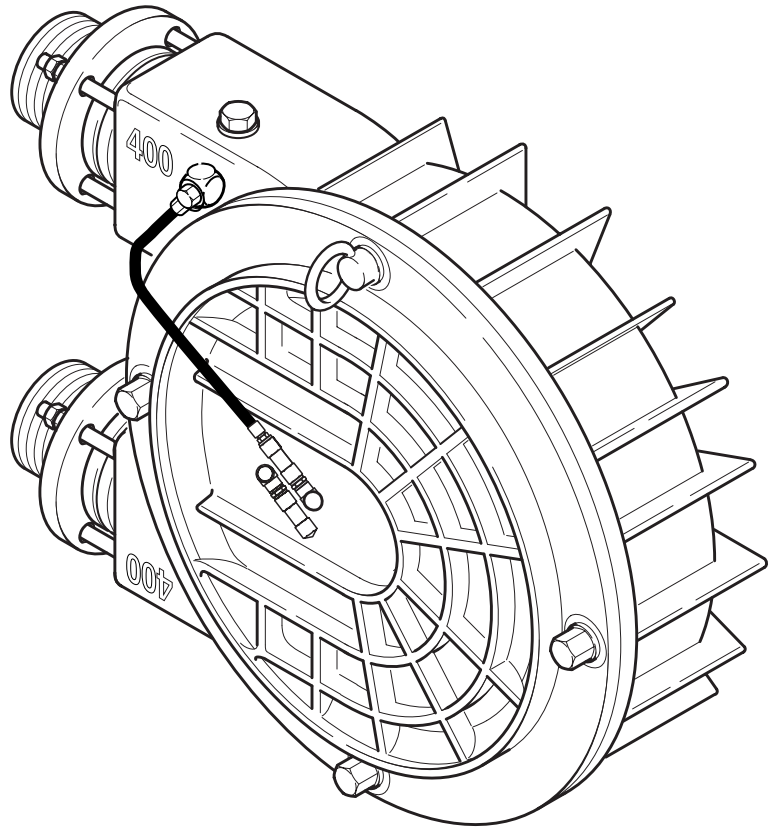


# ELRO®

## Peristaltic Pumps Series XP

Installation, Operation and Maintenance





## **Declaration of Conformity**

**in compliance with the machine directive 98/37/EC**

We hereby declare that the pump units manufactured in series production

Designation: ELRO – Peristaltic Pump  
Series: XP  
Manufacturer: Crane Process Flow Technologies GmbH  
Heerdter Lohweg 63-71  
D-40549 Düsseldorf  
Serial number: (see identification plate)

in the version delivered by us, are in compliance with the following applicable regulations:

EC directive: Machine directive 98/37/EC  
Low voltage directive 73/23/EC  
EMC directive 89/336/EC  
Harmonised standards: EN ISO 12100-1 and 12100-2; EN 294, EN 809

Date / Signature of manufacturer: 2. Juni 2003

A handwritten signature in black ink, appearing to read 'H. Ptak'.

Information on signatory: H. Ptak Managing Director

## Declaration of Manufacturer

**as defined by machine directive 98/37/EC**

We hereby declare that the pump units manufactured in series production

Designation: ELRO – Peristaltic Pump  
Series: XP (without drive)  
Manufacturer: Crane Process Flow Technologies GmbH  
Heerdter Lohweg 63-71  
D-40549 Düsseldorf  
Serial number: (see identification plate)

**in the version delivered by us to be installed in a machine and that any operation is prohibited until it has been confirmed that the machine to be fitted with this pump is in compliance with the EC machine directive, edition 93/44/EEC.**

EC machine directive: Machine directive 98/37/EC  
Low voltage directive 73/23/EC  
EMC directive 89/336/EC  
Harmonised standards: EN ISO 12100-1 and 12100-2; EN 294, EN 809

Date / Signature of manufacturer: 2. Juni 2003



Information on signatory: H. Ptak Managing Director

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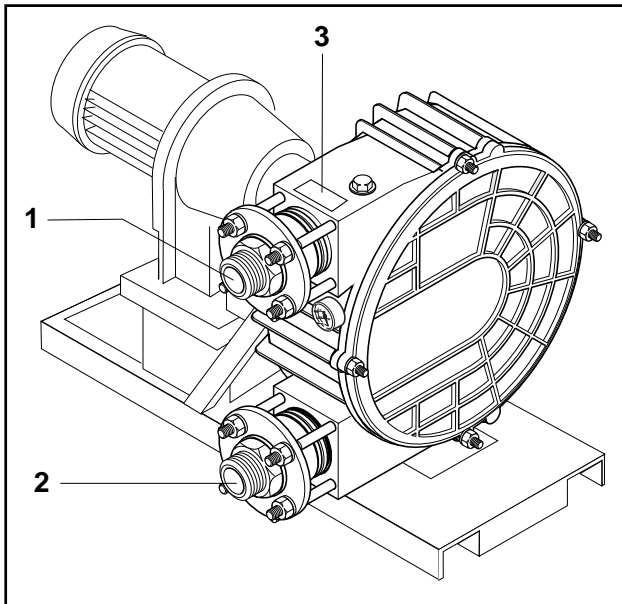
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## 1. General

The following instructions refer only to the pump.

Since the pumps will be used in combination with other assemblies, such as couplings, transmissions and motors, you must also strictly observe and comply with the operating and maintenance instructions for these components, as well as the corresponding notes on safe and reliable operation.

### Schematic installation for peristaltic pumps:



**Fig. 1** Standard Installation

1 suction side      3 identification plate  
2 discharge side

These instructions contain information for the installation, operation and maintenance of ELRO peristaltic pumps.

You should therefore read these instructions through thoroughly before use and always follow the information contained therein.

All personnel involved in activities on pump or equipment associated with the pump must have read this manual, especially the chapter

"Safety" before starting work. This is too late once work has started.

This applies especially for persons who work on the pump only occasionally, e.g. for maintenance and cleaning work.

Each pump is subjected to stringent inspections and function tests before leaving the factory.

You should always bear in mind that correct functioning, a long lifetime and optimal operational reliability of the pump mainly depend on

- correct assembly
- correct start-up
- proper and scheduled maintenance.

Enquiries concerning customer service, spare parts, or repairs should be addressed to the manufacturer or an authorized dealer.

Always provide the following information:

- Series
- Pump size
- Series number of the pump

This information is stamped on the identification plate on top of the pump.

When returning pumps or pump parts to the manufacturer or an authorized dealer for repair or overhaul, the delivery must be accompanied by a certificate stating that the pump is free of product or other aggressive or hazardous substances.

## 1.1 Warranty

The correct function of each ELRO peristaltic pump is checked in the factory before shipment. The manufacturer or authorized dealer assumes warranty for the product as specified in the effective terms of sale and delivery. Faults resulting from non-compliance with the aforementioned regulations and notes can only be rectified at the cost of the customer.

## 1.2 Transport, storage

In order to avoid any problems you should

- check the delivered goods against the delivery note for completeness and correctness,
- check pumps with drive units on arrival of the goods for the corresponding instruction manual for the drive.

Be careful when unpacking the pump and proceed as follows:

- Check the packaging for damages incurred during transport.
- Take the pump carefully out of the packaging.
- Examine the pump for any visible damage.
- Remove the fastenings on the pump connection ports.



