

PTL Low Pressure Hose Pumps

Original Instruction
2023 | 1



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



Pump models:

PTL/PXTL
9
13
17
25
30
45



CONTENTS

EC DECLARATION OF CONFORMITY 01/EU/PTL/2023	5
EU DECLARATION OF CONFORMITY 01/ATEX/PXTL/HEAD/2023	6
EU DECLARATION OF CONFORMITY 01/ATEX/PXTL/2023	7
0. GENERAL	8
0.1. Introduction.....	8
0.2. Warning symbols	8
0.3. Qualification and training of personnel.....	8
0.4. Nameplate	9
1. INSTALLATION	10
1.1. Operation principle.....	10
1.2. Receiving inspection.....	10
1.3. Lifting and transportation.....	10
1.4. Storage.....	11
1.5. Foundation	11
1.6. Environment	11
1.7. Suction and discharge piping	11
1.7.1. Connection of suction pipe	12
1.7.2. Connection of discharge pipe	12
1.8. Health and safety	12
1.8.1. Protection	12
1.8.2. Electrical safety	12
1.8.3. Potentially explosive atmospheres – ATEX.....	13
1.8.4. Chemical hazard	13
1.8.5. Noise level	13
1.8.6. Temperature hazards	13
1.8.7. Rotating parts.....	14
1.8.8. Cleaning and disinfection.....	14
1.9. Installation recommendations	14
1.9.1. Minimum required distance for hose removal	14
1.10. Instruments.....	15
1.10.1. Electric power	15
1.10.2. Optional instruments.....	15
1.10.3. Thermometer.....	15
1.10.4. Pressure safety device	15

CONTENTS

1.11.	Motor connection	16
1.12.	Gear-motor standard	16
2.	OPERATION	17
2.1.	Before starting the pump	17
2.2.	Starting and operation	17
2.2.1.	Dry running	18
2.2.2.	Dead head	18
2.2.3.	Optimization of the pump lifetime	18
2.3.	Pump stopping	18
2.4.	Cleaning and disinfection	18
2.5.	Residual risks	18
2.6.	Disposal after expiration of the expected lifetime	19
2.7.	Waste of electrical and electronic equipment (WEEE) directive	19
2.8.	Actions in emergency	19
3.	MAINTENANCE	20
3.1.	Inspections	20
3.2.	When the pump is new or reassembled	20
3.2.1.	Performance test	20
3.3.	Routine inspection	20
3.4.	Complete inspection	21
3.5.	Location of faults	21
3.6.	Disassembly of the pump	22
3.6.1.	Before the disassembly procedure	22
3.6.2.	Disassembly procedure	23
3.6.3.	Test run	26
3.7.	Casing emptying procedure	26
3.8.	Hose cleaning	27
3.9.	Hose replacement	27
3.10.	Pump casing cleaning procedure	31
3.11.	Rollers adjustment	32
3.12.	Bearings replacement interval	35
3.13.	Shaft bearings assembly PTL9 – PTL17	35
3.14.	Casing assembly directions	36
4.	ACCESSORIES	37
4.1.	Pump trolleys	37
4.2.	Frequency inverters	37

CONTENTS

4.3.	Hose leak detector	37
5.	SPARE PARTS.....	38
5.1.	Exploded view PTL9 – PTL17	38
5.2.	Spare parts list PTL9 – PTL17	38
5.3.	Exploded view PTL25 – PTL45.....	40
5.4.	Spare parts list PTL25 – PTL45	40
5.5.	Stocking recommendation	41
5.6.	How to order parts.....	42
5.7.	Pump code	43
6.	DATA	44
6.1.	Capacity curves.....	44
6.2.	Technical data	45
6.3.	Dimensions	46
6.3.1.	PTL9 – PTL17.....	46
6.3.2.	PTL25 – PTL45	47
6.4.	Tightening torques	48
6.5.	Permitted loads on manifolds.....	49
7.	ATEX supplementary manual	50
7.1.	Potentially explosive atmospheres - ATEX	50
7.2.	Operating limits	50
7.3.	Construction materials use restrictions.....	51
7.4.	Pumped liquids	51
7.5.	Installation, operation and maintenance.....	51
7.6.	Spares.....	51
7.7.	Hose Lubricant	52
7.8.	Hose leak detector	52
7.9.	Temperature sensor	54
7.10.	Casing and temperature positions.....	55
7.11.	Rollers adjustment	56
7.12.	Bearings replacement interval	56
	56
7.13.	Foreign objects in pump casing.....	56
7.14.	Dry run	56
7.15.	Closed-circuit operation	56
7.16.	High negative suction pressure	57
7.17.	Drive	57

CONTENTS

7.18.	Earth connection of the pump and other equipment	57
7.19.	Antistatic surface	57
7.20.	Paint thickness	58
7.21.	Inspection	58
8.	WARRANTY	59
8.1.	Warranty form.....	59
8.2.	Returning parts	60
8.3.	Warranty	60

EC DECLARATION OF CONFORMITY 01/EU/PTL/2023

Series:

PTL(...)9...; PTL(...)13...; PTL(...)17...; PTL(...)25...; PTL(...)30...; PTL(...)45...

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: **LOW PRESSURE HOSE 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;
- Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast);
- Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits;



Signed for and on behalf of Tapflo Group AB

A handwritten signature in black ink, appearing to read 'Per Antonsson'.

Per Antonsson
Chief Executive Officer

Kungälv, 01.06.2023

EU DECLARATION OF CONFORMITY 01/ATEX/PXTL/HEAD/2023

Series:

PXTL(...)9...; PXTL(...)13...; PXTL(...)17...; PXTL(...)25...; PXTL(...)30...; PXTL(...)45...

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: **LOW PRESSURE HOSE PUMP HEADS 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 IIB T4 Gb

II 2D Ex h IIIC T125°C Db

Notified body **J.S. Hamilton Poland Sp. z o.o.** performed **type examination** and issued certificate **JSHP 23 ATEX 0019X**.

Signed for and on behalf of Tapflo Group AB

Per Antonsson

Chief Executive Officer

Kungälv, 09.08.2023

EU DECLARATION OF CONFORMITY 01/ATEX/PXTL/2023

Series:

PXTL(...)9...; PXTL(...)13...; PXTL(...)17...; PXTL(...)25...; PXTL(...)30...; PXTL(...)45...

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: **LOW PRESSURE HOSE PUMPS WITH GEARMOTOR 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 IIB T4 Gb X**
-10° ≤ Ta ≤ +40°C

Signed for and on behalf of Tapflo Group AB



Per Antonsson

Chief Executive Officer

Kungälv, 09.08.2023

0. GENERAL

0. GENERAL

0.1. Introduction

The Tapflo Hose Pump range is a series of pumps for industrial and hygienic applications. The pumps are designed to be safe, simple and easy to use and maintain. The pumps are suitable for almost all different liquids used by the industry today.

The pumps are powered with an electric motor which is coupled with the rotor. To decrease the motor rotational speed a gearbox is used.

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.

When installing, operating and maintaining of the pump unit you must strictly follow the IOM manual. Otherwise injury or life hazard may occur.

In case any instructions in this manual are unclear or any information is missing, contact Tapflo before handling 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.



This symbol signals possible danger caused by the presence of electric fields or live wires.

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, contact Tapflo before handling the pump.

0. GENERAL

0.4. Nameplate

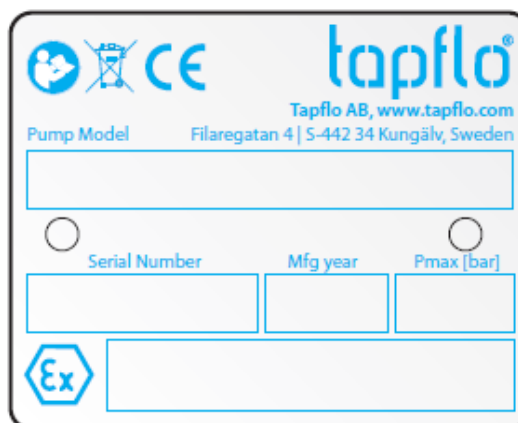
The nameplate is made in the below design. It is made of AISI 304 stainless steel and placed on the pump stand or discharge flange bracket. Nameplate dimensions are 38 x 48 mm.

PTL pumps



The nameplate for PTL pumps is a rectangular plate with a light gray background and a black border. It features the Tapflo logo (a blue circle with a white 'T' and 'F') and the CE mark in the top left corner. The Tapflo logo is in blue, and the text 'Tapflo AB, www.tapflo.com' is in black. Below this, the text 'Pump Model' and 'Filaregatan 4 | S-442 34 Kungälv, Sweden' are printed. A large rectangular box is provided for the pump model number. Below this box, there are three circular fields for 'Serial Number', 'Mfg year', and 'Pmax [bar]'. Each field has a corresponding rectangular box below it for the data entry.

PXTL pumps



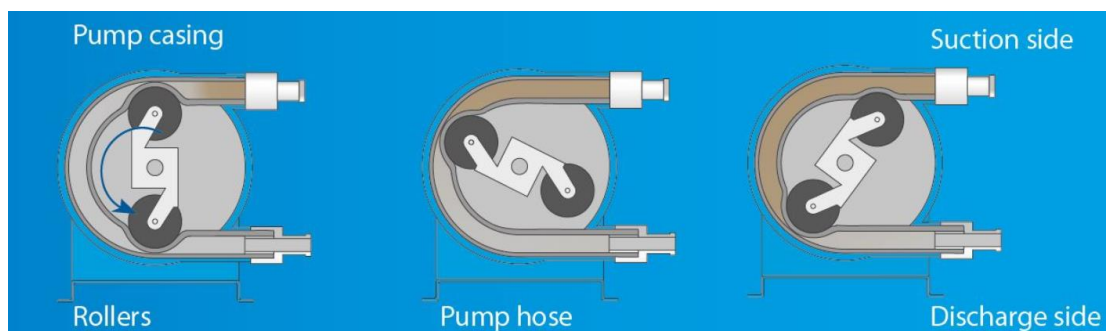
The nameplate for PXTL pumps is similar to the PTL version but includes an additional section for explosion protection. It features the Tapflo logo and CE mark in the top left corner. The text 'Tapflo AB, www.tapflo.com' is in black. Below this, the text 'Pump Model' and 'Filaregatan 4 | S-442 34 Kungälv, Sweden' are printed. A large rectangular box is provided for the pump model number. Below this box, there are three circular fields for 'Serial Number', 'Mfg year', and 'Pmax [bar]'. Each field has a corresponding rectangular box below it for the data entry. At the bottom left, there is a blue hexagonal symbol with a white 'Ex' inside, indicating explosion protection. To the right of this symbol is a large rectangular box for additional information.

1. INSTALLATION

1. INSTALLATION

1.1. Operation principle

The Tapflo hose pump is driven by a gear-motor. The rotor is installed directly on the shaft and is equipped with rollers. The rollers compress the hose creating vacuum on the suction side of the pump and pressure on the discharge to transfer the liquid. The rotary movement of the rollers compresses the hose along the casing wall, constantly sucking/pushing the liquid through the hose. Flow is reversible as pumping direction depends on motor rotation. The hose is lubricated to reduce the friction between the hose and the rollers. The hose and the pump inserts (connections) are the only parts of the pump that are in contact with the pumped liquid.



1.2. Receiving inspection

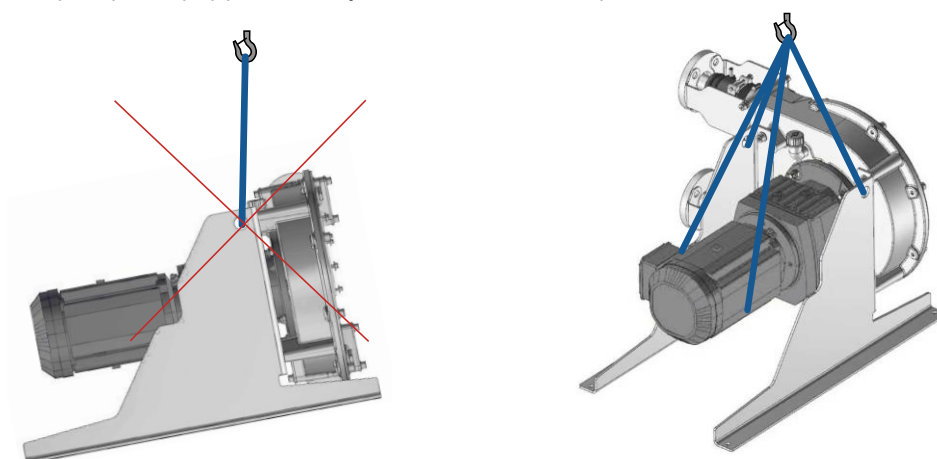
Although precaution is taken by us when packing and shipping, we urge you to carefully check the shipment on receipt. Make sure that all parts and accessories listed on the packing list are accounted for. Immediately report any damage or shortage to the transport company and to us.

1.3. Lifting and transportation



Before handling the pump check the weight of the pump (see 6. "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.

The pump is equipped with eye bolts to ease transportation.



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.

1. INSTALLATION

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 pump.

When in storage, turn the shaft by hand at least twice per month. The pump-motor unit should always be stored indoor in dry, vibration and dust free conditions. If the pump is to be stored more than 1 month, remove the hose from the pump. If this is not possible, run the pump 10 min per week.

Spare hoses must be stored in the same conditions as the pump. What is more, they should be protected from direct sunlight. Rubber materials are subject to aging and their performance and lifetime decrease with time.

NOTE! Do not remove protective covers from the hose when in storage.

1.5. Foundation



The pump-motor unit must stand on and be fixed to a sufficiently rigid structure that can support the entire perimeter on which the unit stands. The foundation on a firm bottom is the most satisfactory. Once the pump is in position, adjust level with metal shims between the feet and the surface on which it stands. Check that the feet of the pump motor unit stand well on each of them. The surface on which the foundation stands must be flat and horizontal. If the unit is fitted on a steel structure, make sure that it is supported so that the feet do not warp. In any case, it is advisable to fit some anti-vibration rubber pieces between the pump and the brickwork.

1.6. Environment



- There should be enough space in the vicinity of the pump in order to operate, maintain and repair it.
- The area in which the pump is operated, must be sufficiently ventilated. Excessive temperature, humidity or dirt may affect the pump operation.
- Behind the cooling fan of the motor there must be sufficient room for the hot air to escape the motor.

1.7. Suction and discharge piping

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

The flow of liquid from the pump must be as even as possible. It is advisable to avoid any tight bends or drastic reductions of diameters that may cause flow resistance in the installation. In case of diameter reduction, it is advisable to use appropriate conical reductions (possibly eccentric on suction side and concentric on discharge side) at changes of diameter and at a minimum distance from pump connections of five diameters.

1. INSTALLATION

1.7.1. 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 at least 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 within long piping.

1.7.2. 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 appropriate PN, according to pump maximum pressure. It is recommended to install a check-valve on the discharge side in order to protect the pump from water hammer effect that can be created in the discharge pipeline. If overpressure in the discharge line is possible, an appropriate pressure safety device should be installed to protect the pump. A device must be incorporated into the pump, system, or drive, to prevent the pump exceeding the rated pressure. Do not allow the pump to operate with a closed/blocked discharge unless a pressure relief device is installed.

A pressure relief valve must be assembled obligatory on the discharge side by the customer if overpressure in the system is possible.

1.8. Health and safety

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



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

The pumps are tested with water. If the pumped product can come into reaction with water, make sure the pump is dry before putting it into operation.

1.8.1. Protection



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

1.8.2. Electrical safety



Do not carry out any maintenance or/and operation on the pump while it is running or before it has been disconnected from the power supply. Avoid any danger caused by electric power (for details see current regulations in force). Check that electrical specifications on the data plate are equivalent to the power supply to which it will be connected.

1. INSTALLATION

1.8.3. Potentially explosive atmospheres – ATEX



The standard PTL series pumps are not allowed to operate in potentially explosive atmospheres. Special PXTL pumps are available for such applications. Follow ATEX supplementary instructions (see section 7) and local/national rules for safe use.

1.8.4. Chemical hazard



Whenever the pump is to be used for pumping a different liquid, it is essential to clean the pump beforehand in order to avoid any possible reaction between the two products.

1.8.5. Noise level



Hose pumps, including the motor, in normal operating conditions produce a sound level below 70 dB(A). The major sources of noise are: liquid turbulence in the installation, cavitation or any other abnormal operation that is independent from the pump construction nor the pump manufacturer. The user must provide suitable protective means if the sources of noise could produce a harmful noise level for operators and for the environment (in compliance with current local regulations).

1.8.6. 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".



- Ambient temperature limits are from -20°C to +40°C. 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 (contact Tapflo for interval proposals).



- 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 pump.
- Below 0°C (32°F) plastic materials become more fragile what can cause accelerated wear of parts made of these materials. This is a hazard that has to be accepted when pumping such cold products. Also in such case, when a pump is not operational it should be drained of all liquid.
- Bear in mind that the viscosity of the product changes with temperature. This has to be taken into consideration when selecting the pump.
- 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.
- Some parts of the hose pump can become hot during operation and cause burns, therefore make sure to use appropriate protection when handling the pump.

1. INSTALLATION

1.8.7. Rotating parts



Do not tamper with the protection of the rotating parts, do not touch or approach rotating parts in movement.

1.8.8. Cleaning and disinfection



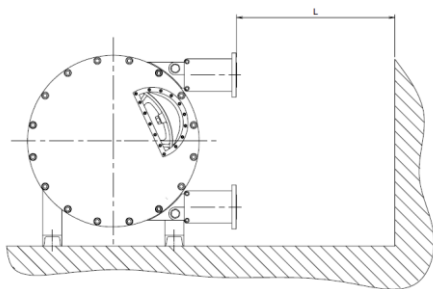
Cleaning and disinfection of the pump system is of greatest importance when the pump is used in a food process installation. Use of a pump system that is NOT cleaned or disinfected can cause contamination of the product

1.9. Installation recommendations

- If liquid contains solid particles bigger than max allowable size for the corresponding pump size, a strainer on the suction side should be used.
- Manometers or pressure sensors must always be installed on the suction and discharge side of the pump to determine proper operation of the pump.
- The suction and discharge piping must be fastened properly so that no strain occurs on the pump manifolds.
- It is recommended to install a check-valve on the discharge side in order to protect the pump from water hammer effect that can be created in the discharge pipeline.
- The suction line should be as short and straight as possible.
- A gate valve could be installed on the discharge line for easier pump disconnection from the pipeline (**ATTENTION!** The gate valve should never be closed during pump operation).
- A pressure relief valve must be assembled obligatory on the discharge side by the customer if overpressure in the system is possible. A device must be incorporated into the pump, system, or drive, to prevent the pump exceeding the rated pressure.

