pump with built-on dampener – TK ...

If you are looking for an effective way to eliminate pressure variations on the pump discharge and you have limited space in your installation, the built-on dampener is an ideal solution. It provides all the advantages of using a standard Tapflo DT dampener but is a compact solution. The dampener housing is also the pump manifold so you do not have to worry about connecting the dampener to the pump. This solution does not affect the pump flow nor the dampening effect.

Available for pump sizes:

- TRK20, TK50, TK100, TK200

Note! For spare parts list see chapter 5. "Spare parts".



4.5.1. Installation recommendation

- Build-on dampener should be supplied with the same air flow and pressure as a pump is.
- When leaving factory, TK pump consist of complete pneumatic equipment, like air tubes and pneumatic push-in fittings, to fulfil above. Remember to connect pneumatic equipment after pump maintenance.
- Recommend check valve after TK pump outlet. If TK pump is placed in a system with other pumps or in a pressurized system, the diaphragm on the dampener will have pressure on the liquid side even if pump is shut off.

4.6. Pump with integrated flanges – T... -3D/-3A

Pumps with integrated flanges are a robust and solid design. When there is a risk of transferring of vibration from the installation to the pump, the solid manifolds provide better stability and sealing for the pump. Using this solution we can connect the pump to the installation by a flange (DIN, ANSI) or through a BSP thread.

Available for pump sizes:

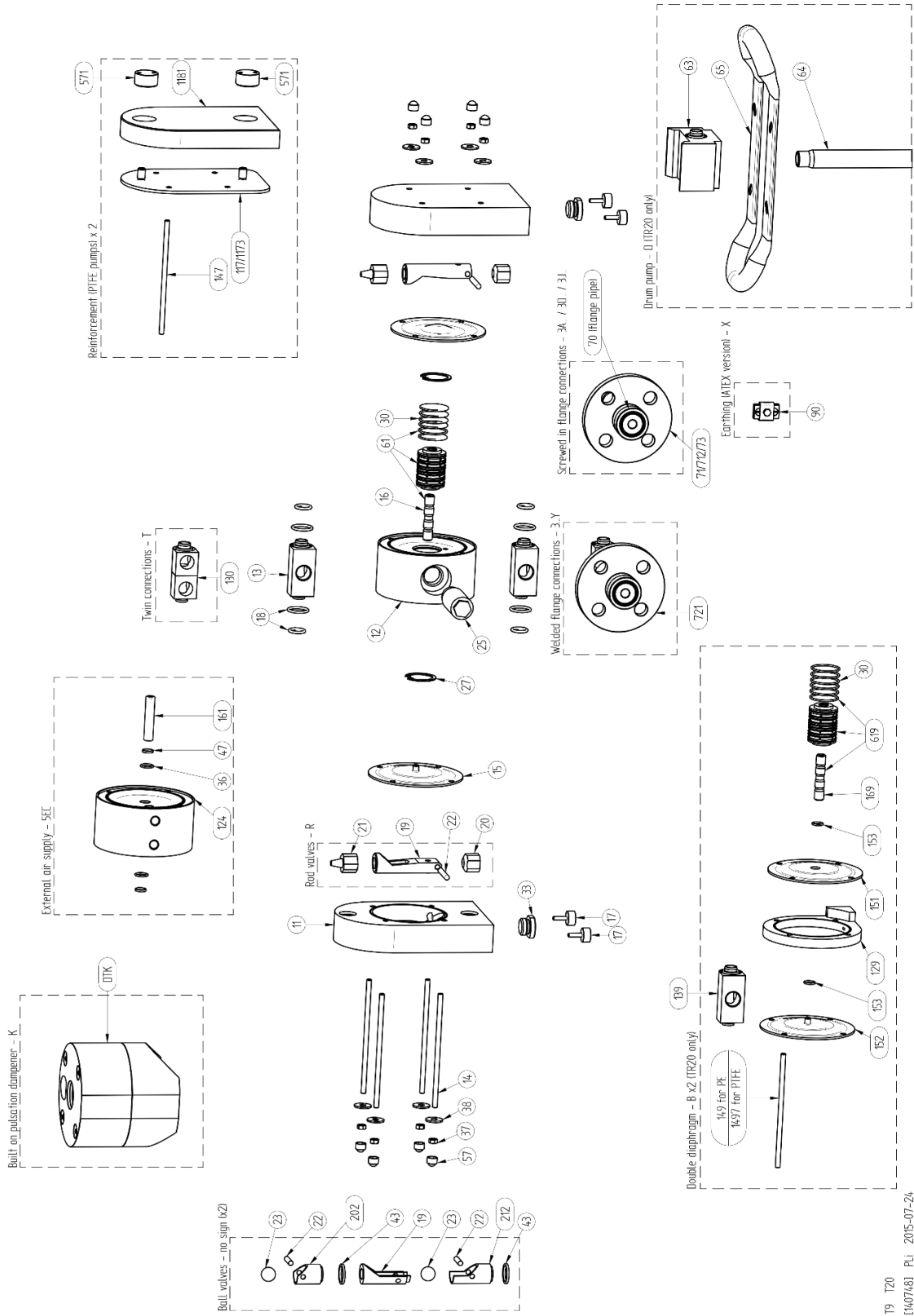
- T50, T100, T200, T400



Note! For spare parts list see chapter 5. "Spare parts".

5. SPARE PARTS

5.1. TR9 and TR20 – Spare parts drawing



T9 T20
[140748] PU 2015-07-24

5.2. TR9 and TR20 – Spare parts list

Pos.	Q-ty	Description	Material	KIT LIQ	KIT AIR
11	2	Housing	PE or PTFE		
12	1	Centre block	PP		
13	2	In/Outlet	PE or PTFE		
14	4	Pin screw	A4-80		
15	2	Diaphragm	EPDM*, PTFE, NBR* or FKM	x	
16	1	Diaphragm shaft (part of air valve assembly)	AISI 316L		
17	4	Rubber foot	NBR		
18	4	O-ring set (in/outlet)	PTFE/EPDM, EPDM, FKM, NBR* or FEP/FKM***	x	x
19	2	Spacer sleeve	PE or PTFE		
20	2	Lower rod	PTFE	x	
21	2	Upper rod	PTFE	x	
22	2	Pin	PTFE	x	
25	1	Muffler	Acetal / felt		x
27	2	Circlip	Cr3 coated steel		
30	6	O-ring	NBR (standard), EPDM or FKM		
33	2	Plug	PE or PTFE		
37	8	Nut	A4-70		
38	8	Washer	A4-70		
57	8	Nut cover	PP		
61	1	Air valve complete	Body: brass (standard), AISI 316L or PET, O-rings: NBR (standard), EPDM or FKM		x

Stainless steel reinforcement (std. on ATEX PTFE)			
Pos.	Q-ty	Description	Material
117	2	Reinforcement plate	AISI 316L
147*	4	Pin screw	A4-80

Stainless steel / PE reinforcement**			
Pos.	Q-ty	Description	Material
1173	2	Reinforcement plate	AISI 316L
1181	2	Cover	PE
147	4	Pin screw	A4-80
571	4	Plug	PE

Built-on dampener*			
Pos.	Q-ty	Description	Material
DTK-xxx	1	Built-on dampener assembly	-
6-xx1-112	1	Dampener housing / pump outlet	PE, PTFE
6-xx1-12	1	Dampener centre body	PP
6-xx0-15	1	Dampener diaphragm	EPDM*, PTFE, NBR*, PTFE 1705b
6-xx0-37	8	Dampener nut	A4-70
6-xx0-38	8	Dampener washer	A4-70
6-xx0-36	3	Dampener PE seal	PE
6-xx0-47	3	Dampener O-ring	NBR, EPDM, FKM
6-xx1-16	1	Dampener shaft	AISI 316L
6-xx1-14	4	Dampener pin screw	A4-80
6-xx1-25	1	Dampener muffler	PPM-F
6-xx1-27	1	Dampener blocking ring	PE

Flange connections*			
Pos.	Q-ty	Description	Material
70	2	Flange pipe (thread)	PE, PTFE
71	2	ANSI flange ring	PP, PTFE, AISI316L
73	2	DIN flange ring	PP, PTFE, AISI316L
701	2	Flange pipe O-ring	FEP/FKM, EPDM, NBR
712	2	JIS flange ring	PP, PTFE, AISI316L
721	2	Integrated manifold with loose flange	PP, PTFE

External air supply			
Pos.	Q-ty	Description	Material
36	2	Centerblock sealing	PE
47	2	O-ring	NBR (std.), EPDM, FKM
124	1	Centerblock	PP
161	1	Shaft	AISI 316L

Double diaphragm system*			
Pos.	Q-ty	Description	Material
129	1	Set of spacers (right + left)	PP
139	2	In/outlet	PE, PTFE
149	4	Pin screw for PE pump	A4-80
1497		Pin screw for PTFE pump	
151	2	Air side diaphragm	EPDM*, PTFE, NBR* or FKM
152	2	Liquid side diaphragm	EPDM*, PTFE, NBR* or FKM
153	4	Diaphragm O-ring	EPDM, FKM, NBR
169	1	Diaphragm shaft (part of air valve assembly)	AISI 316L
339	2	Spacer plug	PP
619	1	Air valve complete	See pos.61

Drum pump*			
Pos.	Q-ty	Description	Material
63	1	Drum inlet	PE, PTFE
64	1	Pump tube	PP, PTFE
65	1	Handle	AISI 316L

Twin connection			
Pos.	Q-ty	Description	Material
130	2	Twin in/outlet	PE, PTFE

Valve ball version*			
Pos.	Q-ty	Description	Material
23	4	Valve ball	EPDM, PTFE, NBR, FKM, AISI 316L, PU
191	2	Spacer sleeve	PE, PTFE
201	2	Upper sleeve	PE, PTFE
211	2	Lower sleeve	PE, PTFE
221	4	Valve ball stop	PE, PTFE
43	4	OP-ring	PTFE

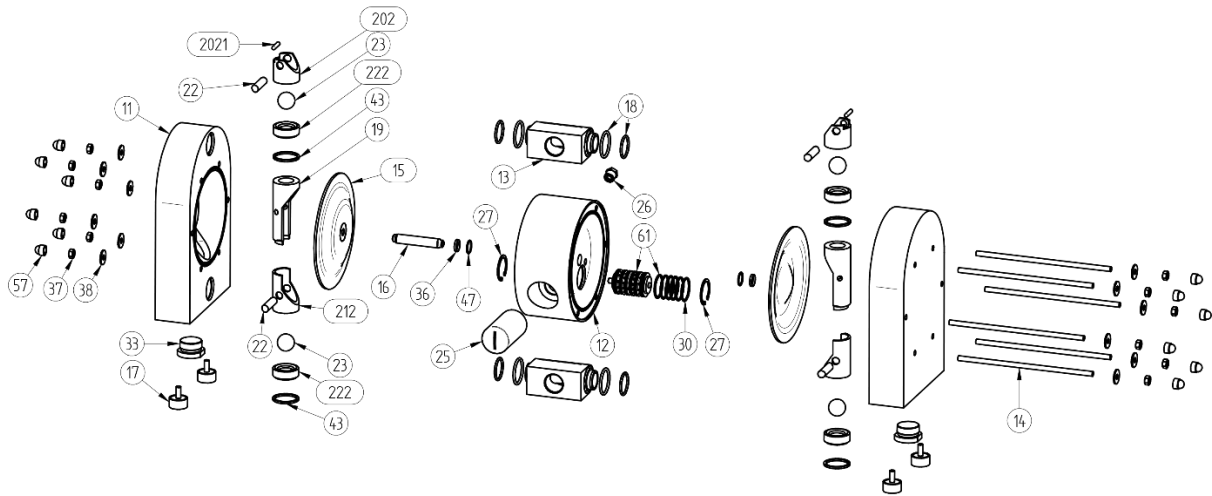
* = TR20 only

** = Standard on PTFE pumps from serial number 1012

*** = Standard in pumps with PTFE diaphragms from serial No 1301 (TR20) and from 1405 (TR9)

FEP/FKM O-rings do not fit on older in/outlets (pos. 13). Older pumps have PTFE/EPDM as standard.