**You must check the specified weight before lifting the pump. Only use lifting gear of appropriate capacity. Do not step or stand under suspended loads.**

**Pumps without drive:** The hoisting rope must be slung around pump body and drive shaft.

**Pumps with drive:** The hoisting rope must be slung around the pump body and motor.



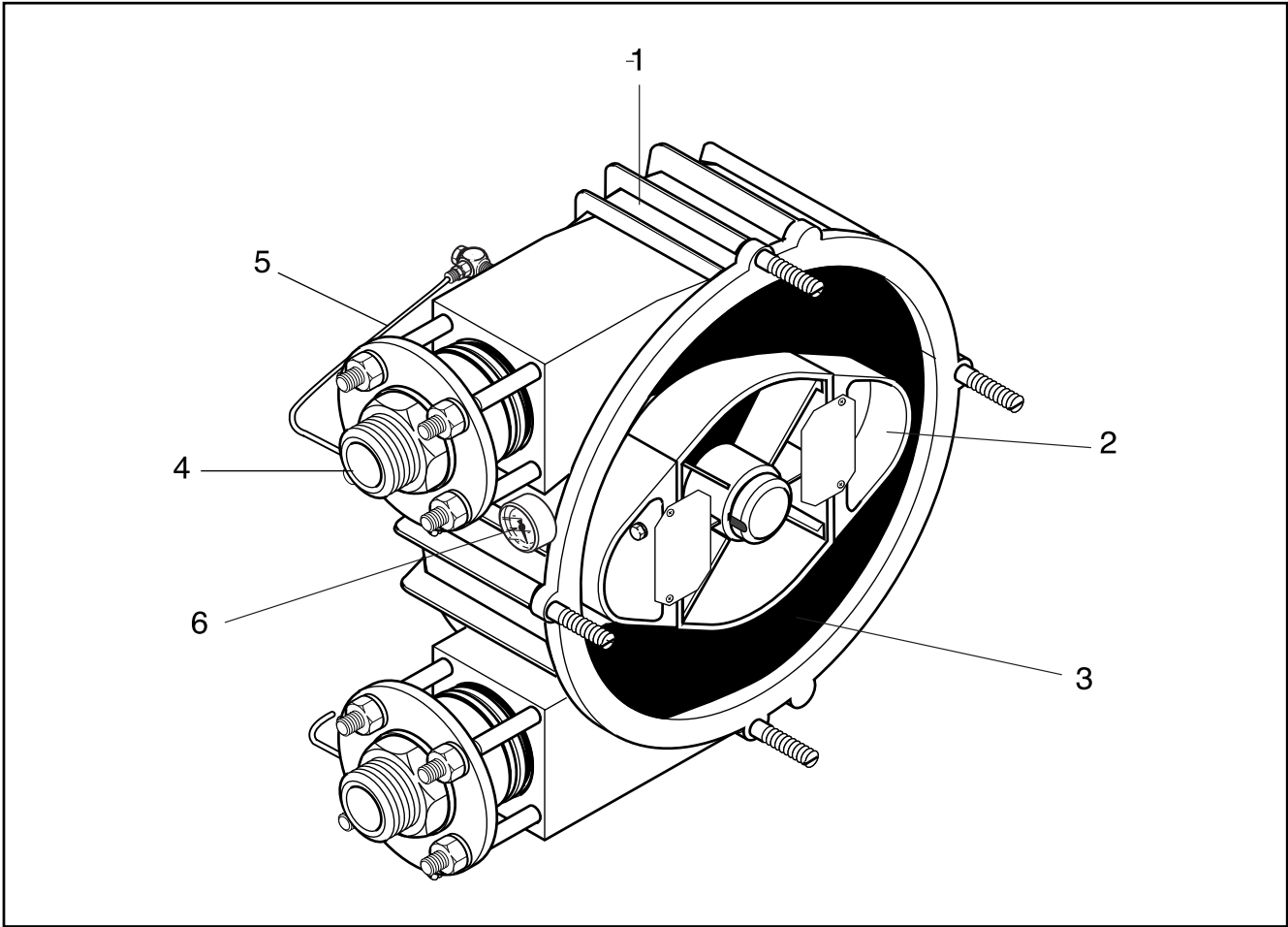
**Caution!**

**In order to avoid slipping of the sling the rope must be crossed over at the hook.**

If the pump is not installed immediately, it should be packed up again and stored in a suitable place. For this the following points must be observed:

- All pump ports must be closed with the appropriate plugs.
- Pumps with corrosion protection must be packed up again and stored in the original packing material.
- The pump is to be stored in a clean, dry and vibration insulated place. If excessive dust and high humidity are expected, the pump should be covered with a material which provides sufficient protection against dampness.

# Peristaltic Pumps Series XP



**Fig. 2**

- 1 *Torsion resistant aluminium housing*
- 2 *Rotor with sliding pieces*
- 3 *Hose with vacuum bore*
- 4 *Connections (standard)*
- 5 *Vacuum channel*
- 6 *Vacuum gauge to monitor the vacuum in the pump*

Peristaltic pumps of series XP work on the basis of a patented vacuum principle.

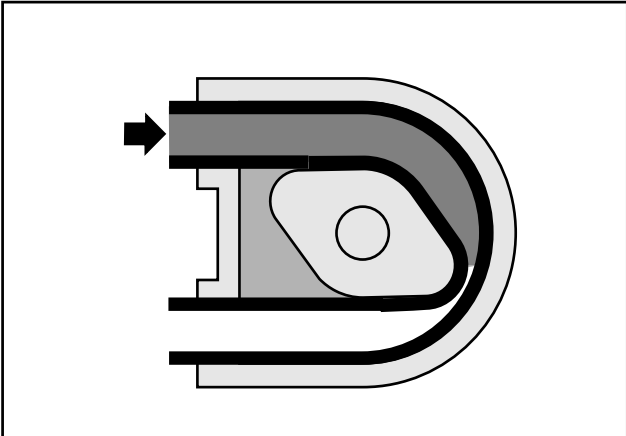
Air is pumped through an additional membrane in the pump cover (see cross section Fig. 2) out of the upper area of the pump housing.

This generates a vacuum inside the sealed aluminium housing. This can be read off the vacuum gauge (6), which is attached to the

pump. Once the pump is switched on the vacuum gauge pointer must begin to move and, depending on the pump type and speed, a vacuum will start to build up (approx. >3min). Otherwise refer to Chp. 6 Troubleshooting.

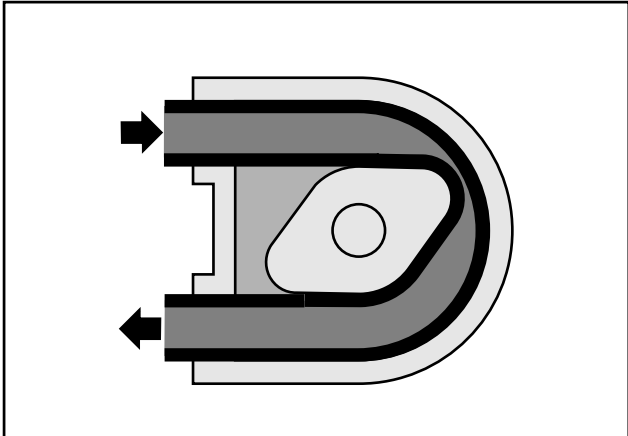
This additionally supports the restoring force of the hose to its original full cross section.





