



English

Installation, Operation and Maintenance Instructions

Luna LB Lobe Pump

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EC Declaration

as defined by Machinery Directive 98/37/EC, and subsequent revisions.

EC Declaration of Incorporation

This declaration is only valid when the machinery has been supplied without drive unit.

In this case, the machinery meets the requirements of the said directive and is intended for incorporation into other machinery or for assembly with other machinery in order to constitute relevant machinery as defined by the said directive including any amendments, which are valid at the time of supply.

IMPORTANT

This machinery must not be put into service until the relevant machinery into which it is to be incorporated has been declared in conformity to the said directive.

This declaration is only valid when the machinery has been installed, operated and maintained in accordance with these instructions and safety guidelines contained within as well as instructions supplied for equipment assembled with or intended for use with this equipment.

The following harmonised standards are applicable:

BS EN 809

BS EN ISO 12100 Parts 1 & 2

EC Declaration of Conformity

This declaration is only valid when the machinery has been supplied with drive unit.

In this case the machinery meets the requirements of the said directive including any amendments which are valid at the time of supply.

IMPORTANT

This declaration is only valid when the machinery has been installed, operated and maintained in accordance with these instructions and safety guidelines contained within as well as instructions supplied for equipment assembled with or intended for use with this equipment.



Mr G.D. Thomas, Chief Engineer

Installation, Operation & Maintenance Instructions

INSTALLATION

1.1 INSTALLATION AND SAFETY RECOMMENDATIONS

In common with other items of process plant a pump must be installed correctly to ensure satisfactory and safe operation. The pump must also be maintained to a suitable standard. Following these recommendations will ensure that the safety of personnel and satisfactory operation of the pump is achieved.

1.2.1. GENERAL

When handling harmful or objectionable materials, adequate ventilation must be provided in order to disperse dangerous concentrations of vapours. It is recommended that wherever possible, Mono pumps should be installed with provision for adequate lighting, thus ensuring that effective maintenance can be carried out in satisfactory conditions. With certain product materials, a hosing down facility with adequate draining will simplify maintenance and prolong the life of pump components.

1.2.2. SYSTEM DESIGN & INSTALLATION

At the system design stage, consideration must be given to provision of filler plugs, and the installation of non-return and/or isolating valves. Pumps cannot be reliably used as non-return valves. Pumps in parallel and those with high static discharge head must be fitted with non-return valves.

The pumps must also be protected by suitable devices against over pressure and dry running.

1.3.1 HANDLING



During installation and maintenance, attention must be paid to the safe handling of all items. Where a pump or its components weigh in excess of 20 kg (45lb) it is recommended that suitable lifting tackle should be used to ensure that personal injury or damage to components does not occur.

For safe handling of both bareshaft pumps and pump units (pump/ gearbox/motor etc.) slings should be used. The position of the slings will depend upon the specific pump/unit construction and should be carried out by personnel with the relevant experience to ensure that the pump is not damaged and injury to personnel does not occur.

If eyebolts do exist then these should only be used for lifting the individual components for which they are supplied.

1.3.2 STORAGE AND INFREQUENT OPERATION

The situation where a pump is used infrequently is also covered by the instructions in this section.

1. Store pump inside wherever possible or if this is not feasible then provide protective covering. Do not allow moisture to collect around the pump.
2. Remove the drain plug, if fitted. Any inspection plates fitted should also be removed to ensure that the suction housing can drain and dry completely.
3. See Manufacturers Instructions for motor/gearbox/drive instructions for storage procedures.

LONG TERM STORAGE

IMMEDIATELY PRIOR TO INSTALLATION AND STARTING

Before installing the pump please ensure that all plugs and inspection plates are replaced.



1.4

ELECTRICAL



Electrical connection should only be made using equipment suitable for both rating and environment. Where any doubts exist regarding the suitability of equipment, Mono Pumps Limited, should be consulted before proceeding. Normally the Mono pump should be installed with starting equipment arranged to give direct on line starting.

