

YKF SERIES



OPERATING MANUAL





EC DECLARATION OF CONFORMITY

AT UYGUNLUK BEYANI

Manufacturer / İmalatçı

: MAS DAF MAKİNA SANAYİ A.Ş.

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Teknik Dosyayı Derleyen Yetkili Kişi ve Adresi

Tuzla - İSTANBUL / TÜRKİYE

The undersigned Company certifies under its sole responsibility that the item of equipment specified below satisfies the requirements of the mainly Machinery Directive 2006/42/EC which is apply to it.

The item of equipment identified below has been subject to internal manufacturing checks with monitoring of the final assessment by **MAS DAF MAKİNA SANAYİ A.Ş.**.

Aşağıda tanımlanmış olan ürünler için Makine Emniyeti Yönetmeliği 2006 / 42 / AT' nin uygulanabilen gerekliliklerinin yerine getirildiğini ve sorumluluğun alınmış olduğunu beyan ederiz.

*Aşağıda tanımlanan ürünler iç üretim kontrollerine bağlı olarak **MAS DAF MAKİNA SANAYİ A.Ş.** tarafından kontrol edilmiştir.*

Equipment / Ürün

: Dişli Pompalar

Gear Pumps

Seri / Model-Tip

: YKF Serisi - YKF Series

For pumps supplied with drivers/ Elektrikli Pompa Üniteleri

Related Directives / Yönetmelikler

2006/42/EC Machinery Directive / 2006/42/AT Makine Emniyeti Yönetmeliği

2014/35/EU Low Voltage Directive / 2014/35/AB Alçak Gerilim Yönetmeliği

2014/30/EU Electromagnetic Compatibility Directive / 2014/30/AB Elektromanyetik Uyumluluk Yönetmeliği

EUP 2009/ 125 /EC Electric Used Products Directive/ Elektrik Kullanan Ekipmanlar Direktifi (EUP)

Regulations applied acc. to harmonize standards / Uygulanan UyumlAŞırılmış Standartlar

TS EN ISO 12100:2010, TS EN 809+A1, TS EN 60204-1:2011.

We hereby declare that this equipment is intended to be incorporated into, or assembled with other machinery to constitute relevant machinery to comply with essential health and safety requirements of Directive. The machinery covered by this declaration must not be put into service until the relevant machinery into which it is to be incorporated has been declared in conformity with provisions of the directive.

Ekipman, uygun bir makina oluşturmak amacıyla diğer ekipmanlar ile birləştirilirken ya da monte edilirken gerekli sağlık ve güvenlik yönetmeliklerine uyulması gerekmektedir.

Bu bildiri kapsamında yönetmelikte belirtilen bütün hükümler yerine getirilmeden makinanın devreye alınması gerekmektedir.

Place and date of issue / Yer ve Tarih

: İstanbul, 02.06.2014

Name and position of authorized person

: Vahdettin YIRTMAÇ

Yetkili Kişinin Adı ve Görevi

General Manager / Genel Müdür

Signature of authorized person

:

Yetkili Kişinin İmzası

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INTRODUCTION

1. GENERAL

MAS Pompa YKF series pumps are the pumps with internal eccentric gears, spur gears, helical gears, and pallet gears. Pumps with internal eccentric gear are manufactured by Yildiz Pompa and marketed through our firm and authorized distributors. This operation manual contains the necessary information for geared pumps and should be read thoroughly before assembly, servicing, and maintenance. The manual should be kept at a place where the user can easily access.



You should not use your pump for purposes other than the specified ones without contacting Yildiz Pompa and its authorized dealers.

Liquids not suitable for the pump may damage the pump and lead to personal injuries.

Yildiz Pompa does not take any responsibilities for the repair and modification works made by the user or by any other unauthorized people.

1.1.Acceptance, Commissioning and Storing

1.1.1.Acceptance

Remove all the packaging material after delivery. After reception, check the provided materials for damages and make sure that the name and type information are the same as your order and the packaging label.

In case there is damage or missing parts, a report should be written and submitted to the transporter. Yildiz Pompa or its dealers should be informed about this situation.

The serial number is written on the label on the pump. When you contact Yildiz Pompa, always indicate this number.

		TEL : (0 216) 378 64 21 Pbx
		FAX : (0 216) 378 64 22
MODEL NO	: :	
MAYİ	:	
m 3/h	: / Hm	m SS.
HP	: /	d/d
SR.NO	: 2007 04 8138	

1.1.2.Commissioning and Storing

Check the weight of the pump. All parts exceeding 20 kg should be lifted with lifting tools such as lifting hook and hoist or cranes.

