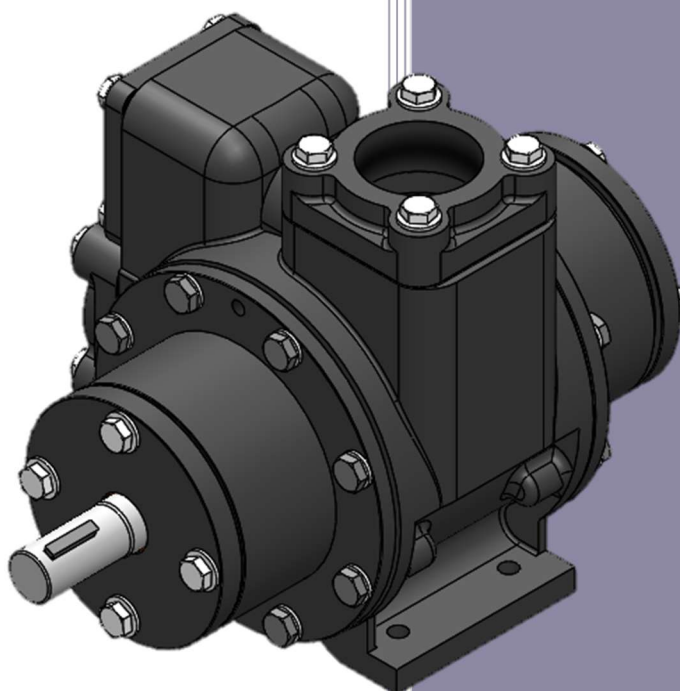




INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

MODEL : TP2.5''



IOM INSTRUCTIONS – TP SERIES 2.5''

VERSION

Version	Date	Author	Approval	Content
A	01/07/2019	A. SCHMITT	V. GUILLEMAUD	Creation of the document
B	29/08/2019	A.SCHMITT	V. GUILLEMAUD	Updating the pump name

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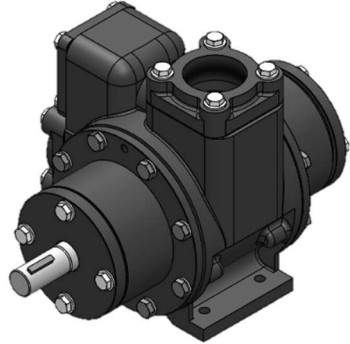
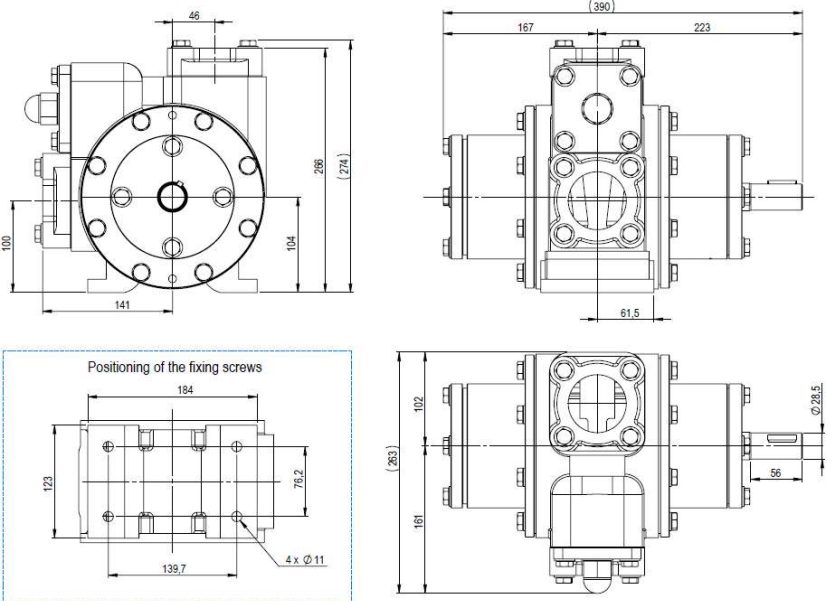
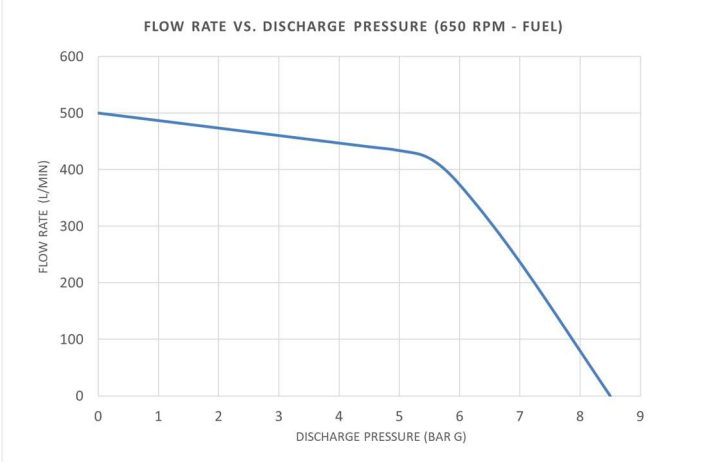
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IOM INSTRUCTIONS – TP SERIES 2.5''

I. TECHNICAL DATA

A. TECHNICAL FEATURES OF THE PUMP TP SERIES 2.5''

TP SERIES 2.5''		 
Flow rate	400 / 500 L/min	
Speed of rotation	650 RPM	
Dynamic viscosity*	0 / 500 cP	
Operating pressure	0 / 5 bar g	
Normal suction pressure	-0,4 / 3 bar g	
Operating temperature	-25 / +55 °C	
Sealing type	Mechanical seal	
Maximal size of solid particles	100 µm	
Body material	Cast iron	
Rotor / vanes material	Steel & Plastic	
Weight	52 kg	
Inlet / outlet flange	2 ½ BSPT	
		
		
* Note: speed of rotation has to be adapted for high viscous fluid up to 4250 cP.		