1.9.1. Minimum required distance for hose removal

During pump installation provide enough space to be able to perform hose replacement procedure. Follow the guideline below:



PUMP	L [mm]
PTL9	400
PTL13	400
PTL17	600
PTL25	700
PTL30	1200
PTL45	1500



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.

1. INSTALLATION

1.10. Instruments



In order to ensure a proper control of the performance and the conditions of the installed pump, we recommend using the following instruments:

- a pressure-vacuum gauge on the suction piping;
- a pressure gauge on the discharge piping.

The pressure intakes must be made of straight pieces of piping at a distance of minimum five diameters from the pump inlets. The pressure gauge on discharge must always be fitted between the pump and the regulation valve. The output can be read on the pressure gauge, transformed into meters and then compared with the typical curves.

1.10.1. Electric power

The electric power absorbed by the motor can be measured by means of a wattmeter or an amp gauge.

1.10.2. Optional instruments

The optional instruments can indicate if pump is working in an abnormal way. The abnormal conditions can be caused by: accidentally closed valves, lack of pumped liquid, overloads, etc.

1.10.3. Thermometer

If the temperature of the pumped liquid is a critical parameter, provide the installation with a thermometer (preferably on the suction side).

1.10.4. Pressure safety device

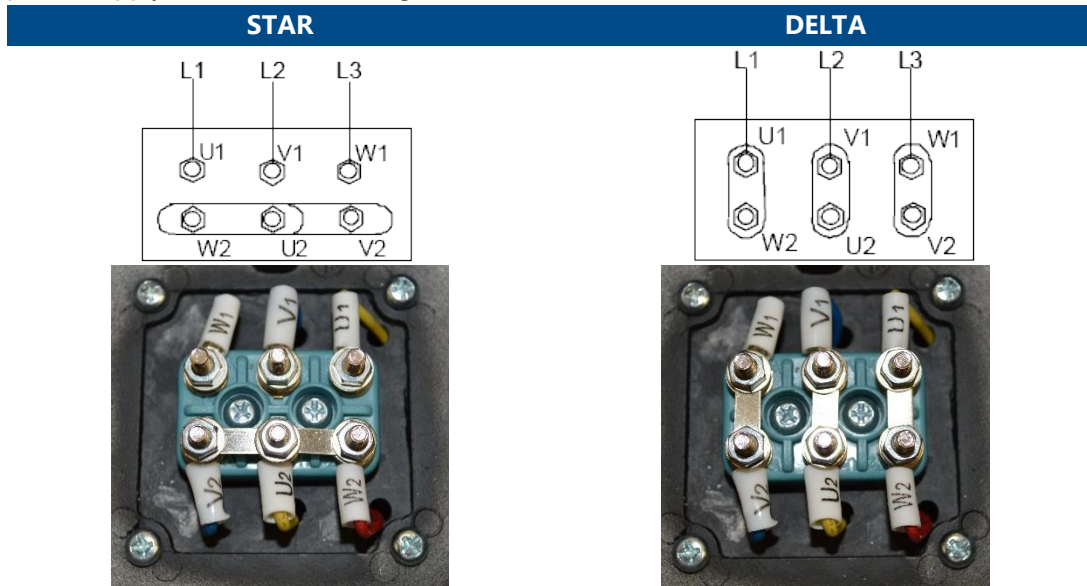
The pump cannot run against higher pressure than stated in this IOM manual. Therefore the pump must be equipped with an appropriate pressure safety device such as a pressure switch, bypass line with a pressure relief valve or motor overload protection that will automatically stop the pump when pressure rises above allowable levels.

1. INSTALLATION

1.11. Motor connection



An expert electrician must always carry out the electrical connection. Compare the power supply with the data plate specifications and then choose a suitable connection. The type of connection is stated on the motor data plate and can be Y (star) or D (Delta), according to the power supply of the motor (see figure below).



Follow the connection standard used in the plant. In no case connect the electrical motor directly to supply network but use a suitable electric switchboard equipped with a knife switch and suitable safety devices (e.g. motor breaker switches) in the power circuit. Safety devices against overloads must also protect the motors. Make sure that the motor has suitable grounding and that it has been connected properly.

1.12. Gear-motor standard

As a standard Tapflo Hose pump are equipped with gear-motors of the following parameters:

- International Mounting Arrangement – **B5**
- Number of poles / Rotation speed [rpm] – **4 / 1400**
- **Non ATEX**
- Protection grade – **IP55**
- Voltage – **3 phase; 230/400 V; 50 Hz**
- Efficiency class – **IE3**
- Output rpm – **23 ÷ 143 @ 50 Hz**
- Thermal protection – **PTC**

The rated gear-motor rpm should not be exceed. If you want to operate the pump at higher speed, consult Tapflo for guidelines.

2. OPERATION

2. OPERATION

2.1. Before starting the pump



- Make sure the pump is installed according to the installation instructions (section 1).
- Filling of the pump with liquid before start is not necessary.
- Ensure that the hose is lubricated. For information on lubricant refer to section 3.9 *"Hose replacement"*.
- Make sure to plug all pump openings to prevent lubricant leakage or/and liquid leakage in the event of a hose rupture. This applies to various openings, including the drainage channels, as well as sensor mounting openings.
- Check manually that the motor is free to turn, moving the motor cooling fan.
- Make sure that the piping is not clogged and is free from residues or foreign objects.
- The suction shut-off valve (if any) must be completely open.
- The shut-off valve on the discharge side (if any) must be completely opened.
- Any auxiliary connections must all be connected.
- Ensure proper rollers adjustment, see 3.11. *"Rollers adjustment"*.
- When installation is new or reinstalled, a test run of the pump with water should be conducted to make sure that the pump operates normally and does not leak.
- When installation is new or reinstalled, check the pump housing nuts tightening torque (see section 6.4. *"Tightening torque"*s). After approximately one week of operation, the torque should be checked again. This is important to prevent possible leakage.
- Starting the electrical motor makes the pump run at full capacity!

2.2. Starting and operation



Open the discharge valve and start the electric motor. The pump must not run with completely closed discharge - these conditions can seriously damage the pump and cause injury to the operator.



If the pressure shown on the pressure gauge on the discharge piping does not increase, turn off the pump immediately and release pressure carefully. Repeat the connection procedure.



Make sure that pressure on the discharge does not exceed the rated pressure!

A device must be incorporated into the pump, system, or drive, to prevent the pump exceeding the above rated pressure. Do not allow the pump to operate with a closed/blocked discharge unless a pressure relief device is installed.

A pressure relief valve must be assembled obligatory on the discharge side by the customer.

Pump can be equipped with such a safety device on customer's request.

If there are changes of flow rate, head, density, temperature or viscosity of the liquid, stop the pump and get in touch with our technical service.

The performance of the pump can be adjusted by means of a frequency inverter. The flow depends on direction of rotation and can achieve full capacity in both directions of rotation.

2. OPERATION

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 wearing parts of the pump. What is more, an empty pump should operate at low speeds – controlled by a frequency inverter.

2.2.2. Dead head



The pump cannot operate with closed discharge valve. This may lead to pump malfunction and cause injury to operators in the vicinity of the pump.

The discharge pressure can never exceed pump rated pressure.

2.2.3. Optimization of the pump lifetime

- Continuous operation at higher frequency than 50 Hz will cause premature wear of the components. As a general rule, we recommend to run the pump at $\pm 20\%$ of the rated frequency.
- When reducing the motor rotation speed, it is important to monitor the surface temperature of the gear-motor and ensure that it does not exceed the nominal working temperatures specified by the gear-motor manufacturer.

2.3. Pump stopping



Turn off the motor to stop the pump. Close the discharge shut-off / regulation valve immediately after. The reverse sequence is not recommendable, especially with larger pumps or longer delivery piping. That is to avoid any problems due to water hammering. It is therefore advised to install a check valve on the discharge to protect the pump. If a suction shutoff valve has been installed, it is advisable to close it completely after pump is fully stopped.

The pump should be stopped by cutting of electrical power to the motor or frequency inverter (if used – at 50 Hz cool down should be set to 5 seconds).



NOTE! Never stop the pump by completely closing the discharge valve without motor shut down.

2.4. Cleaning and disinfection



Cleaning and disinfection of the pump system is of greatest importance when the pump is used in a food processing installation. Use of a pump system that is NOT cleaned or disinfected can cause contamination of the product. The cleaning cycles as well as chemicals to use for the cleaning vary depending on the pumped product and the process. The user is responsible to establish a suitable cleaning and / or disinfection program according to local and public health and safety regulations.



If the outside of the pump is to be rinsed or flushed, the power supply must be disconnected beforehand.

2.5. Residual risks



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

2. OPERATION

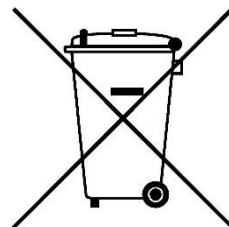
2.6. Disposal after expiration of the expected lifetime

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 be thoroughly cleaned before disposal.

2.7. Waste of electrical and electronic equipment (WEEE) directive



Users of electrical and electronic equipment (EEE) with the WEEE marking per Annex IV of the WEEE Directive must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to them for the return, recycle, recovery of WEEE and minimize any potential effects of EEE on the environment and human health due to the presence of hazardous substances. The WEEE marking applies only to countries within the European Union (EU) and Norway. Appliances are labelled in accordance with European Directive 2002/96/EC. Contact your local waste recovery agency for a designated collection facility in your area.



2.8. Actions in emergency



In case of a leakage of an unknown fluid, respiratory protection should be worn and contact with the fluid avoided. During firefighting, no special hazards are to be expected from the pump itself. In addition, the currently handled fluid and the corresponding safety data sheet must be taken into account. When fluid leakage occurs, the power supply has to be closed and the pressure released. During spillage of an aggressive liquid, local and national safety rules must be followed.

3. MAINTENANCE

3. MAINTENANCE



Maintenance work on electrical installations must be performed by qualified personnel and only when the power supply has been shut off. Wait five minutes for capacitor to discharge before opening the pump. Follow the local and national safety regulations.

Due to size of some of the pumps at least two persons should perform maintenance activities and if needed use appropriate lifting devices according to local rules and regulations.

3.1. Inspections

- Periodically check suction and discharge pressures.
- Inspect the gear-motor according to the instructions from the motor manufacturer.
- Gearbox oil must be exchanged in accordance with the gearbox manufacturer instruction manual.

3.2. When the pump is new or reassembled



If the pump is new or reassembled after maintenance it is important to retighten the screwed connections after one week of operation.

Make sure to use the right torque – see section 6.4. *"Tightening torques"*.

3.2.1. Performance test

When installation is new, a test run of the pump should be conducted. Gauge the capacity at specific pump speed. 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.

3.3. Routine inspection



Frequent observation of the pump operation is recommended to detect problems. A change in sound of the running pump can be an indication of wearing parts (see chapter 3.5 *"Location of faults"* below). Hose damage can be the main reason of liquid leakage therefore it is advisable to install a hose rupture monitoring system that can detect the hose damage and stop the pump when liquid enters the pump chamber.

Leaking liquid from the pump and changes of performance may also be detected. Routine inspections should be conducted frequently. We recommend to conduct a daily check and keep records of the following:

- Leakage of fluid from any connection of the pump
- Tightness of all connection parts of the pump and any peripheral equipment
- 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 hose failure.

3. MAINTENANCE

3.4. 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 recommends to inspect the pump at least once a year.

If a problem has occurred, or if the pump is in need of a complete inspection, refer to chapters 3.5 "Location of faults" and 3.6 "Disassembly of the pump". You are of course warmly welcome to consult Tapflo for further help.

Parts that are subject to wear should be kept in stock, see our recommendations in chapter 5.5 "Stocking recommendation".

3.5. Location of faults

PROBLEM	POSSIBLE ISSUE	POSSIBLE SOLUTION
Pump does not run	Lack of power supply The rotor is stalling	Check if the motor is connected properly Check if power supply is ON Check the fixing of the hose Check if the discharge pressure is not too high Check if particles are not blocking the hose
The suction is bad	Suction connection is not tight Suction connection is blocked Hose is blocked or damaged Air in suction / discharge line	Tighten the suction line Clean suction line Check for any debris inside the hose Vent suction / discharge line
The pump runs irregular	Hose is blocked or damaged	Check for any debris inside the hose
Bad flow/pressure	Wrong set-up of the rollers Suction blocked Pressure losses on suction side Too viscous liquid Air in liquid Hose is blocked or damaged	Check and adjust if necessary Check / clean suction connection Check/change installation on suction side Check if pump speed is proper for viscosity Seal suction line; check / refill container Check for any debris inside the hose, replace hose if necessary
Liquid leaks from the pump	Screws on the pump not properly tightened Shaft seal or seal ring worn Tension / stress from the installation	Check tightening torques of the screws Replace if necessary Adjust installation, eliminate stress, when using a dampener provide separate support for it.
Hose life is too short	Wrong selection of material Long periods of dry running Too high discharge pressure Too high speed Wrong set-up of the rollers Too high liquid temperature	Contact us for information on material selection When dry, run pump slowly (see chapter 2.2) Check if pump rated pressure is not exceeded Check if the discharge line is not blocked Reduce the pump speed Check and adjust if necessary Contact us for information on material selection
Overheating of motor	Flow rate too high Liquid parameters different than calculated	Reduce the flow / rotation speed of the motor Check pumped liquid parameters
Overheating of the pump	Flow rate too high Liquid temperature too high Foreign objects in the liquid Pump is not filled with liquid	Reduce the flow / rotation speed of the motor Cool the liquid Use a filter on the suction side Fill pump with liquid
Noise and vibration	The pump sucks air Suction pipe is blocked Flow rate too high Loads on the pipes	Make sure all connections are tight Check pipes / valves and filters on suction line Reduce the flow / rotation speed of the motor Connect the pipes independent of the pump

3. MAINTENANCE

	Foreign objects in the liquid Liquid parameters different than calculated	Use a filter on the suction side Checked pumped liquid parameters
Abnormal wear	The pump sucks air Liquid temperature too high Loads on the pipes Foreign objects in the liquid	Make sure all connections are tight Cool the liquid Connect the pipes independent of the pump Use a filter on the suction side

3.6. 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*".



The disassembly should be performed only by qualified personnel. There should always be at least two persons present during disassembly.



Each operation to be fulfilled with the machine must always be carried out once all the electrical contacts have been disconnected. The pump-motor unit must be placed in a position where it cannot be started unintentionally.



Before servicing in any way the parts that come in contact with the pumped liquid, make sure that the pump has been fully emptied and washed. When draining the liquid, make sure that there is no danger for people or the environment.

3.6.1. Before the disassembly procedure

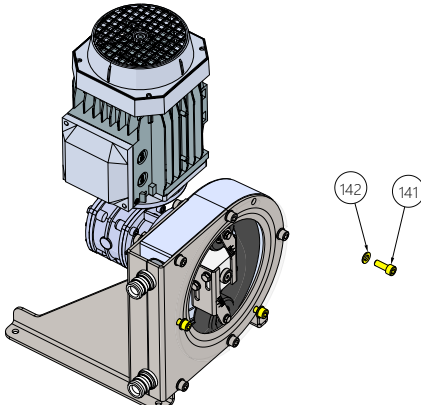
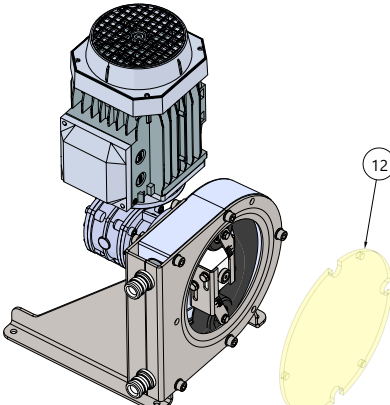
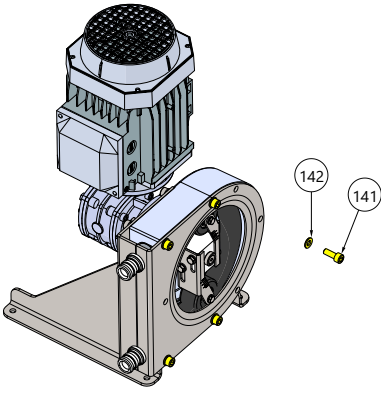
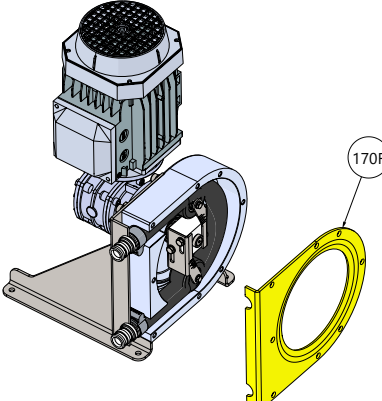
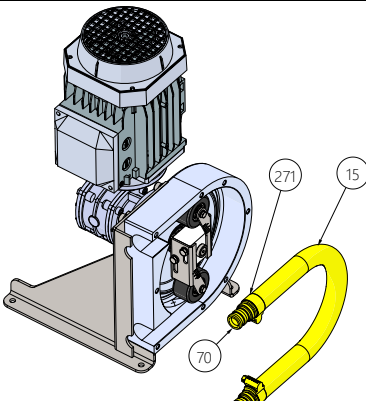
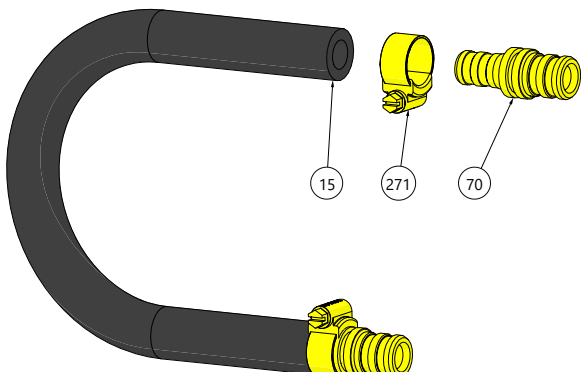


Be sure to drain all liquid from the pump. Cleanse or neutralize the pump thoroughly. Disconnect the electrical connection, and then the suction and discharge connections.