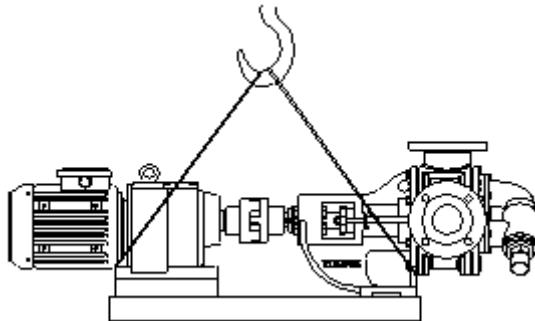


Figure 1. Always use 2 lifting hangers. Make sure that these hangers are placed so as to prevent sliding and properly hung.

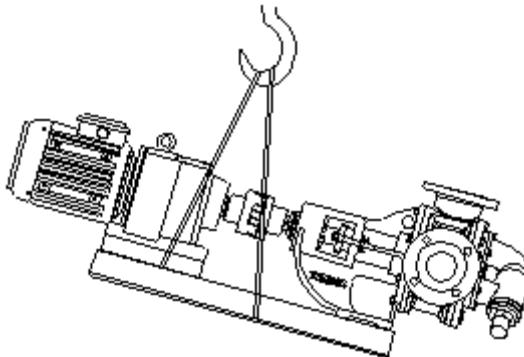


Figure 2: Do not tie the pump from only one point. Improper lifting may lead to personal injuries or product damage.



If the pump will not be installed right away, it should be stored in a dry and clean area. Turn the pump shaft once every two months and check the protective grease in the pump body.

1.2.Safety



The pump should not be used for purposes other than the recommended and specified ones without contacting Yildiz Pompa.

A pump should always be installed and used in accordance with the applicable national and regional health and safety laws and regulations. Therefore, before and after Starting the installation and pumping, you should take into account the following points:

- When commissioning the pump, **always** wear proper protective clothing.
- In order to prevent personal injury and/or pump damages, **always** fix the pump properly.
- In order to close the inlets and the outlets before servicing and maintenance, install an open/close valve to both sides of the pump (inlet and outlet). **Make sure** that the pump can be discharged without injuring anyone or damaging the environment and the nearby equipment.
- In order to prevent the removable parts from harming the personnel, make sure that they are properly covered.
- All the electrical installations must be performed by the authorized personnel. In order to avoid accidental Starts, use a lockable circuit breaker. Protect the motor and other electrical devices from overload. Electrical motors must be supplied with abundant cooling air. In the environments with explosion risk, motors in the explosion-safety class should be used as well as additional special safety devices. Contact with the relevant authorities responsible for such precautions. Improper electrical installations may lead to fatal results.

- Powders, liquids, and gases that might cause overheating, short-circuit, corrosion damage, and fire should be kept away from the motor and other equipments. If the pump is used to pump liquids hazardous to people and environment, then an appropriate container, in which the leaking liquid shall be contained, should be used.
- If the temperature of the system or system parts exceeds 60 °C, then these should be marked with a warning sign "HOT SURFACE" in order to avoid burning risks.
- The pump should not be exposed to rapid and sudden temperature changes in the liquid without pre-heating/pre-cooling. Cleaning a hot pump with cold water is **absolutely** forbidden. Major temperate changes may cause crack formation or explosion that might lead to various personal injuries.
- The pump should **absolutely** not be operated above the rated performance.
- Power should be cut off before intervening the system and the pump; and the Start button should be locked. When servicing the inside of the pump, follow the disassembly/assembly instructions. If these instructions are not followed, the pump or the pump parts may be destroyed. This will also void the warranty.
- Do not use the pump dry. If there is a risk of dry operation, install a protection system against dry operation in order to avoid serious damages.
- If the pump does not operate satisfactorily, contact Yıldız Pompa.

1.3. Pump Coding

Example: YKF 2 "

YK	F	2 "
1	2	3

1= Pump Version
2= Flanged
3= Pump suction and push diameter

1.4. Function and Operation Principles

There are two moving parts: (figure 3) Rotor and idler gear. The gear is placed eccentrically relative to the rotor, and has lesser teeth than the rotor. The crescent acts like a felt between sucking and discharge mouths and the idler gear separates the liquid carried inside the rotor pockets.

