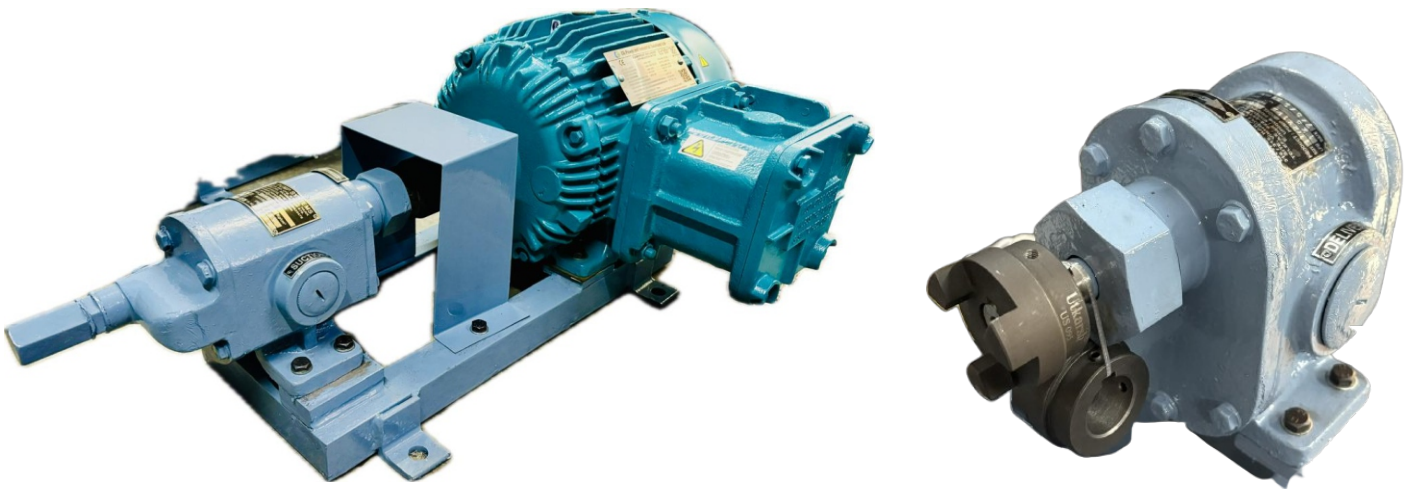


INSTRUCTION MANUAL

ROTARY GEAR PUMP

UA - SERIES



**WARNING : Pump is not to be tested in Oil.
Do not run the pump dry. The suction must always be flooded.**

UNIQUE PUMP SYSTEMS

INSTRUCTIONS FOR INSTALLATION AND OPERATION OF “UNIQUE” ROTARY GEAR PUMP

The information contained herein is of a general character and will be supplemented upon request by specific instructions applying to the particular type of rotary pump being operated. It is requested that these instructions be placed in the hands of those directly charged with the installation and operation of the equipment. Satisfactory service can be realized only upon strict adherence to these instructions.

CHECKING EQUIPMENT

Inspect and check shipping manifest immediately on receipt of shipment and report any damage or shortage to the company.

LOCATION

The pump should be installed in a light, clean, dry location and so placed that it is easily accessible for inspection. Suction piping should be full size, short and direct. Motor driven units should not be located in damp or moist places unless provisions have been made for this condition.

FOUNDATION

The foundation should afford permanent rigid support for the entire unit. Concrete foundation built up from solid ground will prove most satisfactory. Ample allowance should be provided for grout in building the foundation. Foundation bolts of the specified size should be accurately located according to drawings when the unit is mounted on steel work or other structure, it should be set directly over, or as close as possible to the supporting beams or walls, and should be so supported that the base plate cannot be distorted by yielding or springing of the structure.

ERECTION ALIGNMENT

Correct alignment is absolutely essential for successful operation. A flexible coupling will not compensate for slight changes in alignments which may occur during normal operation.

FACTORY ALIGNMENT

Every unit assembled at works is accurately aligned by placing the baseplate on a surface plate and then levelling the machined pads. Shims are inserted under the feet of the pump and driver when necessary to obtain perfect alignment. However, all base plate are elastic and for this reason we cannot assume responsibility for the proper mechanical operation of a unit unless the shop alignment is reproduced when the unit is erected on its foundation.