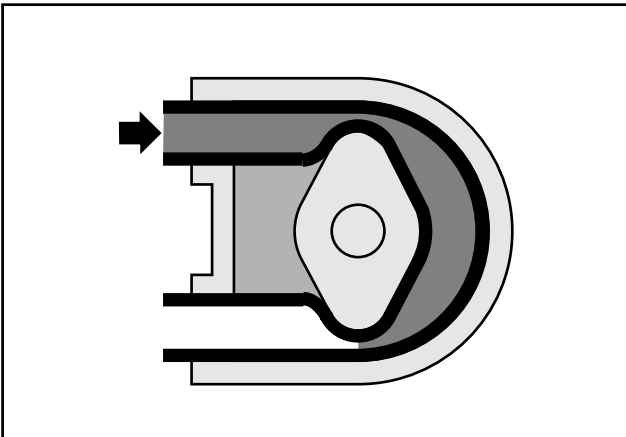
**Fig. 3**

The rotor rotates inside the lubricant filled pump housing and compresses the hose with its outer rotor ends. This process hermetically separates the suction from the pressure side (Fig. 3).



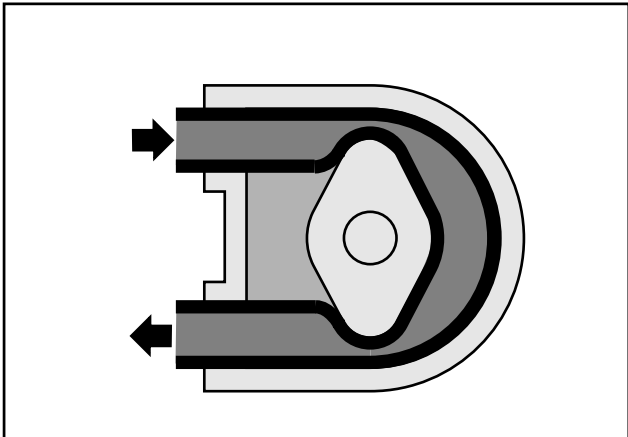
**Fig. 5**

The rotation of the rotor displaces the product inside the hose towards the outlet port on the pressure side. This generates a vacuum in the suction side each time the hose opens, which ensures constant drawing in of product. This can even take place in empty condition (dry priming).



**Fig. 4**

The volume (Fig. 4) between both rotor ends is exactly half the displacement per revolution.



**Fig. 6**

With each rotation of the rotor the two sliding pieces discharge product to the outlet port, while -the same quantity is drawn in by the vacuum on the suction side (Fig. 6).

## 2. Safety

### 2.1 General

Make sure the pump is installed in compliance with all applicable national safety regulations.

Always observe the appropriate accident prevention instructions and implementation instructions.

The following precautions must be applied before performing maintenance work.

If the product to be pumped is a hazardous or noxious substance, the system must be neutralized and vented.



Caution!

#### **Danger of burning!**

**Depending on operating conditions the pump may reach temperatures making it dangerous to touch. You should therefore switch off the pump and let it cool down before touching.**

- Disconnect main drive unit and pump from the electric power supply (e.g. pull out the mains plug).
- Depressurize the pump head.

It is not permitted to run the pump after removing the pump cover. When cleaning the pump manually make sure that all necessary safety precautions have been applied.

All correctly installed, unprofessionally operated or insufficiently serviced machines and pumps are potential safety hazards.

The non-observance of relevant safety measures may cause injury to operating personnel or damage to the pump. On pump systems with safety casing, the casing must be attached correctly before starting operation again.

The pump must be shut down or should be restarted if any defects are found which could affect the operating safety and reliability of the pump.

### 2.2 Intended Use

Peristaltic pumps of series XP have been designed and developed for stationary use and permanent operation in industrial applications.



Danger!

**Pumps without explosion protected drive must not be used in explosive environments.**

Pumping of the following substances is prohibited:

- **combustible gases or vapours mixed with air**
- **combustible fluids of danger class A + B, acc. to VbF**
- **combustible, fluid substances of class III a (appendix C to EVO)**
- **Fluids with ignition temperatures below 200°C must not even be pumped with explosion protected pumps.**



Danger!

**Before using the peristaltic pump check that no chemical reactions can occur on contact of the product with the silicon or glycerin lubricant.**



Danger!

**Pump products which lead to chemical reactions on contact with aluminium may not be pumped with a peristaltic pump under any circumstances.**

Before using the pump for food applications make sure that all pump parts that come into contact with the product have been approved for food.

All normal hygienic requirements for the pumping of foodstuffs must be strictly observed.

**2.3 Unintended use**

The operating safety and reliability of the supplied pump can only be assured if it is used for the purpose it is intended for. The limits mentioned in the technical data sheet must not be exceeded under any circumstances.

**2.4 Operation of pump**

The pump may only be operated by trained, instructed and authorized persons. Any responsibilities must be clearly appointed before starting operation and should always be complied with .

Strictly observe the operating instructions for the connected drive.

**2.5 Conversions and alterations to the pump**

Conversions and alterations to the pump are strictly prohibited.

However, this does not include minor changes, which do not affect safety and reliability, or measures which even enhance safety. Safety features may not be invalidated or altered or used against their intended use .

**2.6 Symbols and notes on safety**



Danger!

Note on danger, which, if not observed, may lead to severe injury or even death.



Warning!

Note on danger, which, if not observed, may lead to severe injury or even death.



Caution!

Note of danger or dangers from insecure handling and working procedures which may cause injury or extensive damage to equipment and property.



Warning - dangerous electric voltage.

Contact with live parts can cause immediate death. Doors and covers (e.g. hoods and lids) marked with this sign must only be opened by "specialists and/or instructed persons" after the repetitive operating voltage (input terminal voltage, operating voltage or external input voltage) has been switched off.



Operating safety of equipment at risk.

Non-compliance with this note impairs operating reliability and cause damages to the pump.

**Attention!** The Attention symbol marks all safety notes in this manual which indicate instructions, guidelines or work procedures which must be complied with.

Further on in the manual these symbols serve to mark danger notes.

## 2.7 Maintenance work

Maintenance work must only be performed by qualified and specially instructed persons. This applies particularly for all work on electric, hydraulic and pneumatic equipment.

Keep unauthorized persons away from the pump.

Mechanical and electrical repairs and maintenance work must only be carried out by qualified specialists. The professional execution of this work must be examined and approved by a highly skilled and responsible "Inspector".

Before starting repair and maintenance work the equipment must be switched off and shut down and secured against unintended or unauthorized restarting.

Before starting work on electrical systems and equipment make sure that the system is reliably de-energized.

Apart from this the pump/system must be reliably secured against unexpected restarting.

- Close the switch and remove the key and/or
- attach a warning sign to the main switch.

The customer (or an „authorized person“ appointed by him) is responsible for compliance with all accident prevention instructions applicable at the place of installation.

As a measure to avoid injury all maintenance, adjustment and repair work should only be carried out using permitted and appropriate tools and working aids.

Blown fuses must not be repaired or bridged and may only be replaced by fuses of the same type.

Cooling facilities, such as ventilation slots, must not be made ineffective.

Rotating or moving parts must be reliably stopped before starting work. It must be assured that these parts will not start to move while work is in progress.

Do not touch rotating parts and always keep a safe distance to avoid clothing or hair being caught.

Always wear protective clothing suitable for the job and the dangers involved.