1.4.1. Operating Principle

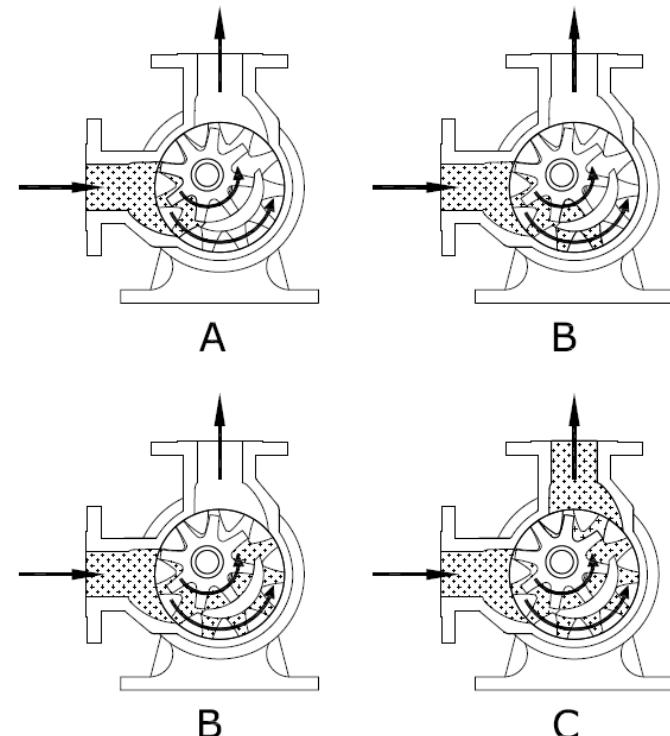


Figure 3: Operating principle

A: When the rotor shaft is rotate, the volume of the pockets between the rotor and idler gear is increased, forming vacuum. The liquid enters the sucking mouth.

B: Observe how the liquid moves in the pump, how the crescent shape at the cover separates the liquid, and how it acts like a felt between the sucking and discharge mouths. The design of the idler and rotor gears forms locked pockets that ensure an absolute volume control for the liquid.

C: The pump is fully filled and overflowed during the discharge operation of the liquid from the discharge mouth. The arrows indicate the rotation direction and the progress of the liquid flow.

1.4.2. Rotation Directions

The pumps are typically (when viewed from the shaft end) designed as clock-wise rotation; that is, the sucking mouth (inlet) is on the right and the discharge mouth (outlet) is on the left.

For reverse operation:

You can operate your pumps in both directions. However, changing rotation direction of the pump shaft changes the pumping direction of the liquid; that is; you can use both mouths of your pumps as the sucking mouth or the discharge mouth. (Figure 4) Otherwise, it may not be able to perform the by-pass operation.