5.3. T50-T100 – Spare parts drawing



5.4. T50-T100 – Spare parts list

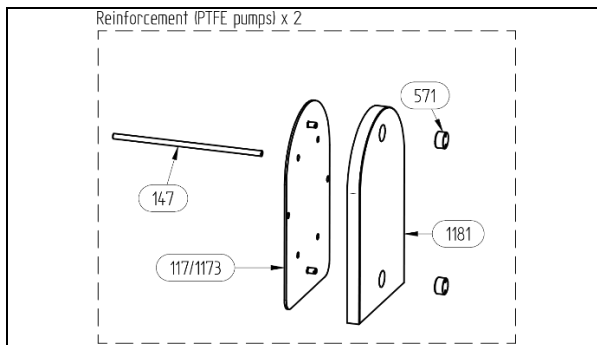
Pos.	Q-ty	Description	Material	KIT LIQ	KIT AIR	KIT VAL
11	2	Housing	PE, PTFE			
12	1	Centre block	PP			
13	2	In/Outlet	PE, PTFE			
14	6	Pin screw	A4-80			
15	2	Diaphragm	EPDM, PTFE, NBR, FKM*	x		
16	1	Diaphragm shaft	AISI 304L		x	
17	4	Rubber foot	NBR			
18	4	O-ring set (in/outlet)	PTFE/EPDM, EPDM, FKM, NBR, FEP/FKM***	x	x	
19	2	Spacer sleeve	PE, PTFE			x
202	2	Upper sleeve	PE, PTFE, AISI 316L			x
2021	2	Blocking pin	PTFE, PE**			x
212	2	Lower sleeve	PE, PTFE, AISI 316L			x
22	4	Valve ball stop	PE1000, PTFE, PU, AISI 316L			x
222	4	Valve seat	PE1000, PTFE, PU, AISI 316L			x
23	4	Valve ball	EPDM, PTFE, NBR, FKM, AISI 316L, PU or ceramic	x		
25	1	Muffler	Acetal/felt		x	
26	1	Air intake adapter	Brass			
27	2	Circlip	Cr3 coated steel			
30	6	O-ring	NBR (standard), EPDM, FKM			
33	2	Plug	PE, PTFE			
36	2	Centerblock seal	PE		x	
37	12	Nut	A4-70			
38	12	Washer	A4-70			
43	4	O-ring (valve seat)	EPDM, PTFE, NBR, FKM	x		
47	2*/4**	O-ring (back up for 36)	NBR (standard), EPDM, FKM		x	
57	12	Nut cover	PP			
61	1	Air valve complete	Body: brass (standard), AISI 316L or PET, O-rings: NBR (standard), EPDM or FKM		x	

* = T50 only

** = T100 only

*** = FEP/FKM standard on pumps with PTFE diaphragms from serial No 1106 FEP/FKM O-rings do not fit on older in/outlets (pos. 13). Older pumps have PTFE/ EPDM in std.

5.5. T50-T100 – Spare parts - Options

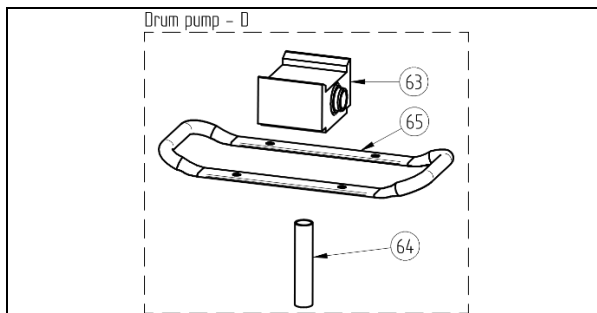


Stainless steel reinforcement (std. on ATEX PTFE)

Pos.	Q-ty	Description	Material
117	2	Reinforcement plate	AISI 316L
147	6	Pin screw	A4-80

Stainless steel / PE reinforcement

Pos.	Q-ty	Description	Material
1173	2	Reinforcement plate	AISI 316L
1181	2	Cover	PE
147	6	Pin screw	A4-80
571	4	Plug	PE



Drum pump

Pos.	Q-ty	Description	Material
63	1	Drum pump inlet	PE, PTFE
64	1	Pump tube	PP, PTFE
65	1	Handle	AISI 316L

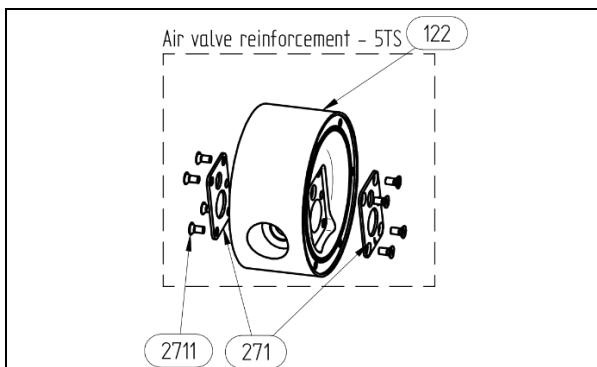
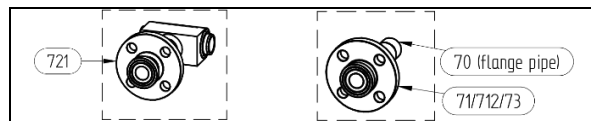


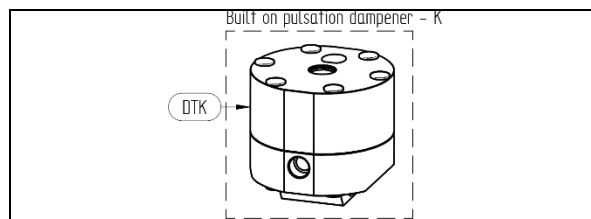
Plate mounted air valve (std. in TX100 form 1106)

Pos.	Q-ty	Description	Material
122	1	Centerblock	PP, PP Con.
271	1	Set of 2 plates	AISI 316L
2711	8	Screws	A4-70



Flange connections

Pos.	Q-ty	Description	Material
70	2	Flange pipe (thread)	PE, PTFE
71	2	ANSI flange ring	PP, PTFE, AISI316L
73	2	DIN flange ring	PP, PTFE, AISI316L
701	2	Flange pipe O-ring	FEP/FKM, EPDM, NBR
712	2	JIS flange ring	PP, PTFE, AISI316L
721	2	Integrated manifold with loose flange	PP, PTFE



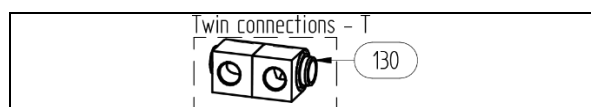
Built-on dampener

Pos.	Q-ty	Description	Material
DTK-xxx	1	Built-on dampener assembly	-
6-xx1-112	1	Dampener housing/pump outlet	PE, PTFE
6-xx1-12	1	Dampener centre body	PP
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
6-xx1-27	1	Dampener blocking ring	PE



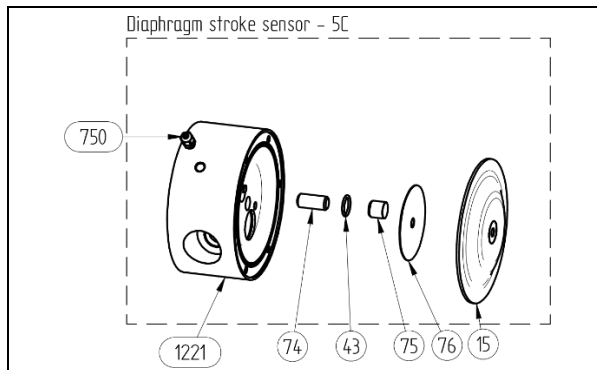
High lift seats

Pos.	Q-ty	Description	Material
203	2	Upper sleeve – high lift	PE, PTFE
213	2	Lower sleeve – high lift	PE, PTFE

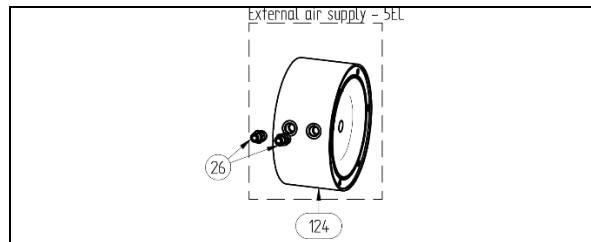


Twin connection

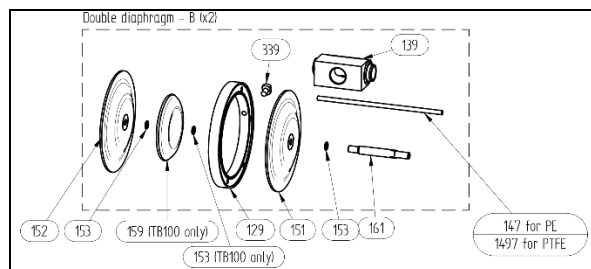
Pos.	Q-ty	Description	Material
130	2	Twin in/outlet	PE, PTFE



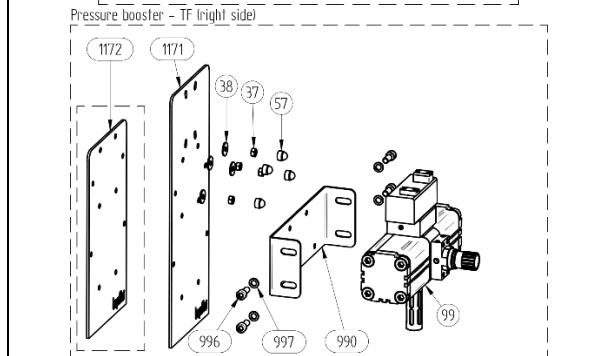
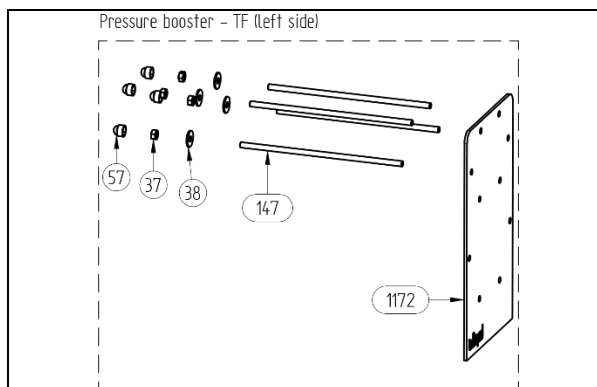
Diaphragm stroke sensor			
Pos.	Q-ty	Description	Material
121	1	Centerblock for stroke sensor	PP
43	1	O-ring	NBR, FKM, EPDM
74	1	Inductive sensor	CuZn
75	1	Sensor cap	PP
76	1	Sensing plate	AISI 316L
750	1	Cable gland	PP



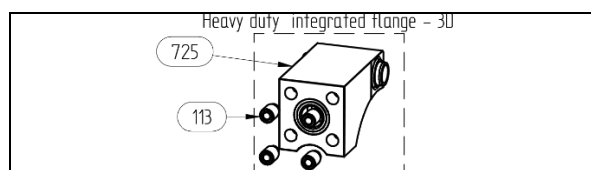
External air supply			
Pos.	Q-ty	Description	Material
124	1	Centerblock	PP
26	2	Air intake adapter	Brass



Double diaphragm system			
Pos.	Q-ty	Description	Material
129	1	Set of spacers (right + left)	PP
139	2	Long In/outlet	PE, PTFE
149	4	Pin screw for PE pump	A4-80
1497		Pin screw for PTFE pump	
151	2	Air side diaphragm	EPDM, PTFE, NBR or FKM
152	2	Liquid side diaphragm	EPDM, PTFE, NBR or FKM
153	4*/6**	Diaphragm O-ring	EPDM, FKM, NBR
159	2**	Diaphragm spacer	PP, PE, PTFE, AISI 316L
169	1	Diaphragm shaft	AISI 304L
339	2	Spacer plug	PP



Pump with pressure booster			
Pos.	Q-ty	Description	Material
99	1	Booster	-
990	1	Booster mounting plate	AISI 304L
996	4	Booster mounting screw	A4-70
997	4	Booster mounting washer	A4-80
1171	1/0***	Reinforcement plate	AISI 304L
1172	1/2***	Reinforcement plate	AISI 304L
37	6	Additional nuts	A4-70
38	6	Additional washers	A4-70
57	4	Additional nut covers	PP
147	2	Additional pin screws	A4-80