Depending on the type of work to be performed, sufficient protection may be provided by e.g. wearing the following protective clothing: Protective goggles, ear defenders, working boots, safety gloves, etc.

Protective clothes should be of tight fit.

If your face might come in contact with chemicals, metal splinters or dust during work, you should wear full face protection with safety goggles.

Always wear safety boots as there is a risk of heavy objects tipping over, slipping or coming loose for whatever reason, thereby causing a danger to your feet.

### 2.7.1 Health and safety information on electric equipment

Depending on the version, the pumps may be equipped with electric accessories (controls, motor drives).

Severe damage to health and property can be caused by:

- unauthorized removal of covers
- unprofessional use of pump
- insufficient maintenance

Before starting installation work on electrical equipment this equipment must be reliably de-energized.

Cover non-insulated live power lines and plug connections against unintended contact.

Electric components stored and not used for a longer period of time should be carefully inspected before use, to ensure that the insulation is still intact.

Wet electric assemblies or components parts, which are perfectly de-energized in dry condition, may still be live.

Before touching damp or wet electric components check by measuring whether parts that could be touched are still live.

When working on high voltage assemblies after voltage has been switched off, connect the supply cable via a discharge to ground and short components, e.g. capacitors.

Do not attempt to insert any objects through the openings on pump or attached equipment. This may cause short circuit and electric shocks with danger to life.

### 2.7.2 Health and safety information for work on pressure lines

Always relieve the pressure before starting work on pressure lines.

- Close shut-off valve
- Vent lines



**Be careful when checking for leaks on pressurized lines. Fluids or air escaping under pressure can penetrate clothes and skin.**

**Be careful when loosening or changing pressure lines; lines mixed up by mistake may reverse the function.**

Always relieve the pressure from hydraulic or pneumatic systems and move mobile parts to a safe home or parking position before starting work.

Take care when handling hazardous (caustic, harmful) fluids.

- Always wear your personal protective outfit (e.g. gloves, goggles, tight fitting clothes).
- In case of skin contact, inhalation of harmful vapours or eye injury you should immediately contact a doctor .

### 2.7.3 Regulations and instructions on lubrication

Lubrication work must only be carried out by authorized personnel. The professional execution of this work must be examined and approved by a highly skilled „inspector“.

Unauthorized persons must not be permitted to work on machine or units or in the vicinity of those machines or units.

Lubricants and oils must not come into contact with naked flames or glowing parts.

When working on assemblies and components (e.g. motor, gearbox) you must also consider the specific instructions and lubrication instructions for these assemblies and components .

The complete system must generally be switched off and secured against unintended and unauthorized restarting before starting lubrication work .

(Exception: Lubrication work that can only be performed when the system is running).

As a measure to avoid injury, all lubrication work should only be carried out using permitted and appropriate tools and working aids.

Rotating or mobile parts must be shut down and reliably secured against restarting before starting work.

Do not touch rotating parts and always keep a safe distance to avoid clothing or hair being caught.

Strict cleanliness is of utmost importance during initial filling and when topping up or changing lubricant so that no foreign matter enters through the lubrication point.

Overflowing and spilling of oil must be avoided.

Wipe off excessive and emerging grease.

Avoid skin contact with oils and grease – wear protective clothes.

With certain lubricants, e.g. low flammability hydraulic fluids, the special safety instructions for these substances must be observed. (See notes on packaging and manufacturer instructions).

### 2.8 Noise emission

In a room with several pumps the noise emissions may be very high. Depending on the sound pressure level the following measures should be applied:

below 70 dB(A): No special measures required

above 70 dB(A): Persons who are permanently in the room must wear ear defenders.

above 85 dB(A): Room with dangerous noise level!  
Each door must have a clearly noticeable warning sign to warn persons entering the room that they must wear ear defenders.

Measured sound pressure level: < 75 dB(A) according to ISO 3746.

### 3. Installation Instructions

#### 3.1 Points to be observed before installation

The pump must only be used by professionals and in compliance with the safety regulations (see chapter 2).

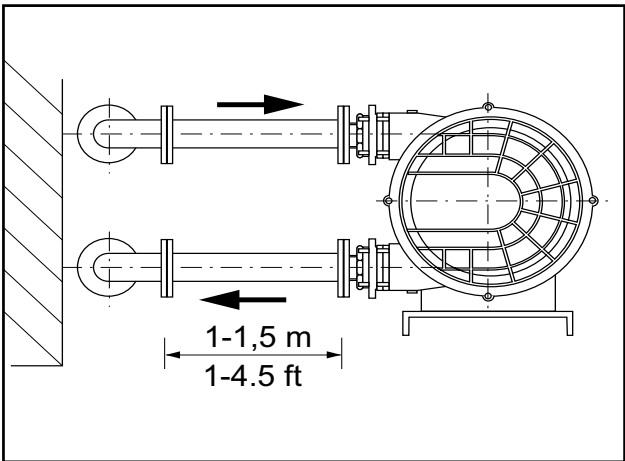


Fig. 7

1. The pump is delivered ready for operation. Before commissioning make sure that pump and drive unit are correctly assembled. The standard pump is delivered with suction port at top / pressure port at bottom – connections on left-hand side (Fig. 7). Pipe lines must be routed in such a way that the weight of the pipes does not rest on the pump.
2. If the pump is to be installed in a rigid pipe system it is recommended to use flexible pipe sections (e.g. expansion joints, pressure resistant hoses) on pressure and suction side to reduce pulsations.
3. In order to avoid damage to the pump new installations should generally be checked for any debris (welding beads, pieces of wire, etc.) in tank and pipeline system.
4. Check the pump arrangement to ensure that suction life and discharge head are not exceeded. Also check motor speed and power in kW.

The pump diagram can be used to check the flow rate at a given speed.

#### 3.2 Installation and connection

The pump unit must be installed and fastened on a level base of sufficient load bearing capacity for the weight of the pump. See foundation plan Fig. 8.

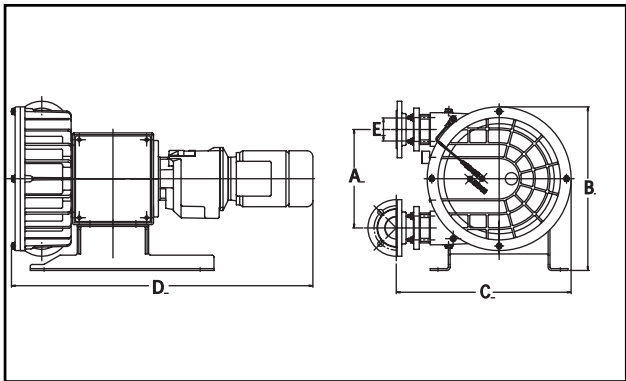


Fig. 8

Type	A	B	øC	D	E	approx. pump weight
XP400	360	330	12	460	380	200 kg

all dimensions in mm (dimension deviations with special frames possible)

Since the pump is a positive displacement pump, it must be assured that the discharge piping has no shut-off elements, pipe tapers or components that could cause clogging of the piping.

An On/Off-switch with locking against switching on (e.g. lockable switch, switch with detachable switching lever) should be installed near the pump.

This is a precaution to avoid accidents, e.g. when inspecting the inside of the pump. To protect the pump from overloading it is recommended to install a motor overload breaker.