B. IDENTIFICATION OF THE MAIN COMPONENTS

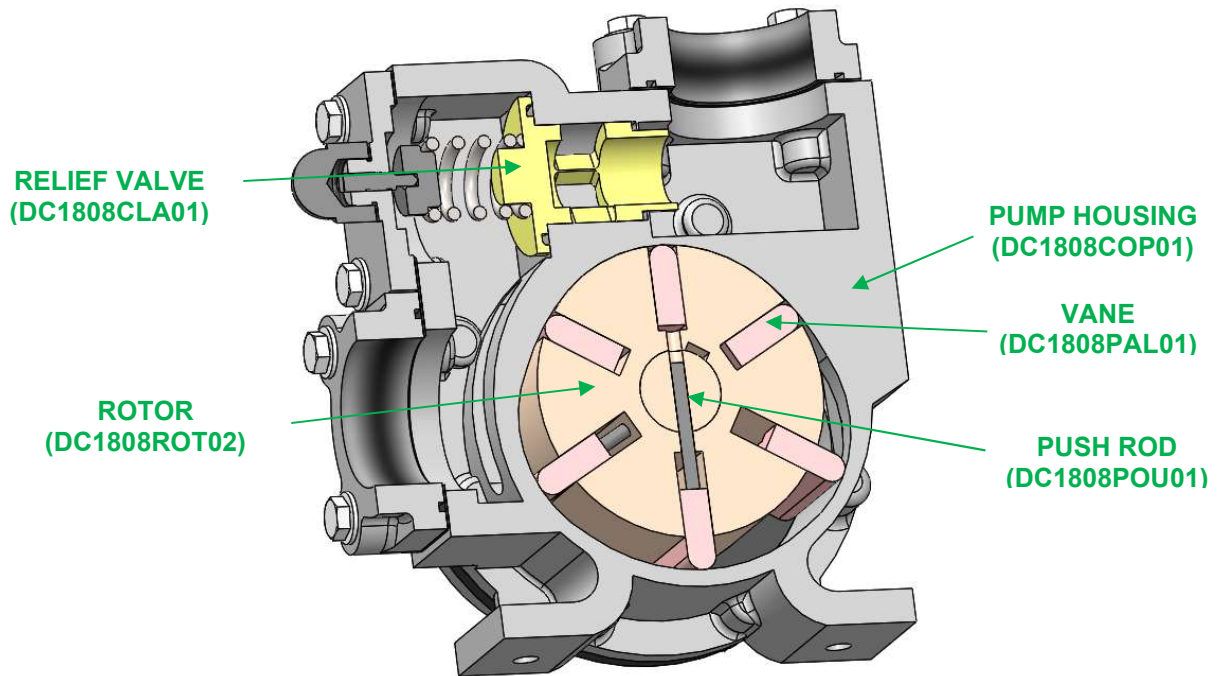


Figure 1 : inside view of the pump

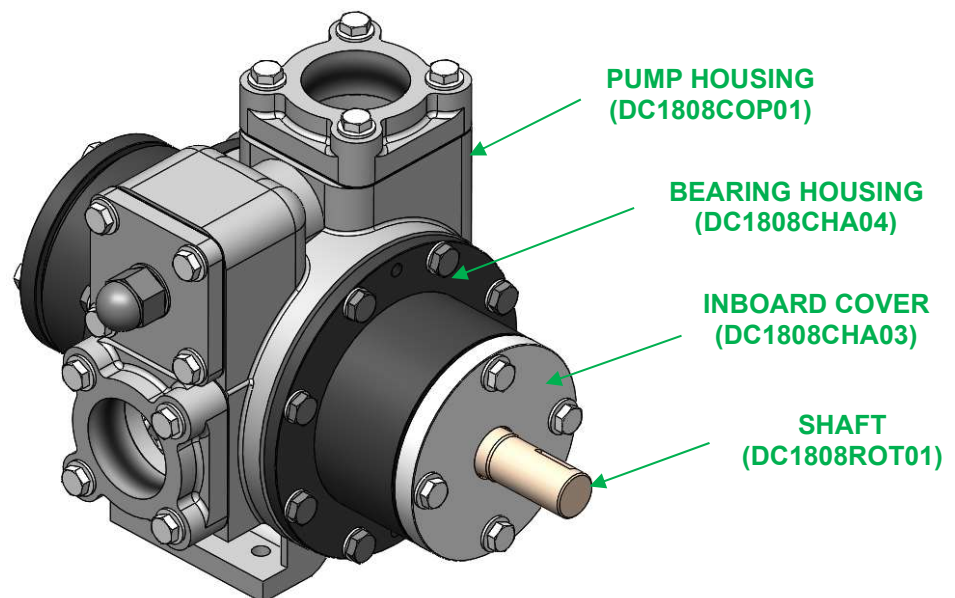
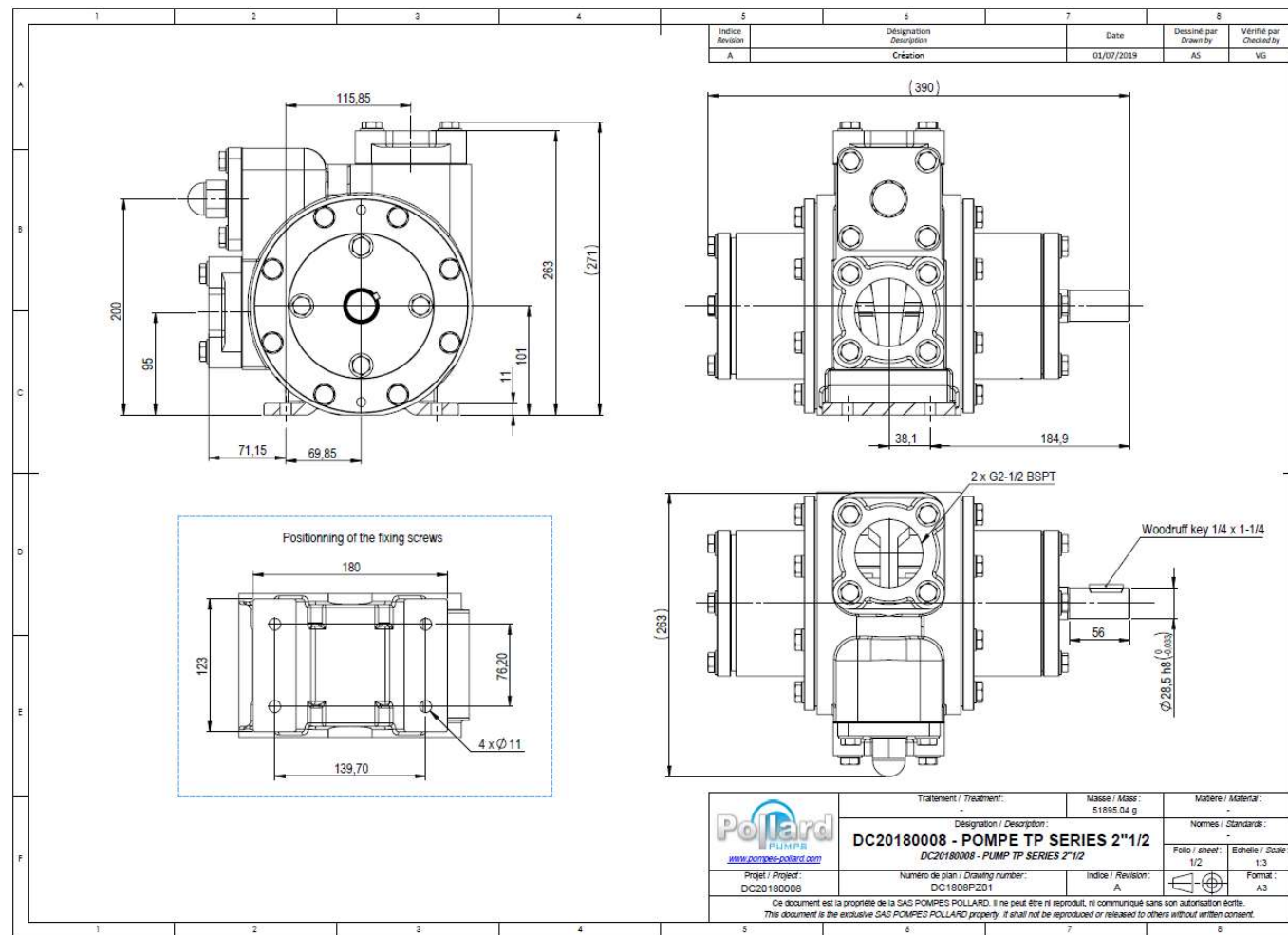