Earthing points will be provided on electric drives (if supplied) and it is essential that these are correctly connected. When the motor is being wired and checked for rotation, the start/stop sequence must be instantaneous to prevent dry running (see 2) or pressurising upstream equipment. (Check direction arrow on pump nameplate). The electrical installation should include appropriate isolating equipment to ensure that the pump unit is safe to work on.

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1.5 PRESSURE RELIEF VALVES AND NON-RETURN VALVES

1. It is recommended that a suitable safety device is installed on the discharge side of the pump to prevent over-pressurisation of the system.
2. It is also recommended that a non-return valve is installed on the discharge side of the pump to prevent reverse flow through the system. When both are installed it is advised that the relief valve is positioned closer to the pump than the non-return valve.
Refer to section 2 page 9.

IMPORTANT



The pump must never run against a closed inlet or outlet valve, as this could result in mechanical failure.

1.6 GENERAL SAFETY



GREAT CARE MUST BE TAKEN TO PROTECT ALL ELECTRICAL EQUIPMENT FROM SPLASHING WHEN HOSING DOWN. WHERE MONO PUMPS LIMITED HAVE SUPPLIED A BARESHAFT PUMP THE ONUS IS ON THE USER TO FIT ADEQUATE GUARDS IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT REGULATIONS.

All nuts and bolts, securing flanges and base mounting fixtures must be checked for tightness before operation. To eliminate vibration, the pump must be correctly aligned with the drive unit, and all guards must be securely fixed in position. When commissioning the plant, all joints in the system must be checked thoroughly for leakage.

If, when starting, the pump does not appear to operate correctly, the plant must be shut down immediately and the cause of the malfunction established before operations are recommenced. It is recommended that depending upon plant system operation, either a combined vacuum and pressure gauge, or a vacuum gauge only be fitted to the pump inlet port, and a pressure gauge fitted to the outlet port, these will then continuously monitor the pump operating conditions.

1.7 DUTY CONDITIONS

Pumps should only be installed on duties for which Mono Pumps Limited have specified the materials of construction, flow rates, pressure, temperature, speed etc. Where dangerous materials are to be pumped, consideration must be given to the safe discharge from relief valves, gland drains etc.

IF THE DUTY SHOULD BE CHANGED, MONO PUMPS LIMITED SHOULD BE CONTACTED AND THEIR RECOMMENDATIONS SOUGHT IN THE INTEREST OF APPLICATION, SAFETY OF PLANT, EFFICIENCY AND PUMP LIFE.

2. START-UP PROCEDURE

Pumps must be filled with liquid before starting. When the pump is stopped, sufficient liquid will normally be trapped in the rotor/stator assembly to provide lubrication upon restarting.

If, however, the pump has been left standing for an appreciable time, moved to a new location, or has been dismantled and re-assembled, it must be refilled with liquid and given a few turns before starting.

2.0 PUMP ROTATION

Pump rotation is bi-directional.

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2.1. GLAND PACKING

Where a pump is supplied fitted with gland packing (manufactured from a non-asbestos material), the gland will require adjustment during the initial running in period. Newly packed glands must be allowed to run-in with only finger tight compression on the gland follower nuts. This should continue for about 3 days. The gland follower should be gradually tightened over the next week to achieve a leakage rate as shown in the table below. Gland followers should be adjusted at regular intervals to maintain the recommended leakage flow rate. Under normal working conditions a slight drip from the gland under pressure assists in cooling and lubricating the packing. **A correctly adjusted gland will always have small leakage of fluid.**

Typical Leakage Rates from Packed Glands

<u>Up to 50mm shaft diameter</u>	<u>2 drops per minute</u>
<u>50 ... 75mm shaft diameter</u>	<u>3 drops per minute</u>
<u>75 ... 100mm shaft diameter</u>	<u>4 drops per minute</u>
<u>100 ... 125mm shaft diameter</u>	<u>5 drops per minute</u>
<u>125 ... 160mm shaft diameter</u>	<u>6 drops per minute</u>

A gland drip is, however, undesirable when handling corrosive, degreasing, or abrasive materials. Under these conditions the gland must be tightened the minimum amount whilst the pump is running to ensure satisfactory sealing when under pressure, or to stop entry of air when under suction conditions.