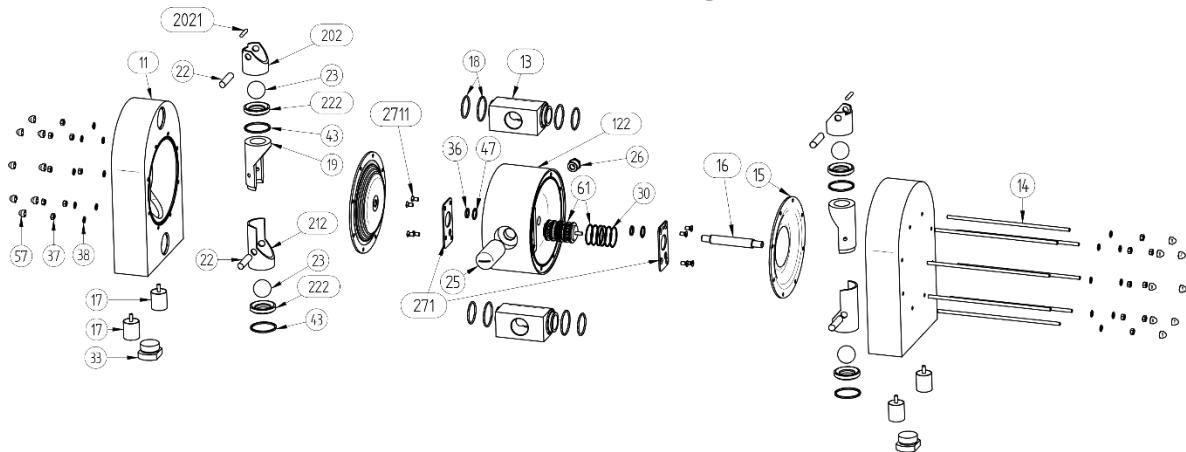
Integrated flange			
Pos.	Q-ty	Description	Material
725-2	2	DIN integrated flange	PE, PTFE
725-9	2	ANSI integrated flange	PE, PTFE
113	8	Threaded inserts	PET

* = T50 only

** = T100 only

*** = For Festo booster 2 x 1172, for SMC and Metal Work 1 x 1171 and 1 x 1172

5.6. T200-T400 – Spare parts drawing

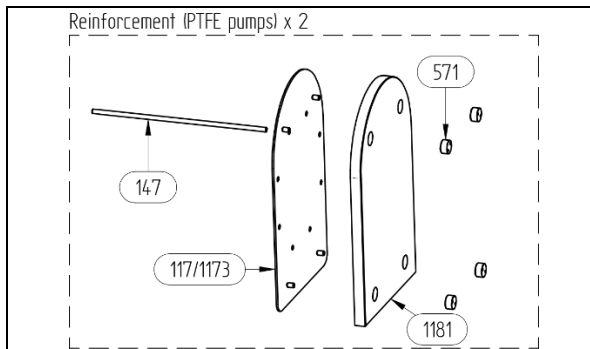


5.7. T200-T400 – Spare parts list

Pos.	Q-ty	Description	Material	KIT LIQ	KIT AIR	KIT VAL
11	2	Housing	PE, PTFE			
122	1	Centre block	PP			
13	2	In/Outlet	PE, PTFE			
14	8	Pin screw	A4-80			
15	2	Diaphragm	EPDM, PTFE, NBR, PTFE 1705b	x		
16	1	Diaphragm shaft	AISI 304L		x	
17	4	Rubber foot	NBR			
18	4	O-ring set (in/outlet)	PTFE/EPDM, EPDM, FKM, NBR, FEP/FKM*	x	x	
19	2	Spacer sleeve	PE, PTFE			x
202	2	Upper sleeve	PE, PTFE, AISI 316			x
2021	2	Blocking pin	PTFE, PE			x
212	2	Lower sleeve	PE, PTFE, AISI 316			x
22	4	Valve ball stop	PE1000, PTFE			x
222	4	Valve seat	PE1000, PTFE, PU, AISI 316			x
23	4	Valve ball	EPDM, PTFE, PTFE 1635 NBR, FKM, AISI 316, PU and Ceramic	x		
25	1	Muffler	Acetal/felt		x	
26	1	Air intake adapter	Brass			
271	1	Set of 2 plates	AISI 316			
2711	8	Screw	A4-70			
30	6	O-ring	NBR (standard), EPDM, FKM			
33	2	Plug	PE, PTFE			
36	2	Centerblock seal	PE		x	
37	16	Nut	A4-70			
38	16	Washer	A4-70			
43	4	O-ring (valve seat)	EPDM, PTFE, NBR, FKM	x		
47	2	O-ring (back up for 36)	NBR (standard), EPDM, FKM		x	
57	16	Nut cover	PP			
61	1	Air valve complete	Body: brass (standard), AISI 316 or PET, O-rings: NBR (standard), EPDM or FKM		x	

* = FEP/FKM standard on pumps with PTFE diaphragms from serial No 1106 FEP/FKM O-rings do not fit on older in/outlets (pos. 13). Older pumps have PTFE/ EPDM in std.

5.8. T200-T400 – Spare parts - Options

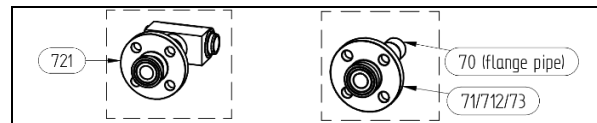


Stainless steel reinforcement (std. on ATEX PTFE)

Pos.	Q-ty	Description	Material
117	2	Reinforcement plate	AISI 316L
147	8	Pin screw	A4-80

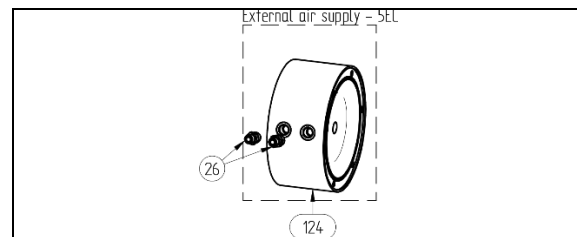
Stainless steel / PE reinforcement

Pos.	Q-ty	Description	Material
1173	2	Reinforcement plate	AISI 316L
1181	2	Cover	PE
147	8	Pin screw	A4-80
571	8**/10***	Plug	PE



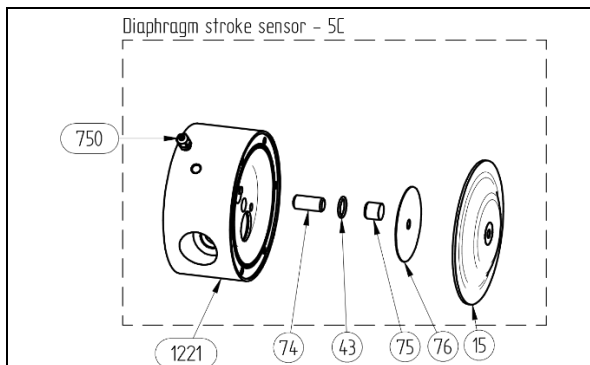
Flange connections

Pos.	Q-ty	Description	Material
70	2	Flange pipe (thread)	PE, PTFE
71	2	ANSI flange ring	PP, PTFE, AISI316L
73	2	DIN flange ring	PP, PTFE, AISI316L
701	2	Flange pipe O-ring	FEP/FKM, EPDM, NBR
712	2	JIS flange ring	PP, PTFE, AISI316L
721	2	Integrated manifold with loose flange	PP, PTFE



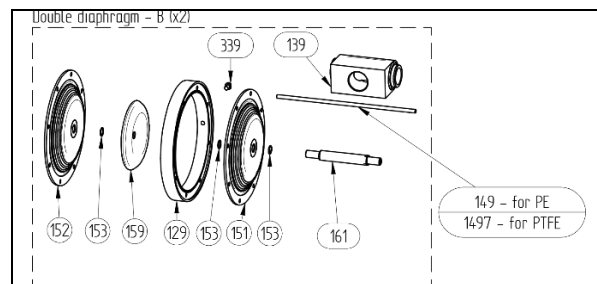
External air supply

Pos.	Q-ty	Description	Material
124	1	Centre block	PP
26	2	Air intake adapter	Brass



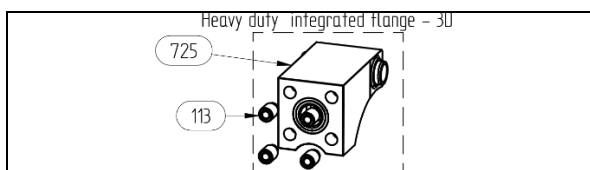
Diaphragm stroke sensor

Pos.	Q-ty	Description	Material
1221	1	Centre block for stroke sensor	PP
43	1	O-ring	NBR, FKM, EPDM
74	1	Inductive sensor	CuZn
75	1	Sensor cap	PP
76	1	Sensing plate	AISI 316L
750	1	Cable gland	PP



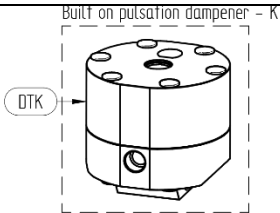
Double diaphragm system

Pos.	Q-ty	Description	Material
129	1	Set of spacers (right + left)	PP
139	2	In/outlet	PE, PTFE
149	8	Pin screw for PE pump	A4-80
1497		Pin screw for PTFE pump	
151	2	Air side diaphragm	EPDM, PTFE, NBR or FKM
152	2	Liquid side diaphragm	EPDM, PTFE, NBR or FKM
153	6	Diaphragm O-ring	EPDM, FKM, NBR
159	2	Diaphragm spacer	PP, PE, PTFE, AISI 316L
169	1	Diaphragm shaft	AISI 304L
339	2	Spacer plug	PP




Integrated flange


Pos.	Q-ty	Description	Material
725-2	2	DIN integrated flange	PE, PTFE
725-9	2	ANSI integrated flange	PE, PTFE
113	8	Threaded inserts	PET



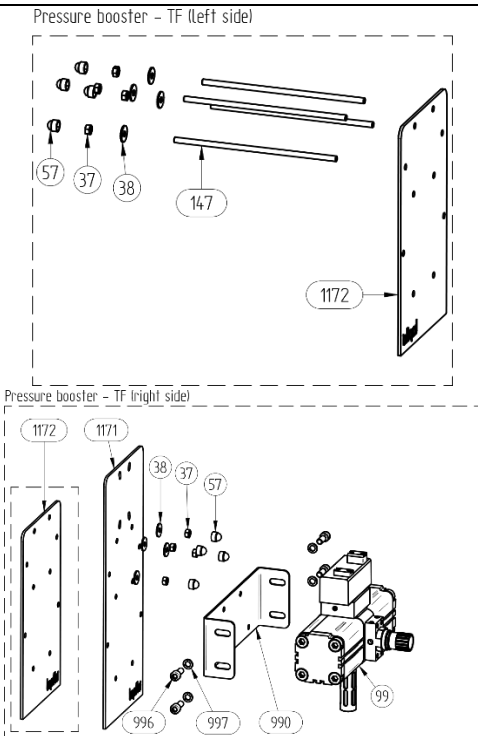
Built-on dampener (T200 only)			
Pos.	Q-ty	Description	Material
DTK-xxx	1	Built-on dampener assembly	-
6-xx1-112	1	Dampener housing/pump outlet	PE, PTFE
6-xx1-12	1	Dampener centre body	PP
6-xx0-15	1	Dampener diaphragm	EPDM, PTFE, NBR, PTFE 1705b
6-xx0-37	16	Dampener nut	A4-70
6-xx0-38	16	Dampener washer	A4-70
6-xx0-36	5	Dampener PE seal	PE
6-xx0-47	5	Dampener O-ring	NBR, EPDM, FKM
6-xx1-16	1	Dampener shaft	AISI 316L
6-xx1-14	8	Dampener pin screw	A4-80
6-xx1-25	1	Dampener muffler	PPM-F
6-xx1-27	1	Dampener blocking ring	PE



High lift seats			
Pos.	Q-ty	Description	Material
203	2	Upper sleeve – high lift	PE, PTFE
213	2	Lower sleeve – high lift	PE, PTFE