Figure 2 : outside view of the pump

IOM INSTRUCTIONS – TP SERIES 2.5”

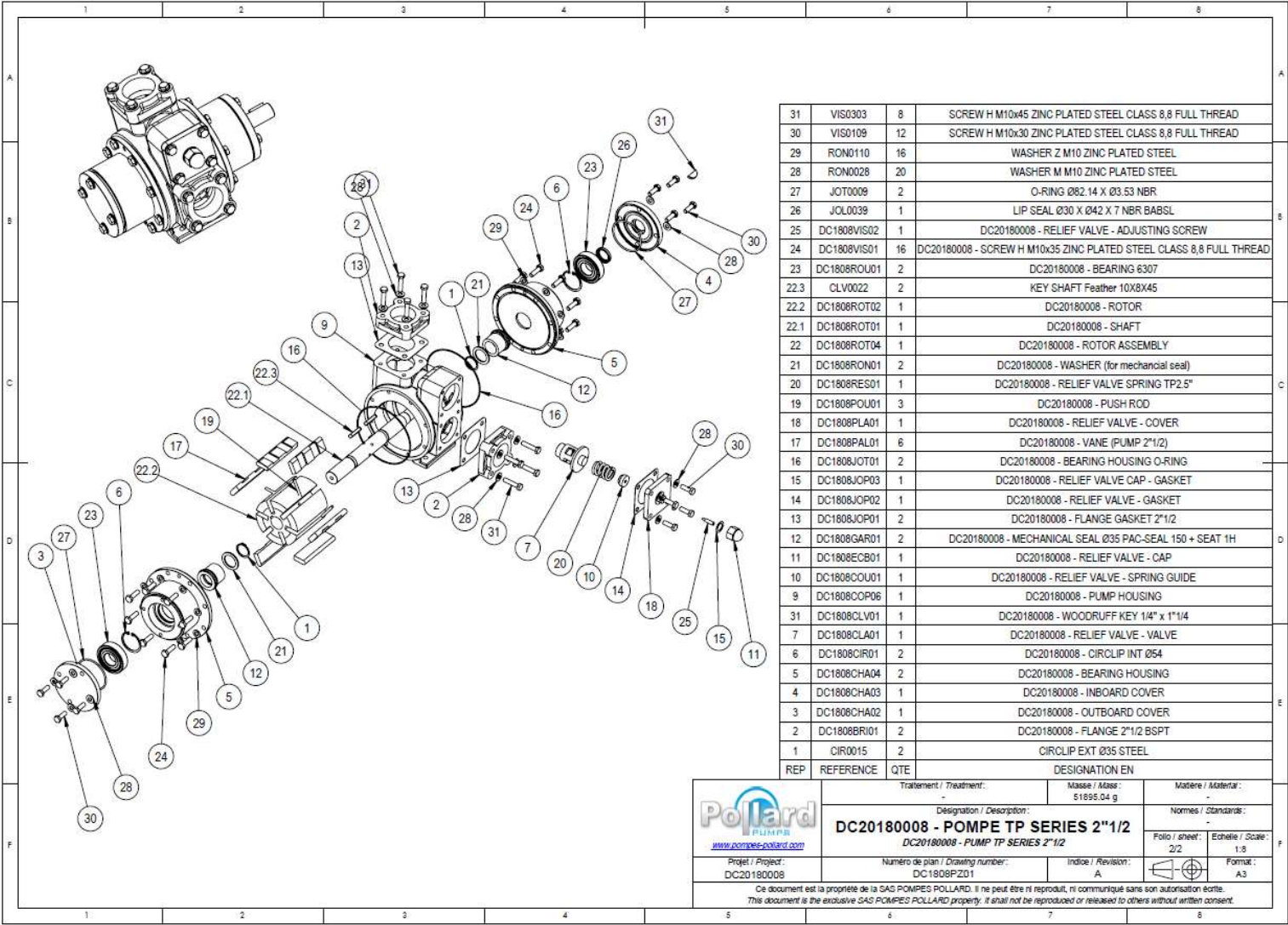
C. GENERAL ASSEMBLY DRAWING OF THE MAIN COMPONENTS

1. DIMENSIONAL DRAWING OF THE PUMP



IOM INSTRUCTIONS – TP SERIES 2.5”

2.EXPLODED VIEW OF THE PUMP



II. SECURITY

A. PICTOGRAMS USED

	General danger		Explosion risk
	Electrical danger		Mandatory protection of hands
	Do not touch		Mandatory protection of face
	Corrosive substances		Mandatory protection of body
	Stumbling risk		

B. OPERATING CONDITIONS

The employer must inform his employees about the guidelines of the implementation and maintenance of the present equipment using this instruction manual. The staff must be informed about the instruction contained below:

- Equipment operating conditions and maintenance prescriptions.
- Additional relevant instructions regarding these operations.
- How to react to predictable abnormal situations.
- Additional safety information resulting from previous experiences which may decrease accident risk.

Under the French law, it should be noted that the staff information is made mandatory by the Labour Code.

IOM INSTRUCTIONS – TP SERIES 2.5”

C. SAFETY INSTRUCTION



- This pump cannot run dry. Dry running will create friction heat which will damage the pump.



- The housing, the piping and fittings are under pressure. No one must ever remove any security or protection, or unscrew any bolts, because it may induce damage to goods or persons.



- Insufficient control and maintenance may result in accidents to goods and persons, especially when toxic or dangerous liquids are being pumped.



- The pump cannot be used in any case in a classified area. Using the pump in a hazardous location or in an environment requiring a higher level of protection is forbidden. Please, use components adapted to the applicable safety standards.



- When a pump is purchased without motor, the coupling with the engine must respect the technical norms and safety rules. After maintenance operations, the appropriate protections should always be upgraded around the rotating parts (couplers, shaft, ...). In particular, as soon as the running of the motor pump is possible (start up, nominal operating ...), a bellhousing or any protection system should never be removed or loosened.



- The general installation requires an appropriate cooling ventilation and sufficient maintenance space.

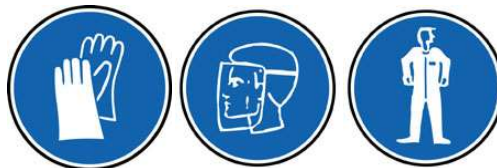


- Electrical components can be under high voltage. In the case of an electrical power supply, operation on electrical parts have to be carried out by qualified staff, trained to respect technical instructions and to use standard rules, and only after allowance from the equipment responsible.