FIELD ALIGNMENT

Pumps are usually shipped on their baseplate and it is seldom necessary to remove the pump and driver from the baseplate while levelling. The pumping unit should be placed on the foundation supported by wedges placed near the foundation bolts. Remove the paint from the projections of the baseplate pads upon which the pump feet are supported. Place a spirit level on these pads and adjust the wedges under the baseplate to bring the pump to the shaft level.

The alignment is then to be checked and corrected so as to bring the driver half coupling in perfect alignment with the pump half coupling. The checking of alignment can be accomplished by the use of a straight - edge across the top and sides of the coupling.

If the coupling's flanges are not perfectly true or not of the same diameter, check the alignment by revolving coupling and checking at each quarter turn. If any variation is found, proper allowance must be made in aligning the unit. The clearances between the coupling halves should be set so that they cannot strike, rub or exert end thrust on either pump or driver.

IMPORTANT

Alignment must be checked after the pump has been completely piped up because pumps are frequently sprung and pulled out of position by drawing up flange bolts when the flanges are not squared up before tightening. Particular care must be taken that the suction and discharge piping is properly supported to prevent a strain or pull on the pump. i.e. strains are a common cause of misalignment, hot bearings, wear and vibration.



GROUTING

The baseplate should be grouted in before the piping connections are made. The usual mixture for grout is: one part cement and two parts sand with sufficient water to cause the mixture to flow freely. The grout should be worked in under the baseplate so as to support it fully throughout its whole area.

SUCTION PIPING

Experience has proved that a faulty suction line is responsible for trouble with rotary pumps. Suction piping should never be less diameter than the full size of the pump suction opening. It should be as short and direct as possible and thoroughly clean. It should be uniformly graded up from the source of supply to the pump. When drawing liquids long distances or on high suction lifts or when handling thick, viscous liquids, the diameter of the suction pipe should be greater than the opening in the pump to convey the liquid with minimum pipe friction loss. Rotary pumps have excellent suction qualities but cannot be expected to do the impossible. Remember that atmospheric pressure (14.71 lbs. per sq. inch absolute) is that force which forces liquid into a pump. If the static suction lift plus suction pipe friction is equal to or greater than the equivalent of atmospheric pressure, the pump will not fill, resulting in reduced or entire loss of capacity.

When pumping highly volatile liquids such as butane, propane, hot oils, etc., there must be sufficient static head on the suction in addition to the vapour pressure to prevent vaporization of the liquid within the pump. Rapid wear or seizing will result if these pumps are allowed to run dry.

The Suction line should be perfectly air-tight. A leak will result in reduced or entire loss of capacity.

A strainer is recommended if the liquid contains foreign material. Abrasives in the liquid will cause rapid wear. The strainer should have a net area of from three to four times the suction pipe area and should permit easy cleaning.

Always carry the discharge up through a riser approximately five times the diameter. This prevents gas or air pockets in the pump and will act as a seal high vacuum service. A valve on the top of the riser may be used as a vent when starting the pump.

To protect the pump against excessive pressures caused by increased pipe friction in cold weather or accidental closing of valve in discharge line, a relief valve is provided. This relief valve should be set slightly higher than maximum pump discharge pressure but not more than 10%.

STUFFING BOXES

Normally pumps are provided with neoprene rubber oil seals. When gland packing is provided, do not tighten the glands too tightly as a slight leakage will help to lubricate the packing.

PRIMING

Before starting up for the first time, prime the pump to wet the gears for effective suction.

These pumps are run and tested on oil. Unless specified on the order, the oil is left in the pump to protect the internal mechanism against corrosion. If this oil will be detrimental to the system, it will be necessary to dismantle the pump, clean all parts thoroughly and fill the pump with the liquid to be pumped.

Never start or run the pump dry. This will inevitably cause galling, seizing or destructive wear between the rotors, end plates and casing.

DIRECTION OF ROTATION

Direction of rotation is marked with an arrow on the pump.

When direction of rotation is to be reversed, fix the back over after rotating the same 180 angle. Two bolts which are seen on the front cover are to be taken out and grub screw fitted below the bolt in the pump body should be changed to delivery side. The bolts should be secured tight in the original position so that there is no leakage.

STARTING AND OPERATING THE PUMP

Before starting prime the pump and then check the prime mover for connection. Circuit pressure or vacuum on the inlet and outlet side to be sure that they conform to specifications and that the pump will deliver full capacity without overloading the driver.