Twin connection			
Pos.	Q-ty	Description	Material
130	2	Twin in/outlet	PE, PTFE



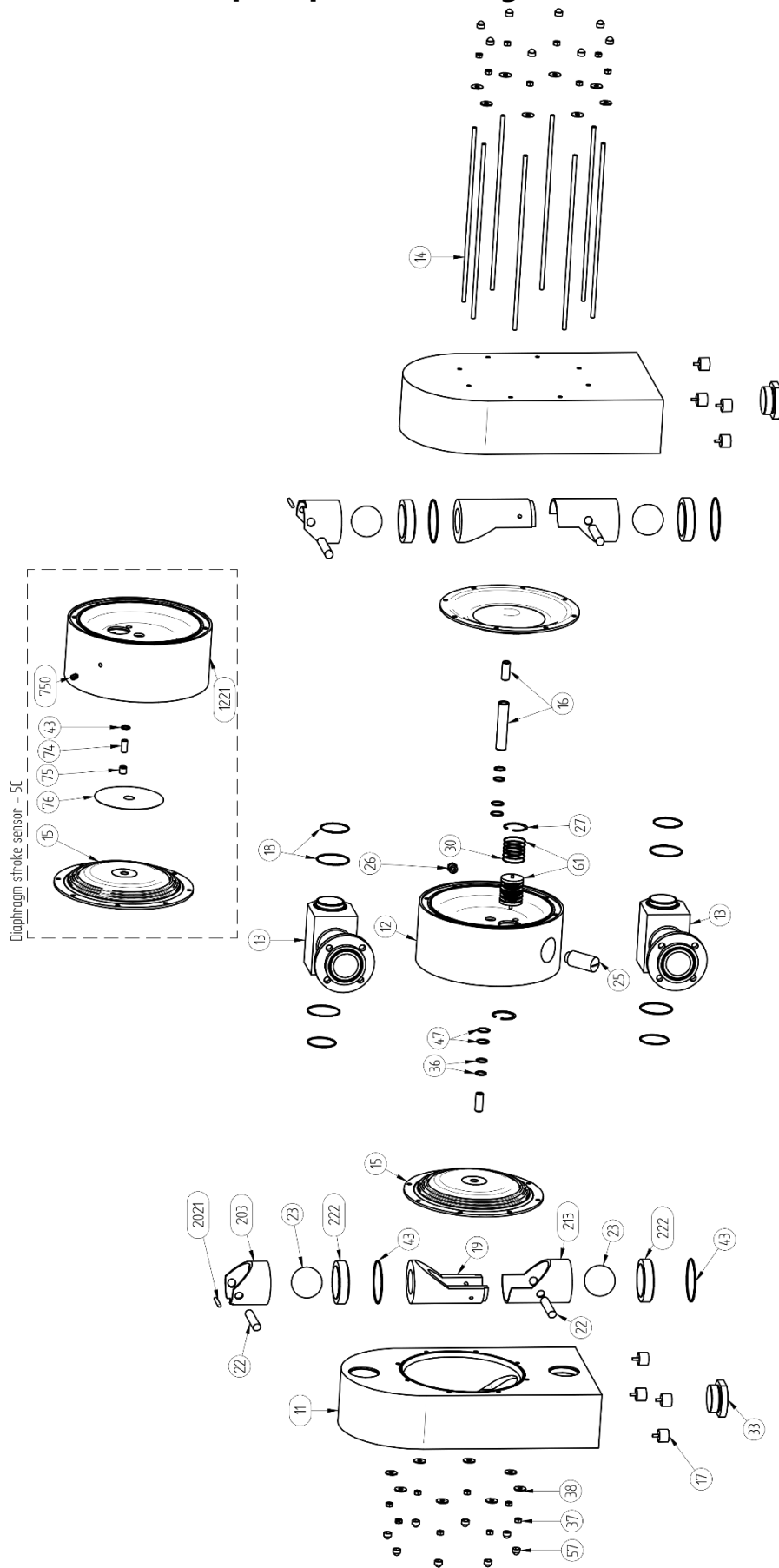
Pump with pressure booster			
Pos.	Q-ty	Description	Material
99	1	Booster	-
990	1	Booster mounting plate	AISI 304
996	4	Booster mounting screw	A4-70
997	4	Booster mounting washer	A4-80
1171	1/0*	Reinforcement plate	AISI 304
1172	1/2*	Reinforcement plate	AISI 304
37	6	Additional nuts	A4-70
38	6	Additional washers	A4-70
57	4	Additional nut covers	PP
147	2	Additional pin screws	A4-80

* = For Festo booster 2 x 1172, for SMC and Metal Work 1 x 1171 and 1 x 1172

** = T200

*** = T400

5.9. T800 – Spare parts drawing



5.10. T800 – Spare parts list

Pos.	Q-ty	Description	Material	KIT LIQ	KIT AIR	KIT VAL
11	2	Housing	PE			
12	1	Centre block	PP			
137-2*	2	In/outlet integrated with DIN flange	PE			
137-9	2	In/outlet integrated with ANSI flange	PE			
137-12	2	In/outlet integrated with JIS flange	PE			
14	8	Pin screw	A4-80			
15	2	Diaphragm	EPDM, PTFE, NBR	x		
16	1	Diaphragm shaft	AISI 316L		x	
17	8	Rubber foot	NBR			
18	4	O-ring set (in/outlet)	PTFE/EPDM, EPDM, FKM, NBR,	x	x	
19	2	Spacer sleeve	PE			x
203	2	Upper sleeve	PE, PTFE			x
2021	2	Blocking pin	PE, PTFE			x
213	2	Lower sleeve	PE, PTFE			x
22	4	Valve ball stop	PE1000			x
222	4	Valve seat	PE1000			x
23	4	Valve ball	EPDM, PTFE, NBR, PU	x		
25	1	Muffler	Acetal/felt		x	
26	1	Air intake adapter	Brass			
27	1	Circlip	Cr3 coated steel			
30	6	O-ring	NBR (standard), EPDM, FKM			
33	2	Plug	PE, PTFE			
36	2	Centre block seal	PE		x	
37	16	Nut	A4-70			
38	16	Washer	A4-70			
43	4	O-ring (valve seat)	EPDM, PTFE, FKM	x		
47	2	O-ring (back up for 36)	NBR (standard), EPDM, FKM		x	
57	16	Nut cover	PP			
61	1	Air valve complete	Body: PET*, brass; Piston: PET*, brass; O-rings: NBR, FKM		x	
721-9	2	In/outlet integrated with ANSI flange	PE			

Diaphragm stroke sensor			
1221	1	Centre block for stroke sensor	PP
43	1	O-ring	NBR, FKM, EPDM
74	1	Inductive sensor	CuZn
75	1	Sensor cap	PP
76	1	Sensing plate	AISI 316L
750	1	Cable gland	PP

* = Standard

5.11. 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** and **KIT VAL** includes parts on pump wetted side, **KIT AIR** includes parts on the pump air side and that are subject to wear.

TR9 and TR20:

	Pos.	Description	Q-ty
KIT LIQ	15	Diaphragm	2
	18	O-ring set in/outlet	4
	20	Lower rod	2
	21	Upper rod	2
	22	Pin	2

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

T50, T100, T200, T400 and T800:

	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
	47	O-ring(back up for 36)	2/4*
	25	Muffler	1

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

	Pos.	Description	Q-ty
KIT VAL	19	Spacer sleeve	2
	2021	Blocking pin	2
	202	Upper sleeve	2
	212	Lower sleeve	2
	222	Valve seat	4
	22	Valve ball stop	4

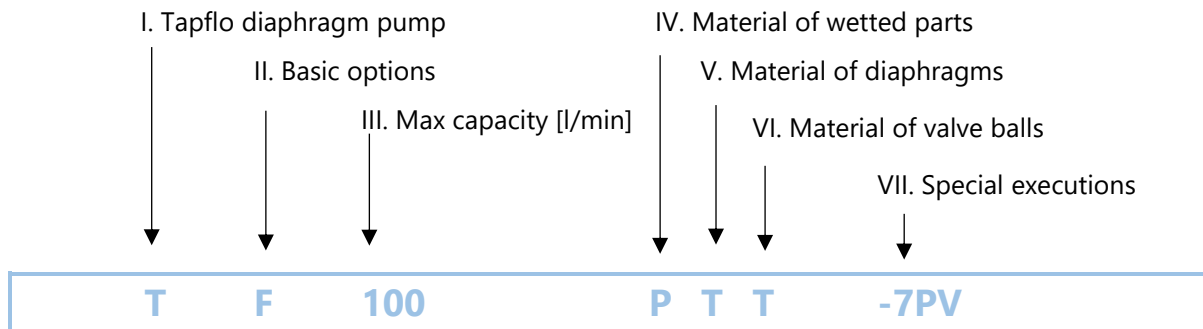
* For T100 pump

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

5.13. 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
- C = Pump with LEAP technology
- D = Drum pump
- F = Filter-press pump
- K = Pump with built-on dampener (TR20 – T200)
- Q = Special sealed pump
- R = Rod valve pump (instead of balls)
- S = Spring valve pumps
- T = Twin inlet/outlet pump
- V = AISI316 valve seats / spacer
- X = ATEX approved, group II, cat. 2
- Y = High lift valve seats
- Z = ATEX approved, group II, cat. 1

IV. Material of wetted parts:

- P = PE
- T = PTFE
- L = PP

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

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

Material of rod valves (TR9 and TR20 only):

- T = PTFE

VII. Special executions:

- 1 = Optional material of in/outlet
- 2 = Optional material of valve seat insert
- 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
- 11 = Housing reinforcement plate options
- 13 = Twin in-/outlet options
- 14 = Optional pump feet
- 17 = Plates for pump/dampener assembly
- 18 = Special ATEX executions
- 19 = TF pump options
- 20 = Optional material of valve seat/sleeves

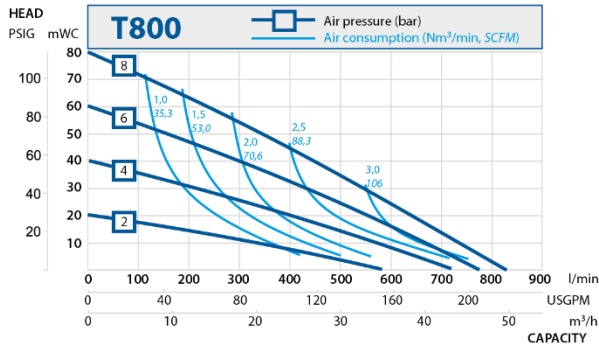
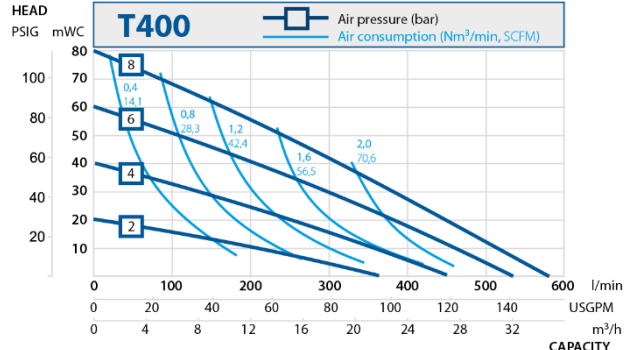
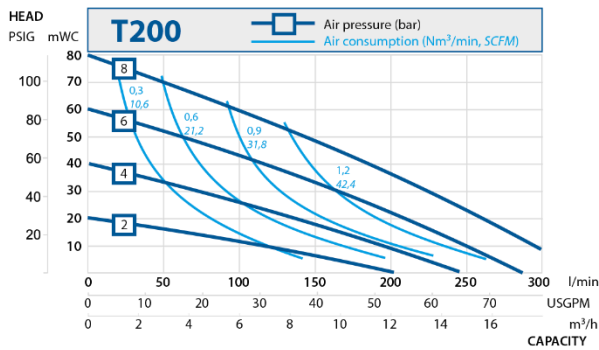
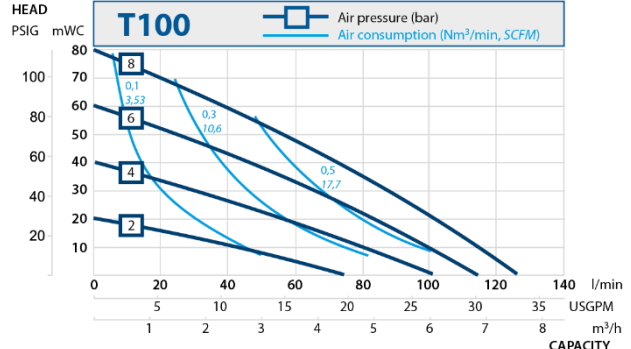
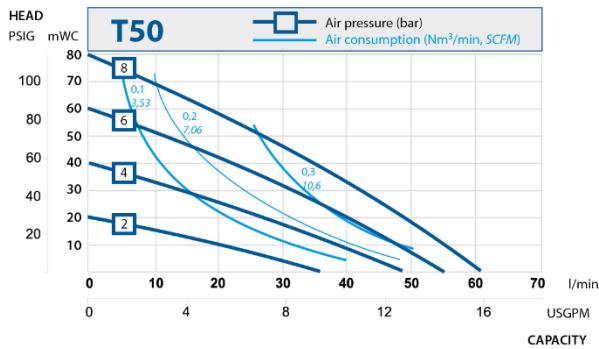
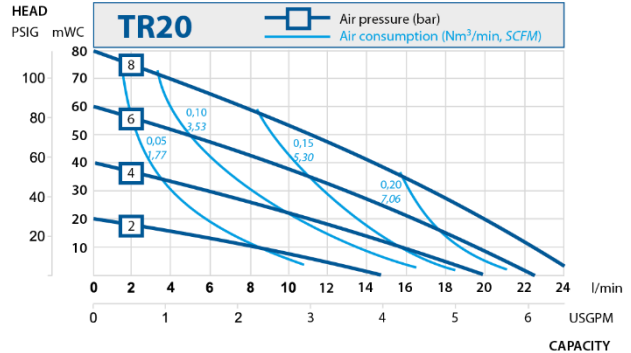
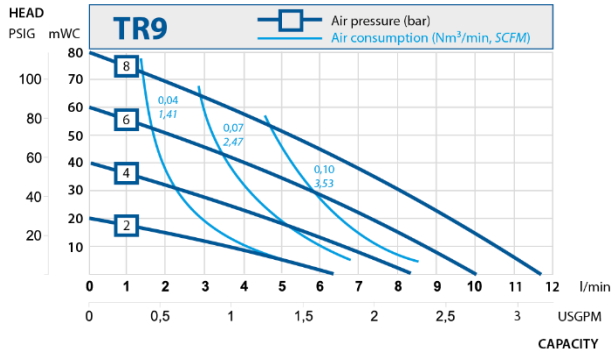
6. DATA

