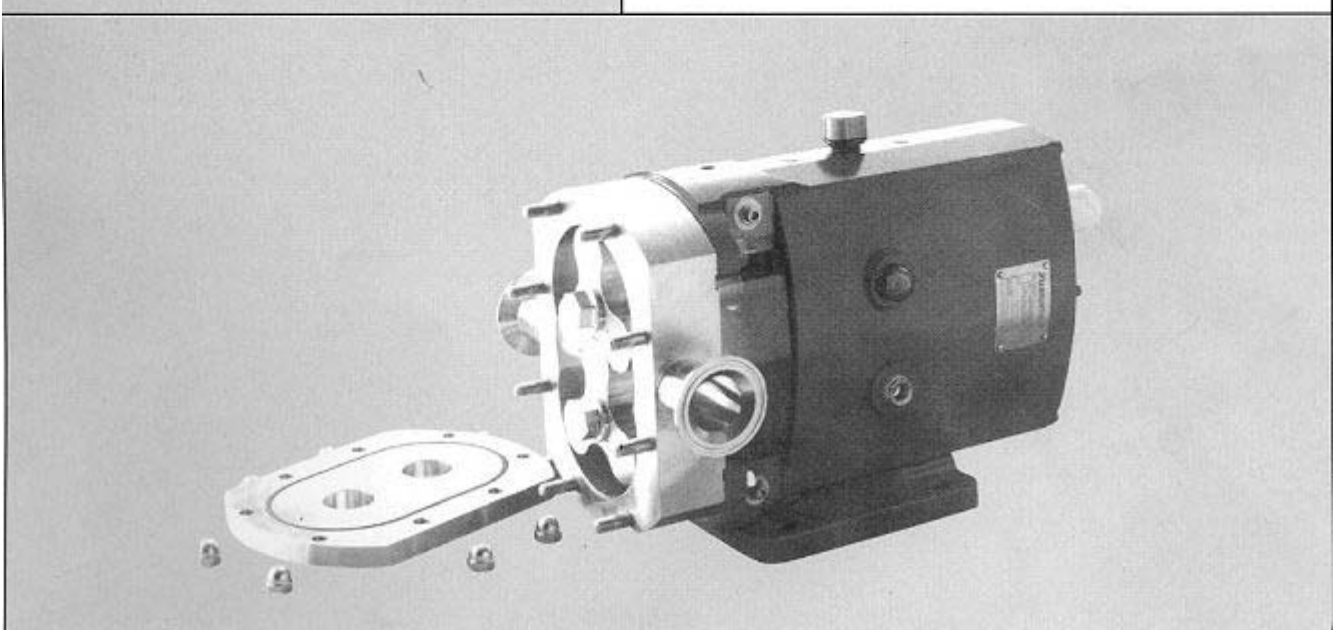




# User's Manual

Rotary Pump – Type  
YAS – YAR



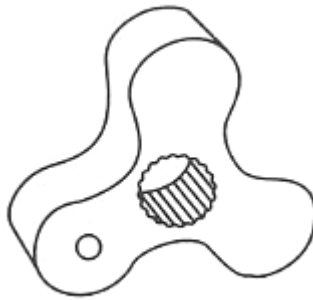
**Preface:**

Instructions to users for type selection

A. It is suggested to use “butterfly type” rotor for particle materials.



B. It is suggested to use “prism” rotor for materials of low viscosity or of thick slurry.



For special configuration requirement, please provide your company’s technical requirement before contacting our company’s technical department.

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The information contained in the specification is correct while being issued, but it is subject to alteration without prior notice.

# 1. General Illustration

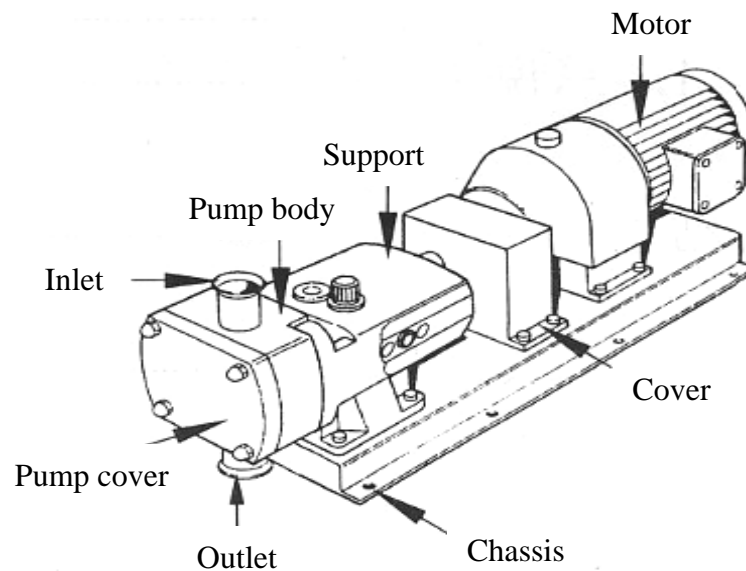
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## 1.1 General Illustration

YAS-YAR pump is a kind of fluid discharge rotary pump, which may or may not be equipped with drive device, each part of the pump being shown in the picture.