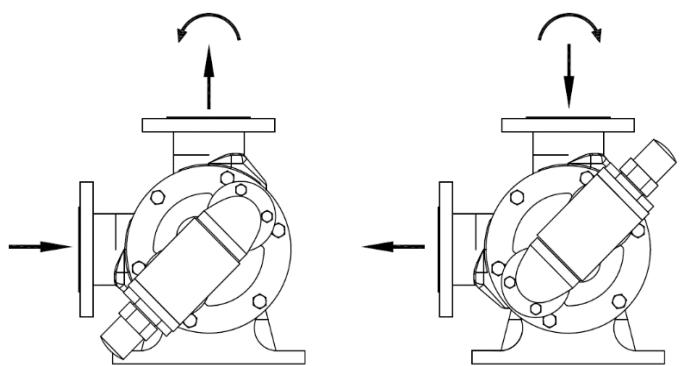
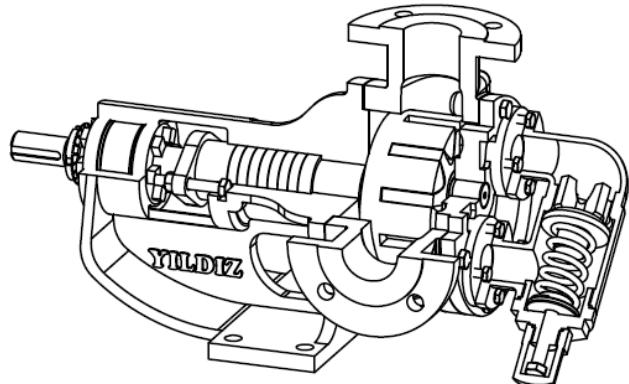
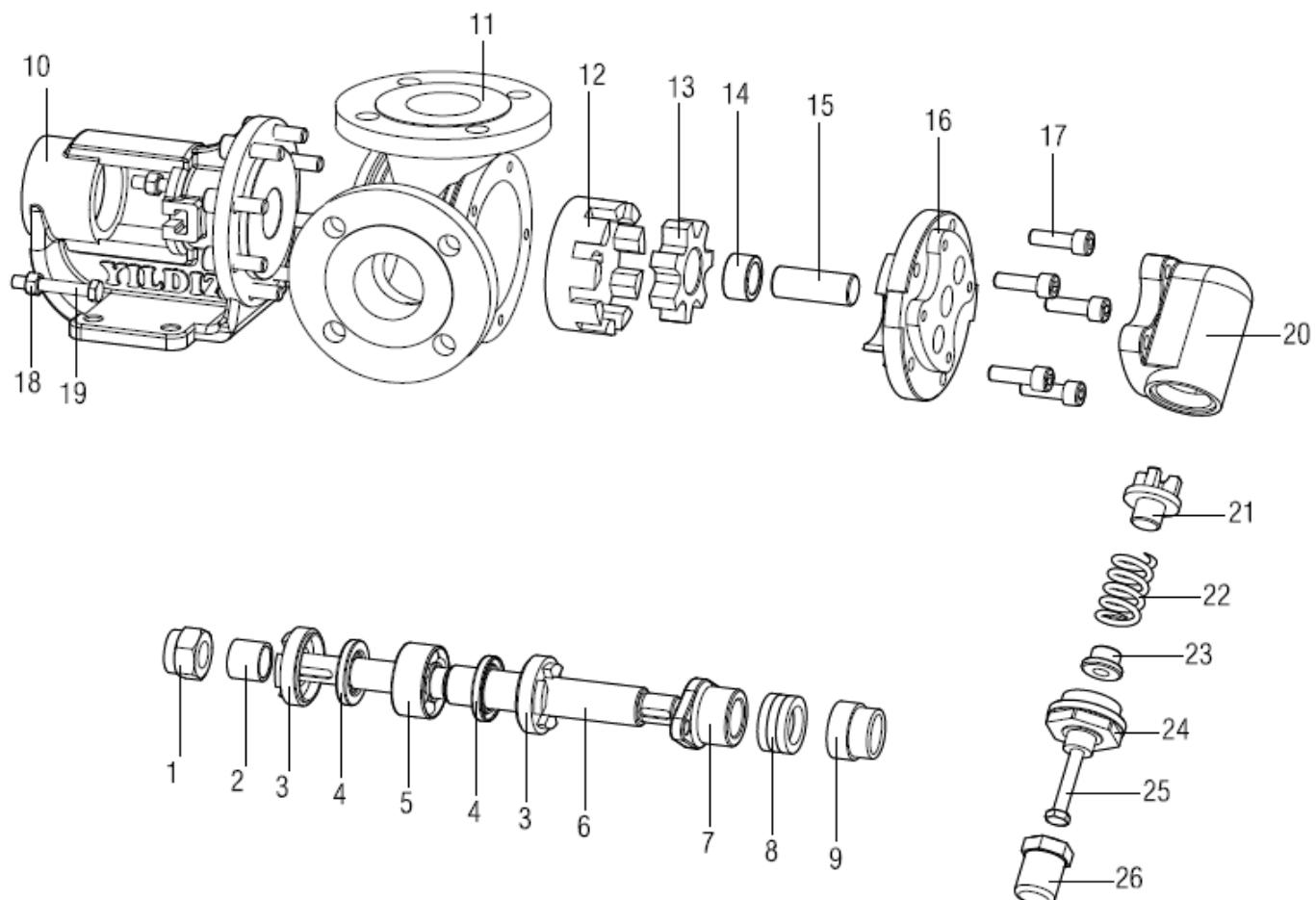


Figure 4: Rotation directions of the shaft



1.5. Standard Parts of the Pump

Figure 5: List of Spare Parts

1	Lock Nut	14	Idler Bushing
2	Ring	15	Cover Pin
3	Adjusting Nut	16	Cover
4	Seal	17	Screw
5	Bearing	18	Nut
6	Shaft	19	Stud
7	Packing Press	20	Internal Relief Valve
8	Seal	21	Valve
9	Bracket Bushing	22	Spring
10	Bracket	23	Washer
11	Casing	24	Bypass Head
12	Rotor	25	Bypass Screw
13	Idler	26	Screw Cover

2. TECHNICAL INFORMATION

2.1. Material Properties

Pump Body and Gears: Cast (pig) iron, steel cast, stainless AISI 304 - 316 cast, spheroid cast