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:

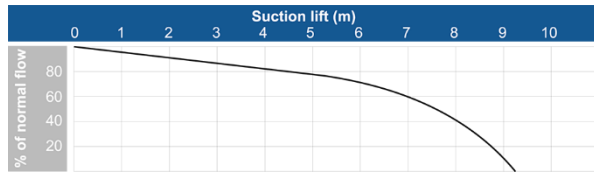
A flow of 30 litre/minute is desired. The discharge pressure is calculated to 30 mWC. We choose a T50 pump. It requires an air pressure of 6 bar and will consume approximately 0.25 Nm³ of air per minute.



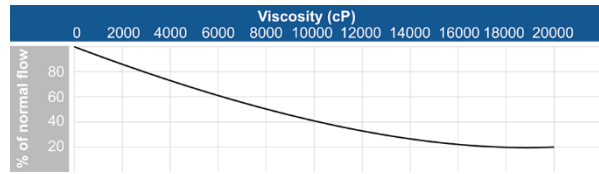
Recommended flow is half of the max flow, e.g. recommended flow for a T50 is 25 l/min.

6.2. Capacity changes

Capacity changes at different suction lifts



Capacity changes at different viscosities



6.3. Technical data

TECHNICAL DATA	PUMP SIZE						
	TR9	TR20	T50	T100	T200	T400	T800
Max capacity* [l/min] / [US GPM]	11 / 2.9	24 / 6.3	60 / 15.8	125 / 33	330 / 87	570 / 150	820 / 216
Volume per stroke** [ml] / [cu in]	15 / 0.92	26 / 1.59	116 / 7.08	305 / 18.6	854 / 52.1	2326 / 141.9	5240 / 319.8
Max discharge pressure [bar] / [psi]	8 / 116	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	8 / 116
Max suction lift dry*** [m] / [Ft]	1.6 / 5.25	2.4 / 7.87	4 / 13	3.5 / 11	4 / 13	4 / 13	5 / 16
Max suction lift wet [m] / [Ft]	8 / 26	8 / 26	9 / 29.5	9 / 29.5	9 / 29.5	9 / 29.5	9 / 29.5
Max size of solids ø in [mm] / [in]	2 / 0.08	3 / 0.12	4 / 0.16	6 / 0.24	10 / 0.39	15 / 0.59	15 / 0.59
Max temp. pump in PE [°C] / [°F]	70 / 158	70 / 158	70 / 158	70 / 158	70 / 158	70 / 158	70 / 158
Max temp. pump in PTFE [°C] / [°F]	100 / 212	100 / 212	100 / 212	100 / 212	100 / 212	100 / 212	-
Weight of pump in PE [kg] / [lb]	0.75 / 1.65	1.6 / 3.53	4.3 / 9.48	10 / 22	25 / 55.12	47 / 103.62	147 / 342
Weight of pump in PTFE [kg] / [lb]	1.35 / 2.98	3.15 / 6.94	9 / 19.84	17 / 38	47 / 103.62	87 / 191.80	-
Weight of drum pump in PE [kg] / [lb]	-	2.4 / 5.29	4.7 / 10.36	10.5 / 23.15	-	-	-
Weight of drum pump in PTFE [kg] / [lb]	-	3.9 / 8.6	9.4 / 20.72	17.5 / 38.58	-	-	-
Standard connection in PE pumps	BSP female thread (G)						DIN flange
Standard connection in PTFE pumps	BSP female thread (G)						-

* = Recommended flow is half of the max flow, i.e. recommended flow for a T50 is 25 l/min (6.6 US GPM)

** = Based on pumps with PTFE diaphragms. Pumps with rubber diaphragms have higher volume per stroke.

*** = With stainless steel valve balls, other materials may reduce suction. Please consult us in this matter.

COMPONENT	MATERIAL
Pump housing and all wetted thermoplastic elements	PE, PTFE (except T800)
Centre block (not wetted)	PP, PP conductive, PE1000 conductive
Diaphragms	PTFE, PTFE with white back, EPDM, white EPDM, NBR, FKM
Valve balls	PTFE, EPDM, NBR, AISI 316*, PU, Ceramic*, SiC*
Rod valves (TR9 and TR20)	PE, PTFE
Air valve	Body: brass (std.), stainless steel AISI 316L or PET O-rings: NBR (std.), EPDM or FKM
O-rings (wetted)	PTFE, EPDM, FKM, FEP/Silicone, FEP/FKM, NBR
Housing pin screws	A4-80
Diaphragm shaft	Stainless steel AISI 316L (TR9, TR20, T800) / 304L (T50 – T400)
Drum handle (TD pumps)	Stainless steel AISI 316L
Drum pipe (TD pumps)	Stainless steel AISI 316L, PP, PTFE, PTFE conductive
Reinforcement plates (TF, PTFE pumps)	Stainless steel AISI 304, AISI 316L

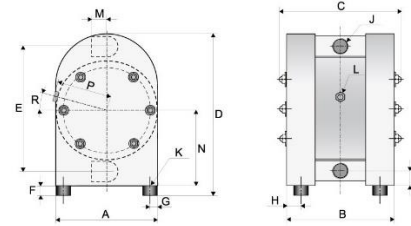
* = Not available for T800

6.4. Dimensions

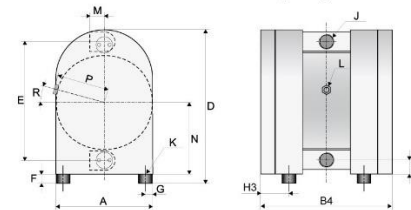
General dimensions only, ask us for detailed drawings. Changes reserved without notice.

Dim	PUMP SIZE						
	TR9	TR20	T50	T100	T200	T400	T800
A	70 2.76	105 4.13	150 5.91	200 7.87	270 10.63	350 13.78	460 18.11
A2	-	-	150 5.91	200 7.87	270 10.63	350 13.78	-
B	94 3.70	113 4.45	162 6.38	216 8.50	313 12.32	382 15.04	557 21.93
B2	-	-	168 6.61	224 8.82	324 12.76	392 15.43	-
B3	-	-	262 10.31	415 16.34	595 23.43	670 26.38	-
B4	134 5.28	152 5.98	200 7.87	254 10.00	350 13.78	420 16.54	-
C	116 4.57	134 5.28	185 7.28	252 9.92	350 13.78	426 16.77	601 23.66
D	123 4.84	168 6.61	243 9.57	320 12.60	450 17.72	563 22.17	830 32.68
D2	-	175 6.89	250 9.84	325 12.80	-	-	-
D3	-	-	352 13.86	351 13.82	501 19.72	583 22.95	-
D4	-	-	343 13.50	364 14.33	500 19.69	610 24.02	-
E	92 3.62	132 5.20	190 7.48	252 9.92	345 13.58	440 17.32	650 25.59
E2	-	147 5.79	210 8.27	280 11.02	-	-	-
E3	-	-	250 9.84	333 13.11	467 18.39	588 23.15	-
F	8 0.31	8 0.31	15 0.59	15 0.59	30 1.18	30 1.18	30 1.18
F2	-	15 0.59	21 0.83	21 0.83	-	-	-
G	9 0.35	15 0.59	17 0.67	30 1.18	30 1.18	30 1.18	20 0.79
H	10 0.39	15 0.59	16 0.63	30 1.18	30 1.18	30 1.18	30 1.18
H2	-	-	19 0.75	34 1.34	35 1.38	35 1.38	-
H3	30 1.18	35 1.38	36 1.42	50 1.97	50 1.97	50 1.97	-
I	12 0.47	15 0.59	20 0.79	28 1.10	38 1.50	48 1.89	80 3.15
J	¼" ¼"	3/8" 3/8"	½" ½"	1" 1"	1 ½" 1 ½"	2" 2"	3" 3"
J2	¼" ¼"	3/8" 3/8"	½" ½"	¾" ¾"	-	-	-
K	M4x16 M4	M4x16 M4	M8x25 M8	M8x25 M8	M8x25 M8	M8x25 M8	M8x25 M8
L	1/8" 1/8"	1/8" 1/8"	¼" ¼"	¼" ¼"	½" ½"	½" ½"	½" 1/2"
M	15 0.59	17 0.67	25 0.98	38 1.50	54 2.13	70 2.76	105 4.13
N	58 2.28	81 3.19	115 4.53	154 6.06	211 8.31	268 10.55	411 16.18
P	35 1.38	52 2.05	80 3.15	105 4.13	143 5.63	183 7.20	237 9.33
R	0° 0°	0° 0°	15° 15°	15° 15°	0° 0°	0° 0°	0° 0°
S	13 0.51	15 0.59	21 0.83	27 1.06	35 1.38	42 1.65	-
ØT	-	20 0.79	32 1.26	32 1.26	-	-	-
U	-	1200* 47.24*	1200* 47.24*	1200* 47.24*	-	-	-
V	-	286 11.22	360 14.17	401 15.57	-	-	-