# Peristaltic Pumps Series XP

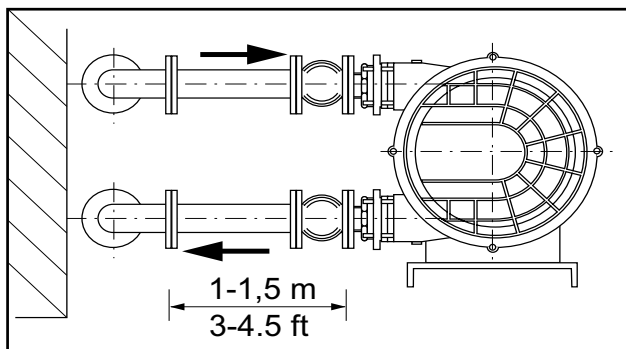


**Electrical installations and connections must only be carried out by a qualified electrician.**

In order to ease the necessary service work it is recommended to install approx. 1 - 1.5 m removable lines (hoses or pipes) between the pump ports and pipe system (Fig. 9). This provides sufficient working space for changing the pumping hose.

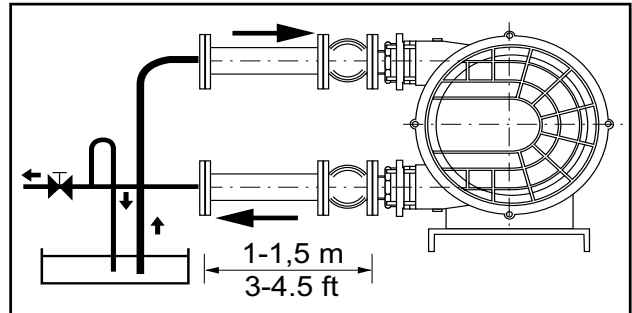
The pump cover must always be easily accessible!

Peristaltic pumps are variable displacement pumps, which produce a pulsating product flow. In order to prevent these pressure shocks from being transferred into the piping system, both pressure and suction sides should be fitted with expansion joints (Fig. 9). As an additional measure to minimize pulsation, the pressure pipe can be fitted with an active pulsation damper. These must be adjusted to the respective working range. For optimal results refer to the installation instructions provided by the respective manufacturers of expansion joints and pulsation dampers.



**Fig. 9**

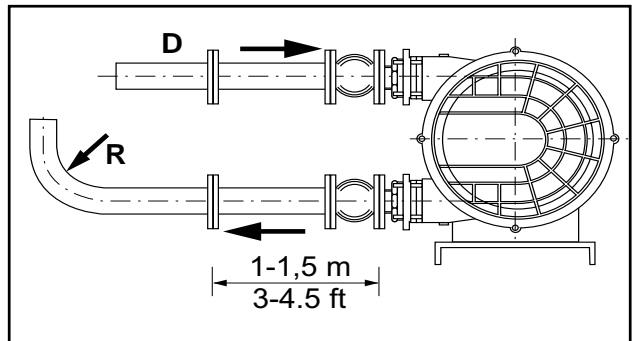
The use of shut-off valves in the pressure line requires the installation of an overflow valve with return line (or bypass or an overpressure switch) in order to avoid damage to the peristaltic pump caused by operating errors (Fig. 10). Should this not be possible, the pump must be switched off before switching off the valve.



**Fig. 10**



**Peristaltic pumps must never be operated discharge side against closed shut-off elements!**



**Fig. 11**

The inner diameters of the suction and pressure lines should be at least the same size as the pumping hose. The ideal radius for elbows is  $> 2 - 3$  the pipe diameter.

When pumping highly viscous fluids ( $> 10,000$  mPas) the diameter of the suction line should be as big as possible, but its lengths as short as possible.

For highly viscous fluids ( $> 10,000$  mPas) the diameter of the suction line should be one size bigger than the connection socket on the pump. Make sure that the pump speed is reduced by using a frequency converter.



## 4. Operating Instructions

### 4.1 Points to be observed before commissioning

#### Please check:

- that the max. permissible pump product temperature of max. 80°C is not exceeded.
- that the max. permissible discharge pressure of max. 13 bar is not exceeded. If necessary install an overpressure valve or sensor.
- whether the pump is correctly installed and connected.
- whether the sense of pump rotation is correct.

The sense of rotation clockwise, when viewed from the pump cover (if not specified differently by the customer).

An arrow on the pump casing marks the sense of rotation; a pump with integrated vacuum system is not suitable for both rotation directions.

- that the pump without explosion protected drive is not operated under any circumstances in explosive environments.
- whether the pumping hose inside the pump is suitable for the product to be pumped.
- whether suction and pressure lines are correctly connected.
- whether switches and power connections for the drive are correctly connected.
- whether the pump is correctly earthed in order to avoid electro-static charging.
- whether the ventilation bore on the gearbox is free and open.

- For the electric motor an overcurrent relay must be installed. For this the wiring diagram in the electric junction box must be observed.
- On engines with thermal circuit breakers all cables and terminals are arranged inside the junction box of the motor. These must be connected so that the motor is stopped when the switch is triggered.

### 4.2 Start-up

The drive unit is to be started up in accordance with the respective operating instruction.

Check the lubrication of the drive unit. Gear motors and regulating gears are filled with grease lubricant as standard. In case of oil lubrication the oil in the gear housing must be checked and, if necessary, filled up before commissioning.

Make sure that all safety installations are fastened and fully functional.



**The peristaltic pump must not be operated against closed shut-off valves.**

**The pump housing must always be filled with a sufficient amount of sliding fluid.**

#### Switching in

The pump starts when the main switch for the drive is switched on.

#### Switching off

Switch the main switch for the drive unit off again.

## 4.3 Taking out of service

**Attention!** Always observe the safety instructions in chapter 2 of this manual.

The shut-down procedure for maintenance, installation and cleaning work must only be performed by authorized and trained personnel.

1. Switch off the electric power supply and secure against unintended restarting.
2. Close shut-off valves on suction and pressure side.
3. Relieve the pressure in suction and pressure lines.



**Danger!**

**Fluids emerging under pressure can cause severe damage.**

**Take care when loosening pressure fittings: wear protective clothing.**

**Particular care should be taken when handling dangerous fluids.**

**You should immediately consult a doctor if you had contact with such substances.**

4. Loosen suction and pressure fittings carefully. The system may still be under pressure or tension.
5. Disconnect suction and pressure lines from the pump and disassemble the rinsing line (if present).
6. If symptoms of wear are detected when inspecting the pump, the respective parts must be replaced.

## 5. Maintenance

**Attention!** Always observe the safety notes with all maintenance work and conversions, chapter 2!

Check all lines and fittings regularly for leaks and externally visible damage!

Eliminate any faults immediately!

Peristaltic pumps of series XP require only little maintenance. Ball bearings and radial seals in the pump neck are lifetime lubricated by the silicone oil or glycerine filling.

The drive must be serviced according to the instructions of the respective manufacturer.

The pumping hose is the only wear item on the pump.



**Pumps with electric drive must generally be switched off and disconnected from the electric power supply before starting maintenance work!**

**Attention!** If the pump is used for aggressive, caustic or toxic media, the pump must generally be flushed with a neutral agent before opening the pump housing.

### 5.1 Cleaning

**General notes:**



**Caution!**

**Always wear protective clothing when working with solvents or cleansing agents.**

Housing, cooling fins, openings and covers on equipment components are very often not just protections, but have additional functions such as cooling, insulation, noise reduction, splash protection, etc.