The gland leakage of toxic, corrosive or hazardous liquids can cause problems of compatibility with the pumps materials of construction.

Provision of a gland drain should be considered, especially for the leakage of hazardous products.



CARE IS REQUIRED WHEN ADJUSTING THE GLAND WHILST PUMP IS RUNNING.

2.1.1 MECHANICAL SEALS - ALL PUMPS

When a mechanical seal is fitted to the pump it may be necessary to provide a barrier fluid to some part of the seal. This should be provided in line with the seal manufacturers instructions.

2.2. GUARDS



In the interests of safety, and in accordance with the U.K. Health and Safety at Work Act 1974, all guards must be replaced after necessary adjustments have been made to the pump.

2.3 WARNING/CONTROL DEVICE

Prior to operating the pump, if any warning or control devices are fitted these must be set in accordance with their specific instructions.

2.4 PUMP OPERATING TEMPERATURE

The range of temperatures the pump surfaces will develop is dependent upon factors such as product temperature and ambient temperature of the installation. There may be instances where the external pump surface can exceed 50°C.

In these instances, personnel must be made aware of this and suitable warnings/guarding used.

2.5 NOISE LEVELS

1. The noise sound pressure level will not exceed 85dB at one metre distance from the pump.
2. This is based on a typical installation and does not necessarily include noise from other sources or any contribution from building reverberation.

2.6 LUBRICATION

Pumps fitted with bearings should be inspected periodically to see if lubricant replenishment is necessary. Recommended lubricants and quantities are given in **section 5 page 7**.

Periodic bearing inspection is necessary to maintain optimum bearing performance. The most expedient time to inspect is during periods of regular scheduled equipment downtime - for routine maintenance or for any other reason.

Under tropical or other arduous conditions, however, a more frequent examination may be necessary. It is therefore advisable to establish a correct maintenance schedule or periodic inspection.

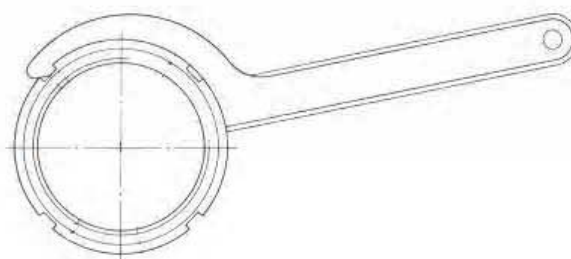
Torque Tightening Figures

Tightening Torques

Pump size	Gear adjustment			Rotor locking		
	Thread d x pitch	Key type/Size [mm]	Torque [Nm]	Thread d x pitch	Key type/Size [mm]	Torque [Nm]
LB100	M4x0,7	A/7	3	M8x1	A/17	25
LB1	M5x0,8	B/4	5	M12x1	A/27	85
LB2	M6x1	B/5	10	M14x1,5	A/30	190
LB3	M8x1,25	B/6	20	M20x1,5	A/38	305
LB4	M10x1,25	B/8	50	M24x2	A/46	480
LB470	M10x1,25	B/8	50	M24x2	A/46	480
LB550	M12x1,75	A/19	70	M24x2	A/46	500
LB6	M16x2	A/24	170	M36x2	A/60	600

Pump size	Rotorcase			Front cover		
	Thread d x pitch	Key type/Size [mm]	Torque [Nm]	Thread d x pitch	Key type/Size [mm]	Torque [Nm]
LB100	M6x1	A/10	10	M6x1	A/10	10
LB1	M8x1,25	A/13	30	M8x1,25	A/13	30
LB2	M10x1,5	A/17	50	M10x1,5	A/17	50
LB3	M12x1,75	A/19	70	M10x1,5	A/17	50
LB4	M16x2	A/24	115	M12x1,75	A/19	70
LB470	M20x2,5	A/30	180	M14x2	A/22	95
LB550	M14x2	A/22	115	M12x1,75	A/19	70
LB6	M14x2	A/22	115	M14x2	A/22	70