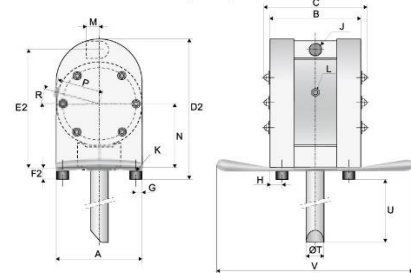
Standard PE pumps



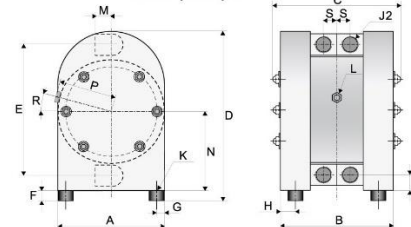
Standard PTFE pumps



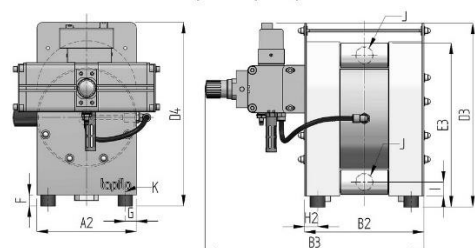
Drum pumps TD



Twin pumps TT



Filterpress pumps TF

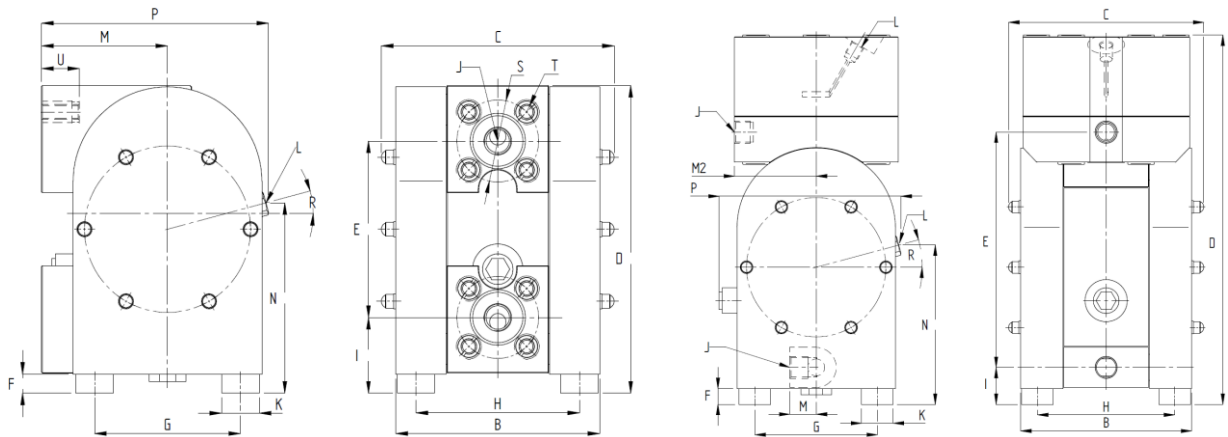


Changes reserved without notice

Dimensions in mm (where other is not indicated)
Dimensions in inch (where other is not indicated)

* = Any length up to 2000 mm (79") upon request

Dim	PUMP SIZE							
	Integrated flanges				Built-on dampener			
	T50	T100	T200	T400	TR20	T50	T100	T200
B	162	216	314	382	112,5	162	216	310
	6.38	8.50	12.36	15.04	4.43	6.38	8.50	12.20
C	185	252	352	427	134	185	252	345
	7.28	9.92	13.86	16.81	5.28	7.28	9.92	13.60
D	244	320	450	564	251	350	461	649
	9.61	12.60	17.72	22.20	9.88	13.78	18.15	25.60
E	140	204	282	372	158	223	299,5	496
	5.51	8.03	11.10	14.65	6.22	8.78	11.79	19.50
F	15	15	30	30	8	15	15	30
	0.59	0.59	1.18	1.18	0.31	0.59	0.59	1.20
G	116	140	210	290	75	116	140	210
	4.57	5.51	8.27	11.42	2.95	4.57	5.51	8.30
H	130	156	254	322	82,5	130	156	250
	5.12	6.14	10.00	12.68	3.25	5.12	6.14	9.80
I	60	67	99,5	112	23	35	43	68
	2.36	2.64	3.92	4.41	0.91	1.38	1.69	2.70
J	½"	1"	1½"	2"	3/8"	½"	1"	1 ½"
	½	1	1 ½	2	3/8	½	1	1 ½
K	30	30	40	40	15	30	30	40
	1.18	1.18	1.57	1.57	0.59	1.18	1.18	1.60
L	¼"	¼"	½"	½"	1/8"	¼"	¼"	½"
	¼	¼	½	½	1/8	¼	¼	½
M	100	135	150	175	17	25	38	54
	3.94	5.31	5.91	6.89	0.67	0.98	1.50	2.10
M2	-	-	-	-	53,5	77,5	101,5	135
	-	-	-	-	2.11	3.05	4.00	5.30
N	151	197	241	298	89	151	196,5	241
	5.94	7.76	9.49	11.73	3.50	5.94	7.74	9.50
P	180	240	341	389	134	172	236	342
	7.09	9.45	13.43	15.31	5.28	6.77	9.29	13.5
R	15°	15°	0°	0°	0°	15°	15°	0°
	-	-	-	-	-	-	-	-
S	DIN	65	85	110	125	-	-	-
	ANSI	60.3	79.4	98.4	120.6	-	-	-
T	M12	M12	M16	M16	-	-	-	-
	M12	M12	M16	M16	-	-	-	-
U	30	30	45	45	-	-	-	-
	1.18	1.18	1.77	1.77	-	-	-	-



6.5. 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.

Pump size	Tightening torques [Nm]						
	TR9	TR20	T50	T100	T200	T400	T800
Pos. 37 – nut	1.5	5.5	8	16	20	23	30
Pos. 16 – diaphragm screw	n/a	n/a	10	13	20	22	26

6.6. Permitted loads on manifolds

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

TR9		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	20	3,5
Y	20	3,5
Z	20	3,5

T400		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	56	9,6
Y	56	9,6
Z	56	9,6

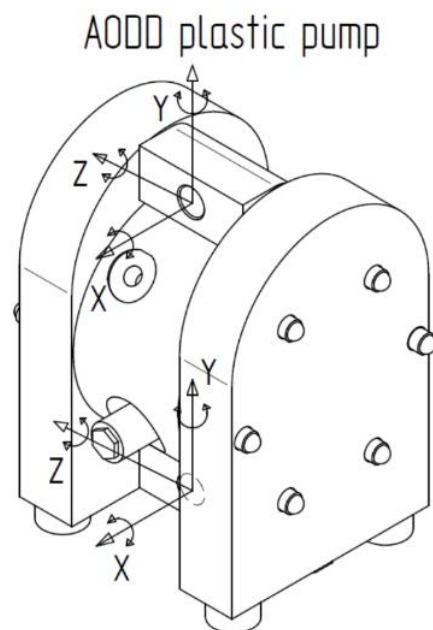
TR20		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	27	4,2
Y	27	4,2
Z	27	4,2

T800		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	83	11
Y	83	11
Z	83	11

T50		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	31	5,3
Y	31	5,3
Z	31	5,3

T100		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	35	6,1
Y	35	6,1
Z	35	6,1

T200		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	43	7,4
Y	43	7,4
Z	43	7,4



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:	

7.2. 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.;
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 warranty 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.

13.2. Appendix B – Predetermining Batcher Manual

Instruction & Operations Manual
Original Version

tapflo®

PNEUMATIC BATCH CONTROL SYSTEM PREDETERMINING TPUK-BP/BPI

Edition 2021

Read the instruction before installing and
commissioning the unit.



» All about your flow

www.tapflo.com

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

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**PNEUMATIC BATCHCONTROL SYSTEM
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**PNEUMATIC BATCHCONTROL SYSTEM
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1. EC Declaration of Conformity

<p>EC DECLARATION OF CONFORMITY</p> <p>CE</p>	
Name and Address of the manufacturer:	Tapflo (UK) Ltd Unit 3 Mayflower Close, Chandlers Ford, Hampshire, SO53 4AR UK
Description of Equipment:	Pneumatic batch control system Predetermining
Model / Type:	TPUK-BP TPUK-BPI
Directives / Conformity Assessment Procedures:	The Machinery Directive (2006/42/EC) / Non Annex IV Machinery, Self declaration/Technical file
Declaration:	The person signing below declares that the above named equipment fulfils all the relevant provisions of the stated directives.
Place of Declaration	Tapflo (UK) Limited, SO53 4AR, UK
Date:	8/7/2011
Signed:	
Printed Name of Authorised Signatory:	Mr. M. Barnes
Position in Company:	Managing Director

**PNEUMATIC BATCHCONTROL SYSTEM
PREDETERMINING
TPUK-BP / BPI**

2. UKCA Declaration of Conformity

<p>UKCA DECLARATION OF CONFORMITY</p> <p>UK CA</p>	
Name and Address of the manufacturer:	Tapflo (UK) Ltd Unit 3 Mayflower Close, Chandlers Ford, Hampshire, SO53 4AR UK
Description of Equipment:	Pneumatic batch control system Predetermining
Model / Type:	TPUK-BP TPUK-BPI
Directives / Conformity Assessment Procedures:	The Supply of Machinery (Safety) Regulations 2008, Self declaration/Technical file
Declaration:	The person signing below declares that the above named equipment fulfils all the relevant provisions of the stated directives.
Place of Declaration	Tapflo (UK) Limited, SO53 4AR, UK
Date:	8/7/2011
Signed:	
Printed Name of Authorised Signatory:	Mr. M. Barnes
Position in Company:	Managing Director

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

3. Introduction

Tapflo (UK) pump control systems are designed to offer simple solutions for industrial pumping applications. The systems work in harmony with each pump application utilising similar means of power and methods of construction to give safe, simple and reliable use.

With proper installation, set-up and maintenance Tapflo (UK) systems give efficient and trouble-free operation. This manual will familiarize operators with detailed information about installing, operating and maintenance of the system.

4. Warning symbols

The following warning symbols are present in this instruction manual. The warning information should be observed when either of these symbols is present.



This symbol highlights all safety instructions in this manual where danger to persons may occur. Observe these instructions carefully and proceed with the utmost caution in these situations. Inform all users of all safety instructions. In addition to the instructions in this manual, the general safety and accident prevention regulations must be observed.



This symbol highlights points in the instruction manual of particular importance for compliance with regulations and directives, for correct workflow and the prevention of damage to, or destruction of the system or its associate equipment.

5. Receiving inspection

Although every precaution is taken when packing and shipping, please carefully check goods on receipt, ensuring all parts listed on the packing note are accounted for. Report any damage or shortages to the delivery company and Tapflo (UK) within 24 hours of receipt.

6. Storage



If the equipment is to be stored prior to installation, place in a clean dry location ensuring it is not exposed to extreme temperature or humidity, ideally in original packaging to prevent contaminants entering the system.

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

7. Mounting



Tapflo (UK) systems will operate properly without being mounted unless otherwise stated. If the system is to be mounted please ensure the surface is suitable for the load detailed in the specifications and appropriate to the system and application.

8. Air connections



Please ensure all connections observe the specifications of the system, failure to observe this could result in damage to the system and danger to personnel.

9. Air preparation



All Tapflo (UK) systems are designed to run on clean, dry air, lubrication is not recommended. Maximum pressure is 7 bar (G) unless otherwise stated. An inline filter of 5 micron or finer is recommended to preserve the life of the system.

10. Air pressure



The maximum pressure specified in the data section of this manual must not be exceeded. Higher pressures can cause damage and may cause injury to personnel.

11. Health and Safety



Systems must be installed according to local and national safety rules. The system must be suitable for the application. Failure to do so could result in poor performance and a risk to plant and personnel. Consult Tapflo (UK) if in doubt.

12. Protection



In the interest of health and safety it is essential to wear appropriate PPE when operating and/or working in the vicinity of the application.

13. Explosive environments



Tapflo (UK) Ltd systems are not certified for use in explosive environments. Consult Tapflo (UK) for further information. Incorrect installation or use may cause injury or death to personnel in the vicinity of the installation!

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

14. Principle of operation

Tapflo (UK)'s Pneumatic Batcher is a non-intrusive, fully pneumatic predetermining counter system which records pump strokes as a series of low-pressure pulses from the air exhaust of an AODD pump, stopping the pump once a pre-set number of strokes have been recorded, thus controlling the volume of product dispensed by the pump.

15. Variants

TPUK-BP The predetermining counter (Figure 1 - BP version) is mounted externally, allowing the user to adjust the preset value as required.

TPUK-BPI The predetermining counter (Figure 1 - BPI version) is mounted internally, preventing the user from adjusting the preset value. Access to the predetermining counter to adjust the preset value is made using a screwdriver to release the hinged lid (see Figure 1 - BPI version).