IOM INSTRUCTIONS – TP SERIES 2.5''



- Before proceeding to any pump dismounting (in case of inspection, cleaning, maintenance, etc.), preliminary rules have to be taken:
 - Turn off the engine and unplug the electric wiring.
 - Close the aspiration and evacuation system valves in order to avoid any flood risk.
 - Use appropriate protection for hands and face in case the pump contains dangerous liquids (acids, solvents, ...)
 - When high temperature fluids are pumped, appropriate protections must be used and working areas must be marked in order to warn of the danger.



- The pump, designed for its function, cannot be used as a step or a support.



- Disconnecting fluid components during pump operation can induce damage to goods or persons.



- Failure to relieve pressure on the system before performing maintenance operations can induce damage to goods or persons.

III. TRANSPORT AND STORAGE

A. TRANSPORT

Upon receipt of the pump, check the packaging.

If you notice obvious damages, please follow the instructions below:

- Receive the product and report the observed defaults on the transport slip, a copy of which shall be given to the driver.
- Take a picture of the obvious damages.
- Inform the concerned services:
 - In case of Exworks, inform your transporter by registered letter with acknowledgment of receipt by enclosing the photos.
 - In case of DDP, inform by e-mail Pollard pumps at contact@pompes-pollard.com by enclosing the photos and the transport slip with a description of the damages.

B. STORAGE

After testing in our factory, these pumps are drained and filled with a protecting oil. Keep the plugs at the inlet and the outlet of the pump in order to prevent the introduction of particles.

If the equipment remains stopped for a period equal or superior of 2 months, the pump must be drained and carefully rinsed. A protecting oil must be sprayed inside.

C. HANDLING

The dimension of the pump doesn't need a special handling equipment. However, as the pump exceeds 52 kg, it is recommended to use a lifting equipment.

D. EXTENDED STOP

In case of an extended shutdown of the pump, the pumped liquid must be completely drained to avoid the formation of deposits or incrustations.

Moreover, in case of a crystallizing fluid, it is particularly recommended to rinse the pump before the shutdown. This operation is critical to increase the life-time expectancy of the sealing systems.

WARNING: before using the pump with other liquids than those specified during the purchasing, check that the materials are compatible with the new product, particularly the rubber parts of the sealing systems. (In case of doubt, contact the manufacturer).

IV. MOUNTING AND INSTALLATION



The pump shall be installed in systems designed by qualified personal. System design must conform with all applicable regulations and codes and provide warning of all system hazards.

Please read the safety instructions chapter

A. IMPLEMENTATION OF THE PUMP UNIT

- The pump must not be subject to any stress, such as supporting heavy pipes.
- Do not remove the protection plugs from the inlet and the outlet of the pump before installing the pipes in order to avoid the introduction of particles inside the pump.

B. HYDRAULIC CONNECTION

- Clean the piping before their installation.
- Remove the welding beads, burrs, mill scale and rust film in the case of rigid pipes.
- The inlet piping should slope downward to the pump without any upwards loops.
- Locate the pump as near as possible to the supply in order to reduce pressure losses.
- It is recommended to add a strainer at the inlet line, to prevent pump from damages. Strainer should respect manufacturer instructions, and must be cleaned regularly to avoid pump damages.
- The pump is primarily designed for a horizontal use. As a consequence, for a different use, consult the manufacturer.
- The hydraulic coupling will preferably be realized with pipes whose inner diameters are compatible with the flow rate of the pump, the viscosity of the fluid and the pressure (in order to avoid cavitation or over pressure phenomenon).
- This hydraulic coupling will be realized without stress or loads on the pump.
- Verify that the seals or sealing products do not overflow in the piping.
- When pumping liquid at elevated temperature, keep in mind that thermal expansion of long pipe should be taken into account, in order to avoid stress or loads on the pump.

IMPORTANT: we recommend to introduce a control equipment at the discharge of the pump (flow meter, pressure indicator, etc.) in order to detect the possible failure of the equipment.

WARNING: the pump must not be subject to water hammer. If the hydraulic circuit is equipped with a fast or ultra-rapid closing valve (less than a second), use a anti water hammer system.

The pumps are equipped with a security by-pass which is set by default to 5 bars with a full flow (this setting can be changed on request). This by-pass must not be used as a flow or pressure regulator.

V. OPERATION AND LIFE CYCLE

A. OPERATING PRINCIPLE OF THE PUMPING SYSTEM

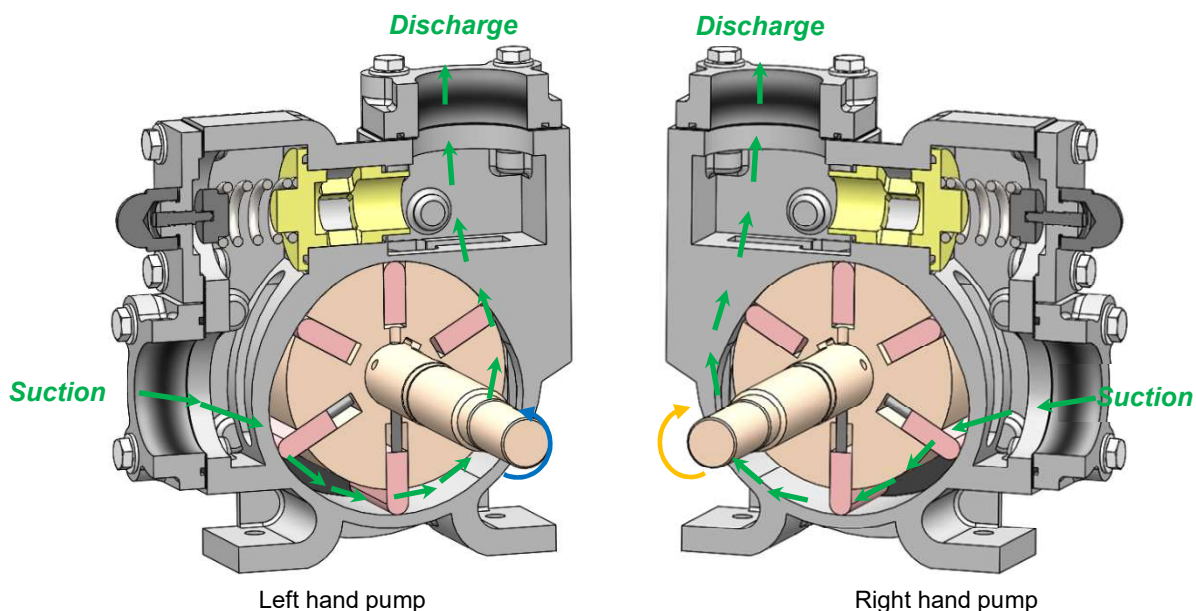


Figure 3 : normal working principle. Left-hand and right-hand pump are presented

The diagram above shows the direction of the fluid in the pump. A left-hand pump rotates counter clockwise (blue arrow), with the intake and relief valve on the left side when view from the driven end. A right-hand pump rotates clockwise (orange arrow), with the intake and relief valve on the right side when view from the driven end.