YAS-YAR pump series have a design of versatile gearbox, which makes pump installation flexible, i.e. outlet and inlet are installed at vertical or horizontal plane and Positioning of outlet and inlet (horizontal or vertical) may be changed by moving one of the bolt feet on the gearbox. Positioning of outlet and inlet should be indicated at ordering.

YAR pump may also be installed with outlet and inlet on vertical or horizontal plane, which may be realized through using outer cover equipped with vertical or horizontal axis.



---

### Working condition of pump

This pump can only be used under specially regulated working conditions. The operation pressure speed and temperature limit have been selected at ordering, which is not to be exceeded. Details about this aspect may be illustrated in the ordering documents or gained from the supplier providing pump type and sequence number.

## 2. Safety

### 2.1 Important Information

### 2.2 Warning Marks

---

This manual warns unsafe operations and other important information.

Special marks are used to give warning.

---

Please thoroughly read this manual before using this product!

#### Warning!

It indicates severe injury must be avoided in certain special steps.

#### Attention!

It indicates damage of pump must be avoided in certain special steps.

#### Annotation!

It indicates to be used for illustrating important information of specification.

---

General warning:



Dangerous voltage:



Corrodent:



---

This page summarizes all the warning contents in this manual.  
Please pay special attention to the following contents to avoid severe injury or damage or pump.

---

### Installation:

- Please refer to technical parameters at any moment (see Chapter 5).
  - Do not start a pump with liquid inside according to wrong rotation direction.
  - Do not put hand or finger into the connection between outlet and inlet or any position near rotation axis.
- Electrical connection of pump must be completed by professionals (refer to the

illustration of motor with drive device).



### Operation:

- Please refer to technical parameters (see Chapter 5).
- Do not contact pump or pipe when pumping hot liquid or at sterilization.
- Do not stand on pump or pipe.
- Do not operate pump when suck side and pressure side are clogged.
- Do not put hand or finger into the inside of connection between outlet and inlet or any position near rotation axis.
- Treat poisonous acid liquid according to producer's instruction and advice.



### Maintenance:

- Please refer to technical parameters at any moment (see chapter 5)
- Do not repair pump when it is hot.
- Do not add pressure to pump or pipe when pump is repaired.



### 3. installation

#### 3.1 System design and installation

---

##### Step 1

When designing pumping system,

-----ensure that NPSH (net pump suction head) meet the requirement of system, which is key to guarantee smooth operation of pump and avoid formation of cavitation.

-----for two pumps, it should be avoided that suction head runs in parallel connection with multiple pipes or ordinary suction pipeline because this may cause vibration or formation of cavitation.

-----Prevent pump from being clogged by solid materials such as nut and bolt. Prevent operation accidents of valves near to pump by means of pressure-reducing pump, pressure switch or current limitation device.



##### Step 2

---

It is advised to take the following points into account before installing pump:

-----Ensure installation face is flat to avoid deformation of base plate because this will lead to displacement of pump engine axis and damager of pump/engine device.

-----Once base plate is stable, “check” whether the alignment accuracy between pump axis and engine axis is within the limit scope by the manufacturer.

Access opening of pump should be at least 1 meter.

-----Pumping and discharging pressure monitoring points for diagnosing failure should be provided.

-----Valves should be provided if two pumps are used on multiple/common discharging pipelines.

-----Necessary pipes must be equipped if sealing needs washing or medium needed for heating/cooling jacket.

-----Do not suffer pump from rapid temperature change as heat impact may cause pump blocking.

---

##### Step 3

All pipe fittings must be supported. Pump should not support the weight of pipe fittings that exceeds the limit values listed in the following table.

Caution:

Supports of fittings also need to support the weight of product being pumped.

-----Design short and straight suction pipelines to reduce loss of fittings abrasion and raise the NPSH available to system.

-----Avoid bends, three-way pipe and any throttle approaching suction or discharging side and use bends with long radius at possible positions.

-----Provide isolating valve at each side of pump for convenience of isolating pump when necessary.

-----Keep fittings horizontal at the position of reducing air valve, including the eccentric reducer on the suction pipeline.