After each use, the pump should only be stored with completely empty and clean pumping hose. This can be carried out by using appropriate hose cleaning balls or small cloths.

Some of these functions can be extremely impaired or may become totally ineffective as a result of dirt deposits.

Here is some advice on how to remove dirt.

- Dried on dirt can be removed by e.g. scratching, scraping or brushing
- Minor dirt deposits, such as layers of dust and fine deposits can e.g. be wiped off, cleaned off with a vacuum cleaner, removed with a brush or broom

**5.1.1 Cleaning foodstuff pumps (CIP = Clean in place)**

The pumps can be cleaned manually after disassembly or in place (CIP). Special application dependent cleaning procedures can be obtained from pump suppliers.



**Caution!**

**Do not touch pump or pipes. Danger of burning.**

**Always wear your personal protective outfit when handling chemicals.**

**Always flush the system thoroughly after.**

**Always observe the applicable regulations when storing or handing out chemicals.**

Possible CIP-cleaning procedure for pumping hoses made of natural rubber.

1. The pump must be flushed with cold water to clean the pumping hose.
2. For products susceptible to sticking or incrustation we recommend having cleaning balls available.

3. Flush the pump with hot water (max. 90°C) for max. 20 minutes (when using a frequency converter run a slow speed).
2. Clean with an approx. 2.5% alkaline soda solution.
3. Finally flush with cold water.

**5.1.2 Selection of pumping hoses**

Peristaltic pumps may be fitted with hoses of various materials, depending on the application.

The following materials are available:

**Colour code**

Natural rubber (NR) technical	yellow
Hypalon (CSM)	black
Nitrile rubber (NBR/FDA)	red

Before installing a new hose you should make sure that the hose material suits the intended application (see compatibility list). If the hose inside the pump has not been damaged by normal mechanical wear, but by chemical influences, you should use a hose of different material.

If necessary, please contact the authorised dealer or manufacturer for checking and advice.

## XP 400

### Note:

The following notes on installation apply for pumps of series XP 400

### 5.2 Replacing the pumping hose

If after a short period of operation the pointer does not move on the vacuum gauge, then the pumping hose must be exchanged. Observe chapter 6 Troubleshooting when installing a new pumping hose.

#### 5.2.1 Removing the old pumping hose

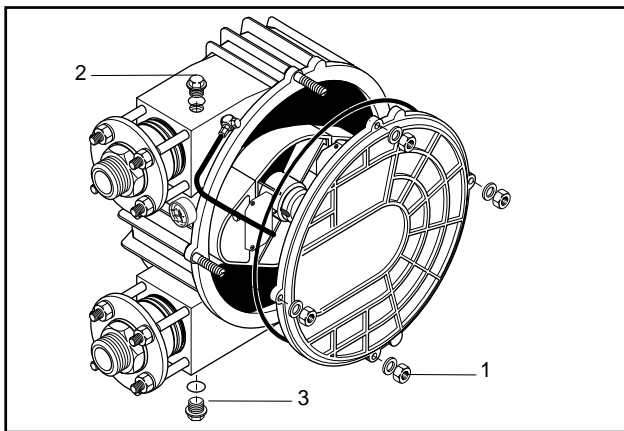
1. Switch off the pump and secure it against switching on, disconnect suction and pressure side from the pipeline.



**Danger of burning with hot pumping product (max. 80°C)**

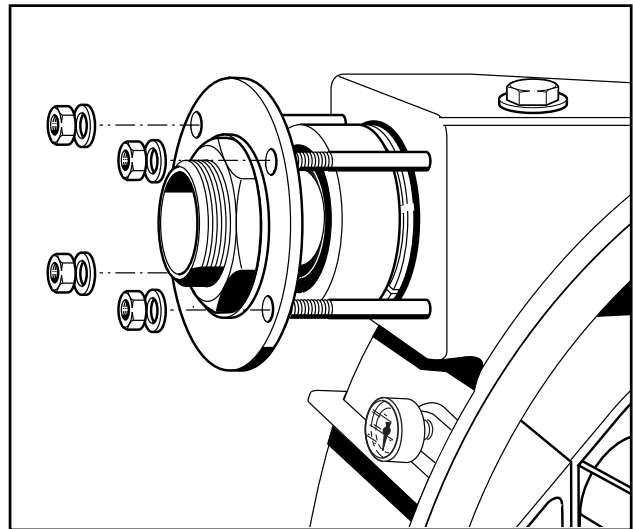
**Caution!** Before removing the pumping hose allow the pump to cool down to a touchable temperature.

2. Place a container under the pump to catch the sliding fluid.
3. Unscrew plugs (2+3, Fig. 12) and let the sliding fluid run into the container.



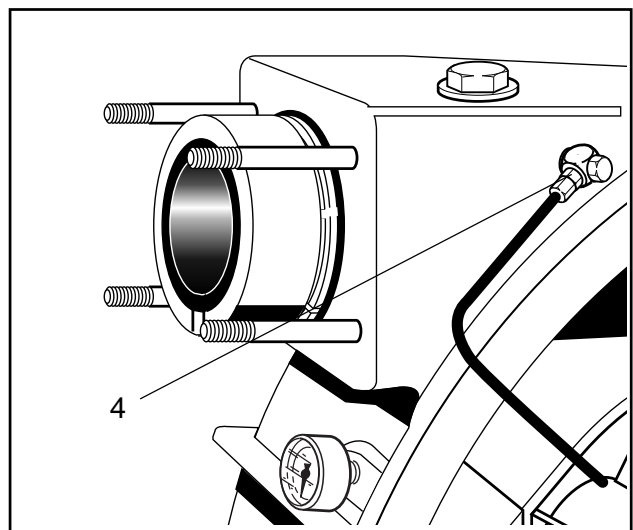
**Fig. 12** 1 Cover fastening nuts  
2 Oil filler bore with plug  
3 Oil drain bore with plug

4. Then dismantle the ventilation pipe (Fig. 14). Remove retaining ring, segment ring, step ring and O-ring from the pumping hose (Fig. 14).



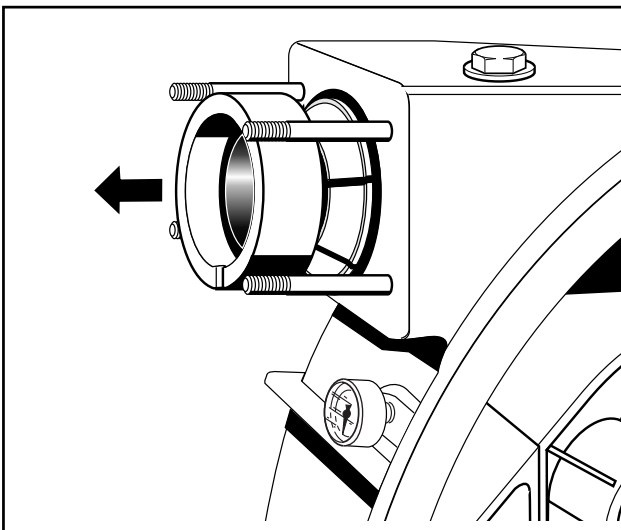
**Fig. 13**

5. Unscrew 4 cover fastening nuts 1 (Fig. 12), take off pump cover and O-ring and let the rest of the sliding fluid flow out of the pump housing into the container .