The fluid (green arrow) enters from the suction inlet and is pumped through the rotor and vanes system to the discharge outlet.

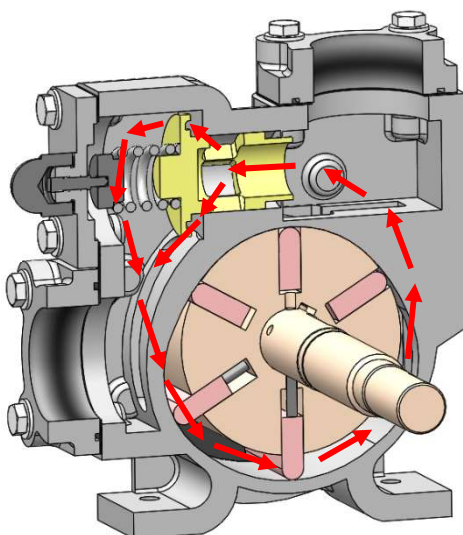


Figure 4 : working principle at over pressure

In case of overpressure, the valve of the by-pass opens and releases the pressure to the suction chamber. Then the fluid (red arrow) recirculates inside the pump. The pressure of the bypass is set before each pump delivery.

IOM INSTRUCTIONS – TP SERIES 2.5''

B. START-UP



Before the start-up of the pump, ensure that the valves in the installation are in the open position.

- Before starting the pump, make sure that nobody could be hurt during this operation.
- Before the start-up, check all the seals of the pipes.
- In case of abnormal decrease in the flow rate, excessive noise and vibration, or abnormal pressure changes, stop the pump immediately. These anomalies are symptomatic of a future failure either in the pump or in the installation.
- After starting the pump, priming should occur under one minute.
- Check the suction and discharge pressure with the help of pressure gauges installed on the upward and downward lines.
- Check for leakage from piping and pump.
- Check the flow rate to ensure the pump is operating on the design range.
- Check the relief valve set up by closing a valve in the discharge line with the help of a pressure gauge installed on the downstream line. This pressure should be between 2 and 4 bar higher than the normal operating pressure.
- Do not run the pump more than 15 seconds with the discharge valve completely closed.

C. NOMINAL OPERATION

During the operation, it is recommended to check the rotation speed and the discharge pressure. Make sure that the pump rotates regularly without jerks or strange noises.

Fluid	Lubricating non corrosive fluid
Ambient temperature	-25 / +55 °C
Dynamic viscosity	0 / 500 cP
Speed of rotation	650 rpm
Flow rate	400 / 500 L/min
Normal discharge pressure	0 / 5 bar g

D. CHANGE THE PUMP ROTATION

To reverse the rotation of the pump, reverse the bearing housings (2) and the shaft (28) in order to reverse the driven side. See chapter VI.A for disassembly / reassembly instructions.

IOM INSTRUCTIONS – TP SERIES 2.5''

E. CHECK VALVE

Caution:

Check valve shall be installed on the outlet line with a self-priming, positive displacement pump. In the case of reverse flow, this would prevent from reverse rotation of the pump, critical for restart and components reliability.

F. RELIEF VALVE SETTING

The relief valve should be set between 2 and 4 bar higher than the operating pressure (0 / 5 bar).

G. STRAINERS

Caution:

Strainers will secure the pump from particles and object. Strainers must be cleaned regularly to avoid starvation of the pump. Maintenance will depend on running conditions.

H. SERVICE AND MAINTENANCE

PRECAUTIONS:



- Any assembling or dismantling error can cause a malfunction of the pump.
- **POMPES POLLARD** is not responsible for accidents or damages resulting from the non-observance of these instructions.
- Never work on the pump while it is in operation.
- Assembling and dismantling operations have to be realized by experienced staffs who have acquired the necessary hydraulic knowledge. These employees always have to wear appropriate protection equipment.

Please work in a clean environment. Keep preciously all fragile parts in their original packaging. Spare parts have to meet technical requirement defined by manufacturer which are always guaranteed with original spare parts.

Please check that all the parts have not been damaged during transportation.

The tightness of the pump is ensured by elastomeric seals. It is necessary to check that the fluid of the pump is compatible with these materials. In case of doubts, please contact us.

When using seals, ensure that no damage occurs during handling over sharp edges, threads, etc. Make sure that they are not bent or twisted in their groove or housing during the mounting.

IOM INSTRUCTIONS – TP SERIES 2.5''

I. MALFUNCTIONS: CAUSES AND REPAIR

Failures										Causes	Corrective action
No pump rotation	Zero flow	Insufficient flow	Insufficient pressure	Loss of prime of the pump	Leak at the seal	Breaking of the seal lip	Vibration and/or abnormal noise	Stop of the pump	Damaged vanes		
●	●							●		Non-compliance with the storage condition.	Disassembly and clean the pump.
							●			Wear of the bearings.	Replace bearings.
	●	●					●	●		Damaged engine, low or irregular speed.	Replace motor.
	●	●	●	●			●			Air intake at the suction.	Check the following tightening torques: hydraulic fitting, screws at the flanges and the covers
	●	●								Leak at the discharge.	Check the following tightening torques: hydraulic fitting, screws at the flanges and the covers
	●	●		●	●	●				Damaged seals, mounted upside down or incorrectly mounted in their housing.	Replace the seals.
	●	●	●	●			●	●	●	Pollution by solid particles and clogging of the pump.	Disassemble and clean the pump. If necessary, replace the damaged parts.
	●	●								Some parts are missing in the pump or have been incorrectly fitted.	Disassemble, check all of the mounting of the pump.
	●						●	●		The pump jammed after a dry functioning or in high speed.	Replace the damaged parts.
							●			Engine, pump, motor pump, hoses or fittings are not fixed properly.	Check the anchors for each of these elements, torque them if necessary.
	●	●	●	●			●			The suction pressure at the inlet of the pump is too high.	Check the clogging of the filter in the installation and change the filter cartridge if necessary. Pump speed too fast for the viscosity or volatility of the liquid.
					●					Seal non compatible with the liquid pumped.	Replace the seal.
					●					Shaft at seal area damaged or worn.	Replace the rotor.
		●					●		●	Cavitation.	Check that the running point is inside the pump operating range.
					●					Mechanical seal faces cracked, scratched, pitted or dirty.	Change the mechanical seal.
		●	●							Excessive restriction in the suction line.	Eliminate restrictions.
		●								Excessive restrictions in the discharge line causing the partial opening of the relief valve.	Eliminate restrictions.