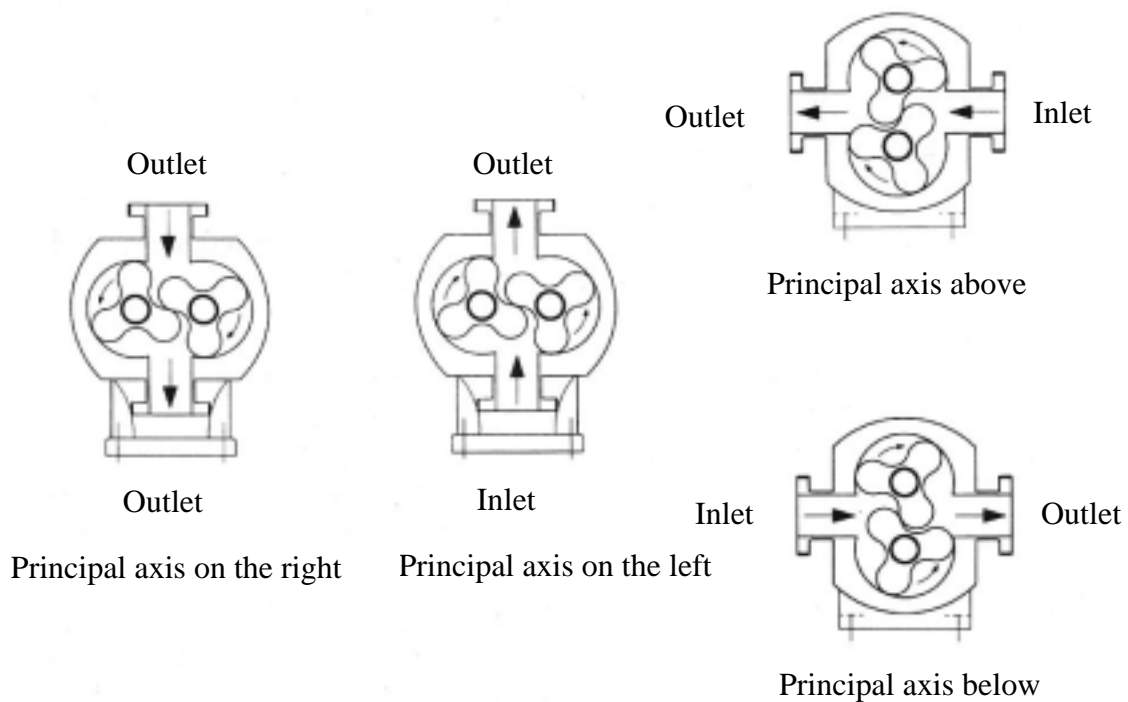
### 3. installation

### 3.2 System design and installation

---

#### Step 4

Flow direction is indicated through turning of drive axis, as change of turning direction will change of flow direction. Note: principal axis thread is clockwise rotation and negative axis thread is counterclockwise rotation. The ex-factory standard is horizontal principal axis above and vertical principal axis on the right.



The connection ways may follow user's requirement: three ways: A, B and C (socket, threaded SMS and flange)



## 4. Maintenance

### 4.1 Maintenance Schedule

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It is advised to install pressure gauge at both sides of pump for the convenience of monitoring when pump or fittings have problems.

#### Maintenance schedule

Weekly maintenance includes the following content:

- Check the oil level in gearbox when pump is under static state.
- Check whether sealing is leaking. Replace it if there is a problem.
- Check whether oil seal is leaking.
- Check pumping pressure.

Do not touch pump under some operation condition because it may scald the operator.

Let it cool for some time after pump device is shut down.

Replace the oil every 3000 hours or once a year (which is the longest time allowed).

Note: oil has been injected at ex-factory (usually machine oil 30~60#)

---

#### Recommended parts and fittings

The following table shows parts and fittings provided in maintenance schedule

Parts	Quantity
Lip seal drive end	1
O-ring rotor box cover	1
Lip seal cover end	2
O-ring rotor seal axis end	2
O-ring rotor seal nut end	2
Mechanical seal	2

## 4. Maintenance and Care

## 4.2 Dismantling

---

### Step 1

Please refer to the content related to safety protection measures.

Refer to disassembling map of parts (Chapter 6)

Dismantle rotor box cover

Remove nut(13) and cover (12) on the rotor box cover.



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### Step 2

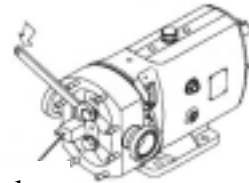
Remove rotor

1. Insert one plastic block or wood between two rotors (17) to avoid rotation of rotor.
2. Remove retention nut (22) and rotor. Inhibit the 6 pump rotors by locking subassemblies tight with torque.