16. Key components

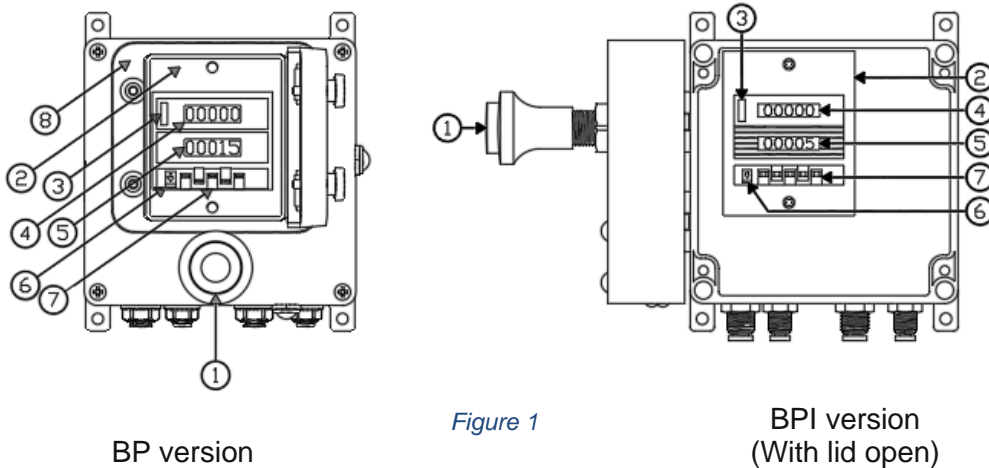


Figure 1

Item No.	Description
1	Start/stop-push/pull valve and visual indicator
2	Predetermining counter
3	Counter reset button
4	Actual value (pump strokes)
5	Preset value (pump strokes)
6	Preset value adjustment lever
7	Individual digit preset adjustment push buttons (x5)
8	Counter Window

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

17. Stand alone and remote start system configuration

Stand alone

The batcher is positioned within 20 metres of the pump and controlled using the start/stop-push/pull valve (1 - Figure 1). The predetermining counter is available for the users to adjust.

Remote start/stop

The batcher (1 - Figure 3) is controlled by either the remote start/stop station (7 - Figure 3) or directly by using the start/stop-push/pull valve (1 - Figure 1) of the batcher (1 - Figure 3). It is intended for use where the batcher is located away from the user preventing uncontrolled adjustment of the predetermining counter (2 - Figure 1), for example the batcher (1 - Figure 3) is located with the pump (2 - Figure 3) in a chemical store and the remote start/stop (7 - Figure 3) is at the dispensing point.

The remote start/stop station (7 - Figure 3) can also be used to extend the distance between the dispensing point and the pump (2 - Figure 3), as the remote start/stop station (7 - Figure 3) can be located up to 20 metres from the batcher (1 - Figure 3), which can also be 20 metres from the pump (2 - Figure 3).

The remote start/stop system (7 - Figure 3) can be offered in either manual or electrical variants allowing the batcher (1 - Figure 3) to be started from a PLC for example.

18. Loss of pressure start-up system

The batcher is equipped with a loss of pressure automatic reset system. If the compressed air supply (P) is removed and re-instated the start/stop-push/pull valve (1 - Figure 1) will automatically reset to the 'off' position.

19. Essential accessories



Items 3 & 4 (Figure 3) are essential accessories available from Tapflo (UK). Please consult Tapflo (UK) for further details.

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

20. Recommended installation – Standalone system

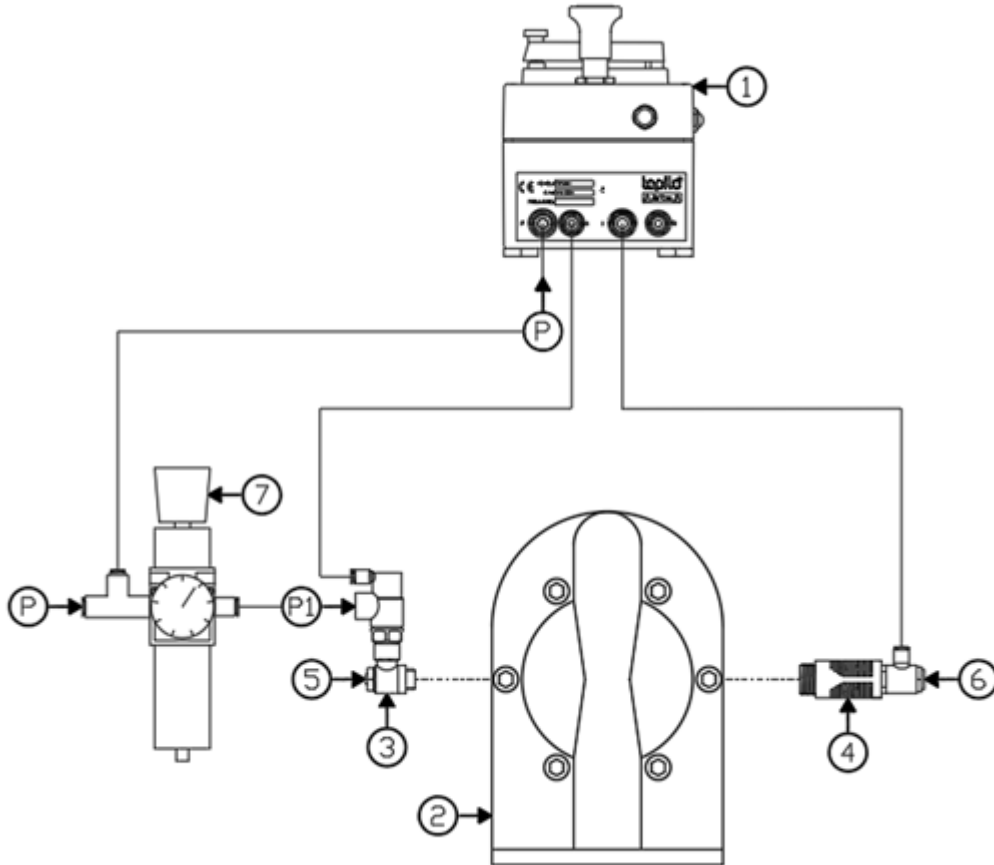


Figure 2

Item No.	Description
1	Tapflo (UK) pneumatic predetermining batch control system (TPUK-BP / TPUK-BPI) (BP version shown for representation purposes only)
2	Pump (for representation purposes only)
3	Combined blocking/needle valve (essential accessory) (Part No. TPUK-B/NV-**, sized to suit pump)
4	Muffler with connection and adjuster (essential accessory) (Part No. TPUK-MU-**, sized to suit pump)
5	Pump speed control adjustment screw
6	Pump stroke sensitivity adjustment screw
7	Filter Regulator
P	System air supply connection
P1	Pump compressed air supply port

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

21. Recommended installation – With remote start/stop system

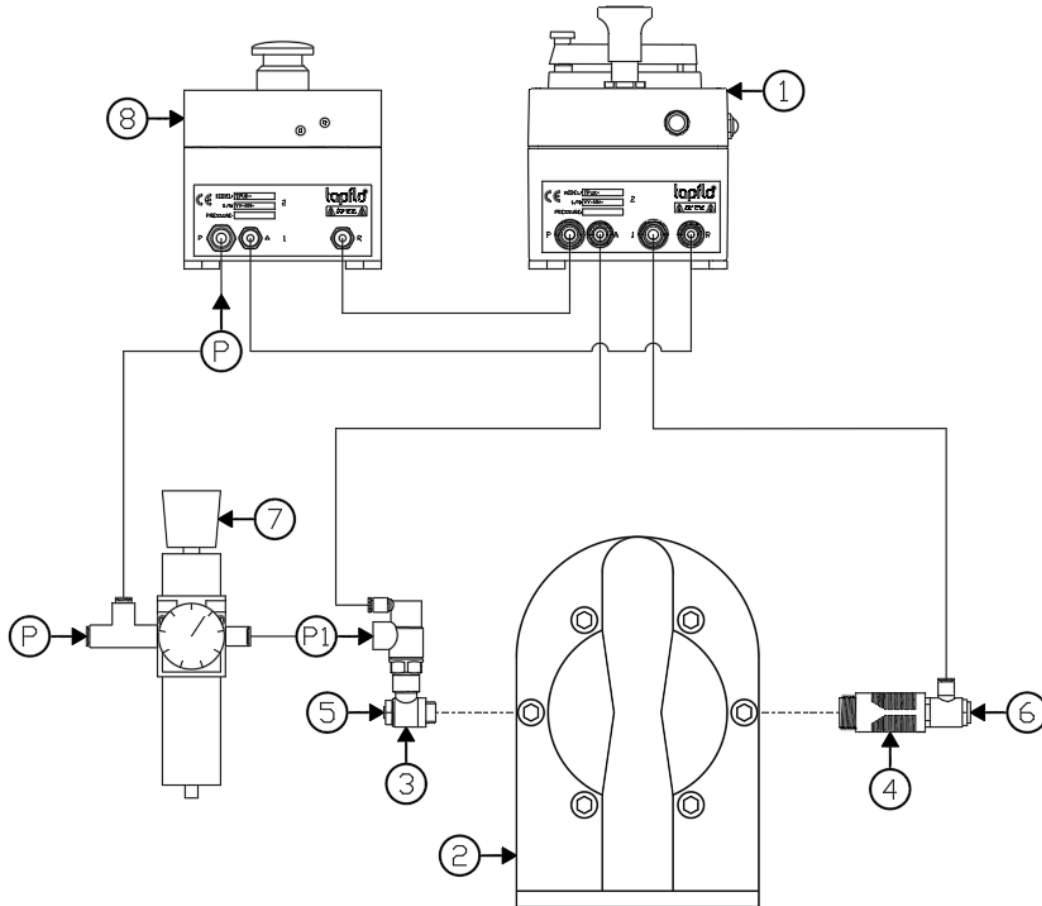


Figure 3

Item No.	Description
1	Tapflo (UK) pneumatic predetermining batch control system (TPUK-BP / TPUK-BPI) (BP version shown for representation purposes only)
2	Pump (for representation purposes only)
3	Combined blocking/needle valve (essential accessory) (Part No. TPUK-B/NV-size, sized to suit pump)
4	Muffer with connection and adjuster (essential accessory) (Part No. TPUK-MU-size, sized to suit pump)
5	Pump speed control adjustment screw
6	Pump stroke sensitivity adjustment screw
7	Filter Regulator
8	Tapflo (UK) remote start/stop system (TPUK-SSR or SSE-voltage) (SSR shown for representation purposes only)
P	System air supply connection
P1	Pump compressed air supply port

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

22. Set up

Before using the system ensure the following



- The system is configured correctly and has not been modified.
- Make all connections as instructed.
- Set the air pressure.
- Turn the compressed air supply on.
- Check for leaks. (N.B. the system utilizes an 'air bleed' design and discharges a small amount of air during normal use).
- The system is located on a clean, flat surface.

23. Setting the predetermining counter (2 - Figure 1)

To program the lower 'preset value' (5 - Figure 1) to the required number strokes, each digit of the 'predetermining counter' (2 - Figure 1) can be set independently.

1. Push the white preset value adjustment lever (6 - Figure 1) as shown by the arrow and hold it.
2. Set the desired value with the corresponding preset push buttons (7 - Figure 1).
3. Release white preset value adjustment lever (6 - Figure 1).

24. Dry test

This sets the sensitivity of the counting circuit and proves the system.

1. Ensure the system is configured as per - Figure 3
2. BPI versions - Undo the four lid retaining screws, lift the lid and swing open the enclosure to access the predetermining counter (2 - Figure 1).
3. Using a flat bladed screwdriver turn the "pump speed control adjustment screw" (5 - Figure 3) fully clockwise.
4. Using a flat bladed screwdriver turn the "pump stroke sensitivity adjustment screw" (6 - Figure 3) fully clockwise.
5. Set the predetermining counter (2 - Figure 1) to 00010 as described in "Setting the predetermining counter (2 - Figure 1)" section above.
6. Turn 'on' the compressed air supplies P & P1 (Figure 3)
7. Pull the start/stop-push/pull valve (1 - Figure 1), nothing should happen.
8. Using a flat bladed screwdriver slowly turn the "pump speed control adjustment screw" (5 - Figure 3) counter-clockwise until the pump is running at a controlled rate. The counter should not be counting.
9. Using a flat bladed screwdriver slowly turn the "pump stroke sensitivity adjustment screw" (6 - Figure 3) counter-clockwise until the predetermining counter (2 - Figure 1) begins to count. After the 10 strokes are recorded the pump will stop.
10. Pull the start/stop-push/pull valve (1 - Figure 1), and the pump should start and the counter should count each stroke cleanly, stopping the pump once 10 strokes are recorded.
11. Repeat this test adjusting the settings as per steps 7-9 if necessary.

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

12. BPI version – Replace the enclosure lid, ensuring no pipes are trapped

25. Wet test



Install the pump into the application or prepare a test rig to enable the system to pump liquid. The system is best set using the media to be batched, however for safety reasons Tapflo (UK) recommend the system is wet tested with water first, then recalibrated once the whole pump system is installed and tested.