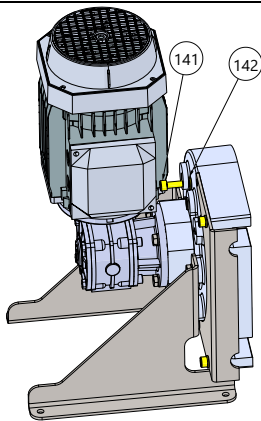
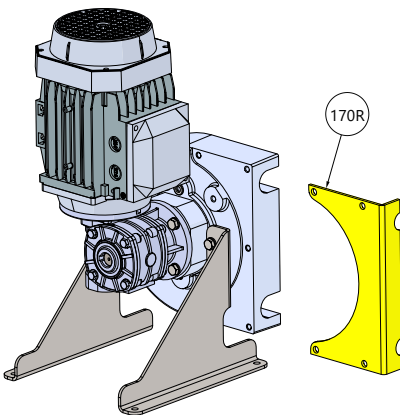
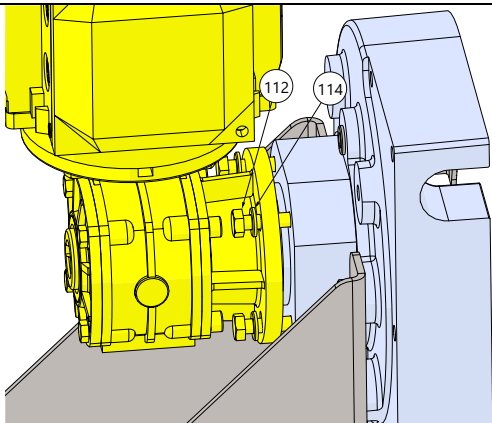
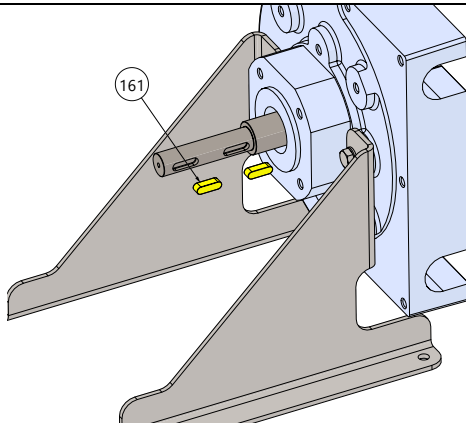
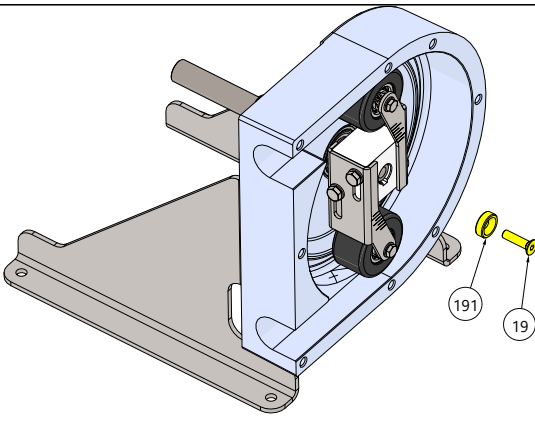
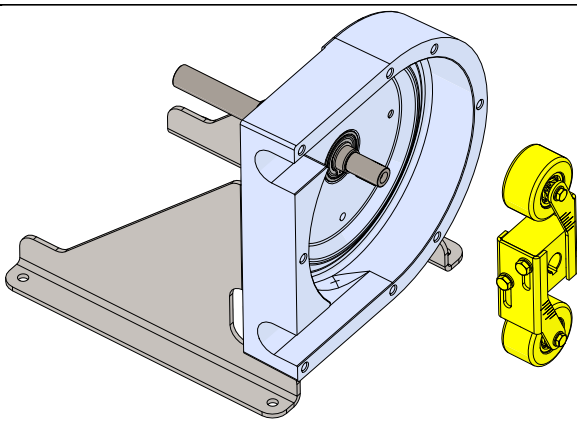
3. MAINTENANCE

3.6.2. Disassembly procedure

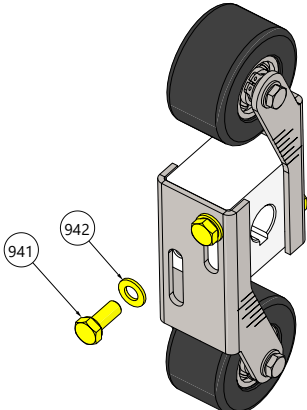
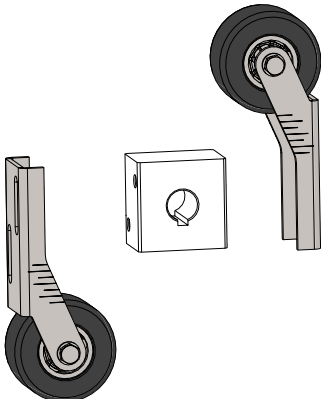
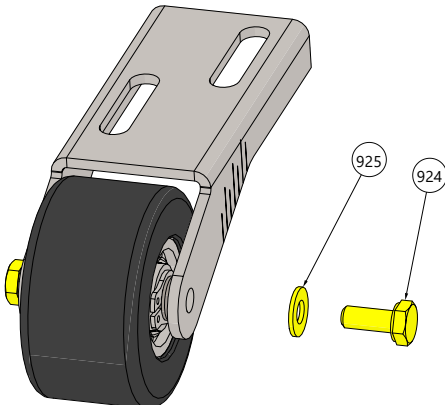
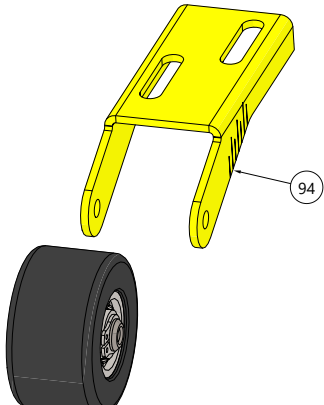
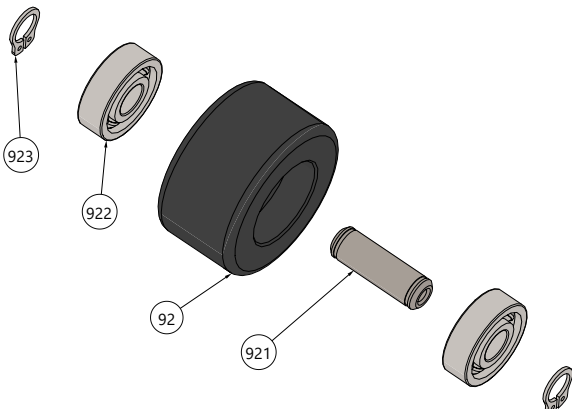
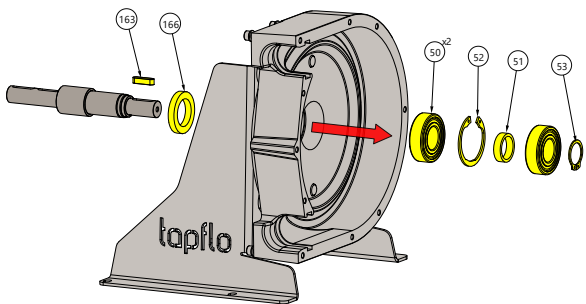
The following procedure shows a complete pump disassembly. However, keep in mind that there is no need to completely disassemble the pump for standard pump maintenance. Refer to the further sections for specific maintenance actions.

	
<p>Fig. 3.6.1 Unscrew the front cover mounting bolts [141], and remove them with their washers [142].</p>	<p>Fig. 3.6.2 Remove the front cover [12].</p>
	
<p>Fig. 3.6.3 Unscrew the front connection bracket bolts [141], and remove them with their washers [142].</p>	<p>Fig. 3.6.4 Remove the front connection bracket [170F].</p>
	
<p>Fig. 3.6.5 Remove the hose [15] along with the inserts [70] and clamp bands [271].</p>	<p>Fig. 3.6.6 Remove the clamp bands [271] and the inserts [70] from the hose.</p>

3. MAINTENANCE

	
<p>Fig. 3.6.7 Unscrew the rear connection bracket bolts [141], and remove them with their washers [142].</p>	<p>Fig. 3.6.8 Remove the rear connection bracket [170R].</p>
	
<p>Fig. 3.6.9 Unscrew the gear motor mounting bolts [112], and remove them with their washers [114].</p>	<p>Fig. 3.6.10 Remove both keys [161] from the shaft.</p>
	
<p>Fig. 3.6.11 Unscrew the shaft screw [19] and remove it with the retaining washer [191].</p>	<p>Fig. 3.6.12 Remove the complete rotor/roller assembly.</p>

3. MAINTENANCE

	
<p>Fig. 3.6.13 Unscrew the roller bracket mounting bolts [941] and remove them with their washers [942].</p>	<p>Fig. 3.6.14 Take of the rollers and brackets off the rotor.</p>
	
<p>Fig. 3.6.15 Unscrew the roller mounting bolts [924] and remove them with their washers [925]. NOTE! During assembly use blue Loctite 243 on the screw thread!</p>	<p>Fig. 3.6.16 Remove the brackets [94] from the rollers.</p>
	
<p>Fig. 3.6.17 Take apart the roller assembly.</p>	<p>Fig. 3.6.18a PTL9 – PTL17 For the PTL9 and PTL13 models only: remove the rotor key [163]. Then, detach the small circlip [53] to remove the bearing [50], distance sleeve [51], shaft [16], and shaft seal [54]. Finally, detach the big circlip [52] to remove the bearing [50].</p>

3. MAINTENANCE

3.6.3. Test run



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

After two weeks of operation retighten the nuts with appropriate torque.

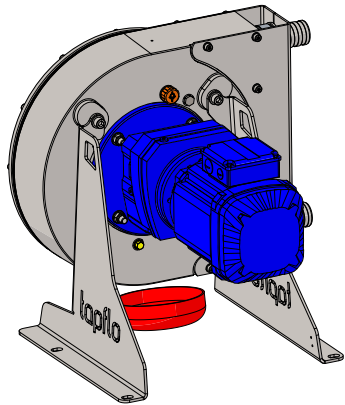
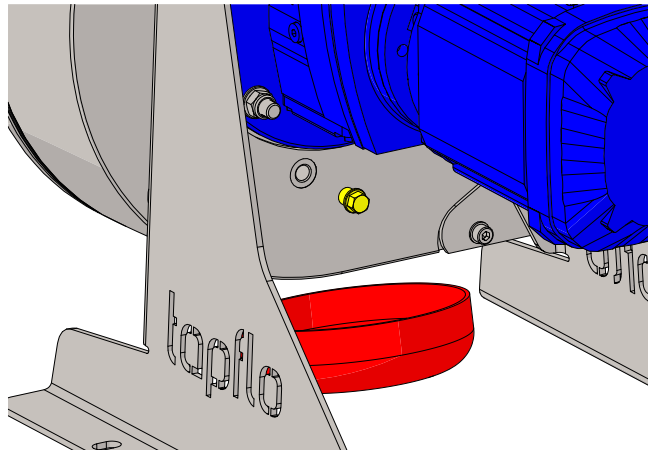
3.7. Casing emptying procedure



If you experienced hose rupture, take health and safety precautions appropriate to the pumped liquid. Be prepared to pick up the leaked medium that fills the pump housing.

Make sure that suction and discharge valves are closed before draining.

Pump size	PTL9/13	PTL17	PTL25	PTL30	PTL45
Casing volume [L]	0.6	1.3	3.5	8	20

	
<p>Fig. 3.7.1</p> <p>Place a drip pan under the drain plug.</p> <p>NOTE! Make sure the drip pan is large enough to contain the whole amount of lubricant that is inside the pump.</p>	<p>Fig. 3.7.2</p> <p>Unscrew the plug [33] and empty the pump from the leaked medium.</p> <p>NOTE! If the pump is casing equipped any sensor instead of plug, unscrew the sensor to drain the pump.</p> <p>NOTE! If the pump is oriented with the connections facing upwards, you can initiate drainage by unscrewing a few front cover bolts [141] located at the bottom of the casing [11] and then pulling the front cover [12].</p>

3. MAINTENANCE

3.8. Hose cleaning

The hose can be cleaned in place without disassembly. It can be done with water or any other appropriate agent as long as it is compatible with the hose material. Check not only the chemical compatibility but also the allowable temperature for the utilized hose.

3.9. Hose replacement

The PTL pump hose is a consumable part that may break due to excessive wear, which can lead to leakage inside the pump casing. The service life of the hose is affected by various factors such as rotor speed, rollers adjustment, discharge pressure, pumped liquid abrasiveness, chemical composition, and viscosity. Since it is impossible to definitively determine the lifetime of the hose, it is important to schedule preventive maintenance.

The pump can be optionally equipped with a hose leak detector or that, when coupled with appropriate automation, can immediately turn off the pump and display an alarm in case of hose rupture. It is recommended to record and store information about operating conditions and the number of working hours before the malfunction, and use it to schedule preventive maintenance. The more uniform the pump operating conditions, the more repeatable the hose life will be. See 4.3 "Hose leak detector".

In order to avoid costly downtime of the pump, it is recommended to inspect the hose after about 90% of the lifetime of the first hose as part of preventive maintenance.



The hose can be replaced without the whole pump disassembly. However, if you experienced a hose rupture, before starting of this procedure, drain the pump from leaked medium according to section 3.7. "Casing emptying procedure" and clean it thoroughly according to section 3.10. "Pump casing cleaning procedure".



For proper pump operation, it is necessary to lubricate the hose. Failure to fulfil this requirement result in generating increased temperature and reducing the working parts' lifespan.

NOTE! Make sure that suction and discharge valves are closed before disconnecting of the pump from installation.



NOTE! Proceed with this procedure only after familiarizing oneself with the instructions at the beginning of section 3. "Maintenance" and all safety instruction in chapter 1.8. "Health and safety".

NOTE! New hose must be lubricated prior to operation. Use only silicon grease LOCTITE® 8104™.

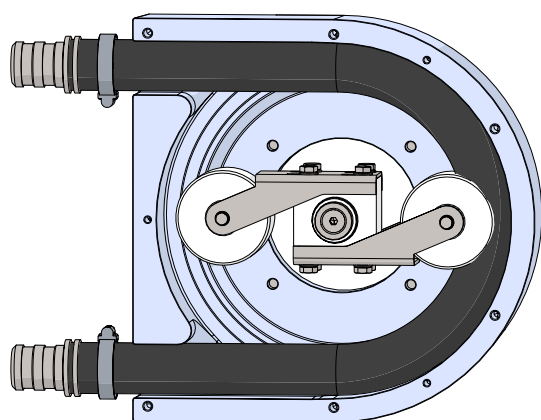


Fig. 3.9.1 Run the pump and position the rotor so that only one roller is pressing against the hose.