**Fig. 14** 4 Ventilation pipe

6. Unscrew both connecting sockets complete with retaining flange and hexagon tube nuts from the pump housing (Fig. 13) and pull both connecting sockets out of the pumping hose.
7. Attach pump cover with O-ring and tighten slightly with nuts.



**Fig. 15**

8. Switch the pump on for a moment, so that the pumping hose is pushed out of the pump housing (keep on pulling the pumping hose out of the housing).

**Attention!** Perform this process with the utmost attention. In case of failure switch the pump off immediately.

9. Remove pump cover and O-ring again and inspect the inside of the housing.

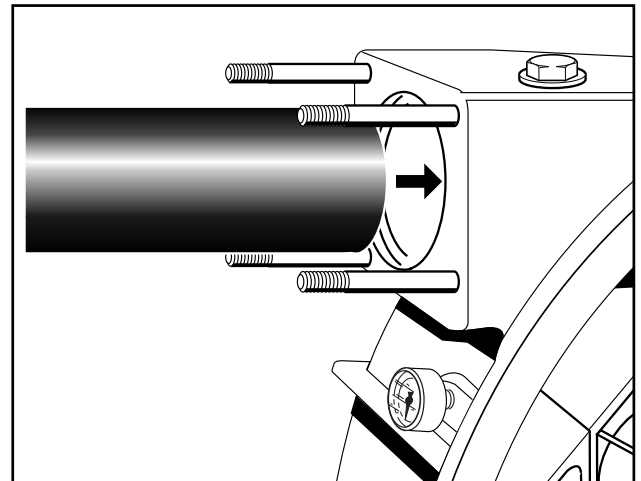
## 5.2.2 Inspecting the inside of the pump

Before installing a new pumping hose clean the inside of the pump housing and check for damage.

Replace damaged parts.

## 5.2.2.3 Installing the new pumping hose

1. Attach the pump cover with a new O-ring and tighten the nuts.



**Fig. 16**

2. Slightly lubricate one end of the pumping hose with sliding fluid and push it into the suction port of the pump (Fig. 16), until the hose abuts.

Before lubricating the new pumping hose please check that there are not packaging residues in the pumping hose and in the vacuum channel.

Place a few drops of lubricant in the vacuum channel.

3. Switch the pump on for a short moment, so that the rotor can pull the pumping hose step by step into the pump housing, keep pushing to assist.

Once the pumping hose has reached the opening on the pressure side of the pump housing switch off the pump and guide the pumping hose with a round steel bar through the opening in the pump housing (**do not use any tools with sharp edges**). Switch the pump on again for a short moment, so that the correct installation position can be reached.

Pumping hoses are delivered in correct installation lengths. The correct installation position is reached when the hose section protruding from the opening in the pump housing matches the non-threaded part of the studs (Fig. 17).

If the hose protrudes too far out of the pump housing on the pressure side, it must be completely removed and reassembled again.

4. Completely assemble the connecting socket on the pressure side. Start by assembling the new O-ring to the step ring (Fig. 18).

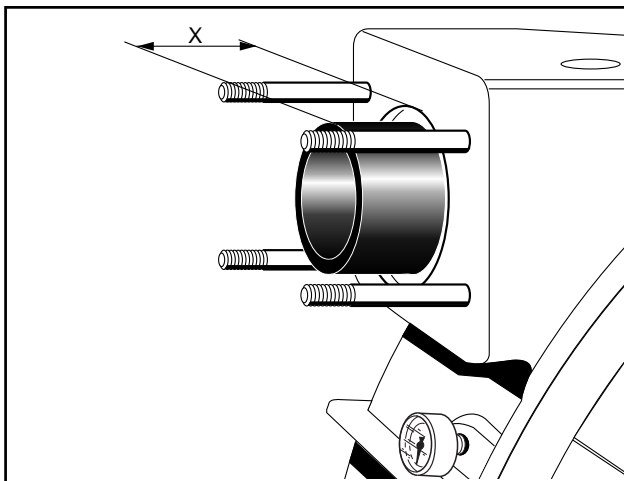


Fig. 17

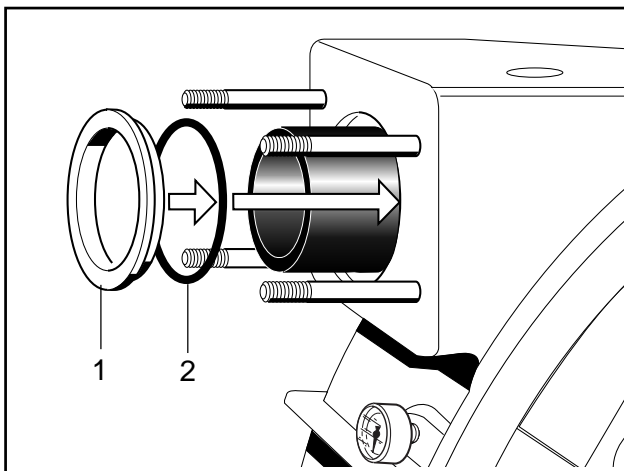


Fig. 18  
1 Retaining ring  
2 O-ring

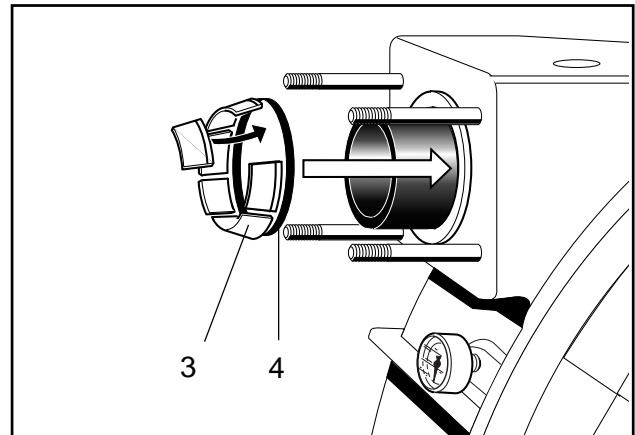


Fig. 19  
3 Segment ring  
4 Retaining rubber

Then assemble the segment ring with the help of a retaining rubber (Fig. 19). This retaining rubber helps to keep the individual segments in position.

Then insert the connecting socket carefully into the pumping hose and tighten the retaining flange evenly.

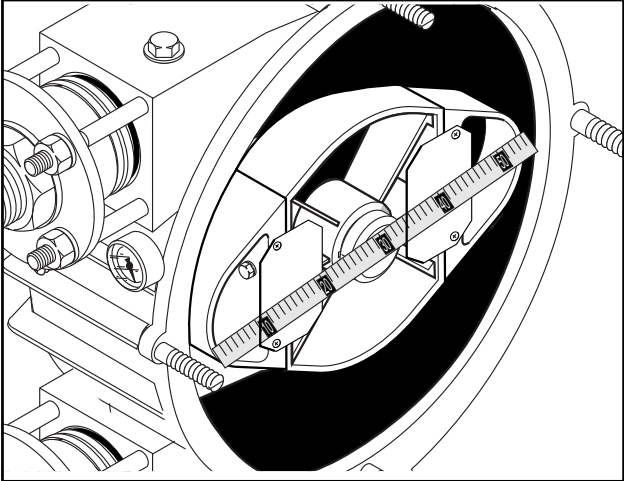
**Attention!** Perform this process with the utmost attention. In case of failure switch the pump off immediately.

Switch the pump on again for a short moment, so that the end of the hose on the suction side is pulled to the correct installation position.