TLAS(19) may be dismantled in following ways:

-----Loose each TLA screw in each stages in the totally reverse sequence.

-----Screw the screw with bolt into the two holes of TLA hole (equipped with washer) and pull out TLAS with strength.



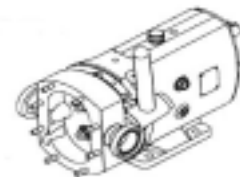
Plastic or wood block

---

### Step 3

Dismantle rotor box

1. For gland seal, loose the sealing gland to release pressure on axis. For mechanical seal, dismantle retention nut of sealing shell and loose the sealing shell from rotor box.
2. Remove retention nut (4) and washer (4A) of rotor box.
3. Use a soft hammer to gently punch both sides of rotor box.
4. Do not damage mechanical seal. Do not let rotor box fall on axis during dismantling process (24 and 25).
5. Do not dismantle filler piece unless rotor gap is required to be reset.



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### Step 4

Lubricating drainage pump

1. Place a tray under gearbox to collect grease waste.
2. remove the drainage clog below at one side of gearbox (1).

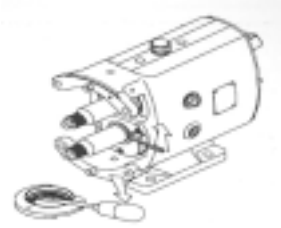


## 4.2 Dismantling

## 4. Maintenance

### Step 5

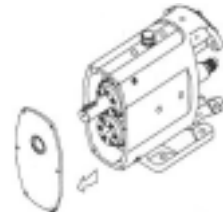
1. Remove screw (15)
2. Remove seal retainer (14) -----manual tools may be used to remove it if liquid sealant is used.
3. Once seal retainer is removed, screw driver may be used to remove lip seal (16). It is necessary to replace lip seal. It is advised to use new sealant or gasket before reassembling.



### Step 6

#### Remove gearbox cover

1. Remove screw (6)
2. Remove gearbox cover (5) after gasket is destroyed, and then push out lip seal (17). Replace lip seal before reassembling.



### Step 7

#### Remove timing gear

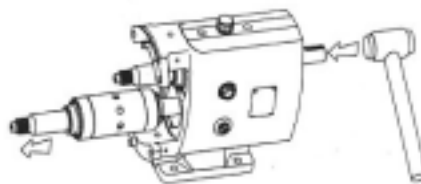
1. Loose splint screw on pump (40)
2. Remove gear (36) through tap discharge orifice or remove axis parts according to Step 8.



### Step 8

#### Remove axis parts

1. Use a soft hammer to gently punch the back end of each axis (24 and 25). Remove axis parts through the front of gearbox (1).
2. Support each axis during removing axis parts from gearbox.
3. -----For YAS pump series and YAR pump series with transverse opening, axis spacer (27) should be removed from bearing hole. This bearing hole is attached with mechanical processing mark and reverse to the installation face or rotor box.  
-----For YAR pump series with vertical opening, remove axle base spacer from bearing hole on the right. (Here the right refers to the position observed at the front of pump).



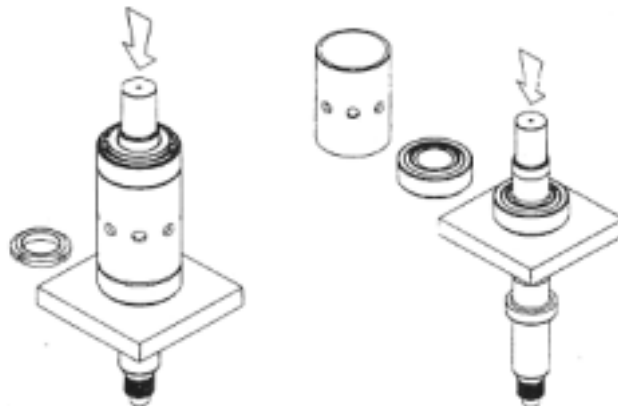
**Step 9****Remove bearing**

1. Use a soft vice to clamp axis (24 and 25) to protect the area where the seal is.
2. Use a taper tap located on “C” spanner to remove bearing nuts. The nuts can be very tight because it is equipped with thread locking glue.
3. Use a tool located inside the bearing as is shown in the picture to install axis vertically in the punch.

And then exert pressure on axis top so that the axis can move in the whole bearing (26 an 31).

4. Remove each bearing part (inside and outside). It is advised that bearing parts should be replaced if bearing needs to be removed from the axis due to some reasons.