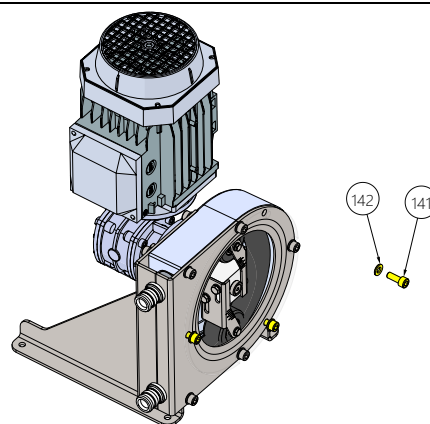
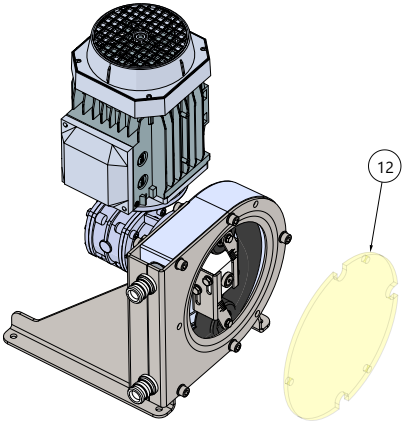
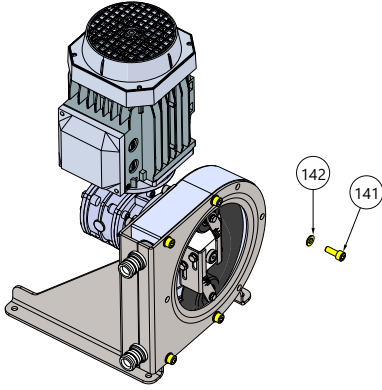
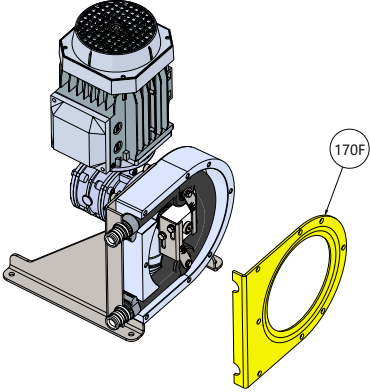
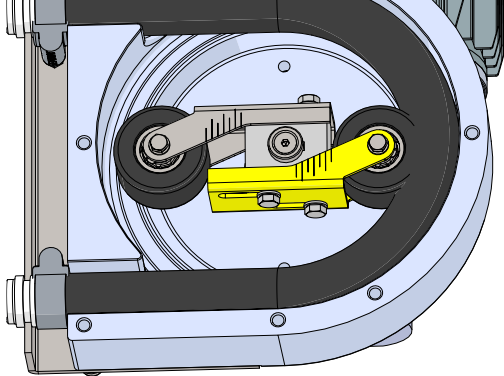
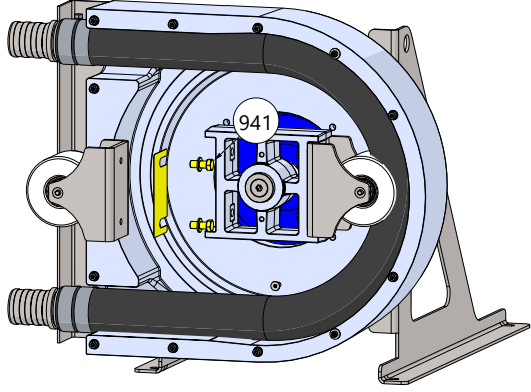
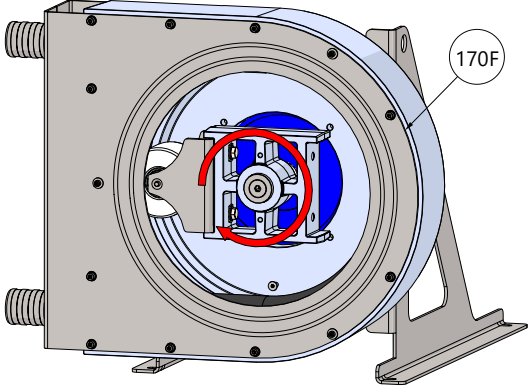
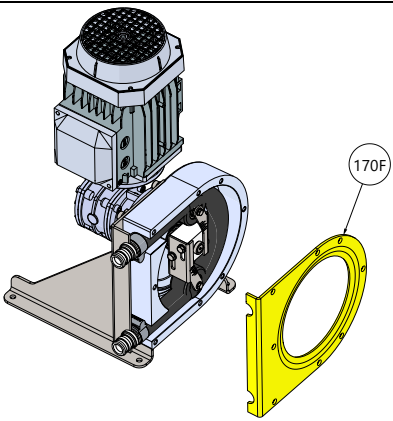
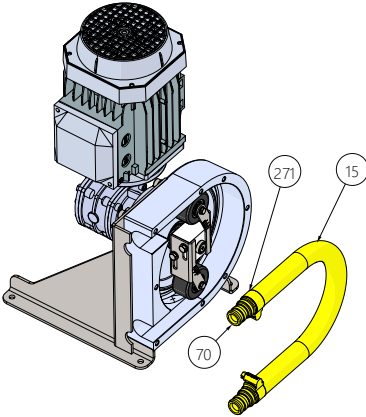
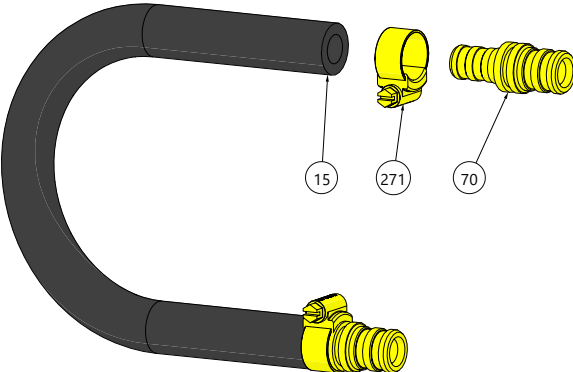
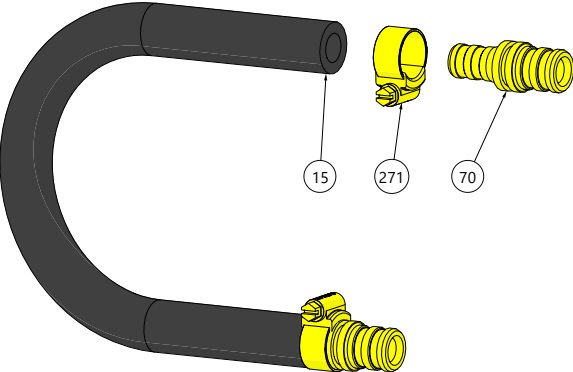
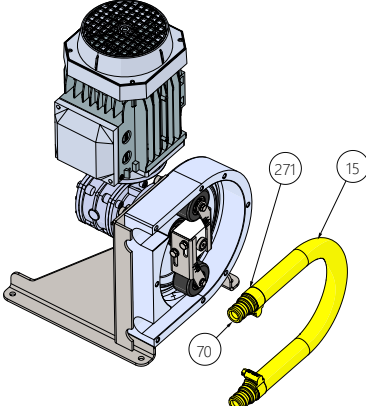
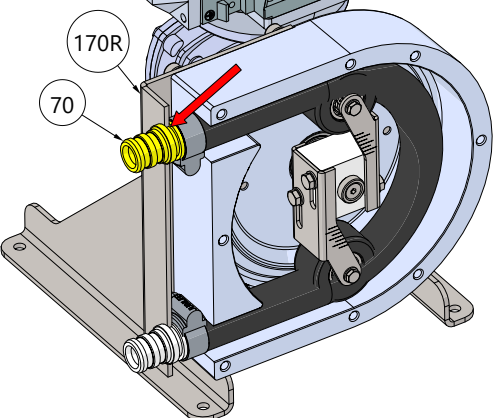


Fig. 3.9.2 Disconnect power supply from the motor. Unscrew the front cover mounting bolts [141] and remove them with their washers [142].

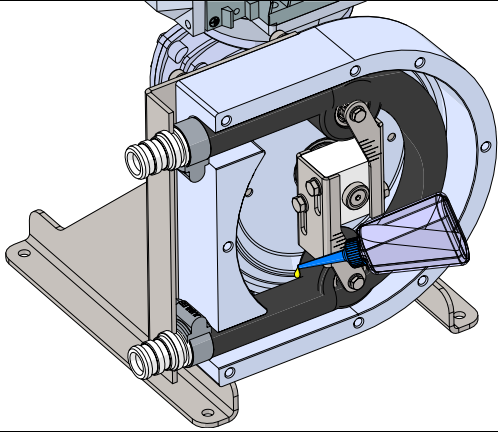
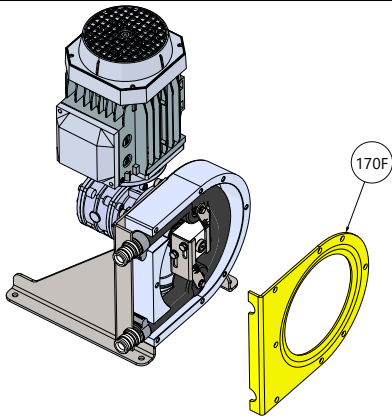
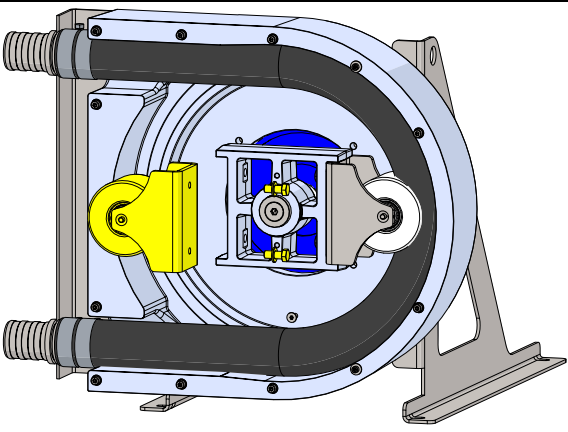
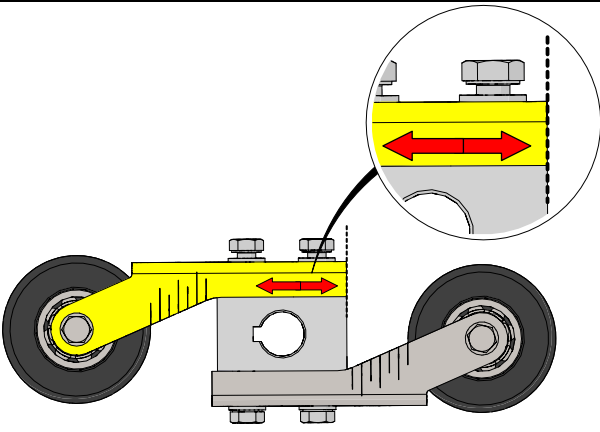
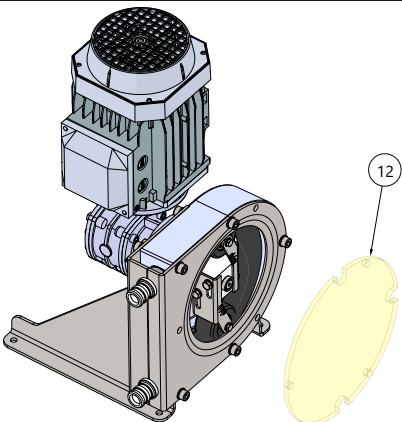
3. MAINTENANCE

	
<p>Fig. 3.9.3 Remove the front cover [12].</p>	<p>Fig. 3.9.4 Unscrew the front connection bracket bolts [141] and remove them with their washers [142].</p>
	
<p>Fig. 3.9.5 Remove the front connection bracket [170F].</p>	<p>Fig. 3.9.5a PTL9 – PTL25 On the side where the roller IS pressing the hose, loosen the roller bracket mounting screws [941] and retract the bracket so that there is no pressure on the hose anymore. NOTE! Do not loosen the screws on the other side of the rotor.</p>
	
<p>Fig. 3.9.5b PTL30 – PTL45 On the side where the roller is NOT pressing the hose, remove the roller bracket mounting screws [941] and remove the roller assembly with the shims (if any).</p>	<p>Fig. 3.9.5c PTL30 – PTL45 Reassemble the front connection bracket [170F], connect power to the motor and rotate the roller 180° so that there roller is no longer pressing the hose. NOTE! DO NOT remove the second roller assembly.</p>

3. MAINTENANCE

	
<p>Fig. 3.9.6 Disconnect power from the motor and once again remove the front connection bracket [170F].</p>	<p>Fig. 3.9.7 Remove the hose [15] along with the inserts [70] and clamp bands [271].</p>
	
<p>Fig. 3.9.8 Remove the clamp bands [271] and the inserts [70] from the hose. Clean the inserts [70] and pump casing [11].</p>	<p>Fig. 3.9.9 Clean the new hose [15] thoroughly before assembly. Assemble the new hose with inserts [70] and tighten the clamp bands [271].</p>
	
<p>Fig. 3.9.10 Place the hose [15] inside the pump casing.</p>	<p>Fig. 3.9.11 Align the inserts with the rear connection bracket [170R].</p>

3. MAINTENANCE

	
<p>Fig. 3.9.12 Apply grease to the surface of the hose that comes into contact with the rollers. NOTE! Use only silicon grease LOCTITE® 8104™.</p>	<p>Fig. 3.9.13 Assemble the front connection bracket [170F], connect power to the motor and rotate the roller 180°.</p>
	
<p>Fig. 3.9.14 PTL30 – PTL45 Remove the cover and install the missing roller assembly without any shims.</p>	<p>Fig. 3.9.15 Set the roller pressure according to the Roller Adjustment procedure described in section 3.11.</p>
	
<p>Fig. 3.9.16 Assemble the front connection bracket and the front cover [12].</p>	

The hose is now re-assembled. Make sure to open the suction and discharge valves before pump start-up. Check the direction of rotation of the motor.

3. MAINTENANCE

3.10. Pump casing cleaning procedure

When a hose rupture has occurred, the pump casing inside will be contaminated. In such case cleaning of the pump casing is required.

NOTE! Proceed with this procedure only after familiarizing oneself with the instructions at the beginning of chapter 3. "Maintenance" and all safety instruction in chapter 1.8. "Health and safety".

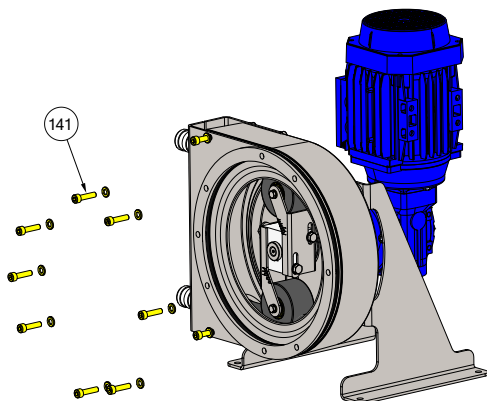


Fig. 3.10.1

Remove the front cover mounting bolts [141], leaving two of them partially fastened to avoid accidental falling off of the pump.

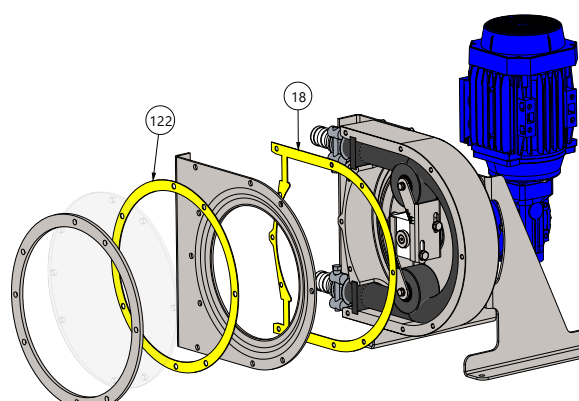


Fig. 3.10.2

Check condition of casing gasket [18] and revision windows gasket [122]. Replace if necessary.

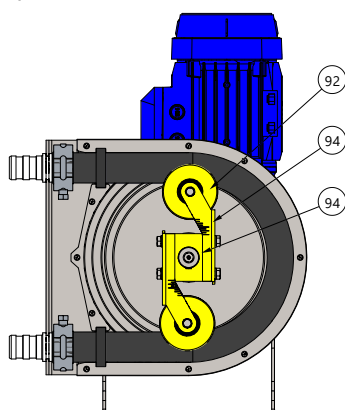


Fig. 3.10.3

Check condition of the rotor [90], rollers [92] and bracket [94], replace if necessary.

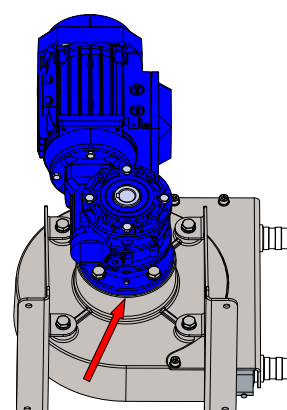


Fig. 3.10.4

Check condition of the shaft seal [161] and seal ring [162] and replace if necessary.

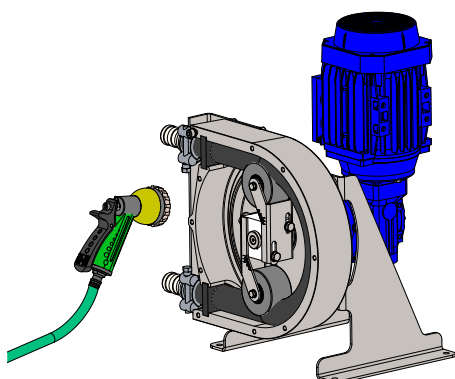


Fig. 3.10.5

Wash the casing with water and remove any debris left inside the casing.

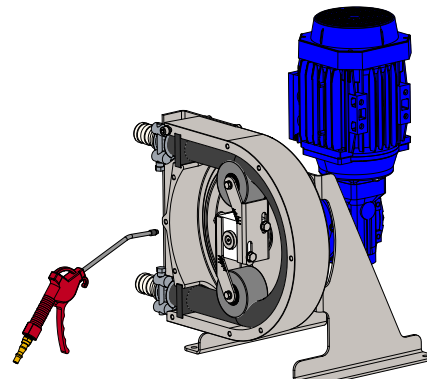


Fig. 3.10.6

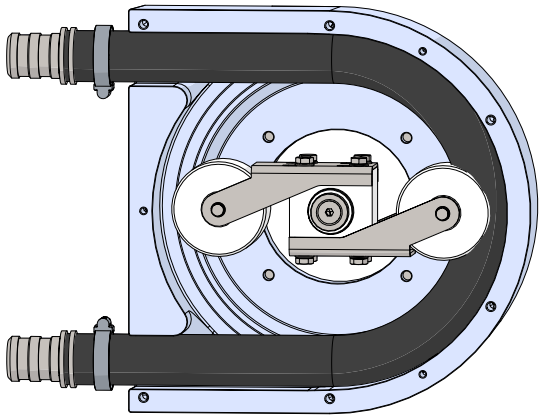
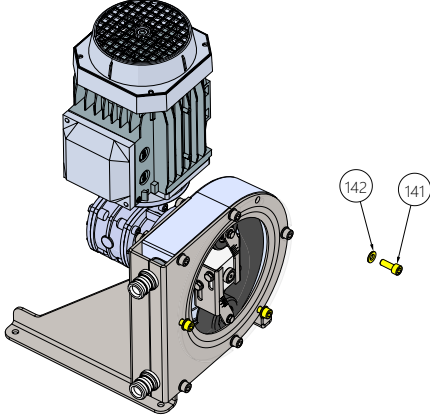
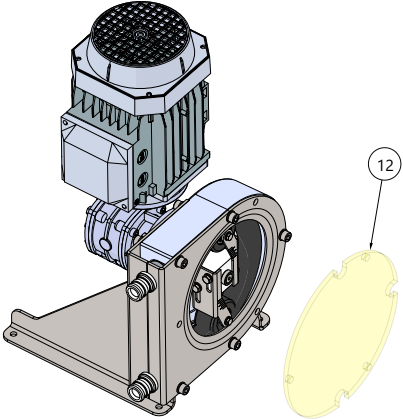
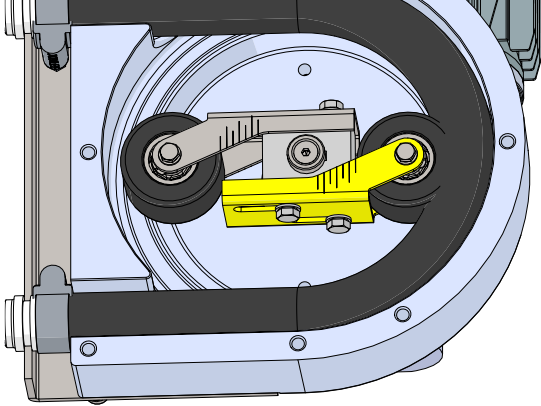
Dry the pump casing thoroughly and reassemble the pump cover.