1. Ensure the system is configured as per Figure 3
2. BPI versions - Undo the four lid retaining screws, lift the lid and swing open the enclosure to access the predetermining counter (2 - Figure 1).
3. Set the predetermining counter (2 - Figure 1) to 00010 as described in "Setting the predetermining counter (2 - Figure 1)" section above.
4. Turn on the compressed air supplies P & P1 (Figure 3)
5. Prime the system by repeatedly running the pump until media is discharged and no air is present.
6. If necessary, using a flat bladed screwdriver slowly adjust the "pump speed control adjustment screw" (5 - Figure 3) until the pump is running at the desired flow rate.
7. Check the predetermining counter (2 - Figure 1) is counting cleanly, if not using a flat bladed screwdriver slowly turn the "pump stroke sensitivity adjustment screw" (6 - Figure 3) until the predetermining counter (2 - Figure 1) is recording the strokes cleanly. (N.B. if the pump is running too fast the batcher can struggle to record strokes accurately. If so, reduce the pump speed by repeating step 5-6 until the strokes are recorded accurately)
8. Install or position a means of capturing the discharged media such as a suitable container.
9. Pull the start/stop push/pull valve (1 - Figure 1), and the pump should start and the counter should count each stroke cleanly, stopping the pump after 10 strokes are recorded.
10. Measure the volume of discharged media and using 'Formula.#1' work out the displacement per stroke.

$$\text{Formula.\#1} : \frac{\text{Displaced volume (litres)}}{\text{Number of strokes (10)}} = \text{Volume in litres / stroke}$$

11. Repeat steps 7-9 to ensure the accuracy of the above calculation, obtaining an average over several runs.

12. To calculate the number of strokes to give a set volume use 'Formula.#2' to work out the number of strokes required for a specific batch volume.

$$\text{Formula.\#2} : \frac{\text{Batch volume (litres)}}{\text{Volume per stroke (litres/stroke)}} = \text{Number of strokes}$$

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

13. Set the predetermining counter preset value (5 - Figure 1) to the number of stokes calculated in 'Formula #2', as described in "Setting the predetermining counter (2 - Figure 1)" section.
14. Run a test cycle checking the dispensed volume is correct.
Due to compound errors, it is often necessary to adjust the number of stokes to give the exact dispensed volume for larger batch sizes.
15. If the correct volume has been dispensed the batcher is calibrated.
16. BPI version – Replace the enclosure lid, ensuring no pipes are trapped.
17. If the incorrect volume has been dispensed repeat this section.

26. Tapflo pump volume per stroke table

Alternatively the table below can give approximate guidance to the volume per stroke. Using 'Formula.#2' to calculate the estimated number of stokes for a given batch size.

Plastic Series		Metal Series		Sanitary Series		Aseptic Series	
TR9	15	T25	45	T30	40	TX94	95
T20	26	T70A	105	T80	135	TX144	256
T50	116	T70S	101	T125	314	TX244	796
T100	305	T120A	272	T225	1000	TX444	1922
T200	854	T120S	304	T425	2300		
T400	2326	T220A	884	T825	3281		
T800	5240	T220S	962				
		T420A	2440				
		T420S	2480				
		T820A	4897				
		T820S	3452				



- Units: (ml)
- The values are for reference only.
- All values were accurate at the time of print.
- All values obtained from latest Tapflo IOM manuals (2019).
- The values above are based on PTFE diaphragms. Pumps with other diaphragms increase the volume by approximately 15%

27. System test



Once the system is fully installed and the media is primed, run some test cycles to confirm the calibration, adjusting the predetermining counter (2 - Figure 1) to trim the batch size.

Operation – stand alone

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

Risk of product splashing or spill!



- Ensure pump discharge is positioned correctly to capture the discharged media.
- Use the correct PPE.
- Use a bund if discharging into small containers.

To dispense a batch, pull the start/stop-push/pull valve (1 - Figure 1).

- Pump will start and media is dispensed.
- Once the number of strokes recorded equals the number in the 'preset value (pump strokes)' shown on the display (5 - Figure 1) the pump will stop.
- The dispensed batch will be as per the calibration.

To stop the pump mid-batch, press the start/stop-push/pull valve (1 - Figure 1).

- Pump will stop immediately.
- Number of recoded strokes will reset to 00000

28. Operation – remote start/stop manual

The batcher can be started as per 'Operation – stand-alone', but can also be operated via the optional remote start/stop system (TPUK-SSR)

To dispense a batch from the remote start/stop station press the start button.

- Batch will be dispensed as per sequence detailed in stand-alone system.

To stop the pump mid-batch from the remote start/stop station, press the stop button.

- Pump will stop as per sequence detailed in stand-alone system.

The stop button requires releasing after a mid-batch stop. Twist the stop button to release.

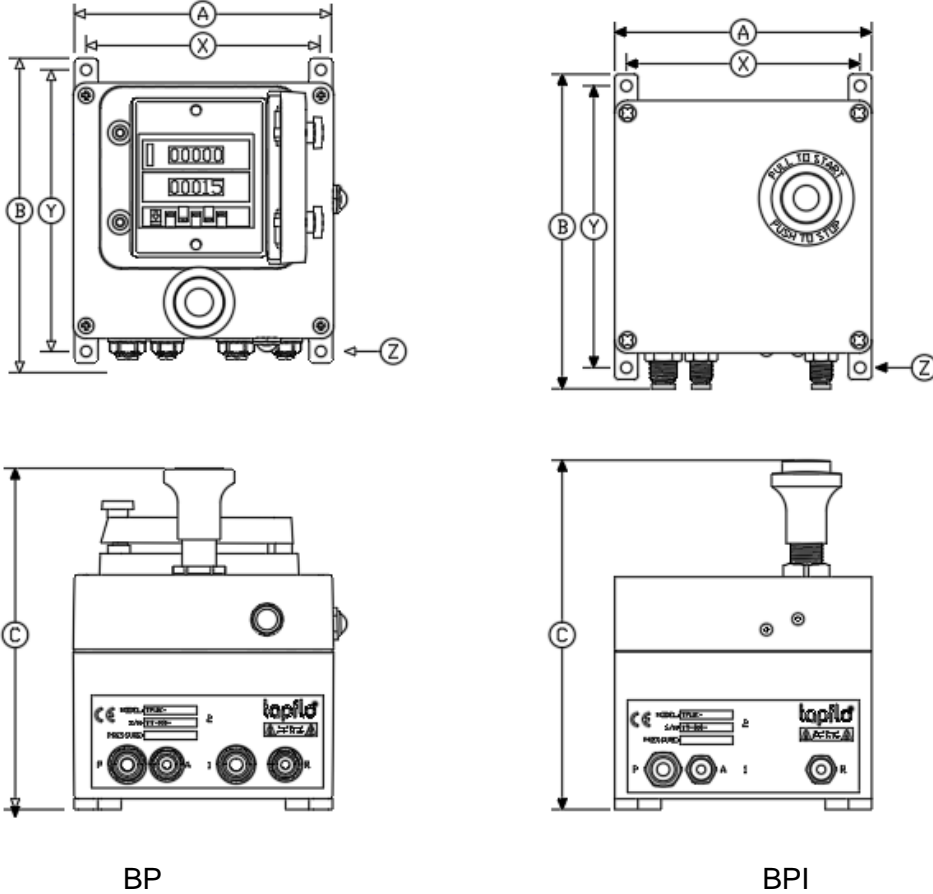
Whilst the stop button of the remote start/stop is pressed the start/stop push/pull valve of the batcher (1 - Figure 1) is disabled, automatically resetting when the remote start/stop stop button is released.

29. Operation – remote start/stop electrical

The batcher can be started via an electrical pulse as per the sequence described in 'Operation – stand-alone' detailed above (TPUK-SSE-*voltage*)

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

30. Technical data



Dimensions			
A	BP=122 mm, BPI=129 mm	X	111 mm
B	150 mm	Y	134 mm
C	175 mm MAX	Z	Diameter 5 mm

Connections		
Port No.	Description	Connection type
P	Air supply	6mm push fit
A	Pump pilot output	4mm push fit
1	Pump silencer input	6mm push fit
2		
R	Remote start input	4mm push fit

Specifications	
Temperature range – Ambient	0°C to +40°C
Air pressure – Min/Max	3-7 BAR (G)
Pilot output flow rate at 6 bar with p=1	120 NI/min (Effective orifice = 2.5mm)
Weight	1100 g

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

31. Routine maintenance

Routinely check the function and calibration, as normal wear can affect performance. To re-calibrate; follow the instructions in the application specific sections of this manual.

32. Trouble shooting

Check the system is configured as shown in the recommended configuration then see possible solutions below. If the problem persists, consult Tapflo (UK).

Please refer to the pump manual for more detail specific to pump issues.

Symptom	Cause	Remedy
System inoperative	Insufficient air supply.	Check all incoming air supplies are connected and meets minimum requirements.
	Speed control adjusted to closed position.	Adjust the speed control (3 - Figure 3).
	Blocked muffler	Replace and reset muffler (4 - Figure 3)
	Damaged interconnection	Check and repair any blocked or damaged interconnections
	Control system is out of calibration.	Check calibration as detailed in this O&M manual
	Remote start/stop stop button pressed	Reset as instructed in this manual.
	Pump issue.	See pump O&M manual.
Inconsistent batch sizes	No media	Ensure pump suction is immersed throughout the batch
	Fluctuating air supply	Check all incoming air supplies are connected and meets minimum requirements. Fit regulator.
	Siphoning	Install non-return valve in the discharge line
	Leaking suction connections	Check and remake any damaged or leaking interconnections

33. Siphoning



If the application has a positive head pressure on the suction of the pump, or the discharge is below the pump/media head there is a chance of siphoning that can cause inconsistent batch sizes.

Install a non-return valve in the discharge with a cracking pressure greater than the head pressure to prevent this.

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

34. Spare parts



There are no user serviceable parts within the system.
The essential accessories are detailed below.
Please consult Tapflo (UK) for service.

Quantity	Description	Part number
1	Muffler with connection and adjustment	TPUK-MU-size
1	Combined blocking/needle valve	TPUK-B/NV-size

35. How to order parts

When ordering parts for Tapflo (UK) system, please provide the model number and serial number of the system, position number and quantity of items required.

36. Returning parts

To return parts to Tapflo (UK) please follow this procedure.



- Consult Tapflo (UK) for shipping instructions.
- Cleanse, neutralise and rinse the part making sure the part is completely free from media.
- Provide a certificate of decontamination, where appropriate
- Complete the Warranty / Returns form on following page and return articles carefully to prevent any damage during transport

PNEUMATIC BATCHCONTROL SYSTEM PREDETERMINING TPUK-BP / BPI

37. Warranty

Tapflo UK warrants products under conditions as below for a period of not more than 12 months from installation and not more than 24 months from date of manufacture.

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

Except as expressly stated above, Tapflo UK 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, bushings, etc..);
 - b. Damage to the product resulting from:
 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 UK 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;
 2. Repairs performed by non-skilled personnel or use of non-original Tapflo UK parts
 3. Accidents or any cause beyond the control of Tapflo UK, 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 documentedly 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 UK in written within the mandatory term of 8 days from the discovery.
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 UK 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 UK
7. The products are built in accordance with standard CE normative and are tested (where applicable) by Tapflo UK. Approval and tests by other control authority are for the customers 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 UK
8. Installation, including electric and other connections to utility mains according to Tapflo UK drawings, is for the cost and responsibility of the customer, unless otherwise agreed in writing.
9. Tapflo UK 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.

Notwithstanding the above, Tapflo UK 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.

**PNEUMATIC BATCHCONTROL SYSTEM
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38. Warranty / return form

Company			
Address			
Country			
Contact Name			
Telephone		Fax	
E-mail			
Delivery date		Install date	
System Type		Serial No.	
Description of fault			
Media			
Temperature (°C)		Viscosity (cPs)	
Spec. grav. (Kg/m ³)		pH (Value)	
Particle content (%)		Particle size (mm)	
Duty (h/day)		Starts per day (No.)	
Media Pressure (bar)			
Air pressure (bar)		Air quality	
Notes			

**PNEUMATIC BATCHCONTROL SYSTEM
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TPUK-BP / BPI**

39. Warranty / return form

Sketch of installation

Whilst every effort has been made to ensure that all the information contained in this document is correct at the time of publication, due to our policy of continuous product improvement, the company reserves its right to change any information contained herein without notice.



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