Bearings: Snbz 12 bronze, bearing, carbon graphite, silicon carbide, hard metal plating

Sealing: Soft seal, rotatherm seal, mechanical seal

2.2. Pump Versions

SERIES: Our pumps from 1 " to 8 " are used in fuel oil service tanks, oil tankers, gas oil tankers, fuel oil tankers, small hot-oil circulations, transfer works of all viscose, semi-viscose industrial liquids, and pharmaceutical, chemical, detergent, and food industries. General maximum liquid temperature (-20 ÷ 200 °C)

3. ASSEMBLY AND MAINTENANCE

3.1. General

- The pump unit should be completely mounted in its place.
- A lockable circuit breaker should be installed to the pump unit.
- Turn off the power before any maintenance on the pump or the system and lock out the Starting device to prevent accidental Starts. The pumps should be disconnected from the pipeline and the electrical circuit. If the pump is used for corrosive and hazardous liquids, empty the system and the pump.
- Always connect an appropriate safety valve or another safety device in order to prevent the overload of the pump and the pump system.
- The pump may be installed horizontally or vertically, but the connection mouths should look downwards unless the storage tank is placed over the pump level (overflow pipe).

4. INSTALLATION AND PIPELINE

After the pipes are installed, it should be checked that the pump and the propulsion motor pump and motor shafts are at the same level and the base bolts are tightened.

The smallest deviations must be corrected. The gap between the two halves of the coupling should be approximately.

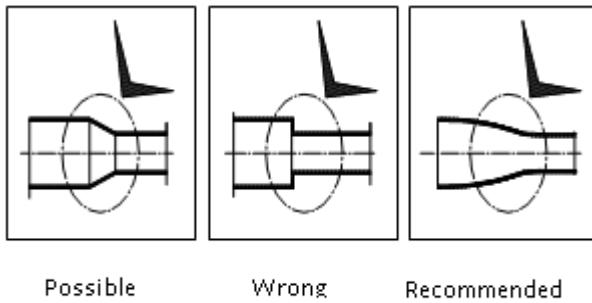


Figure 6

Check that the treated surfaces around the coupling (a) are aligned from four different points with a steel ruler. The length of the coupling should be equal and the outer surfaces of the coupling halves (b) are measured from four different points.

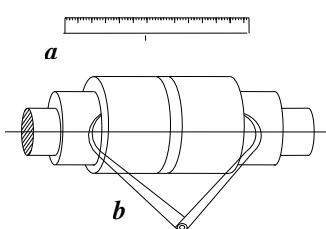
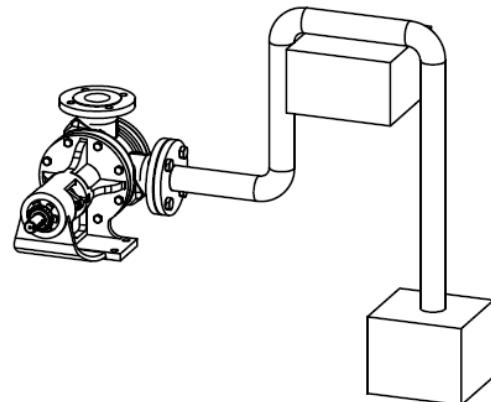
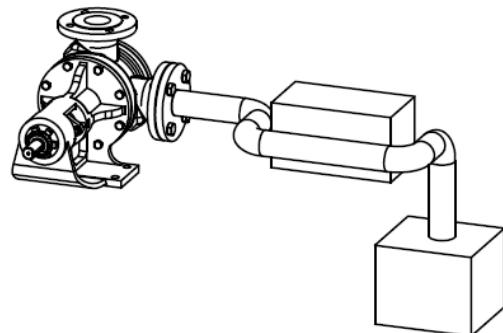


Figure 7: Coupling Adjustment

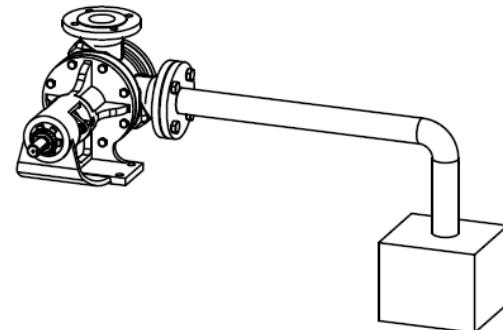
- Check that all the pipelines are aligned properly with the pump mouths and the stresses are removed in order to prevent load transfer to the pump. Use pipes made of proper material and measures. All the pipelines should be completely cleaned. Seal the pipe connections with an appropriate material.
- Before tightening, check that the pipe flanges are fitting the pump flanges