3. MAINTENANCE

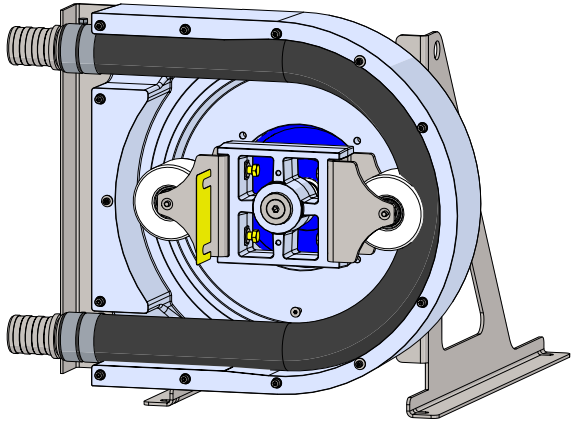
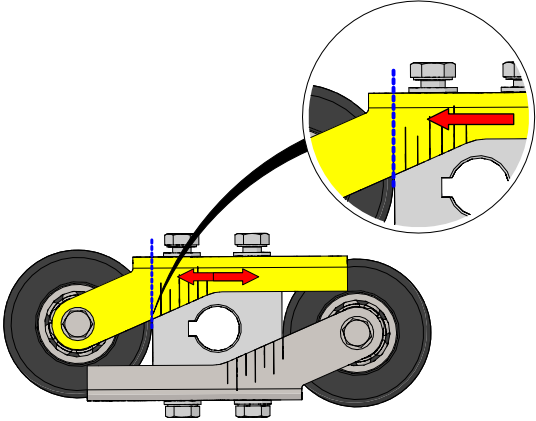
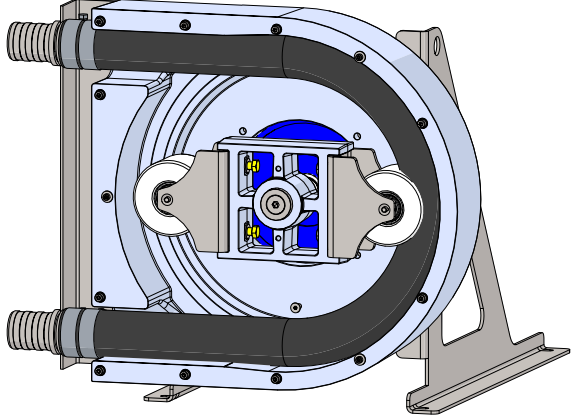
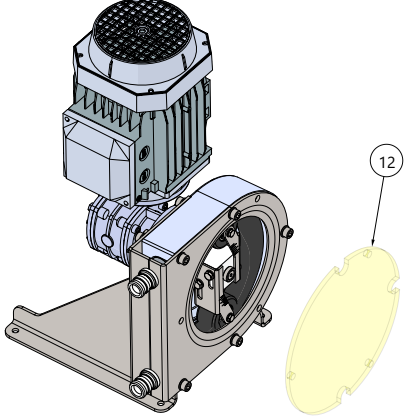
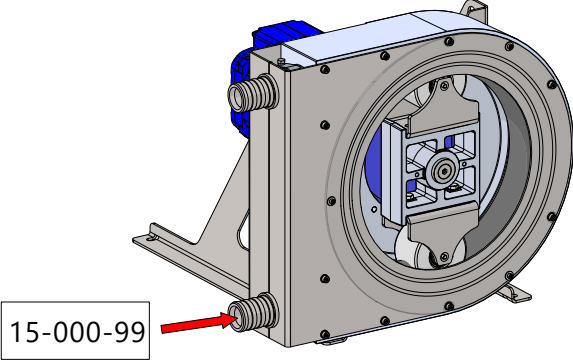
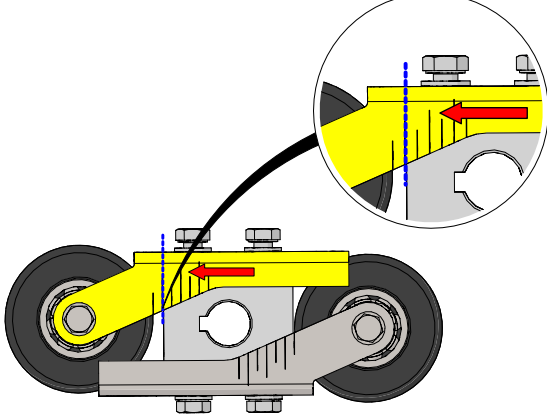
3.11. Rollers adjustment

During pump operation as the hose starts to wear, back flow inside the hose can occur. In order to avoid this, roller adjustment can be performed in order to increase the compression of the hose. This is an important procedure, as back flow reduces the hose lifetime and affect the pump flow. The adjustments vary based on pump rotation speed, discharge pressure and liquid viscosity. This operation can be done without complete pump disassembly.

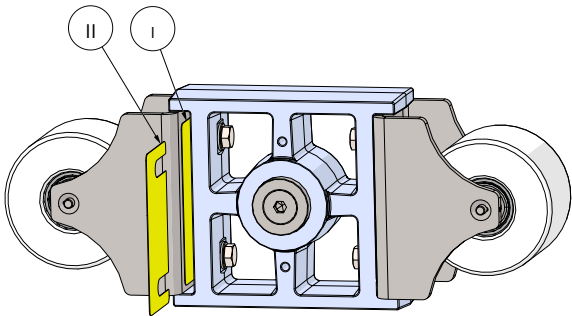
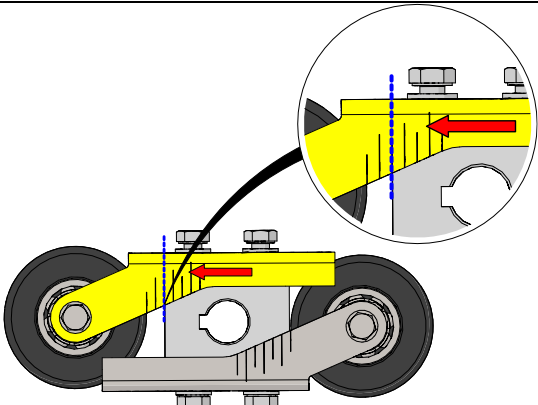
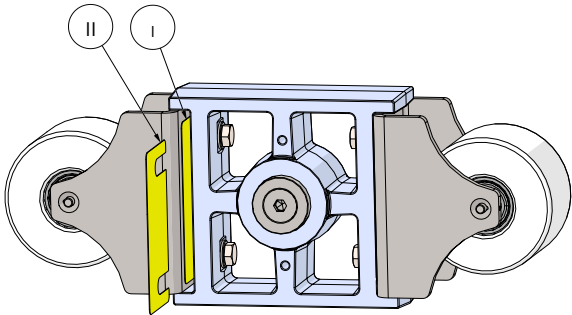
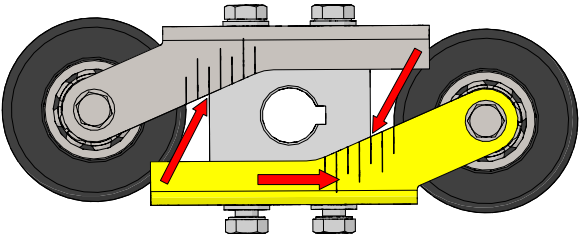
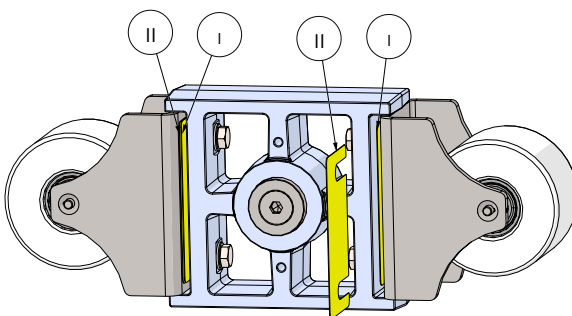
NOTE! Proceed with this procedure only after familiarizing oneself with the instructions at the beginning of chapter 3. "Maintenance" and all safety instruction in chapter 1.8. "Health and safety".

	
<p>Fig. 3.9.1 Run the pump and position the rotor so that only one roller is pressing against the hose.</p>	<p>Fig. 3.9.2 Disconnect power supply from the motor. Unscrew the front cover mounting bolts [141] and remove them with their washers [142].</p>
	
<p>Fig. 3.9.3 Remove the front cover [12].</p>	<p>Fig. 3.9.4a PTL9 – PTL25 On the side where the roller is pressing the hose, loosen the roller bracket mounting screws [941].</p>

3. MAINTENANCE

	
<p>Fig. 3.9.4b PTL30 – PTL45</p> <p>Loosen the roller bracket mounting screws [941] and remove the shims [91] (if any).</p>	<p>Fig. 3.9.5a PTL9 – PTL25</p> <p>On the side where the roller is not compressing the hose, adjust the roller bracket position so that the rotor is aligned with the first graduation mark on the bracket.</p> <p>Tighten the roller bracket mounting screws.</p>
	
<p>Fig. 3.9.5b PTL30 – PTL45</p> <p>Re-tighten the roller bracket mounting screws [941].</p>	<p>Fig. 3.9.6</p> <p>Reassemble the front cover [12] and run the pump.</p>
	
<p>Fig. 3.9.7</p> <p>Place the vacuum gauge tool [15-000-99] on the suction insert of the pump. If the reading is (-0.6) bar or lower then further adjustment is not required.</p>	<p>Fig. 3.9.8a PTL9 – PTL25</p> <p>If vacuum is not sufficient, remove the front cover again and move the bracket so the second graduation mark is in line with the rotor edge.</p>

3. MAINTENANCE

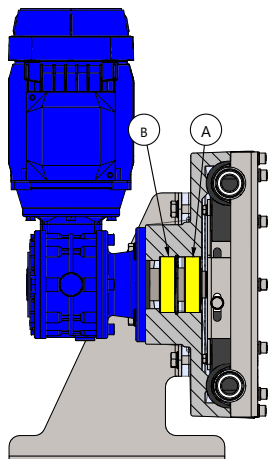
	
<p>Fig. 3.9.8b PTL30 – PTL45</p> <p>If vacuum is not sufficient, remove the front cover again and add an extra 0.5 mm shim.</p>	<p>Fig. 3.9.9a PTL9 – PTL25</p> <p>Repeat steps 3.9.6 and 3.9.7 and check the vacuum. Move the roller bracket to the next graduation marks as long as the vacuum reading is (-0.6) bar or lower.</p>
	
<p>Fig. 3.9.9b PTL30 – PTL45</p> <p>Repeat steps 3.9.6 and 3.9.7 and check the vacuum. Add extra shims as long as the vacuum reading is (-0.6) bar or lower.</p>	<p>Fig. 3.9.10a PTL9 – PTL25</p> <p>Adjust the loose roller bracket to the same distance, install the front cover [12] and re-test the pump vacuum capabilities.</p> <p>NOTE! Both rollers need to be adjusted equally.</p>
	
<p>Fig. 3.9.10b PTL30 – PTL45</p> <p>Add the same number of shims under the second roller bracket, install the front cover [12] and re-test the pump vacuum capabilities.</p> <p>NOTE! Both rollers need to be shimmed equally.</p>	

3. MAINTENANCE

3.12. Bearings replacement interval



Rollers acting on the hose are supported by bearings [922], additionally PTL9-PTL17 pumps are equipped with gearmotor shaft support bearings [50]. It is necessary to replace these bearings at regular intervals, following the intervals specified below. After re-assembly make sure if the pump does not generate unusual noises.



Pump size	Replacement interval [h]		
	Pos. 50 - A	Pos. 50 - B	Pos. 922
PTL9	8700	25600	75500
PTL13	8700	25600	75500
PTL17	7300	27400	7450
PTL25	-	-	5850
PTL30	-	-	12500
PTL45	-	-	20000

3.13. Shaft bearings assembly PTL9 – PTL17

<p>Fig. 3.13.1 Place the bearing [50] by pressing it against the raised edge on the front of pump casing [11].</p>	<p>Fig. 3.13.2 Fix the bearing [50] with the bigger circlip [52].</p>
<p>Fig. 3.13.3 Rest the shaft seal [166] against the raised edge on the back of pump housing, and then press it tightly with the shaft [16].</p>	<p>Fig. 3.13.4 Place the distance sleeve [51] and bearing [50] on the shaft [16], so they rest against the previously placed bearing.</p>

3. MAINTENANCE

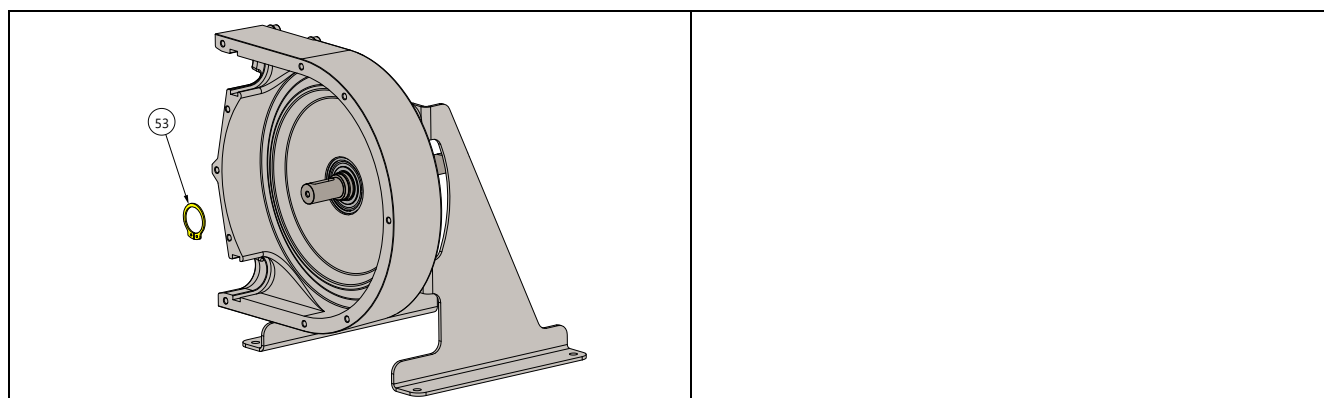


Fig. 3.13.5 Fix the shaft [16] with the smaller circlip [53] by placing it in the shaft groove.

3.14. Casing assembly directions

The standard pump configuration includes casing directed to the right. However, other positions are also possible.

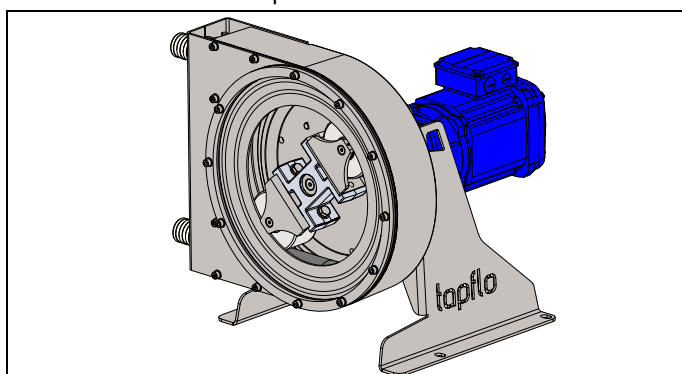


Fig. 3.14.1 Left direction; standard casing direction

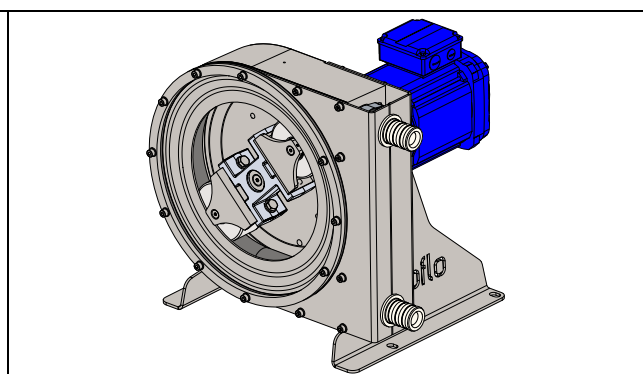


Fig. 3.14.2 Right direction; the pump is designed in such a way that it can be easily directed to the right without any modifications. By using the code "2R" when ordering the pump, the housing will be installed in the right direction.

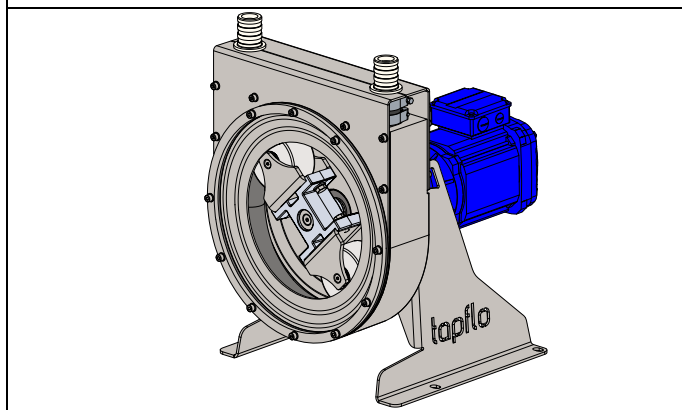


Fig. 3.14.3 Upwards direction; directing casing upwards requires certain modifications that need to be made at the ordering stage. Use the code "2U" for such a configuration.

NOTE! This position is not recommended for fluids with solid particles due to the possibility of their accumulation in the hose due to gravity.

NOTE! Due to the increased risk of hose rupture, directing the housing upwards is not permitted in potentially explosive atmospheres (ATEX).

4. ACCESSORIES

4. ACCESSORIES

4.1. Pump trolleys

If the hose pump is required to be a mobile device, a range of industrial trolleys are available. They are designed to enable mobility but also stable and easy operation of the delivered devices. Thanks to the trolleys the pumps can be easily transported and used in many applications and locations. Because some of the pump are pretty big, the trolleys are available for **PTL17**, **PTL25**, **PTL30** and **PTL45** pumps. The trolleys are made of sandblasted AISI 304 stainless steel. A variety of options is also available, including: ATEX, ON/OFF switch, built-on frequency inverter, supply cable with 3-phase plug.

For more details see the "Mobile Pump Solutions" Info letter under this [LINK](#).



4.2. Frequency inverters

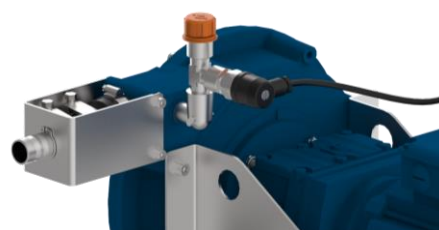
The frequency inverters are used regulate the motor speed and therefore the capacity of the pump. They can be purchased as standalone units to be installed separately of the pump or pre-installed in a cabinet including a control system or built on a trolley.

For more details see the "Frequency inverters" Info letter under this [LINK](#).



4.3. Hose leak detector

The rupture of the hose, which is a wearing part, creates a leakage of the pumped liquid. Hose detectors make it possible to detect these leakages and stop the pump upon hose rupture. The system is based on a capacitive sensor and is available for all pump sizes. Apart from the sensor itself, it includes a threaded reduction and a connection cable of desired length. For more details see the "Hose Leak Detectors" Info letter under this [LINK](#).