It is advisable to start operation at a reduced load gradually increasing to maximum service conditions.

External bearing pumps require occasional lubrication of soft grease in the bearings. If no grease fittings are furnished on internal bearing pump, no attention for lubrication is necessary.

MAINTENANCE

PERIODICALLY

- (a) Alignment of the pump and motor should be checked.
- (b) Suction line should be checked for no air leakage and jamming of the dirt in filter. If there is a pressure drop, the relief valve should be further screwed in till desired pressure is achieved.
- (c) If this does not give result then there should be a considerable wear in the plates, which should be replaced.
- (d) Leakage, if any, on end covers should be eliminated by tightening bolts.

YEARLY

- (a) If a pressure drop is too much the gears or the end plates should be changed as the case may be due to excess wear on them.
- (b) Oil seal should be replaced if there is leakage from the drive end.
- © On dismantling, if the body shows wear, then it should be sent back to us for replacement. This will be in a very long run only.
- (d) Bearings, if found worn out, should be replaced.

IMPORTANT

- (a) If the pump gets jammed in running position, in that case loosen all the bolts by half a turn (this will also be in the case of pumps with bush-bearings)-and-try to rotate the pulmap-shaft-with pipe spanner. If it rotates then start the pump and allow it to run smoothly, and tighten the bolts slowly till there is no jamming.
- (b) If the rotor does not rotate, then dismantling is necessary.
- © Where the pump is excessively heated in the initial running and jamming is caused, allow it to cool down to the temperature till the jamming is eliminated.
- (d) At the time of commissioning, under no circumstances the pump should be dismantled due to any fault whatsoever without consulting the manufacturers.
- (e) At the commissioning stage, if the shaft is found tight, try to rotate the shaft with the help of pipe wrench. If it rotates with pipe wrench then tightness should be considered as normal and the pump can start without any trouble.

DISMANTLING AND REASSEMBLY OF "UNIQUE" ROTARY GEAR PUMP

A. PUMPS FITTED WITH BUSH BEARING :

- (1) Unbolt side covers and push out assembly of rotors and bushes making note of packing on either side.
- (2) Slide out the bushes from shafts and check for face wear. If excessive wear is there, replace them and if minor wear is there, have a fine machine cut on the face such that both bushes on either side are exactly of same width.
- (3) No. of packing should be reduced corresponding to the reduction in bush width but minimum one packing should be there on either side.
- (4) Remove all the burrs in body bore, on body faces as well as on rotors. Insert the rotors first in the body and then fit the bushes on either end and check for free rotation.
- (5) If seal is damaged, take out circlip and seals. replace with new seals and fit back in the cover.
- (6) Put appropriate pickings with grease taking care that there is no over lapping on bush faces and then fit the covers with bolts.
- (7) Free rotation of the shaft should be checked with a small pipe wrench. If shaft is found tight, loosen cover bolts by quarter turn and start the pump. When it runs smoothly, tighten the bolts equally and slowly. If seizure occurs, add one more packing.
- (8) In case of any ovality found in bush bore, it should be replaced.
- (9) If excessive wear is found on gear teeth, complete set is to be replaced.
- (10) High pressure pumps are fitted with 'O' Rings. In case of any wear on bush face in pump, it should be replaced.
- (11) Minor scoring in body bore will not affect pumps performance to a great extent but if heavy scoring is found, body should be replaced.

B. PUMPS FITTED WITH ANTIFRICTION BEARINGS :

- (1) Unbolt both side covers making note of packings on either side.
- (2) Heavier pumps are provided with jacking arrangement to take out covers. Threaded holes are provided on covers. Insert suitable bolts and jack up the covers.
- (3) Push out the assembly of rotors, wear plates and bearings such that wear plates of opposite side come out of the body. By means of pullers, take out the bearings and wear plates and push the remaining assembly out in the opposite direction. Take out the bearings and wear plates from the other side also by means of pullers.



(4) Check the wear on wear plates. If excessive wear is there, replace the complete set of wear plates. In case of minor wear, take a fine machine cut on the face such that the width of top and bottom wear plates is equal.