Clean and check whether all parts and fittings are damaged or worn. Replace the parts if necessary.



### 4.3 Assembly

### 4. Maintenance and Care

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#### 4.3.1 Assemble the bearing on the axis

Be careful not to damage the axis surface, especially pay attention to the area where there is seal. Make sure all fasteners smooth.

---

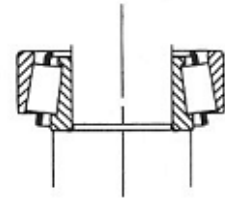
##### Step 1

Vertically position the axes (24 and 25) by soft vice and daub anti-sticking agent on the sectional plane of bearing.

---

##### Step 2

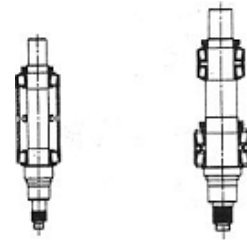
Mount the inner cone assembly on the axis, closely sticking to the axis shoulder.



---

##### Step 3

Keep the external cup, the bearing spacer (32) and the post bearing cup in place.



---

##### Step 4

1. Apply PermaBond145 level or other sequestering agent with the same property on the screw thread of bearing nut.

2. Screw tight the bearing nut (30); meanwhile rotate the bearings (26 and 31) and spacer (32). If the spacer can move when being knocked gently by a hammer, this indicates that the bearings are correctly and well-adjusted.

3. As for the double bearing component, the above procedure needs being repeated.

4. Grease the oil on the bearings.

**4.3.2 Assemble axis components****Step 1**

----- For YAS pump series and YAR pump series with transverse opening, the axis spacer (27) should be mounted in the bearing hole. This bearing hole is attached with mechanical processing mark and reverse to the installation face or rotor box.

----- For YAR pump series with vertical opening, mount the axle base spacer (27) from the bearing hole on the right. (Here the right refers to the position observe in the front of pump.)

---

**Step 2**

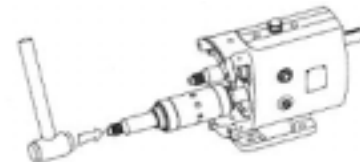
Based on the position of gearbox cover (5), find out the places of drive axis and auxiliary axis

---

**Step 3**

1. Knock the axes (24 and 25) into the gearbox (1) by a soft hammer.

2. If the bearing has already reset, then a new and fit spacer is needed. It is very critical for aligning the rotor within the scope of fixed value in Paragraph 4.4.4.

**4.3.3 Mount seal retainer****Step 1**

Clear the back of the seal retainer (14), and fix the retainer well.

---

**Step 2**

1. Check whether the rotor is aligned by referring to the relevant regulations in the Paragraph 4.4.4.

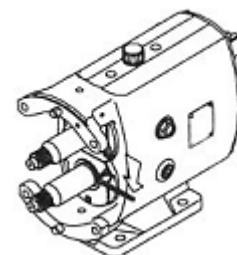
2. After the alignment of rotor, remove the seal retainer and press new lip seal (16) in the seal retainer.

3. Daub the liquid sealant on the front part of the gear box (1) and then push the seal retainer into the right place, making sure that the lip seal is not damaged when it slides to the axis.

---

**Step 3**

Remount the screw and screw it tight.



## 4.3 Assembly

## 4. Maintenance

### 4.3.4 Check the alignment of rotor

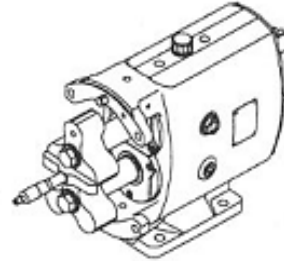
#### Step 1

Aligning the rotor with incorrect setting may damage the pump.

Fix the rotor on axes (24 and 25) and then screw tight the retention nut of rotor (22).

#### Step 2

1. The depth micrometer is used to make sure the axis alignment is within the scope of the tolerance 0.012mm (0.0005).
2. If the alignment is incorrect, the axis spacer (27) must be changed and processed.



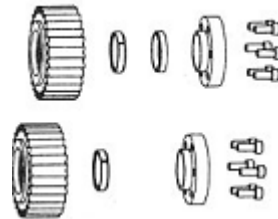
### 4.3.5 Assembling timing gear

#### Step 1

Slide the timing gear (36) on axes (24 and 25) and realign the time scale.

#### Step 2

Before assembling the torque locking device (38), lubricate them by gear oil first.

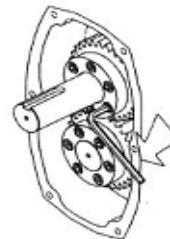


#### Step 3

Assemble the splint of timing gear.