5. SPARE PARTS

5. SPARE PARTS

Full part number consist of three parts, pump type (15 for PT pumps; 16 for PTL), pump size (e.g. 017, 045) and part position which corresponds to the number in the drawing e.g. **16-xxx-18**:

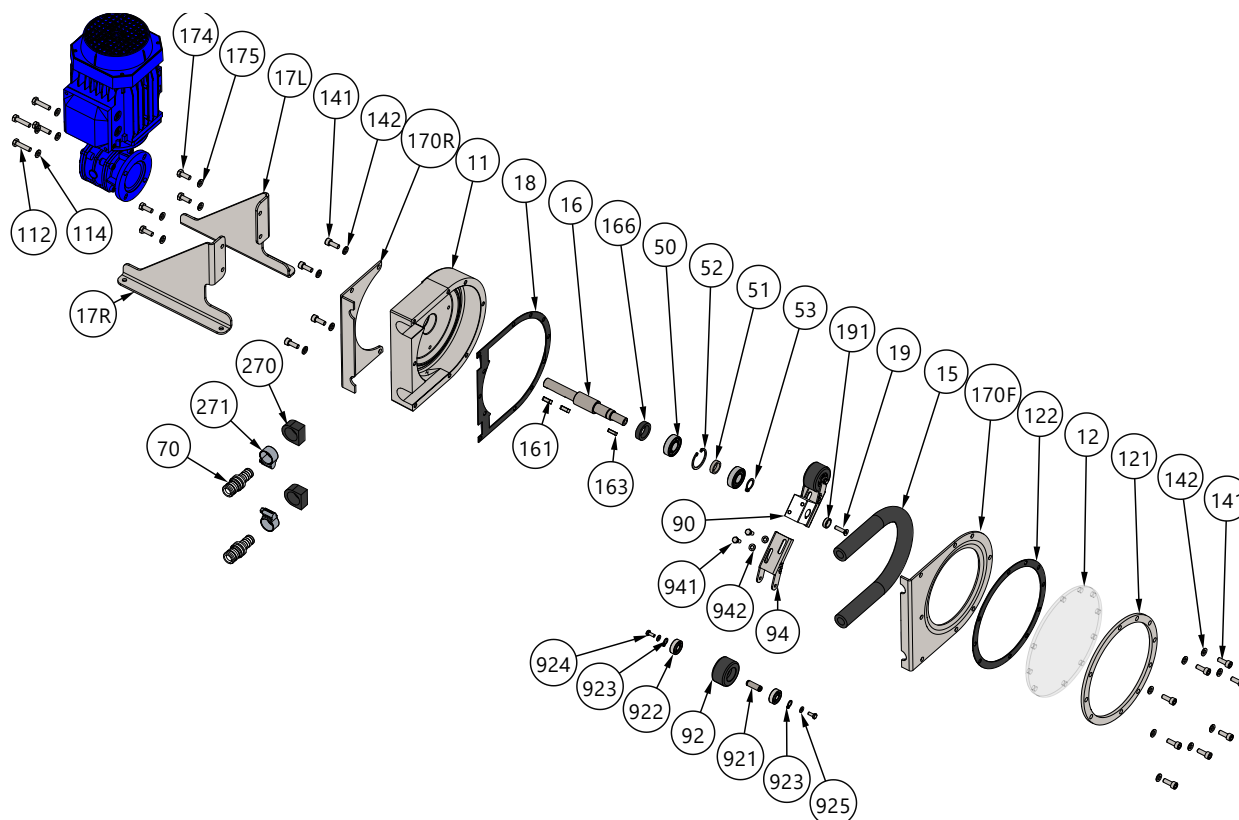
16 – PTL low pressure hose pump

xxx – pump size

18 – part position

NOTE! Use only Original Tapflo spare parts. Using counterfeit parts creates a risk of improper operation, increases possibility of breakdown and voids warranty terms.

5.1. Exploded view PTL9 – PTL17



For interactive exploded view go [HERE](#)

5.2. Spare parts list PTL9 – PTL17

Pos.	Q-ty	Description	Material
11	1	Pump casing	Aluminium
112	4	Gearmotor mounting screw	A4-70
114	4	Gearmotor mounting washer	A4
12	1	Front cover	Polycarbonate, AISI 304 ³⁾
121	1	Front cover reinforcement ring	AISI 304L
122	1	Front cover gasket	NBR

5. SPARE PARTS

141	12	Bracket / front cover mounting bolt	A4-70
142	12	Bracket / front cover mounting washer	A4-70
15	1	Hose	NR, NBR, EPDM
16	1	Pump shaft	Steel
161	2/3 ²⁾	Shaft key	Black steel
163 ¹⁾	1	Rotor key	Black steel
166	1	Shaft seal / simmering	NBR
17L	1	Pump foot – left	Galvanized steel
17R	1	Pump foot – right	Galvanized steel
170F	1	Connection bracket - front	Galvanized steel
170R	1	Connection bracket - rear	Galvanized steel
174	4	Casing mounting bolt	A4-70
175	4	Casing mounting washer	A4-70
18	1	Casing gasket	NBR
19	1	Shaft screw	A4-70
191	1	Retaining washer	AISI 304L
270	2	Hose cover	NBR
271	2	Clamp band	AISI 316L
50	2	Bearing	Steel
51	1	Distance sleeve	Steel
52	1	Shaft circlip – big	Zinc plated steel
53	1	Shaft circlip - small	Zinc plated steel
70	2	Hose insert	AISI 316L, PTFE
90	1	Rotor	Aluminium
92	2	Roller	Polyamide
921	2	Roller shaft	Steel
922	4	Roller bearing	Steel
923	4	Roller circlip	Zinc plated steel
924	4	Roller mounting screw	A4-70
925	4	Roller mounting washer	A4-70
94	2	Roller bracket	Galvanized steel
941	4	Roller bracket mounting bolt	A4-70
942	4	Roller bracket mounting washer	A4-70

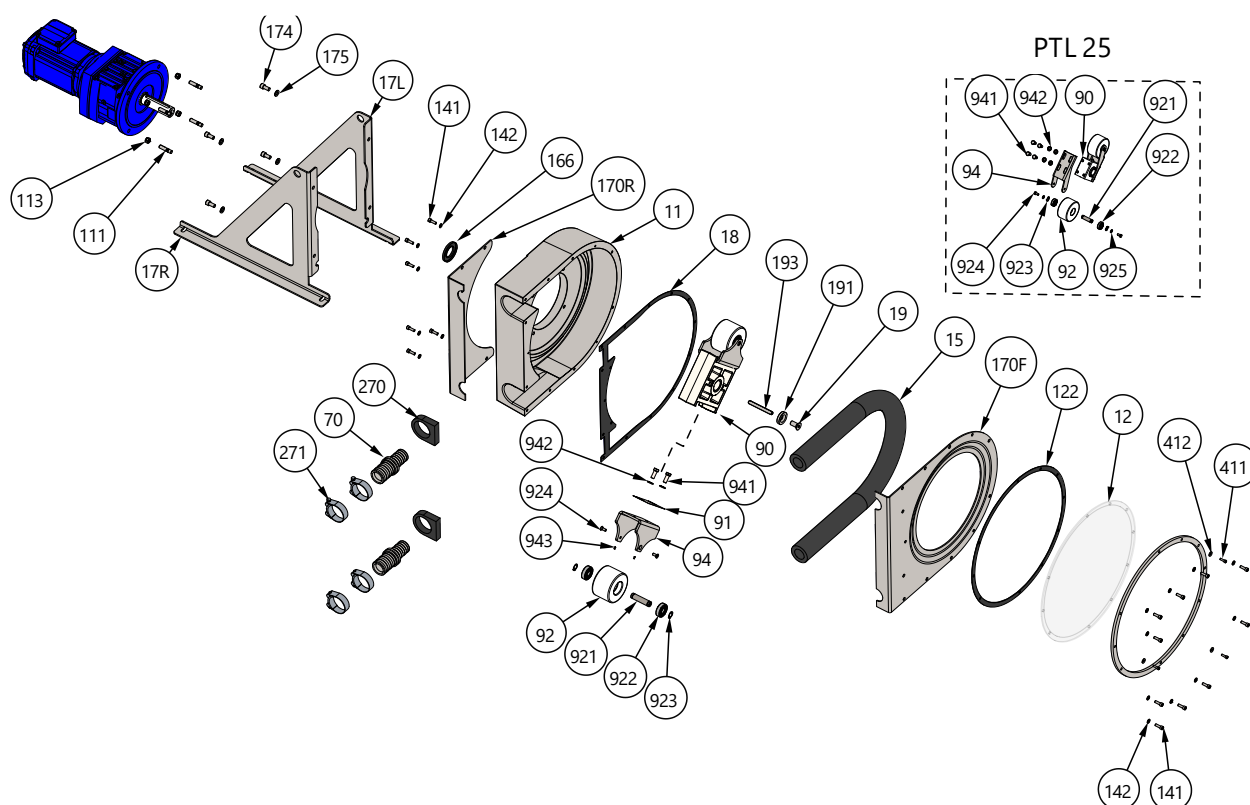
1) Only for PTL9 and PTL13

2) **2** for PTL9 and PTL1313 / **3** for PTL17

3) **Polycarbonate:** non-ATEX pumps / **AISI 304:** ATEX pumps

5. SPARE PARTS

5.3. Exploded view PTL25 – PTL45



For interactive exploded view go [HERE](#)

5.4. Spare parts list PTL25 – PTL45

Pos.	Q-ty	Description	Material
11	1	Pump casing	Aluminium
111	4	Gearmotor mounting stud bolts	A4-70
113	4	Gearmotor mounting nuts	A4
12	1	Front cover	Polycarbonate, AISI 304 ⁶⁾
121	1	Front cover reinforcement ring	AISI 304L
122	1	Front cover gasket	NBR
141	11/16 ³⁾	Bracket mounting bolt	A4-70
142	11/16 ³⁾	Bracket mounting washer	A4-70
15	1	Hose	NR, NBR, EPDM
162	1	Shaft sleeve	Steel
54	1	Shaft seal / simmering	NBR
17L	1	Pump foot – left	Galvanized steel
17R	1	Pump foot – right	Galvanized steel
170F	1	Connection bracket - front	Galvanized steel
170R	1	Connection bracket - rear	Galvanized steel
174	4	Casing mounting bolt	A4-70
175	4	Casing mounting washer	A4-70
18	1	Casing gasket	NBR
19	1	Shaft screw	A4-70
191	1	Retaining washer	AISI 304L
193	1	Rotor key	Carbon steel

5. SPARE PARTS

270	2	Hose cover	NBR
271	2/4 ¹⁾	Clamp band	AISI 316L
411	3	Front cover mounting bolt	A4-70
412	3	Front cover mounting washer	A4-70
70	2	Hose insert	AISI 316L, PTFE
90	1	Rotor	Aluminium
91 ⁵⁾	8	Shim	AISI 304L
92	2	Roller	Aluminium
921	2	Roller shaft	Steel
922	4	Bearing	Steel
923	4	Circlip	Zinc plated steel
924	4	Roller mounting screw	A4-70
925 ²⁾	4	Roller mounting washer	A4-70
94	2	Roller bracket	Galvanized steel
941	8/4 ⁴⁾	Roller bracket mounting bolt	A4-70
942	8/4 ⁴⁾	Roller bracket mounting washer	A4-70
943 ⁵⁾	4	Roller bracket grub screw	A4

- 1) **2** for PTL25 / **4** for PTL30 and PTL45
- 2) Only PTL25
- 3) **11** for PTL25 / **16** for PTL30 and PTL45
- 4) **8** for PTL25 / **4** for PTL30 and PTL45
- 5) Only for PTL30 and PTL45
- 6) **Polycarbonate:** non-ATEX pumps / **AISI 304:** ATEX pumps

5.5. Stocking recommendation

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

Pos.	Description	Q-ty
15	Hose	2-3*
91	Shim	8

* Depending on the application conditions it is recommended to keep 2 to 3 hoses on stock.

Tapflo also offers **spare parts KITS** for the PTL pumps:

- Rotor spare parts KIT: [16-013-90S](#), [16-017-90S](#), [16-025-90S](#)

Click above links for interactive exploded views.

Pos.	Description	Q-ty
90	Rotor	1
92	Roller	2
94	Roller bracket	2
921	Roller shaft	2
922	Roller bearing	4
923	Roller circlip	4
924	Roller mounting screw	4
925	Roller mounting washer	4
941	Roller bracket bolt	4/8*
942	Roller bracket washer	4/8*

* **4** for PTL9 – PTL17 / **8** for PTL25

5. SPARE PARTS

- Shaft spare parts KIT: [16-013-16S](#), [16-017-16S](#)

Click above links for interactive exploded views.

Pos.	Description	Q-ty
16	Shaft	1
161	Shaft key	2/0*
163	Rotor key	1/3**
19	Shaft screw	1
191	Retaining washer	1
50	Roller bearing – shaft	2
51	Distance sleeve	1
52	Shaft circlip – large	1
53	Shaft circlip – small	1

* **2** for PTL9/13 / **0** for PTL17

* **1** for PTL9/13 / **3** for PTL17

- Roller spare parts KIT: [16-013-92S](#), [16-017-92S](#), [16-025-92S](#), [16-030-92S](#), [16-045-92S](#)

Click above links for interactive exploded views.

Pos.	Description	Q-ty
92	Roller	2
921	Roller shaft	2
922	Roller bearing	4
923	Roller circlip	4
924	Roller mounting screw	4
925	Roller mounting washer	4/0*

* **4** for PTL9-25 / **0** for PTL30-45

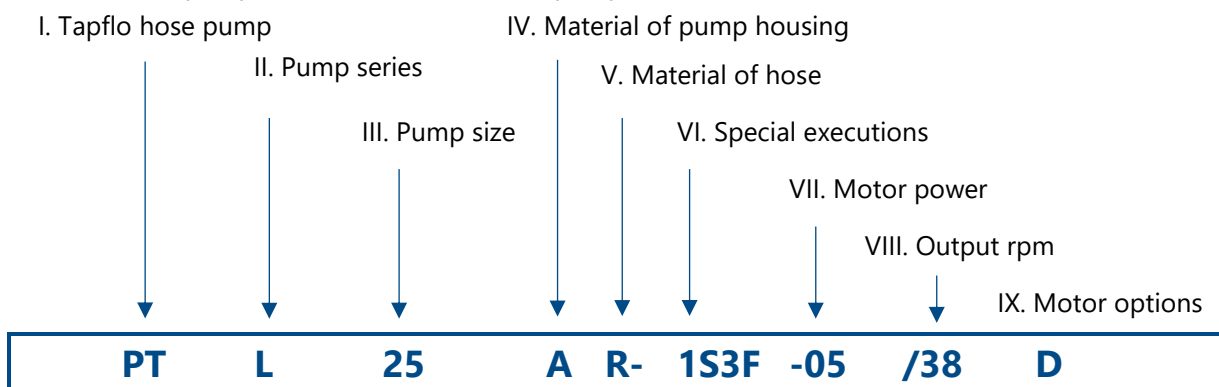
5.6. How to order parts

When ordering spare parts for Tapflo pumps, 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. SPARE PARTS

5.7. 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. PT = Tapflo hose pump
PXT = Tapflo ATEX hose pump

II. Pump series:
blank = High pressure pumps
L = Low pressure pumps

III. Pump size = Hose inner diameter
9, 13, 17, 25, 30, 45mm

IV. Material of pump housing:
A = Aluminium (**standard**)

V. Material of hose:
E = EPDM
N = NBR (nitrile rubber)
R = NR (**standard**)
W = EPDM FDA
S = NR FDA
F = NBR FDA

VI. Special executions:
1 = Optional insert material
S = AISI 316L (**standard**)
T = PTFE
P = PE AST
L = PP
2 = Inlet/outlet direction (looking from pump head side)
L = Left (**standard**)
R = Right
U = Up
D = Down

3 = Optional connection type
A = ANSI/ASME B16.5 Class 150 Flange
B = BSP male thread
C = SMS 3017 clamp
F = EN 1092-1 flange
H = Hose tail (**standard**)
T = DIN 32676 clamp
5 = Other special executions
L = Hose leak detection system
T = 3-lobe rotor (standard on PT5)
6 = Optional flange bracket material
blank = Galvanized steel
S = AISI 304L stainless steel

VII. Motor power
01 = 0.18 kW
02 = 0.25 kW
03 = 0.37 kW
05 = 0.55 kW
07 = 0.75 kW
11 = 1.1 kW
15 = 1.5 kW
22 = 2.2 kW

VIII. Output rpm

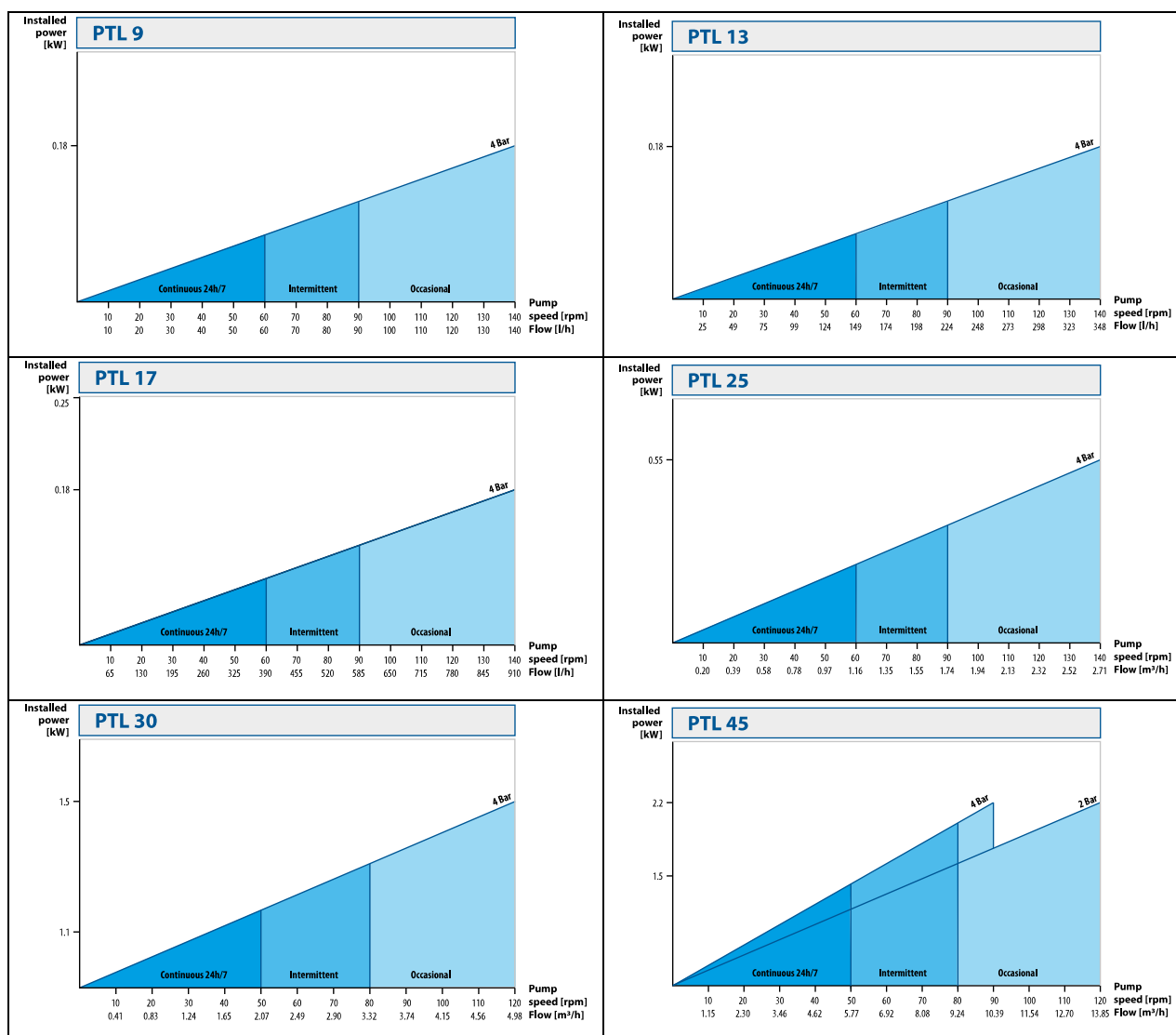
IX. Motor options
C = External cooling fan
D = Built on frequency inverter
A = Angle reducer

6. DATA

6. DATA

6.1. Capacity curves

The performance curves are based on water at 20°C. Other circumstances might change the performance. See below how the capacity will change at different viscosities and suction lifts.
Intermittent duty = 1 hour stop for every 2 hours of operation.
Occasional duty = not more than 1 hour per day.