Key type : A= hexagonal head, B= socket head



Pump size	Bearing ring nut		
	Thread d x pitch	Key type/Size [mm]	Torque [Nm]
LB1	M30x1,5	HN 6	90
LB2	M40x1,5	HN 8	105
LB3	M50x1,5	HN 10	115
LB4 - LB5	M70x2	HN 14	220
LB470	M80x2	HN 16	400

Pump size	Gear ring nut		
	Thread d x pitch	Size	Torque [Nm]
LB100	M20x1	HN 4	50
LB1	M30x1,5	HN 6	90
LB2	M35x1,5	HN 7	90
LB3	M40x1,5	HN 8	105
LB4	M60x2	HN 12	145
LB470 - LB5	M70x2	HN 14	220
LB6	M100x2	HN 20	600

Pressure Relief Valves

2.7.1 - Internal relief valve (on the cover)

- 1 - The relief valve, assembled directly on the pump front cover, is reversible and driven by a spring compressed by an adjuster.
- 2 - The adjustment of the relief valve is carried out in the site of assemblage because the extent of the recycle depends on the speed of the pump, on the specific weight and viscosity of the product.
- 3 - In order to avoid continuous vibrations, the relief valve must be adjusted in such way that it starts operating at a pressure greater than 10% of the operating pressure.

PUMP SIZE	REGULATION PRESSURE (BAR)		
	0 ÷ 5	1 ÷ 7	2 ÷ 10
LB1	Ø5 36 x 53 cod. 422F010	-	SL 38 x 50 cod. 422F001
LB2	Ø5 36 x 53 cod. 422F010	-	SL 38 x 50 cod. 422F001
LB3	SL 38 x 63 cod. 422F003	HL 38 x 63 cod. 422F004	H 38 x 63 cod. 422F005
LB4	SL 50 x 63 cod. 422F006	HL 50 x 63 cod. 422F007	H 50 x 63 cod. 422F005
LB470-490	SL 63 x 75 cod. 422F012		S 63 x 75 cod. 422F013

2.7.2 - Adjustment of the internal relief valve fig. 3.2

- 1 - Start the pump after loosening the relief valve, i.e. with the spring not under pressure.
- 2 - Tighten the adjusting screw (59) by gradually putting the spring under pressure, checking that the pressure at the outlet port of the pump does not exceed the maximum allowed pressure.
- 3 - By operating the adjusting screw and checking with a probe (see fig.3.1), find the critical opening point of the valve at the desired pressure.
- 4 - Compress the spring by about a 1/4 of a screw turn beyond the critical opening point, in order to avoid vibrations.
- 5 - Position the adjustment retainer (62) and lock it with the special screw (65).