(5) Check wear on gears and shaft. If minor wear is observed on face of gears grind the faces (in case of hardened gears) or take a fine machine on the faces of soft gears such that driver and driven gears match perfectly well with the same face width. Remove all burrs from body bore, body face as well as on rotors and wear plates.

(6) Insert the rotors first in the body and then wear plates on both sides. Now fit the bearings in each wear plate. Keep a watch on free rotation of shaft with the help of a pipe wrench.

(7) Reduce the packing corresponding to the reduction in width of wear plates and gears. Place the packings on body face with grease such that there is no overlapping on wear plates.

(8) If seals are damaged, take out circlip and seals and fit new seals in the cover.

(9) Now fit front & back covers and bolt them. If dowel pins are provided covers should be first located with dowel pins and then they should be bolted.

(10) In case of excessive scoring pump body, it should be replaced.

(11) If pump is not rotating freely, loosen cover bolts slightly. Now start the pump and let it run for some time, then tighten all bolts equally. In case of seizure add one more packing.

(12) If the pump is having steam jacket, then before taking out covers remove jacket coupling and plugs from both covers.

“UNIQUE” ROTARY GEAR PUMP SPARE PARTS LIST

RECOMMENDED SPARE PARTS FOR NORMAL

OPERATING OF GEAR PUMPS

- | | |
|-------------------------------|-------|
| 1. Neoprene Oil Seals | 2 No. |
| 2. Relief Valve Spring | 1 No. |
| 3. Packing Set | 1 Set |
| 4. Rubber Spaiser of Coupling | 1 No. |

RECOMMENDED SPARE PARTS FOR NORMAL

- | | |
|------------------------|-------|
| 1. Bush Bearing | 1 Set |
| 2. Ball Bearing | 1 Set |
| 3. Wear Plates | 1 Set |
| 4. Gear Set with Shaft | 1 Set |

SPECIAL INSTRUCTION

1. In case of pumps provided with Mech/seal instead of oil seals, procure 1 No. Mech/seal.

IMPORTANT

1. While floating your enquiries for spares of Unique Rotary Gear Pumps, Please Furnish the following details:

- a) Nameplate details / Pump Serial Number.
- b) Purchase order number & date.

UNIQUE PUMP SYSTEM

G-316, 3rd Floor, Kailas Industrial Complex,
Park Site, Vikhroli (West),
Mumbai-400079.

Telefax: 022-25182235 Mob: 0982062576

E-mail: uniquepump@gmail.com

ss.uniquepump@gmail.com

GEAR PUMP FAULT FINDING CHART

FAULT	CAUSE	ACTION
I. a) Pump dose not prime	1. Rotation wrong 2. Pump is dry 3. Suction line is not tight. 4. Relief Valve not tight. Damaged valve joint. Foreign body between valve seat and valve.	Check rotation. If necessary change connections on motor. Fill pump Initially with oil. Tighten all bolts and nuts on suction side. II necessary, pressure test suction line. Attach vacuum gauge which should show approximately 20 ins. Hg. Vacuum at closed suction valve. Remove valve and check seat. If necessary grind in. Check joint between suction and discharge opening in the pump. If necessary replace Joint: Remove foreign body. In case of damage to valve seat, grind In. Tighten bolts of cover.
I. b) In the case of working against closed discharged line.	1. Evacuated air cannot pass through the pressurizes oil column and streams back into the suction line.	Arrange deaeration cock on discharge side of pump. When pump is started open this cock until all air is exhausted and then close. In the case of such arrangements, a new return valve is necessary on the discharge line and also a foot valve is suggested so that the suction line, when switching off pump, remains full.
II. Loss of output	1. Speed too slow 2. Relief Valve opens too soon 3. Loss in output due to air in stuffing box. 4. suction line friction too great.	Check speed by means of a tacho meter. Check frequency and voltage motor name plate. Check pump as in the case of overload, speed can be dropped. Check star-delta and compare with voltage. Remove valve cover and adjusting screw. If spring is fatigued, replace. Take care when adjusting that the pressure rise with closed discharged valve does not overload the pump. Further details see fault 1, Paragraph 4. See fault 1, paragraph 3. Fit vacuum gauge and check suction lift which should not be more than 5-6 MLC.