#### Step 4

Requirements for timing adjustment: Only one splint or locking component of torque is fixed and let the axis in another gear rotates to adjust the timing. Please refer to the "Timing adjustment of rotor" in Paragraph 4.4.6.



## 4.3 Assembly

## 4. Maintenance and Care

### 4.3.6 Timing adjustment of rotor

#### Step 1

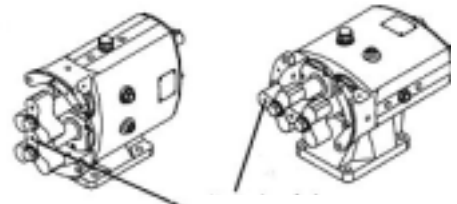
If the timing of rotor is required being adjusted (suppose the pump hasn't been reassembled yet), it is very important to find out the cause of error timing of rotor.

It is allowable to adjust the timing to enable the axis to rotate in the locking component or part of torque. Another locking component or part should be fixed pursuant to recommended torque.

---

#### Step 2

Set the rotor in the place with rotor recesses, which are within the 6-12 o'clock plane (pump with transverse opening) or the 3-9 o'clock plane (pump with vertical opening).



In the same direction

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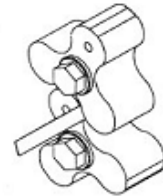
#### Step 3

Roll the axis to place the rotor in the new place as shown in the diagram.



#### Step 4

Between the specified points, the probe measuring instrument is used to measure and the axis rotates as required.



#### Step 5

If the measuring points are unequal, please knock on the rotor, and rotate the axis until 6 equal points are obtained.

---

#### Step 6

Fix the locking component of torque or the screw of splint well, check whether the timing is correct, and disassemble the rotor.



**4.3.7 Assemble the gearbox cover****Step 1**

Clean the hole of gearbox cover, then remove all seal gasket materials and press the new lip seal (2) in the gearbox cover.

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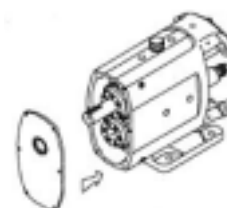
**Step 2**

Apply the liquid seal gasket to the cover surface meshed with the gearbox.

---

**Step 3**

Carefully slide the cover on the axis to make sure that the lip seal is in the center and not damaged, and screw tight the screw (6).



---

**4.3.8 Assembly and gap filling of rotor box**

If new parts are assembled, the rotor box may need refilling. Before operating the pump, the post gap must be checked.

**Annotation:**

The supplier can supply the correct gap according to the serial number of pump. The adjustment of gap must follow the following steps. Incorrect setting of gaps may damage the pump. The filler pieces of different thickness have different colors. They are arranged on the top and bottom of the rotor box and are kept on the specific places by the filler piece holder.

---

**Step 1**

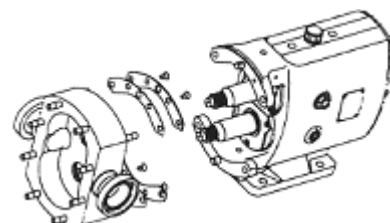
1. Disassemble the filler piece holder (8A) and mount the thinnest filler piece (8) at the top and bottom.
2. Remount the filler piece holder and screw (8B).
3. Assemble the rotor box (9) on the gearbox (1), screw tight the retention nut (4) of the rotor box and mount the rotor (17).

The post gap is measured by the probe measuring instrument so as to clarify how many filler pieces are filled to meet the standard gap tolerance. Fill the complementary filler pieces and recheck the gaps.

---

**Step 2**

Disassemble the rotor box for mounting of product sealing device.



### 4.3 Assembly

### 4. Maintenance and Care

#### 4.3.9 Primary seal

##### Step 1

Please refer to the instructions for sealing assemblage in Paragraph 4.5.

#### 4.3.10 Rotor assemblage

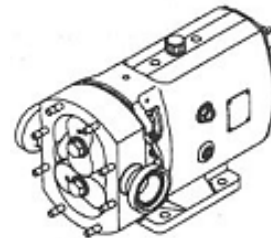
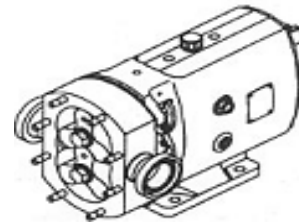
##### Step 1

1. Install the O-ring of new rotor (18)
2. Install the rotor (17) on the axes (24 and 25) with recesses on main blades, which locate in the 6-12 o'clock hold (pump with transverse opening) or 3-9 o'clock hold (pump with vertical opening).