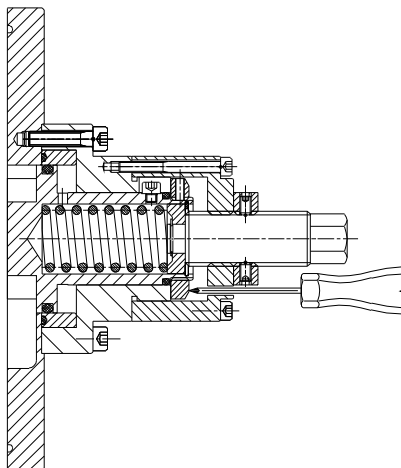


Fig.3.1

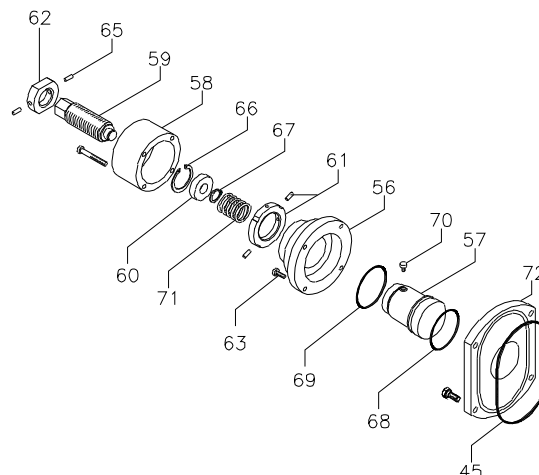


Fig.3.2 Relief valve and manual by-pass valve

2.7.3 - Manual by-pass valve

- 1 - The relief valve can also be used as a manual by-pass to adjust the capacity.
- 2 - Loosening the register screw (59), release the pressure on the spring so that to remove the piston (57) from the pumping chamber, letting part of the pumped liquid go back into the sucking chamber.
- 3 - This operation is not allowed with volatile liquids or with products sensitive to temperature increase, due to product continuous recycle.
- 4 - For products with viscosity over 15000 Cps, if you have to recycle the whole pumped product, we suggest you should arrange in line a by-pass, rightly proportionate, so that it allows the whole flow transit.

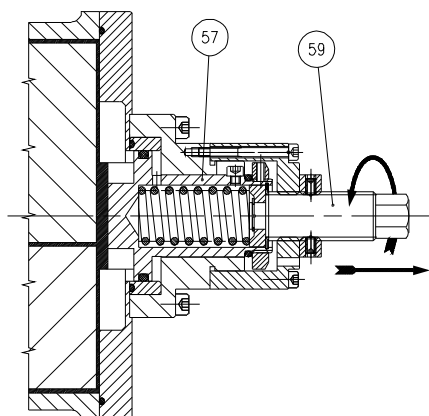


Fig.13

Pressure Relief Valves

2.7.4 - Pneumatic pressure relief valve

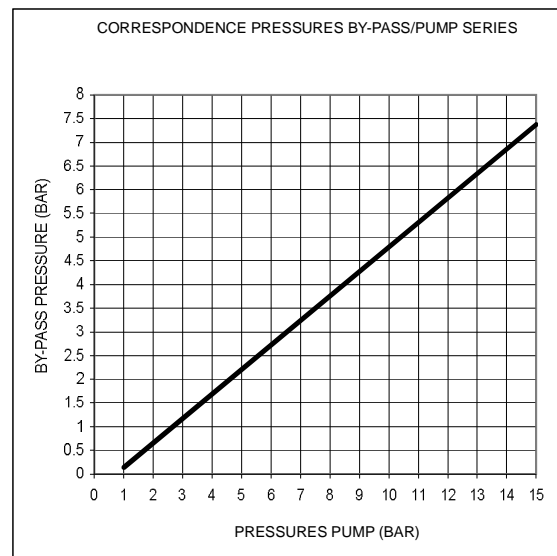
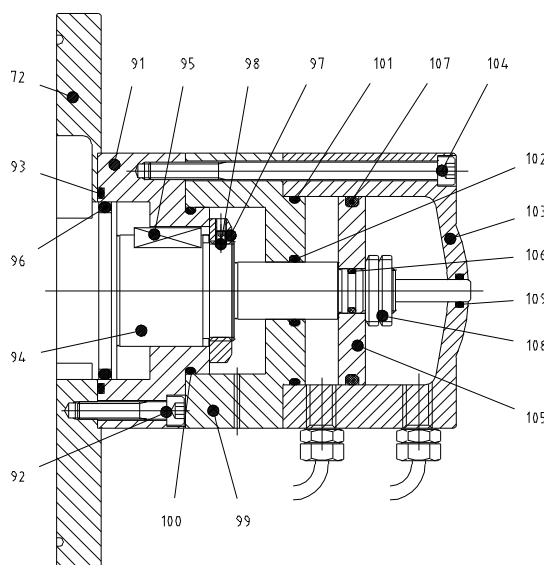
Valve, assembled on the cover, consist mainly of a cylindrical case and a piston. At one side of piston there is a discharge pressure of pump, at the other side a chamber with the pressure of pneumatic circuit. As the air force over piston is greater than liquid pressure, valve is closed; when the situation change (outlet pressure the value of compressed air) piston leave out. So the pressure opposite discharge decrease.