5. Assemble the connecting socket on the suction side. Assemble the connecting socket as described under Point 4.
6. Close the oil drain bore, fill in sliding fluid (see chapter Technical Data). Fill in sliding fluid through the oil filler bore.
7. Turn the plug back in (do not forget the seal ring).
8. Assemble ventilation pipe.

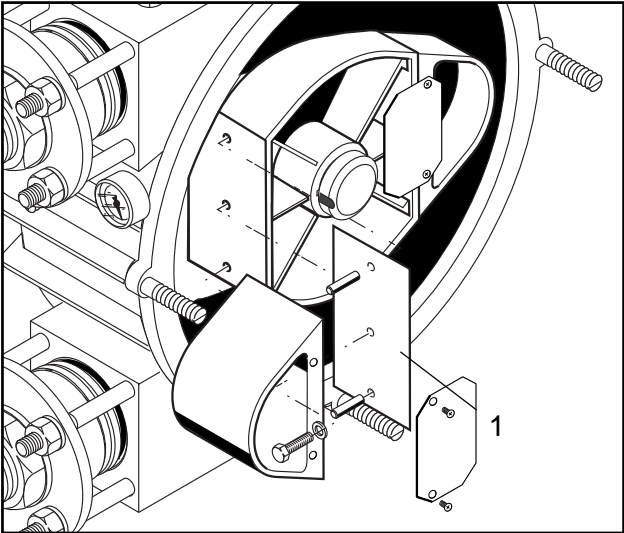
**Attention!** Pumping hose with vacuum bores may not be operated without ventilation pipes under any circumstances.

**5.3 Pump conversion for different pumping pressure**



**Fig. 20**

Each pumping hose is adjusted to the desired pumping pressure ex factory. Should an application related change in pumping pressure become necessary, the desired pumping pressure can be adjusted by changing the rotor diameter (Fig. 20).



**Fig. 21** 1 shim

1. Switch off pump and secure against switching on.
2. Drain off the sliding fluid (see chapter 5.8.1)

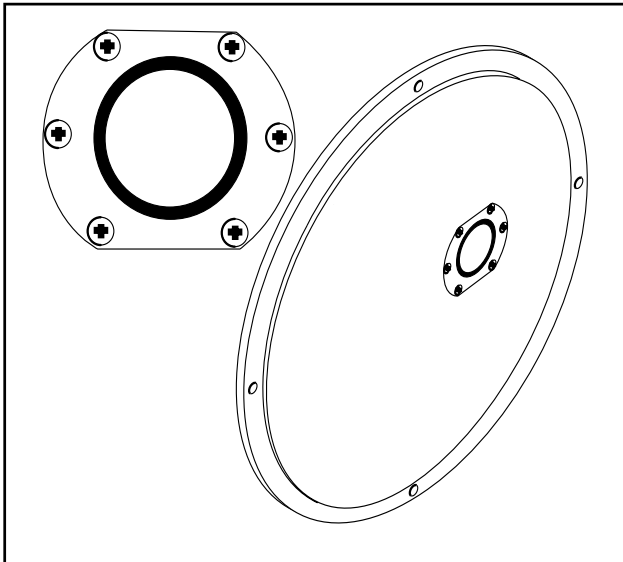
3. Remove pump cover with O-ring.
4. Turn the rotor by hand until one sliding piece is free.
5. Then the shims (Fig. 21) must be removed to reduce the pumping pressure or additional shims must be added to increase the pumping pressure. If shims are changed, you must make sure that both sliding pieces are changed to the same dimension. The measurements must comply exactly with the table (see below).
6. Fasten the pump cover again with O-ring (see chapter 5.8.3).
7. Close the oil drain bore.
8. Fill in sliding fluid.
9. Turn the plug back in.

Pressure	Diameter
0 - 2 bar	362 mm
2 - 4 bar	363 mm
4 - 6 bar	364 mm
6 - 8 bar	365 mm
8 - 10 bar	366 mm
10 - 13 bar	367 mm

**Attention!** When changing the rotor dimension use shims evenly on both sides.  
 At pumping product temperatures (>60°C) generally use one shim less than the actually required pressure stage.

### 5.4 Exchanging the vacuum membrane

Each time the hose is changed the vacuum membrane should also be changed. The vacuum membrane is located on the reverse of the pump cover. It is held by a clamp ring which is secured with 6 screws. The vacuum membrane can be removed by loosening the screws. The membrane is reassembled by evenly tightening the screws.



*Fig. 22*



**6. Troubleshooting**

<b>Problem</b>	<b>Possible cause</b>	<b>Solution</b>
No pump flow	Pressure and suction valves closed	Open valves
	Wrong direction of rotation	Reverse rotation
	Suction line blocked	Remove blockage
	Leaks in suction pipe (entering of air)	Find and eliminate leaks
	Suction head too high	Pay attention to vapour pressure, possibly change arrangement
	Motor incorrectly connected	Check installation
Pumping power too low	Discharge pressure too high	Reduce pressure Find and eliminate leaks
	Leaks in suction pipe	Check speed and electric wiring
	Speed too low	Remove blockage
	Suction line blocked	Reduce viscosity or redesign pump
	Viscosity too high	Increase suction pressure
	Insufficient suction pressure	Replace these parts
	Pump parts worn	
Pump builds up no vacuum (no display on vacuum gauge)	Check direction of rotation	Motor incorrectly connected
	O-rings on connecting socket or on pump cover damaged	Renew O-rings
	Sealing rings on plugs damaged or missing	Renew sealing rings

## Peristaltic Pumps Series XP

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<b>Problem</b>	<b>Possible cause</b>	<b>Solution</b>
Pump loses suction ability	Leaks in suction line	Find and seal leaks
	Suction head too high or air or gas in fluid	Increase suction pressure, degas fluid
	Pump worn	Examine, if necessary replace parts
	Speed too low	Increase speed
Pump makes noises	Cavitation	Increase suction pressure
	Pump worn or defective	Examine, if necessary replace defective parts
	Air or gas in fluid	Degas fluid
	Solids in fluid	Install dirt catcher in suction line
Drive heats up or is overloaded	A certain amount of heating with electric motors is normal	Check the current consumption to be sure
	Discharge pressure too high	Reduce the pressure, check the pressure gauge
	Fluid more viscose than intended	Install a stronger motor
	Speed too high	Reduce the speed
	Pump parts seized or sticking	Examine and change pumping hose conditions
	Motor incorrectly connected	Check connection and change, if necessary
	Suction or ventilation pipes leaking or squashed	Reseal or renew

<b>Problem</b>	<b>Possible cause</b>	<b>Solution</b>
Pumping hose service life insufficient	Chemical attack. Hose swollen or peeling	Check chemical compatibility of hose material on the basis of the resistance list, if necessary contact the authorized dealer or manufacturer.
	Too high speed	Reduce speed using a frequency converter
	Too high pumping pressure	Change the pressure side relations (reduce), increase the hose service life
	Abrasive solids-containing medium	Check pumping hose and if necessary reduce speed
	Washouts in pump hose	Back flow, i.e. too high pumping pressure, change the rotor setting according to the pressure table, installation of pressure gauge
	Pumping hose defective on discharge side (pressure stop)	Pump driven against closed shut-off valve
	Pumping hose burnt externally	Too little sliding fluid or wrong sliding fluid

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We reserve the right to modifications to all technical specifications.