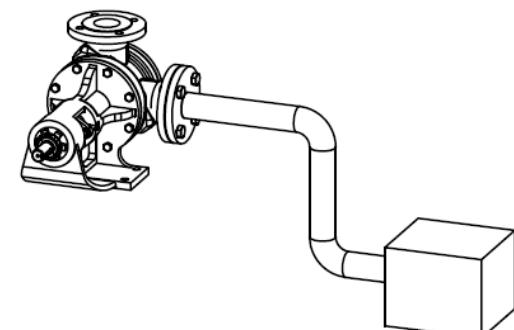
1. Avoid this shape.



2. If necessary, prefer a horizontal crank as seen in the figure instead of a vertical one



3. In order to prevent air pockets formation, give a proper slope to the sucking pipe as seen in the figure.



4. This shape should be preferred. Because the liquid will be close to the pump.

Figure 8

- If the discharge (outlet) pipe is equipped with an open/close valve, a safety valve should always be placed between the pump and the pipe. If the open/close valve is closed while the pump is operating, this is to protect the pump from overpressure. If the pump is supplied with a (internal) built-in safety valve, this valve shall be installed so that it shall be mounted in the direction of the arrow indicating the rotational direction.

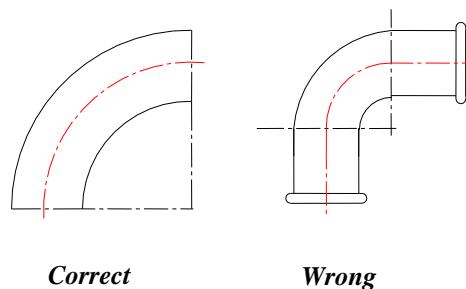


Figure 9

- Springs are available for different pressure ranges. When changing the spring, the protective cap nut is removed. The rear bearing of the spring has M18 or 10-mm teeth that can be used to lift the bearing.
- Before Starting, clean thoroughly the pipe system especially around the sucking side to remove any burrs or dirt.

4.1. Start-up (Commissioning)

- Open all valves in the pipe system and make sure that there is not any plugged part in the pipeline.
- Fill the pump with fluid.
- Check that all the safety devices have been properly installed and that all moving parts have been covered (in order to avoid physical injuries) properly. In order to avoid physical injuries, the protective cover should always be placed before Start-up.
- First, operate the pump slowly in order to check that the rotational direction is correct. Observe the rotation arrow on the pump cover.
- Operate the pump and check the fluid flow rate (speed). If it is not correct, stop the pump and follow the troubleshooting table.
- Check the pressure, temperature, and capacity.
- If the pump has soft-type seal, ensure a little leakage so as to lubricate and cool the seal. Adjust the leakage via seal pressure.

4.2. Routine Check

- Check regularly that the noise level, vibration, and pump temperature are normal.
- Check for any abnormal leakages.
- Check the discharge pressure and flow regularly.
- Check the pump shaft seal and other damaged parts and replace if necessary.

4.2.1. By-Pass Operation

By-Pass means the protection of the motor against the excessive pressure due to any blockage that might occur in the pipeline for any reason. This pump with positive sweeping may be overloaded because of the closing in the pressure line during operation. As a result, some parts of the pump might break. By-pass can be installed on the pressure line as well as directly on the pump. The assembly form does not change the operation principle.

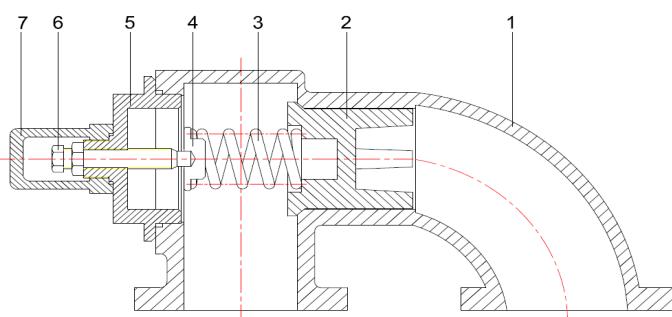


Figure 10

- 1 – By-Pass
- 2 – By-Pass Damper
- 3 – Spring
- 4 – Py Pass Washer
- 5 – By-Pass Cover
- 6 – By-Pass Adjustment Screw
- 7 – By-Pass Peste Cover

4.2.2. Circuit By-Pass

When by-pass shall be installed on the pumps with jacketed cover, by-pass should be placed in the circuit (Figure 12). Thus, the pressure and the flow values can be controlled, while the pumps are secured. Therefore, the safety of the pump shall be provided. The circuit by-pass has types with or without jackets.