As for double blade rotor

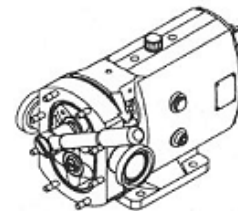
Assemble the rotor in the 6-12 o'clock plane on the head shaft and the holding rotor in the 3-9 o'clock plane on the bottom shaft.

Rotate the pump for a full circle to ensure the detachment of rotors.



##### Step 2

Fix the new O-ring (20) on the retention nut (22) of rotor. Apply a wood block or foam block between rotors and the recommended setting value of torque; screw tight the retention nut of rotor, the rotor rotates.

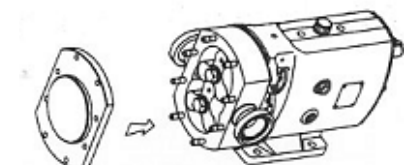


##### Step 3

Check whether the rotation of rotor is synchronous, rotate the driving shaft (24) by hand, and check whether the backlash accords with the recommended value by use of probe measuring instrument.

#### 4.3.11 Assemble the rotor box cover

1. Lubricate the grease gently on the new O-ring (11) and assemble it on the rotor box cover.
2. Assemble the rotor box cover with the rotor box (9) and screw tight the nut (13) of rotor box cover.
3. By reference to the pump, conduct starting check before operation.



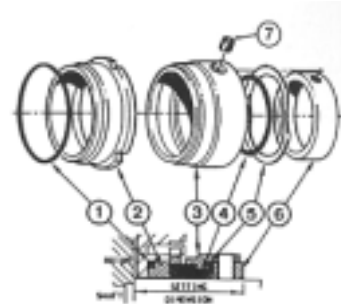
## 4.4 Disassembly and assembly of primary seal

## 4. Maintenance and Care

### 4.4.1 Single mechanical seal of YA-JM-30 YA-JM35

The mechanical seal is easy to be damaged, so special cautiousness is needed during operation; before assemblage, clean the parts, check whether there is any damage to the sealing surface, and during assemblage mount new flexible assemblies.

Item	Description
1	static seal ring O-ring
2	static seal ring
3	rotary seal ring
4	rotary seal ring O-ring
5	wave spring
6	drive ring
7	flat head screw



### Removing seal

1. Loosen the screw (7)
2. Dismount the rotor box
3. Draw out the static seal from the rotor box (if has).
4. Remove the rotary seal (3) from the axis (and the gasket).

### Assembling seal

1. Mark the axis to indicate the setting length of seal.
2. Gently lubricate O-rings (4 and 1) and then assemble them on the rotary and static seal (3 and 2).
3. Remount the gasket (if has) and assemble the rotary seal on the axis until it is aligned with the predefined mark.
4. Screw tight the screw (7).
5. Assemble the static seal on the rotor box.
6. Wipe clean the sealing surface by use of solvent.
7. Reassemble the rotor box.

#### 4. Maintenance and Care

#### 4.5 Troubleshooting

Troubles																Causes	Solutions	
N o f l o w	In s u f f i c i e n t c a p a c i t y	Irr e g u l a r d i s c h a r g e	Lo w d i s c h a r g e p r e s s u r e	U n a b l e t o f i l l w a t e r t o m a k e t h e p u m p s t a r t	Af t e r s t a r t i n g , w a t e r f i l l i n g l o s s	D u r i n g s t a r t i n g , t h e p u m p s t o p s r u n n i n g	Pu m p t o h o t	M o t o r h o t	Ex c e d e d t h e a b s o r b e d p o w e r	G e n e r a t e n o i s e a n d v i b r a t i o n	Pu m p u n a b n o r m a l o p e r a t i o n	Si m p h o n	Cl o g	Le a k a g e o f m e c h a n i c a l s e a l	Le a k a g e o f s e a l a n d			
																	Incorrect rotary directions	Reverse the motor
																	No water filled in the pump	Exhaust air from the pumping pipe and pumping clog and fill water