IOM INSTRUCTIONS – TP SERIES 2.5''

Failures										Causes	Corrective action
No pump rotation	Zero flow	Insufficient flow	Insufficient pressure	Loss of prime of the pump	Leak at the seal	Breaking of the seal lip	Vibration and/or abnormal noise	Stop of the pump	Damaged vanes		
		●	●				●			Relief valve worn and not setting properly.	Check the relief valve set up or change the relief valve.
		●	●				●		●	Vanes installed incorrectly.	Check the vanes.
		●	●	●			●			Worn vanes.	Replace vanes.
				●						Pump speed too low for priming.	Set the nominal speed.
				●						Strainer clogged.	Clean the strainer.
							●			Drive coupling misaligned.	Check and set the alignment.
							●			Excessively worn rotor.	Maintenance required.
									●	Object entering the pump	Put a strainer in the inlet line
									●	Running the pump dry for extended period of time.	Limit the operation in dry running.
									●	Viscosity too high for the vanes and/or the pump speed.	Adapt the operating conditions to the fluid properties.
									●	Incompatibility with the liquids pumped.	Adapt the liquid pumped to the design of the pump.
									●	Excessive heat.	Control the temperature of the fluid and/or the pump.
									●	Worn or bent push rods.	Replace the push rods Check the axial clearances.

VI. INSTRUCTION OF ASSEMBLY / DISASSEMBLY

A. DISASSEMBLY / REASSEMBLY OF THE PUMP



Maintenance shall be performed by qualified personal only.



Pump components are exposed to the fluid. Hazardous or toxic fluid can cause severe injury. Flush the pump prior to operation.

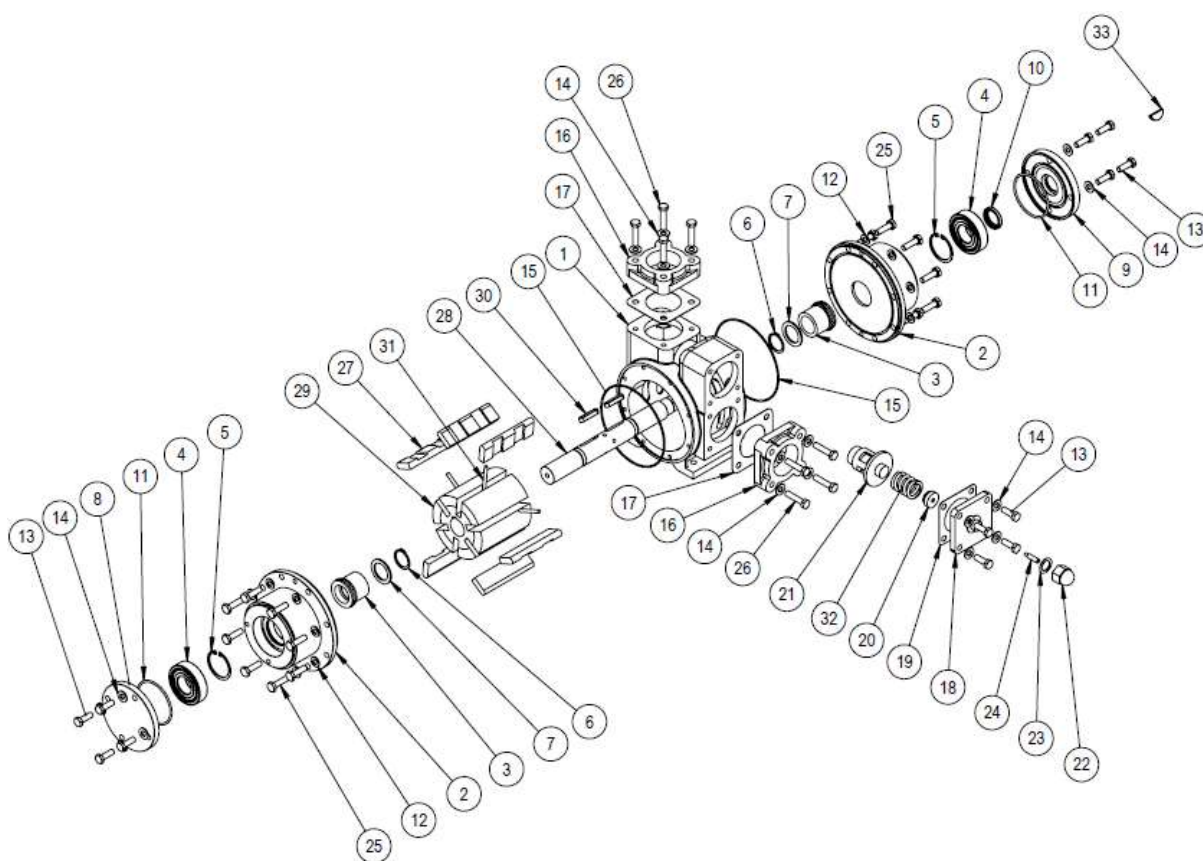


Figure 5 : disassembly / reassembly of the pump

For the disassembly

Starting on the inboard (driven) end of the pump.

- Remove the woodruff key shaft (33).
- Untighten the screws (13) and washers (14) in order to remove the inboard cover (9). Remove and discard the o-ring (11).
- Remove the lip seal (10). Inspect it and replace it as required.

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- Untighten the screws (25) and washers (12) and slide the bearing housing (2) (including bearing (4)) off the shaft (28), using extractor. The 2 threads M10 on the bearing housing (2) shall be used. Remove and discard the o-ring (15).
- Remove the bearing (4) and the circlip (5) from the bearing housing (2).
- Remove the mechanical seal (3), the washer (7) and the circlip (6) from the shaft.
- Remove the vanes (27) from the rotor (29).

Turn the pump housing (1) around, and begin the disassembly on the opposite, outboard side (nondriven).

- Untighten the screws (13) and washers (14) in order to remove the outboard cover (8). Remove and discard the o-ring (11).
- Untighten the screws (25) and washers (12) and remove the bearing housing (2) (including the shaft (28)) off the pump housing (1). Remove and discard the o-ring (15).
- Slide the shaft (28) off the bearing (4), using an extractor.
- Remove the bearing (4) and the circlip (5) from the bearing housing (2).
- Remove the mechanical seal (3), the washer (7) and the circlip (6) from the shaft.
- Remove the push rod (31) from the rotor (29).
- Remove the rotor (29) from the shaft (28).
- Remove the shaft key (30) from the shaft (28).

For the reassembly

Note:

Before assembling, inspect all components for wear and damage, and replace as required. Wash the bearing/seal recess and remove any burrs or nicks from the rotor and shaft.

Reassemble the outboard side first (non-driven)

- Install the shaft key (30) in the shaft (28) before placing the rotor (29).
- Install the circlip (6) and the washer (7) on the shaft (28). Then, install the moving part of the mechanical seal (3) in contact with the washer (7).
- Install the circlip (5) and the fixed part of the mechanical seal (3) into the bearing housing (2). Check the o-ring of the mechanical seal and changed as required.
- Insert the shaft (28) into the bearing housing (2), in the good position along the shaft axis.
- Insert the bearing (4) in the bearing housing (2). The shaft end (28) shall be front flush to the external bearing face (4). See picture below.

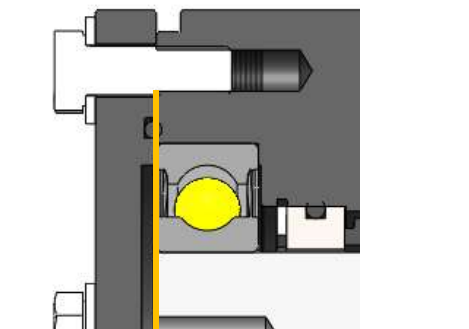


Figure 6: the shaft shall be installed front flush to the external bearing face (orange line)

- Put the push rods (31) through the rotor (29).