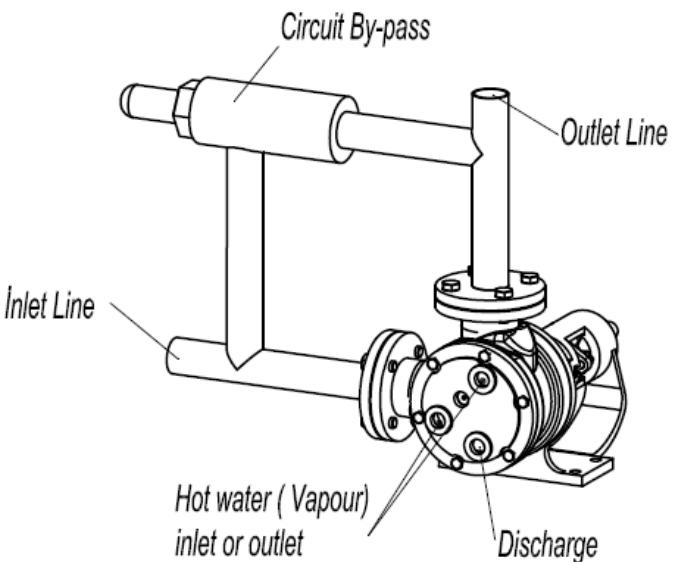


Figure 11

4.2.3. Cover-Jacketed Pumps

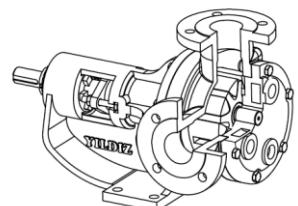
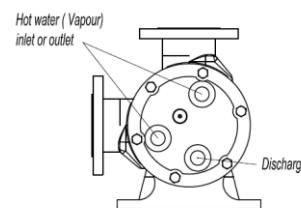


Figure 12

One of many properties of our pumps is that the pump without a jacket can be turned into jacketed ones through a cover change. The cover in question has three toothed dents. One of the two upper dents is either vapor or hot water inlet and the other one is the outlet. The dent at a lower level than these two dents is for the discharge of the condensed water.

5. SEALS

5.1. Pumps With Soft Seal

- When starting to replace the soft seal, clean the seal box, glen, and the shaft (and the shaft bushing, if any).
- Cut diagonal parts at a sufficient number and length from seal with an appropriate size, wind these on the shaft (and the shaft bushing, if any) and check if they close completely.
- Place the first ring with the joint at the top, and drive it into the seal box via glen.
- Place the second ring with the joint at the bottom.
- Place the glen and tighten. Thus, the seal take the shape of the seal box. Then loosen the glen. Tighten the shaft slightly and stop tightening when the shaft is slightly restrained.

- After the pump is started, liquid should drop from the seal. The amount of water should not be less than 10 cm³/min. Find the appropriate amount by tightening or loosening the gland nuts mutually.
- After having made the gland adjustment, check whether the seal temperature increases excessively for two hours. For a pump lifting a liquid at the ambient temperature, the seal temperature should not exceed 80 °C.

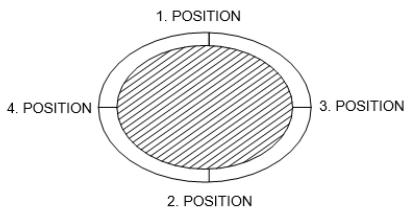


Figure 14

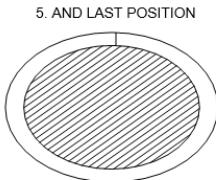


Figure 13

5.2. Rotatherm Seal

Meeting the most difficult needs of the sealing technology that has a wide application in the pumps and being a material with a wide operating and application range, ROTATHERM is a product consisting of purified, expanded graphite. Being a perfect sealing element, ROTATHERM has a wide heat and pressure range and the highest sliding capability obtained in the sealing area.