																	Not enough NPSH	<p>Augment the diameter of pumping pipes</p> <p>Augment the pump head</p> <p>Simplify the structure of pumping pipeline and reduce the length</p> <p>Minish the pump speed</p>	
																		Evaporation of liquid in the pumping pipe	<p>Augment the diameter of pumping pipes</p> <p>Augment the pump head</p> <p>Simplify the structure of pumping pipeline and reduce the length</p> <p>Minish the pump speed</p>
																		Air enters the pumping pipes	Reconnect the pipe fittings
																		Strainer or filter clogged	Repair the fittings
																		Liquid viscosity higher than the rated value	<p>Increase the liquid temperature</p> <p>Minish pump speed</p> <p>Check the limits on viscosity of sealing surface</p>
																		Liquid viscosity lower than the rated value	<p>Reduce the liquid temperature</p> <p>Increase the pump speed</p>
																		Liquid temperature higher than the rated value	<p>Cool the outer casing of pump</p> <p>Reduce the liquid temperature</p> <p>Check limits on sealing surface and elastic materials</p>
																		Liquid temperature lower than the rated value	<p>Heat the outer casing of pump</p> <p>Increase the liquid temperature</p>
																		Unpredictable solid matters in liquid	<p>Keep the system clean</p> <p>Fit the strainer in the pumping pipeline, if the solid cannot be remover, consider assemble double mechanical seal</p>

																	Discharging pressure higher than the rated value	Check if it is clogged, shut the valve to repair the system, change some parts to avoid the recurrence of system failure Simplify the discharging pipes to reduce pressure	
																		Seal gland is too tight	Loosen the gland
																		Seal gland is not tight enough	Increase the purging flow rate Check if the purging liquid fully flows in the seal area
																		Pump speed higher than the rated value	Decelerate the pump speed
																		Pump speed lower than the rated value	Increase the pump speed
																		Distortion of pump box casing by pipe fittings	Check if pipes are aligned Mount active pipes or expansion fittings Support the pipe fittings
																		Displacement of active joints	Check if they are aligned and adjust correspondingly
																		Unsafe pump driver mounted	Mount the locking spacer on the loosening fasteners and refasten.
																		Bearing abrasion or failure	Change parts by referring to manufacturer's suggestions.
																		Insufficient lubrication of gearbox	Refer to the relevant descriptions of pump manufacturer
																		Contact of metals of pumping components	Check the rated and work pressure Refer to the descriptions of pump manufacturer
																		Abraded pumping parts and components	Mount new parts
																		Pressure reducing valve of	Check the pressure setting, readjust if necessary



## 5. Technical Parameters

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Please choose a model, which can be fitted with motor according to the viscosity of materials.

### 5.1 Technical Parameters

Model	Import/export	Pumpage every 100R	Speed governing	Corresponding flow rate (L/H)	Power of motor (KW)
YAS-6	38/38	6	200-500	650-160	1.1
YAS-8	38/38	8	200-500	850-2160	1.5
YAS-12	38/38	12	200-500	1300-3200	1.5
YAS-20	51/51	20	200-500	2100-5400	2.2
YAS-30	51/51 63/63	30	200-500	3200-6400	2.2
YAS-36	63/63	36	200-500	3800-7600	3
YAS-52	70/70	52	200-500	5600-11000	4
YAS-66	70/70	66	200-500	7100-14000	4
YAS-78	89/89	78	200-500	9000-18000	15.5
YAS-100	101/101	100	200-500	11000-22000	7.5
YAS-135	101/101	135	200-500	15000-30000	7.5

The speed governing adopts stepless speed change or frequency control of motor speed with the scope of speed-governing 200-900rpm (for the performances of YAR series, please refer to YAS series).



## 6. Parts Catalogue

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### Parts Catalogue

<b>No.</b>	<b>Designation</b>
1	gearbox --- common mounting
2	pin
3	stub bolt, rotor box holding device
4	nut, rotor box holding device
4A	washer, rotor box holding device
5	cover, gearbox
6	screw, gearbox cover
7	lip seal, driver
8	filler piece
8A	filler piece retainer
8B	filler piece retainer screw
9	rotor box
10	stub bolt, rotor box/cover holding device
11	O-ring, cover
12	cover, rotor box
13	domed nut, rotor box cover
14	gasket, seal
15	screw, seal gasket
16	lip seal, gland end
17	rotor
18	O-ring, rotor sealing axis end
20	O-ring, rotor sealing nut end
22	nut, rotor holding device
23	bolt
24	axis, drive
25	axis, auxiliary
26	bearing, post
27	spacer, bearing seat
30	nut, bearing
31	bearing, front
32	space, bearing
36	timing gear
38	torque locking component
39	splint
40	screw, splint
45	drainage clog
46	inspection hole
46A	spacer, inspection hole

47	filter clog
48	clog
49	feeding clog
50	gland protection device
51	screw, gland protection device
52	spacer, gland protection device
53	spacer, gland protection device
54	foot, vertical opening
55	foot sealing gasket, vertical opening
56	foot, transverse opening
57	foot sealing gasket, transverse opening
58	bolt, foot

This page is the exploded view of the main part of YAS-YAR pumps, which includes the 3D exploded views of all components.