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- Install the bearing housing (2) (assembled to the shaft and the rotor) on the pump housing (1), with the bearing housing o-ring (15). Tighten the screws (25) using washers (12) at 34 N.m. The tell-tale hole (used for mechanical seal damage detection) shall be located downward.
- Install the vanes (27) on the rotor (29). Vane grooves shall face toward the direction of rotation. The rounded edge of the vanes shall be located at the outer radius. See picture below.

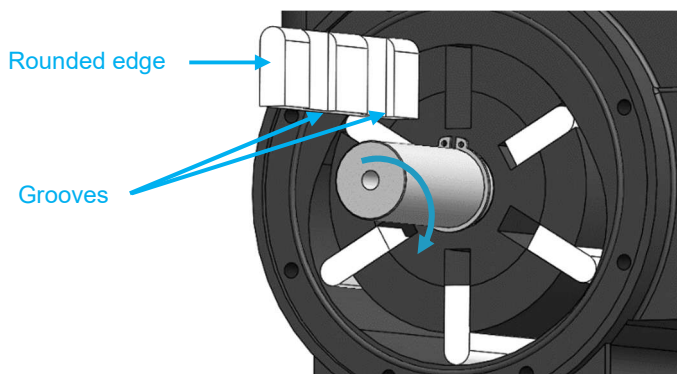


Figure 7: vane position – Rounded edge is located at the outer radius and grooves are in the direction of rotation

Turn the pump housing (1) around and begin assembly on the opposite, inboard end (driven).

- Install the circlip (6) and the washer (7) on the shaft (28). Then, install the moving part of the mechanical seal (3) in contact with the washer (7).
- Install the circlip (5) and the fixed part of the mechanical seal (3) into the bearing housing (2). Check the o-ring of the mechanical seal and changed as required.
- Install the bearing housing (2) on the cylinder (1) with the pump cylinder o-ring (15). Tighten the screws (25) using washers (12) at 34 N.m. The tell-tale hole (used for mechanical seal damage detection) shall be located downward.
- Insert the bearing (4) in the bearing housing (2). The bearing (4) shall be installed front flush to the external surface of the bearing housing (2). Note: The other bearing (4) previously installed on the outboard side (non-driven) must stay front flush to the external surface of the outboard bearing housing (2). See picture below.

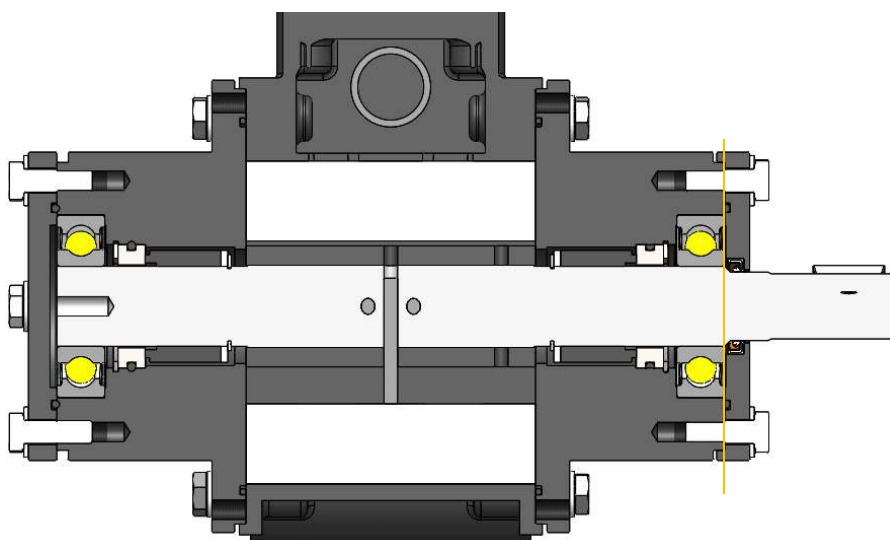


Figure 8: the bearing is installed front flush to the inboard (driven) bearing housing (orange line)

Turn the pump housing (1).

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- Install the outboard (non-driven) cover (8) to the bearing housing (2) with the o-ring (11). Tighten the screws (13) using washers (14) at 20 N.m.

Turn the pump housing (1).

- Install the inboard (driven) cover (9) to the bearing housing (2) with the o-ring (11) and the lip seal (10). Tighten the screws (13) using washers (14) at 20 N.m.

B. RELIEF VALVE DISASSEMBLY / REASSEMBLY



The relief valve setting is realised by the adjusting screw DC201808VIS02 (24). While dismantling it, it is important to note the distance X (see picture below).



Maintenance shall be performed by qualified personal only.



Pump components are exposed to the fluid. Hazardous or toxic fluid can cause severe injury. Flush the pump prior to operation.