ROTATHERM is resistant to any chemical materials between 200 °C and -550 °C under normal conditions. When applying ROTATHERM on the pumps, one of the issues that should be considered is the winding direction. When winding, it should be wound in anti-clockwise direction and tightened (but this tightening should not be too much; the actual tightening should be made as defined for the soft seal after the pump is started up). The ROTATHERM seal in ring shape should be placed into its socket. Another usage technique is to use the ready rings of Rotatherm prepared beforehand; in this case, the rings of the Rotatherm placed in the sockets should be tightened the same way.

5.3. Mechanical Seal

- The mechanical seals not operator necessitate maintenance unless there is a visible leakage. However, the tightness of the mechanical seals should be checked regularly.
- In the pumps where mechanical seal is used, follow instructions of the mechanical seal manufacturer, and **never operate the mechanical seal dry.**

5.4. Micrometric Drum Adjustment

Loosen completely the allen-headed bolt placed horizontally on the drum. Remove the clawed drum-locking pin at the bottom of the drum with a screwdriver, push inside as seen in the figure and turn it 180° so that the pin claw faces downward. Now the pump drum is ready to be adjusted for the intended purpose. You can turn the drum to the right (so as to decrease the gaps) or to the left (so as to increase the gaps) with a pinned spanner. (Figure 15.)

When the adjustment is completed, lock the locking pin to its corresponding location and tighten the bolt you have loosened. There are four-canalled nuts passed in the shaft in front of the drum and a locking sheet under the nut.

When making the drum adjustment, never meddle with the mentioned nut.

When there is corrosion on the pump body, there is no need for repairing the pump body. When you replace the part that we call intermediate body, you renew the body completely. Provided that it is not broken, you can use the part called as console as long as you wish.

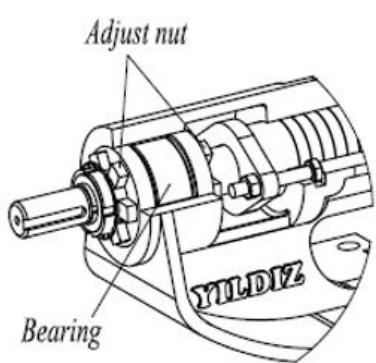
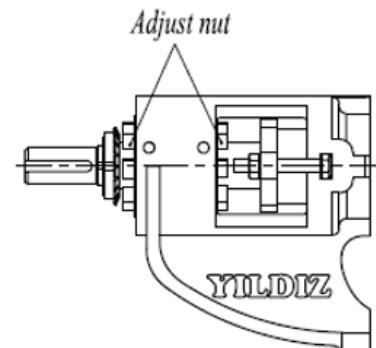
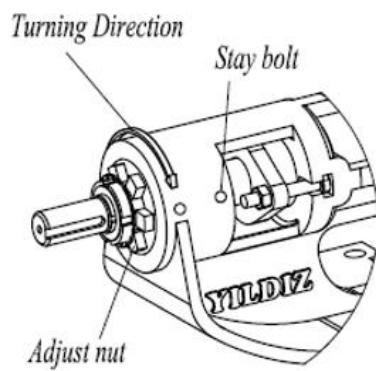


Figure 15

6. POSSIBLE FAILURES, CAUSES, SOLUTIONS

POSSIBLE FAILURES	CAUSES	SOLUTIONS
No flow while the pump is operating. (No pushing)	Wrong rotation direction.	Reverse the rotation direction.
	There is air in the sucking pipe.	Fill the sucking pipe. Suck all the air and discharge.
	Blocked control valve.	Clean the control valve.
	Pump is not connected correctly (sealing is not sufficient), sucks air from the sucking line or the shaft felt.	Check and provide sealing in the sucking line. Change the seal, if necessary.
Insufficient capacity and/or power	Blocked control valve.	Clean the control valve.
	Air leakage	Check and provide sealing in the sucking line. Change the seal, if necessary.
	NPSH is too low (manometrical sucking is too high)	Increase the diameter of the sucking pipe and /or shorten the sucking pipe. Decrease the manometric sucking height.
	The pump is worn	Check the rotor gap. Decrease the rotor gap by removing the adjustment washers if necessary.
	The safety valve is activated too soon or does not shut off at all.	Adjust the opening pressure. Check the valve mechanism.
Pump makes noise	Cavitation - manometrical sucking is too high	Increase the diameter of the sucking pipe and /or shorten the sucking pipe. Decrease the sucking height. Check the filters/drainers at the sucking side.
	Rotor/ gear damage	Check and replace if necessary.
	Wrong alignment of the pump / propulsion shaft	Correct with washers/wedges.
	Vibration sound comes from the safety valve	Increase the pressure on the spring. Replace if necessary.



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