Adjustment of by-pass means to feed air side of piston at a pressure value corresponding the limited liquid pressure value you want in system.

2.7.5 - Adjustment of pneumatic relief valve

The adjustment of valve have to be made on site because it's necessary connect it on pneumatic system. In order to execute the adjustment we suggest to use, as reference for dimensioning of pneumatic system, graphic inserted, where you can see the correspondence between pressure at one side (pump) and at the other side (valve) of piston.

- 1 Start the pump after connecting relief valve with pneumatic system
- 2 Following graphic indication, feed air side of piston with a test pressure.
- 3 With a manometer, applied at the discharge pipe, check outlet pressure; then increase and decrease the value of pneumatic circuit pressure just to achieve the balance value. In order to avoid continuous vibrations, valve have to be set at a 10% value over critical pressure.



2.7.6 - External relief/by-pass valve

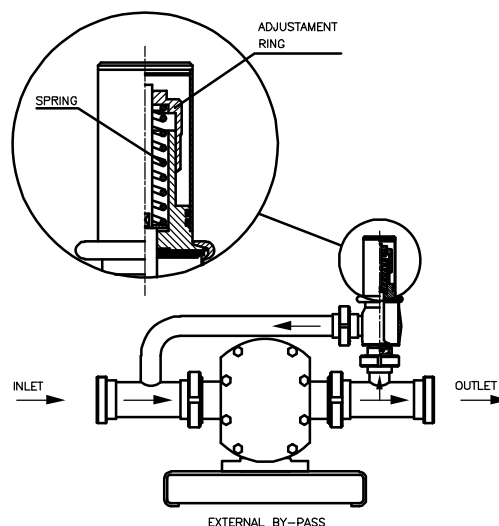
The external relief valve consists of a spring valve placed on a bridge pipe that connects the outlet with the inlet and can be used also as a by-pass to recycle all or part of the pumped liquid.

On this valve, the regulation of the sealing pressure is entrusted to the loading of a spring that can be more or less compressed.

This system is unidirectional, therefore if the direction of the pump is inverted, it is essential to invert also the position of the valve that, in any case, must always be on the discharge side.

Different types of springs can be chosen according to the operating pressure.

The adjustment must be carried out in the site of assemblage by operating manually the special adjustment ring.



Pressure Relief Valves

Available springs for external relief valves

Valve size	REGULATION PRESSURE (BAR)				
	Spring "A"	Spring "B"	Spring "C"	Spring "D"	Spring "E"
DN 25	1 ÷ 2	1,2 ÷ 3,4	2,3 ÷ 6,3	4 ÷ 13	
DN 32	0,6 ÷ 1,7	0,8 ÷ 3,2	1,8 ÷ 6,1	2,8 ÷ 10,5	
DN 40	0,5 ÷ 1,5	0,6 ÷ 2,4	1,7 ÷ 6	2 ÷ 8	
DN 50	0,1 ÷ 0,5	0,2 ÷ 1,1	0,2 ÷ 3	1,5 ÷ 5,8	1,8 ÷ 12
DN 65	0 ÷ 0,1	0,1 ÷ 0,5	0,2 ÷ 1,6	0,3 ÷ 3,4	1 ÷ 7
DN 80			0,05 ÷ 1,8	0,1 ÷ 2,8	0,2 ÷ 5
DN 100					0,15 ÷ 3,4

2.8 - Earth connection

The connection must be carried out by means of a NO7Vk type wire with a 16 mm². sec. with yellow-green insulation and crimped wire terminals.

2.9 - Residual risk areas

Not with standing the accident-prevention devices provided on the Pump unit, possible residual risk areas may be present due to a possible improper maintenance intervention by the personnel in charge.

If the Pump unit is used for pumping special materials (for example chemical substances), before beginning any maintenance operation, refer to the safety card of the product in order to wear the proper ISD (Individual Safety Devices) recommended when handling these products.