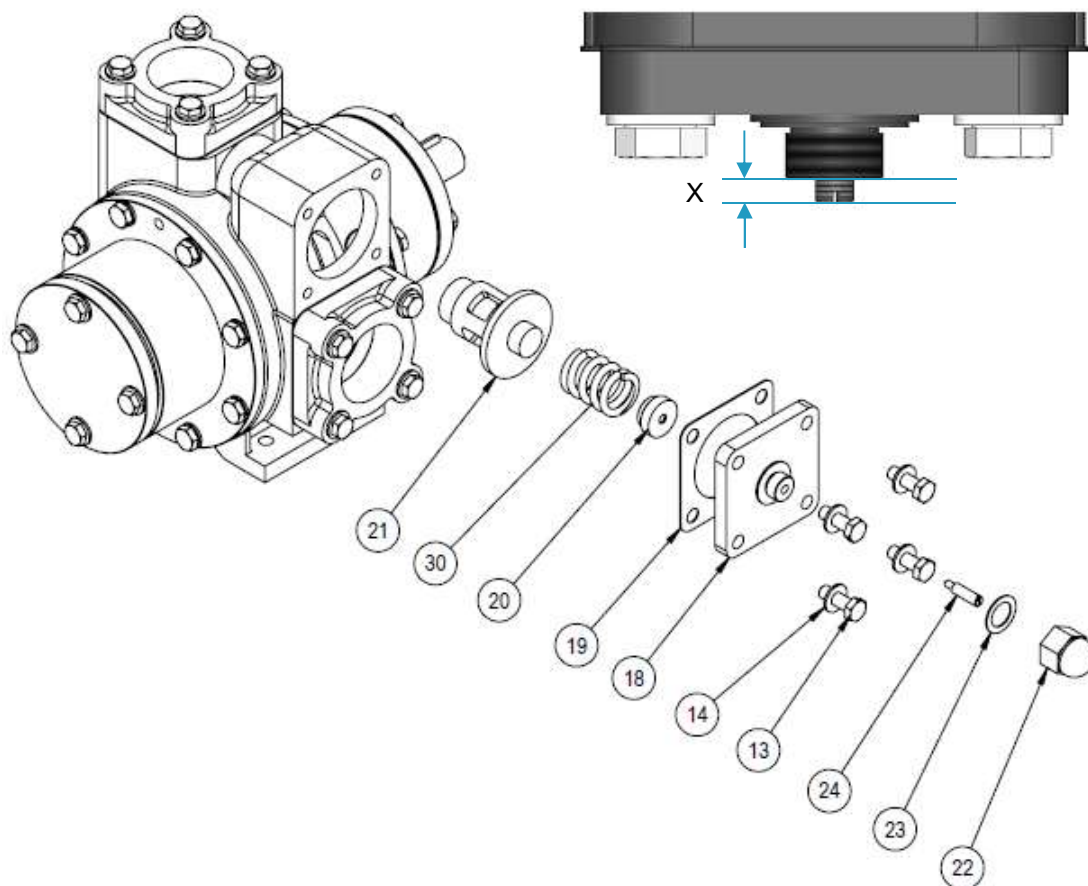


Figure 9 : disassembly / reassembly of the relief valve

IOM INSTRUCTIONS – TP SERIES 2.5''

For the disassembly

- Unscrew the relief valve cap (22) and remove the relief valve cap gasket (23).
- Unscrew the relief valve adjusting screw (24) from the relief valve cover (18), in order to uncompressing the relief valve spring (32).
- Unscrew the screws (14) and remove the washers (13).
- Remove the relief valve cover (18) and the relief valve gasket (19). Discard the gasket.
- Remove the relief valve spring (32) and the relief valve spring guide (20) from the pump housing (1).
- Remove the valve (21) from the relief valve bore of the pump housing (1).

For the reassembly



Before any reassembly, check the condition of the bypass seat and the needle.

If the needle of the valve is damaged, please replace it.

If the bypass seat is damaged, the pump must be returned in our workshop.

- Insert the valve (21) into the relief valve bore of the pump housing (1) with the fluted end inward.
- Insert the relief valve spring (32) and the relief valve spring guide (20) against the valve.
- Put a new relief valve gasket (19) and the relief valve cover (18) on the pump housing (1). Tighten the screws (14) with the washers (13) at 20 N.m.
- Screw the relief valve adjusting screw (24) into the relief valve cover (18) until it makes contact with the spring guide.
- After the relief valve has been adjusted to the initial set up, install the relief valve cap (22) with its gasket (23).

For the adjustment

- Unscrew the relief valve cap (22) and remove the relief valve cap gasket (23).
- Turn the relief valve adjusting screw (24) clockwise (to increase the pressure setting) or counterclockwise (to decrease the pressure setting).
- Inspect the relief valve cap gasket (23) and replace as required.
- Install the relief valve cap (22) with its gasket (23).

C. VANE REPLACEMENT



Maintenance shall be performed by qualified personal only.



Pump components are exposed to the fluid. Hazardous or toxic fluid can cause severe injury. Flush the pump prior to operation.

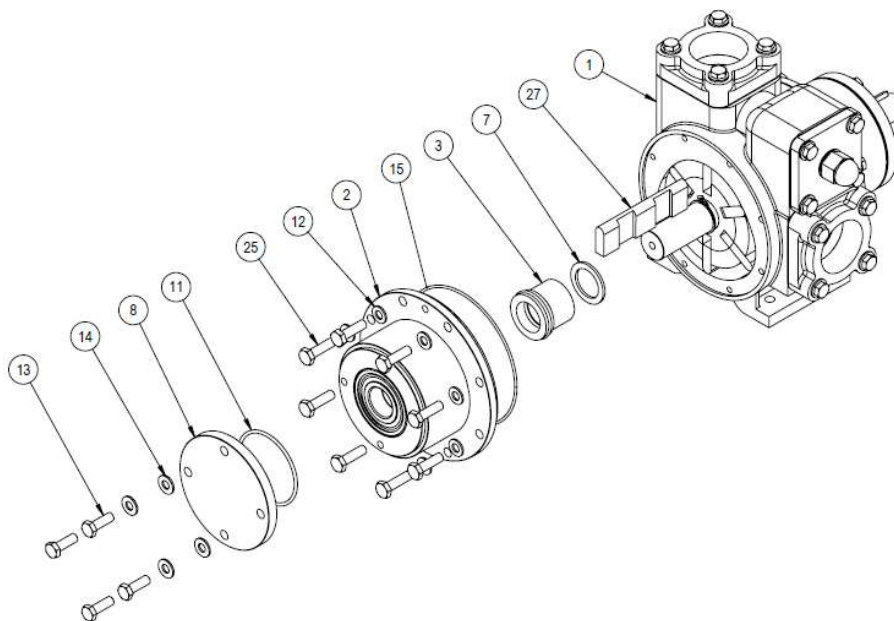


Figure 10 : vane replacement

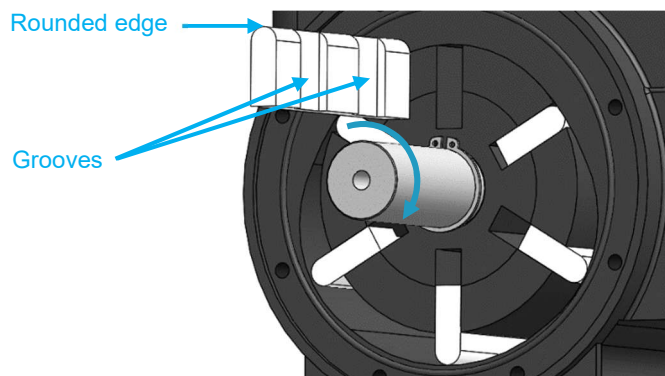


Figure 11 : vane position – Rounded edge is located at the outer radius and grooves are in the direction of rotation

Vane replacement

Disassemble the outboard side of the pump (non-driven).

- Unscrew the screws (13) and washers (14) in order to remove the outboard cover (8). Remove and discard the o-ring (11).
- Unscrew the screws (25) and washers (12) of the bearing housing (2).
- Slide the bearing housing (2) off the pump housing (1), using extractor. The 2 threads M10 on the bearing housing (2) shall be used.
- Remove and discard the o-ring (15).
- Remove the mechanical seal (3) and the washer (7).
- Turn the shaft by hand until a vane comes at the top position (12 o'clock). Remove the vane (27).
- Install a new vane, ensuring that the rounded end is up, and the relief groove facing toward the direction of rotation.
- Repeat the previous steps until all the vanes are changed.

Reassemble the outboard side of the pump (non-driven).

- Put the rotating part of the mechanical seal (3) and the washer (7) on the shaft (28).
- Ensure the static part of the mechanical seal is against the circlip (5).
- Put the bearing housing (2) in place against the pump housing (1) with the o-ring (15). Tighten the screws (25) with the washers (12) at 34 N.m.
- Install the bearing (4).
- Install the outboard cover (8) to the bearing housing (2) with the o-ring (11). Tighten the screws (13) with washers (14) at 20 N.m.

NOTES

[illegible]