6. DATA

6.2. Technical data

TECHNICAL DATA	PUMP TYPE					
	PTL9	PTL13	PTL17	PTL25	PTL30	PTL45
Max capacity @ 50 Hz [l/m] / [US GPM]	3.1 / 0.82	7.7 / 2.02	20.2 / 5.34	44.2 / 11.67	71.2 / 18.8	178.8 / 47.24
Max discharge pressure [bar] / [psi]	4 / 58	4 / 58	4 / 58	4 / 58	4 / 58	4 / 58
Max suction lift [m] / [Ft]	9 / 29.5	9 / 29.5	9 / 29.5	9 / 29.5	9 / 29.5	9 / 29.5
Maximum pump speed [rpm @ 50 Hz]	187	187	187	138	104	93
Max liquid temperature* [°C] / [°F]	80 / 176	80 / 176	80 / 176	80 / 176	80 / 176	80 / 176
Min ambient temperature [°C] / [°F]	-20 / -4	-20 / -4	-20 / -4	-20 / -4	-20 / -4	-20 / -4
Max ambient temperature [°C] / [°F]	40 / 104	40 / 104	40 / 104	40 / 104	40 / 104	40 / 104
Max viscosity [cP]	1200	2100	4000	6000	9000	12000
Weight with biggest gearmotor [kg] / [lb]	9.2 / 20.3	9 / 19.8	35 / 77.2	35 / 77.2	35 / 77.2	80 / 176.4
Volume per revolution [ml] / [US oz]	17 / 0.57	41 / 1.39	108 / 3.65	320 / 10.82	684 / 23.13	1900 / 64.25

* Max temperature can depend on hose material utilized in the pump.

6. DATA

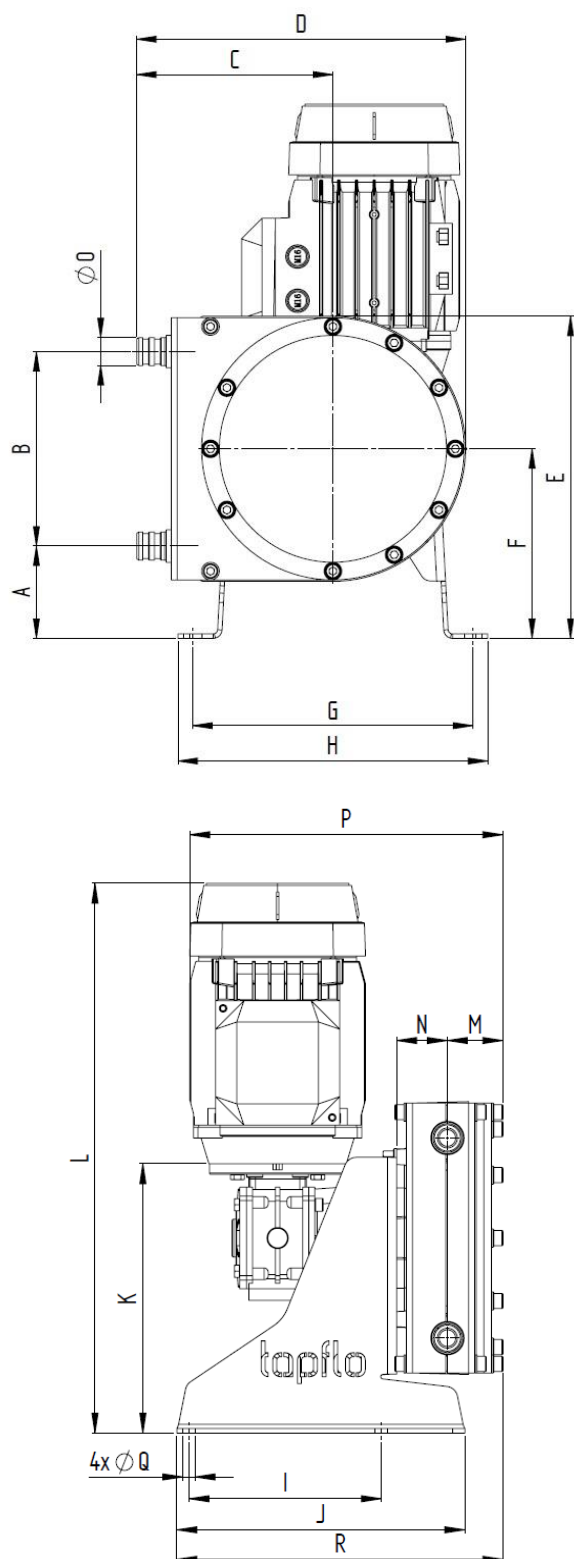
6.3. Dimensions

Dimensions in mm (where other is not indicated)

Dimensions in inch (where other is not indicated)

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

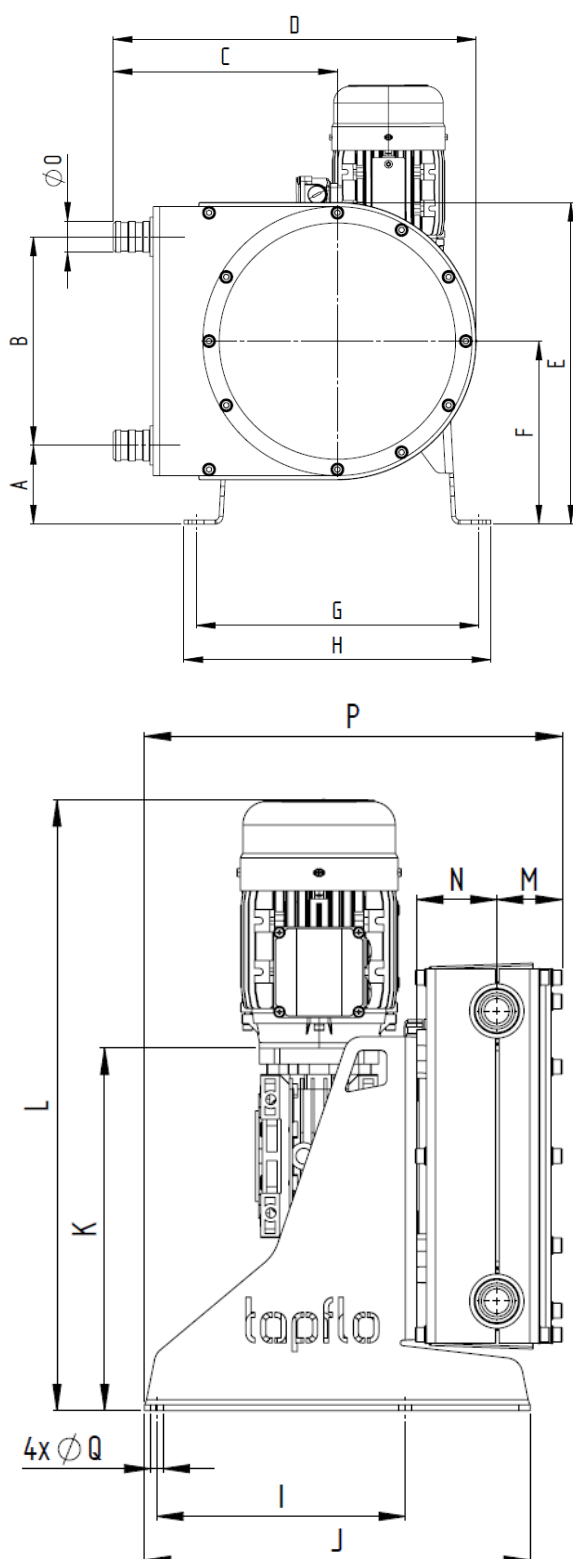
6.3.1. PTL9 – PTL17



	PUMP SIZE		
	PTL9	PTL13	PTL17
A	63 2.48	63 2.48	72 2.83
B	132 5.20	132 5.20	188 7.40
C	133 5.24	133 5.24	188 7.40
D	223 8.78	223 8.78	313 12.32
E	219 8.62	219 8.62	291 11.46
F	129 5.08	129 5.08	166 6.54
G	190 7.48	190 7.48	251 9.88
H	210 8.27	210 8.27	269 10.59
I	127 5	127 5	153 6.02
J	190 7.48	190 7.48	230 9.06
K	178 7.01	178 7.01	237 9.33
L	363 14.29	363 14.29	422 16.61
M	37 1.46	37 1.46	45 1.77
N	33.5 1.32	33.5 1.32	44.5 1.75
ØØ	16 0.63	19 0.75	25 1
P	207 8.15	207 8.15	250 9.84
ØQ	4 x 8 4 x 0.32	4 x 8 4 x 0.32	4 x 7 4 x 0.28
R	215 8.46	215 8.46	259 10.2

6. DATA

6.3.2. PTL25 – PTL45

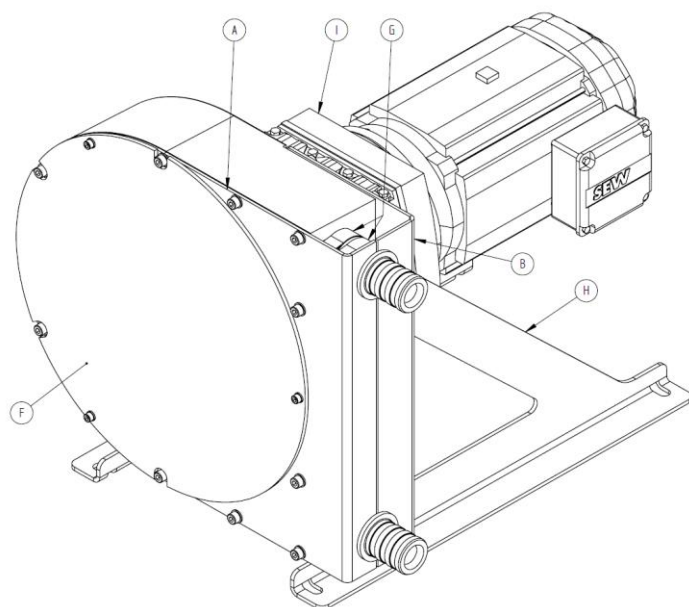


	PUMP SIZE		
	PTL25	PTL30	PTL45
A	97	133	155
	3.82	5.24	6.10
B	256	355	438
	10.08	13.98	17.24
C	275	350	453
	10.83	13.78	17.83
D	445	579	748
	17.52	22.80	29.45
E	395	539	669
	15.55	21.22	26.34
F	225	310	374
	8.86	12.20	14.72
G	346	424	533
	13.62	16.69	20.98
H	376	460	571
	14.80	18.11	22.48
I	219	276	346
	8.62	10.87	13.62
J	340	415	510
	13.39	16.34	20.08
K	320	446	533
	12.60	17.56	20.98
L	539	729	879
	21.22	28.70	34.61
M	58	71	90
	2.28	2.80	3.54
N	71	79	91
	2.80	3.11	3.58
ØO	38	45.2	60
	1.50	1.78	2.36
P	368	450	551
	14.49	17.72	21.69
ØQ	4 x 11	4 x 14	4 x 14
	4 x 0.43	4 x 0.55	4 x 0.55

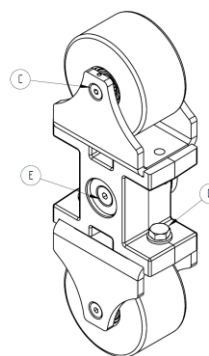
6. DATA

6.4. Tightening torques

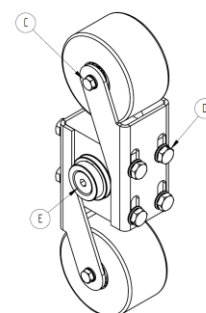
Checking of the tightening torques is necessary after all periods of stoppage, when temperature variations are a factor and after all transport and maintenance of the pump. What is more, for proper operation and safety the torque values should be checked frequently as part of preventive maintenance (contact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



PTL30-PTL45:



PTL9-PTL25:

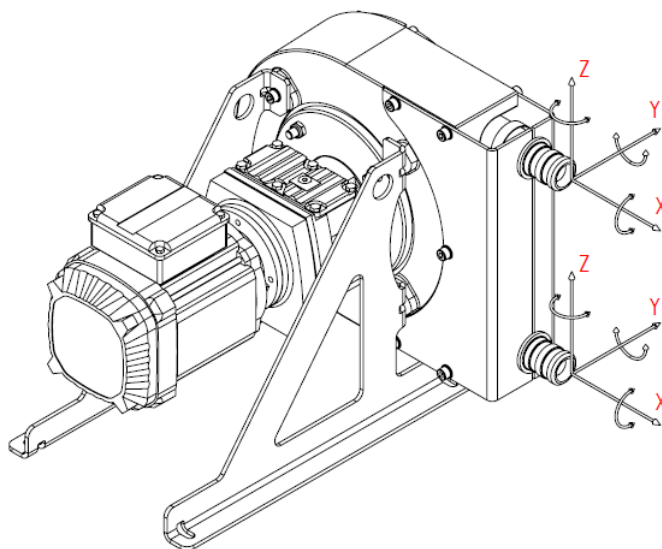


Item	Bolt pos.	Name	TPRQUE [Nm]				
			PTL9-13	PTL17	PTL25	PTL30	PTL45
A	141	Connection bracket - front	15	15	22	24	26
B	141	Connection bracket - rear	15	15	22	24	26
C	924	Roller	5	12	25	45	45
D	941	Bracket	7	16	25	55	55
E	19	Shaft	5	5	55	55	80
F	411	Front cover	3.3	3.3	3.3	3.3	3.3
G	271	Clamp band	2	20	4	20	20
H	174	Casing	15	26	30	50	50
I	112	Gear motor	20	30	35	40	40

6. DATA

6.5. Permitted loads on manifolds

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



Pump size	Direction	Load [Nm]	Force [Nm]
PTL9 – PTL13	X	110	-
	Y	90	5
	Z	85	5
PTL17	X	330	-
	Y	160	5
	Z	80	5
PTL25	X	240	-
	Y	180	10
	Z	210	15
PTL30	X	290	-
	Y	200	15
	Z	180	25
PTL45	X	280	-
	Y	190	20
	Z	140	30

7. ATEX supplementary manual

7. ATEX supplementary manual

7.1. Potentially explosive atmospheres - ATEX

The standard PTL series pumps are not allowed to operate in potentially explosive atmosphere. Special PXTL pumps are available for such applications.

Follow this ATEX supplementary instructions and local/national rules for safe use.

ATEX (directive 2014/34/EU) classification of Tapflo PXT pump heads:

II 2G Ex h IIB T4 Gb

II 2D Ex h IIIC 125°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: **IIB** – gas group (such as ethylene);

IIIC – dust group (conductive dusts);

Type of protection: **h** – constructional safety;

Temperature class: **T4** – in the event of a malfunction, the maximum temperature of a surface that may be exposed to gas; **T4** = 135°C;

EPL protection level): **Gb, Db** – high protection level;

ATEX classification of complete unit depends on used drive.

Check if the ATEX marking of the delivered pump corresponds to the marking of the zone in which the pump will be installed.

The pumps are designed 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.

7.2. Operating limits

Maximum operating parameters are selected for continuous operation, exceeding the limits may result in pump surface excessive temperature. It is forbidden to exceed these limits even for a short time during intermittent and occasional operation (described in section 6.1 "Capacity curves"), with intention of stopping the pump before reaching the temperature limits.

Pump model	PTL9	PTL13	PTL17		PTL25	PTL30		PTL45	
Motor power [kW]	0.18	0.18	0.18	0.25	0.55	1.1	1.5	1.5	2.2
Max output [rpm]	187	187	139	187	138	40	104	58	93
Max discharge pressure [bar]	4	4	4	4	4	4	4	4	4
Max inlet pressure [bar]	1								
Max liquid temperature [°C]	40								

7. ATEX supplementary manual

7.3. Construction materials use restrictions

Hose material

Only specific sizes and material executions of Tapflo hoses are allowed to operate in potentially explosive atmospheres or/and transfer flammable liquids.