FAULT	CAUSE	ACTION
<p>III. Pump is noisy</p> <p>a) Mechanical Noise</p> <p>b) Hydraulic or</p>	<p>a) Suction pipe too small</p> <p>b) Suction line too long.</p> <p>c) Suction filter blocked</p> <p>d) Viscosity too high</p>	<p>In the case of items (a), (b) & (d) only, a larger suction line or a reduction in length can help. In case of (c) clean the filter element.</p> <p>In case of (c) clean the filter element.</p>
	<p>1. Badly aligned coupling</p> <p>2. Spindle not running</p> <p>3. Gear flanks are damaged by foreign bodies.</p> <p>4. Delivery against low</p> <p>5. The pumped medium</p>	<p>Disconnect pump from motor and align coupling.</p> <p>Strip motor and remove main spindle (an operation that should only be carried out by an expert.) Test with clock gauge between centres.</p> <p>Remove gears and correct damaged flanks with oil stone. Finally grind by hand.</p> <p>Load gear flanks by closing discharge, valve giving approximately 15-20 psi. Noise will be eliminated.</p> <p>Determine whether air is drawn through leak (see also Fault II paragraph 2 & 3) or whether return lino is unsuitable in the case of a circulating pump. In such a case it is also necessary that the return pipe terminates below liquid level.</p>
<p>IV. Motor is heating up.</p>	<p>6. Cavitation due to</p> <p>a) Too high suction lift.</p> <p>b) Excessive speed in the case of very viscous liquids.</p> <p>c) Pumping of liquids which are highly volatile like petrol, solvents etc.</p>	<p>a) Reduce the suction lift.</p> <p>b) Reduce speed. Only a low vacuum is permissible.</p> <p>c) Under certain circumstances liquid may require pressurization, depending on its vapour pressure.</p>
	<p>1. Wrong connection of motors or only two phases</p> <p>2. Motor overloaded</p> <p>3. Wrong frequency</p> <p>4. Pump, seizing</p> <p>5. Delivery pressure</p>	<p>Connect motor according to name plate and check voltages in all three phases.</p> <p>Check amps by means of an ammeter.</p> <p>Check frequency on name plate.</p> <p>Disconnect motor and check that the pump can be turned by hand.</p> <p>Connect pressure gauge on the discharge branch and check whether delivery pressure is in accordance with the name plate of the pump.</p>

FAULT	CAUSE	ACTION
<p>V. Fluctuating delivery</p> <p>VI. Pump Seized.</p> <p>VII. Relief Valve chattering.</p>	<p>6. Viscosity too high.</p> <p>7. Mis alignment.</p> <p>1. Frothing medium.</p> <p>1. Excessive pressure due.</p> <p>2. Foreign body in pumped medium.</p> <p>3. Dry running.</p> <p>4. Insufficient lubricating quality of pumped medium.</p>	<p>Check viscosity at pumping temperature and compare with name plate of the pump.</p> <p>He align coupling.</p> <p>Avoid air entry in the oil (see that in the case of circulating pumps, the return line ends well below the oil level.)</p> <p>Check relief valve pressure at closed. discharged valve, re-adjust relief valve, so that it opens approximately al 10% above working pressure.</p> <p>Dismantle pump. Remove foreign body. Smoother seized area with oil stone, If necessary, fit new bearings and provide suction filter.</p> <p>Remove seized area as above. Fill with oil and wet rotors before starting up. Under certain circumstances check deaeration. (See suction 1. paragraph 2.).</p> <p>Check whether pumped medium has lost its lubricating properties due to elevated temperature.</p> <p>If a pump has seized, years and bearings should be dismantled. All seized areas to be smoothened with oil stone. The bearings should be scraped and casting bores ground if necessary. Reassemble the pump and put it in operation initially at low pressure.</p> <p>Fit new spring, check valve for easy movement in the valve seat.</p>

LH Suction looking from drive side

PUMP FITTED WITH BUSH BEARING
DRAWING No: ASSLY 001

FROM MODEL NO

SPARE PART LIST		
SR. NO.	NAME OF PART	QTY.
16	Front Cover	1
15	Main Body	1
14	Driven Shaft With Gear	1
13	Spring Cap	1
12	Tinsion B Bolt	1
11	Cap Nut	1
10	Union	1
09	Spring	1
08	Valve	1
07	Back over	1
06	Driver Shaft With Gear	1
05	Bush	1
04	Packing	1
03	Mechanical Seal	1
02	Seal Cap	1
01	Key	1