Size	NR	NR (FDA)	EPDM	EPDM (FDA)	NBR	NBR (FDA)	CSM	TP-XL60	TP-E65F	Silicone
PTL 9	X	X	X	X	X	X	X	X	X	X
PTL 13	F	X	F	X	NF	NF	X	X	X	X
PTL 17	X	X	X	X	X	X	X	X	X	X
PTL 25	F	X	F	X	NF	NF	X	X	X	X
PTL 30	F	X	F	X	NF	NF	X	X	X	X
PTL 45	F	X	F	X	NF	NF	X	X	X	X

X – hose not allowed to operate in potentially explosive atmosphere;

NF – hose allowed to operate in potentially explosive atmosphere but not allowed to transfer flammable liquids;

F – hose allowed to operate in potentially explosive atmosphere and transfer flammable liquids - IIB T4.

Front cover material

The transparent polycarbonate front cover [12] cannot be used. Only a metal cover is allowed.

7.4. Pumped liquids

Pumped liquid must be chemically compatible and not cause exothermic reaction with lubricant, nor with any of pump materials of construction.

The pumps are tested with water. If the pumped product can come into reaction with water, make sure the pump is dry before putting it into operation.

7.5. Installation, operation and maintenance

- The pump maintenance can be performed by the user.
- The personnel conducting pump servicing should be trained for working in potentially explosive environments and should wear antistatic workwear.
- The inspection of an explosion-proof pump should be carried out in accordance with the requirements of EN 60079-17 standard.
- The repair of an explosion-proof pump should be performed in compliance with the requirements of EN 60079-19 standard.

7.6. Spares

- Only original Tapflo spare parts can be used for spare parts replacement. Failing to follow the instruction voids the ATEX marking.
- When ordering spares ATEX execution must be clearly mentioned. Always indicate pump code and serial number.

7. ATEX supplementary manual

7.7. Hose Lubricant

Hose lubrication is necessary for proper operation, lack of lubrication results in pump surface excessive temperature. Follow section 3.9 "Hose replacement" for lubrication procedure.

7.8. Hose leak detector

When pumping flammable liquids, a hose rupture can potentially create an explosive environment inside the pump casing. Even if there is no source of ignition, it is essential to stop the pump as soon as possible. For that purpose all Tapflo ATEX rated pumps are equipped with a leak sensor. The sensor must be connected to a circuit (e.g. via frequency inverter) that automatically stops the pump.

It is strongly recommended to establish preventive maintenance procedures, as outlined in chapter 3.9. *Hose replacement*.

Description

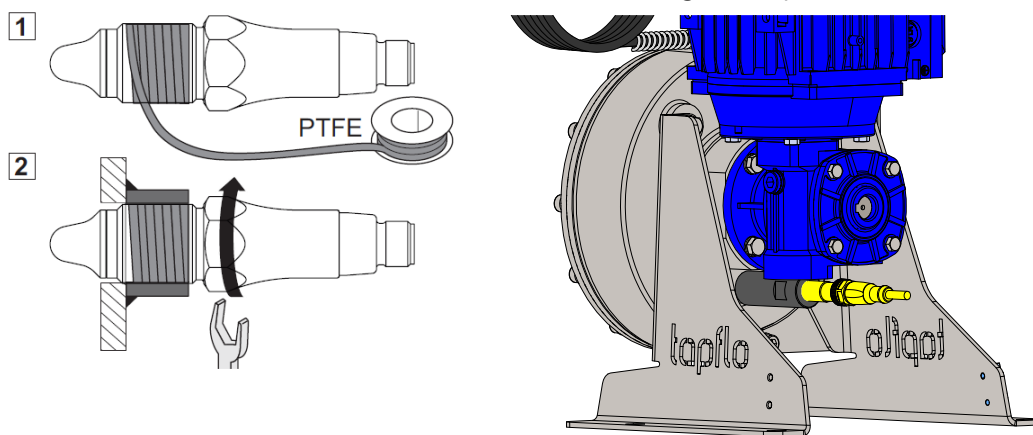
Leak sensor is a 4-pin, normally open (NO) or normally open (NC) sensor using frequency sweep measuring principle.

ATEX marking: **II 1G Ex ia IIC T4 Ga**
II 1D Ex ta IIIC T100°C Da

The sensor detects solely liquids and solids with a dielectric constant of at least 1.5.

Mounting

The sensor must be screwed into the designated location on the back of the pump casing. Sensor come pre-mounted in the pump's casing. When re-installing, apply the PTFE tape to the thread on the sensor, and then screw it in using a torque of maximum 30 Nm.



Electrical connection

- Provide a voltage supply of 12 V to 30 V DC
- Switch off supply voltage.
- Connect sensor in accordance with the pin assignment

Terminal assignment



7. ATEX supplementary manual

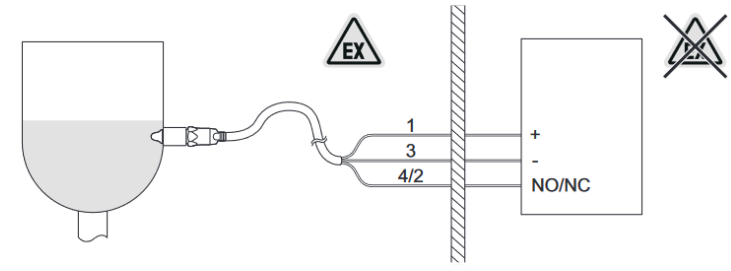
Intrinsically safe "ia" electrical specification:

$U_i = 30V\ DC$; $I_i = 100mA$; $P_i = 750mW$; $C_i = 43nF/m$; $L_i = 10\mu F/m$

The connection of temperature sensor in intrinsically safe execution "ia" must comply with the requirements of EN 60079-14 and EN 60079-25 standards.

Coperative instruments

Use "ia" isolation barriers for the connection, e.g. Baumber PROFSI3-B25100-ALG-LS.

	Function	M12-A4-pin
	+Va	1
	GND (0V)	3
	NO/NC	4/2

Use and maintenance

The sensor does not require any maintenance when connected according to specifications. In case of suspicion that sensor does not operate properly, unscrew the sensor from the pump and spray the tip with water.

Do not repair the sensor by yourself.

7. ATEX supplementary manual

7.9. Temperature sensor

If the pump is used in accordance with this IOM manual and permissible operating conditions, it should not exceed the maximum temperature given by the pump's ATEX classification. However, each pump comes with a temperature sensor as an additional safety feature. The sensor must be connected to a circuit (e.g. via frequency inverter) that automatically stops the pump.

Description

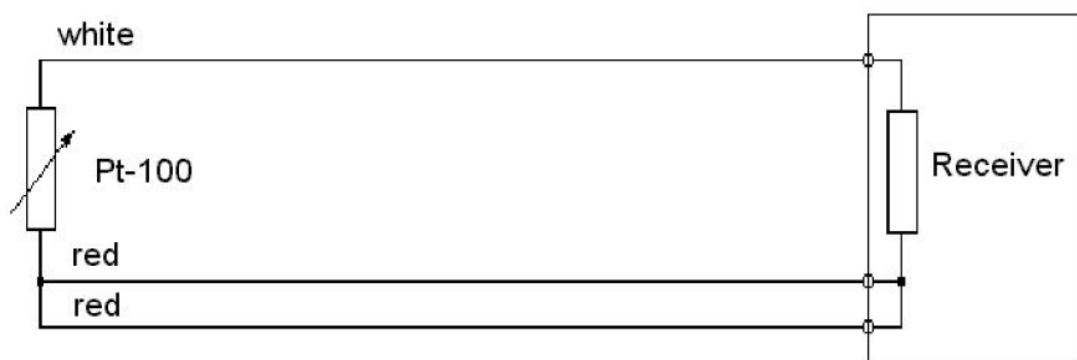
Temperature sensor is a 3-wire PT100 resistance thermometer with 3m cable.

ATEX marking: **II 2G Ex ia IIC T4 Gb**
II 1D Ex ia IIIC T125°C Da

Mounting

The sensor must be placed in the designated location, fixed with M4 screw by its pass-through hole on the front of the pump front cover.

Connection of a 3-wire line



Intrinsically safe "ia" electrical specification:

$U_i = 45V$, $I_i = 110mA$, $P_i = 750mW$, $C_i = 0,1nF/m$, $L_i = 1\mu F/m$

The connection of temperature sensor in intrinsically safe execution "ia" must comply with the requirements of EN 60079-14 and EN 60079-25 standards.

Cooperative instruments

The sensor can cooperate with any instruments adjusted to work with resistance thermometer.

Temperature threshold

The stop circuit activation temperature threshold for the PXTL series is 75°C. The temperature threshold should take into account the measurement accuracy of the temperature reading device, e.g. to a accuracy of $\pm 2^\circ C$, temperature threshold must be set to $75^\circ C - 2^\circ C = 73^\circ C$.

Use and maintenance

The sensor does not require any maintenance when connected according to specifications. In case of suspicion that sensor does not operate properly, place it in known temperature, measure its resistance and compare the value with value included in EN 60751 and EN 60584 standards.

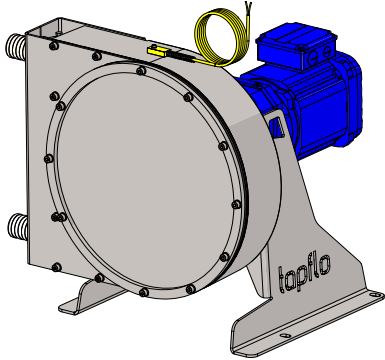
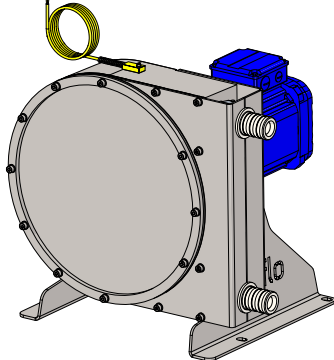
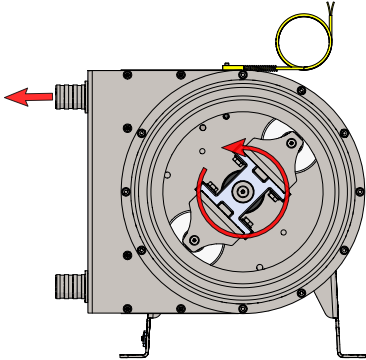
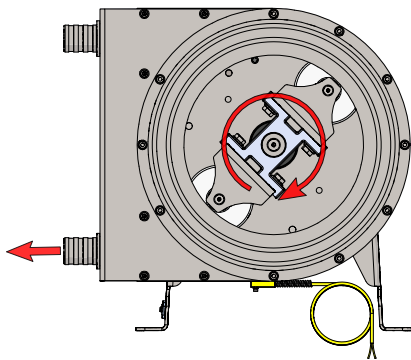
7. ATEX supplementary manual

7.10. Casing and temperature positions

When operating in potentially explosive atmospheres, pumps are allowed to operate in two positions, pump connections facing left or right. Directing casing up and down is forbidden. PXTL pumps are assembled with casing directed left as standard configuration. However, when using the "2R" code pump can be delivered with casing assembled right as an optional configuration.

The position of the temperature sensor is determined by the operation direction, and it must be placed only in the designated positions, on the top or bottom of the pump casing. In particular, the temperature sensor must be placed on the pump outlet.

If you anticipate frequently changing the pumping direction, it is recommended to use two temperature sensors to ensure that the sensor is always properly positioned regardless of the direction of operation. When ordering pump with "5XT" code, it will be equipped with two sensors.

Allowable casing positions	
	
Fig. 7.10.1 Casing position left (standard)	Fig. 7.10.2 Casing position right (optional)
Temperature sensor position related to pumping direction	
	
Fig. 7.10.3 Pumping direction bottom to top. Temperature sensor assembled on the top of pump casing.	Fig. 7.10.4 Pumping direction top to bottom. Temperature sensor assembled on the bottom of pump casing.

7. ATEX supplementary manual

7.11. Rollers adjustment

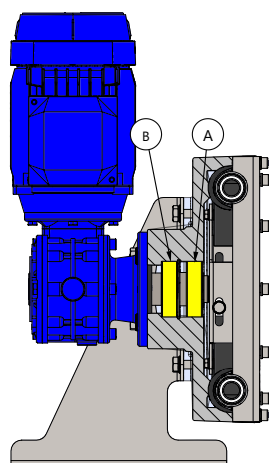
Avoid excessive compression on the rollers as it may generate increased temperature, follow the shimming procedure in section 3.11 "Rollers adjustment".

7.12. Bearings replacement interval

Rollers acting on the hose are supported by bearings [922], additionally PTL9-PT17 pumps are equipped with gearmotor shaft support bearings [50]. It is necessary to replace these bearings at regular intervals, following the intervals specified below.

Failure to follow bearings replacement interval may result in pump surface excessive temperature. The replacement interval for PXTL pump bearings in this section is shorter compared to the replacement interval for PTL (non-ATEX) bearings in section 3.12. "Bearings replacement interval". For replacement procedure see section 3.13. "Shaft bearings assembly PTL9 – PTL17".

After re-assembly make sure that the pump does not generate unusual noises.



Pump size	Replacement interval [h]		
	Pos. 50 - A	Pos. 50 - B	Pos. 922
PTL9	5800	17100	50300
PTL13	5800	17100	50300
PTL17	4850	18300	5000
PTL25	-	-	3950
PTL30	-	-	8350
PTL45	-	-	13300

7.13. Foreign objects in pump casing

- Foreign objects in pump casing may lead to increased surface temperature.
- Pay attention during pump maintenance not to leave any tool inside the casing.
- When experiencing hose break, clean the casing thoroughly to avoid leaving any residues, see section 3.10. "Pump casing cleaning procedure".

7.14. Dry run

Running a pump without liquid may result in pump surface excessive temperature. Although it is allowed to dry run a pump, it is not considered as normal operation and pump should not run dry longer than 1 minute. If there is risk of longer dry run, appropriate dry run protection should be applied.

7.15. Closed-circuit operation

Closed-circuit operation with small volumes of pumped medium can lead to significant heating of the pumped medium.

In the case of closed-circuit operation, user must control the pumped medium temperature and provide a protective system against temperatures exceeding limits outlined in 7.2. "Operating limits".

7. ATEX supplementary manual

7.16. High negative suction pressure

Running a pump with obstructed suction port, closed valve and high pressure losses generated by the installation, causes heavy strain on the pump hose and may result in pump surface excessive temperature. Refer to the safety measures listed in the table below before starting the pump.

Issue	Safety measure
Obstructed suction port	Check if the suction port is not obstructed
Closed suction valve	Check if the suction valve is fully opened
High pressure losses	Keep the suction line as short as possible and ensure that the piping diameter matches or exceeds the hose diameter. Pay attention for high viscosity fluids, as the higher the viscosity, the higher the pressure losses. Consult Tapflo for pressure losses calculation.

7.17. Drive

- To ensure proper service of the drive, follow the guidelines provided in the original gearmotor's IOM manual supplied with the. The gearmotor model can be found on its nameplate.
- When reducing the motor rotation speed, it is important to monitor the surface temperature of the gear-motor and ensure that it does not exceed the nominal working temperatures specified by the gear-motor manufacturer. An optional external cooling system may be required.
- The pump can be supplied with or without a gearmotor. When coupling the pump head with a drive that was not supplied by Tapflo, it is important to follow the limits outlined in section 7.2. *Pump operating conditions*.
- When changing the drive, it is obligatory to check if the drive speed is within the limits of the pump allowable operating conditions.
- For proper gearmotor selection see separate appendix, the *PTL flat pack manual appendix*.
- To maintain the pump head ATEX marking, gearmotor must have at least the same ATEX marking as pump head. PXT pumps are equipped with explosion-proof gearmotors that meet the following requirements:
 - II 2G Ex... IIB T4 Gb
 - II 2D Ex... IIIC T125°C Db

7.18. Earth connection of the pump and other equipment

Connect a suitable earth wire to the stainless steel earth connection that is placed on the pump stand. 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.

Required wire cross-section area $\geq 4\text{mm}^2$.

7.19. 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.

7. ATEX supplementary manual

7.20. Paint thickness

In case of re-painting any of pump part, the thickness of the paint layer must not exceed 2mm.

7.21. Inspection

Check below points before every pump start or at least once a day when operating pump in continuous duty:

- Pump tightness
- If suction port is not obstructed (see section 7.16)
- If suction valve is fully opened (see section 7.16)
- Pump earthing connection

8. WARRANTY

8. WARRANTY

8.1. Warranty form

[illegible]

6. WARRANTY

8.2. Returning parts

When returning parts to Tapflo 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.

8.3. 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, hoses, 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.;

6. WARRANTY

4. The warrantee shall cover the replacement or repairing of any parts, which is documented faulty due to construction or assembling, with new or repaired parts free of charges delivered by Tapflo. Parts subjected to normal tear and wear shall not be covered by the warranty. Tapflo shall decide as to whether the defective or faulty part shall be replaced or repaired.
5. The warrantee of the products shall be valid for a period in accordance to the current law from the date of delivery, under the condition that notice of the alleged defect to the products or parts thereof be given to Tapflo in written within the mandatory term of 8 days from the discovery. Repair or replacement under the terms of this warranty shall not give a right to an extension to, or a new commencement of, the period of warranty.
6. Repair or replacement under the terms of this warranty shall not give a right to an extension to, or a new commencement of, the period of warranty. Repair or replacement under the terms of this warranty may be fulfilled with functionally equivalent reconditioned units. Tapflo qualified personnel shall be solely entitled to carry out repair or replacement of faulty parts after careful examination of the pump. Replaced faulty parts or components will become the property of Tapflo.
7. The products are built in accordance with standard CE normative and are tested (where applicable) by Tapflo. Approval and tests by other control authority are for the customer's account. The products shall not be considered defective in materials, design or workmanship if they need to be adapted, changed or adjusted to conform to national or local technical or safety standards in force in any country other than that for which the unit was originally designed and manufactured. This warranty shall not reimburse such adaptations, changes or adjustments, or attempt to do so, whether properly performed or not, nor any damage resulting from them, nor any adaptation, change or adjustments to upgrade the products from their normal purpose as described in the products operative manual without the prior written consent of Tapflo.
8. Installation, including electric and other connections to utility mains according to Tapflo drawings, is for the cost and responsibility of the customer, unless otherwise agreed in writing.
9. Tapflo will not be liable on any claim, whether in contract, tort, or otherwise, for any indirect, special, incidental, or consequential damages, caused to the customer or to third parties, including loss of profits, arising by any possible infringement of par. 3 above or by the customer or third parties being in the impossibility of using the products.

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

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