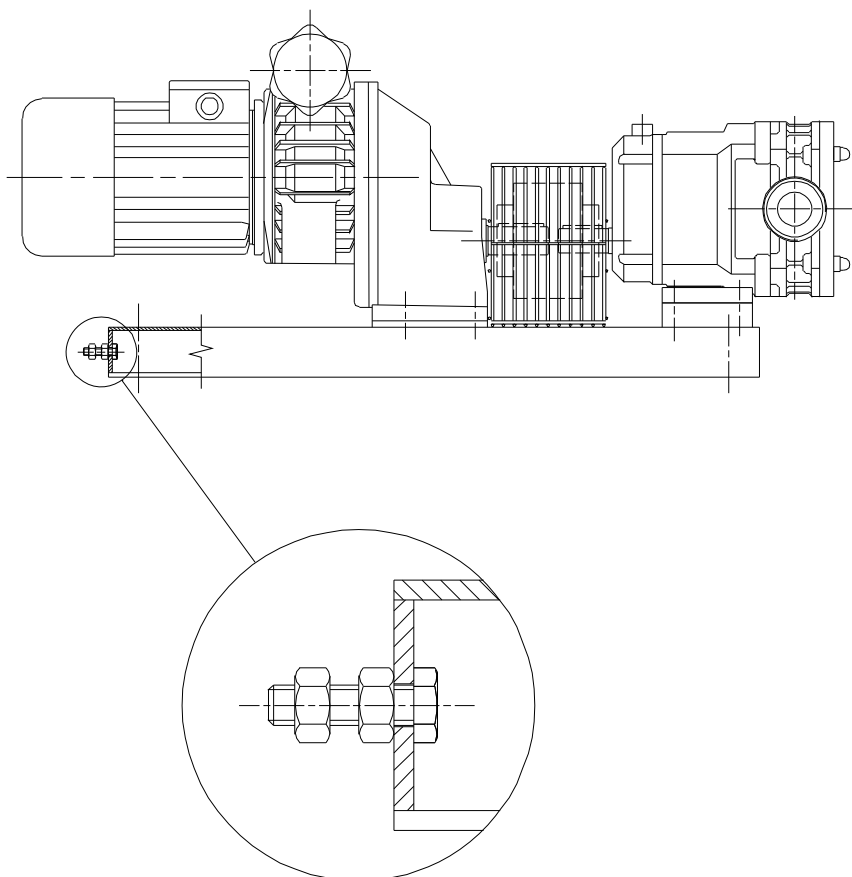


Fig.3.6

Installation, Operation & Maintenance Instructions

3 PUMP UNITS

Where a pump unit is dismantled and re-assembled, consideration must be given to ensure that where appropriate the following steps are covered.

1. Correct alignment of pump/gearbox
2. Use of appropriate couplings & bushes
3. Use of appropriate belts & pulleys correctly tensioned.

3.1 CLEANING PRIOR TO OPERATION

i. Non Food Use

During the commissioning of a new pump or recommissioning of an overhauled pump, it is advisable to clean the pump prior to the initial operation of the pump in the process.

ii. Food Use

When a pump has been supplied for a food application, it is important to ensure that the pump is clean prior to initial operation of the pump.

Therefore, it is important that a clean-in-place treatment is executed on the pump at the following times:-

1. When the pump is first commissioned for use.
2. When any spare components are fitted into the wetted area of the pump.

3.2 EXPLOSIVE PRODUCTS/ HAZARDOUS ATMOSPHERES

In certain instances the product being pumped may well be of a hazardous nature.

In these installations consideration must be given to provide suitable protection and appropriate warnings to safeguard personnel and plant.

3.3 ACCESS PORTS



Where access ports are fitted then the following steps must be followed prior to removal:

1. Pump must be shut down and the electrical supply isolated.
2. Protective clothing should be worn, especially if the pumped product is obnoxious.

3. Remove access plate with care utilising where possible drip trays to collect product leakage.

Access ports are included to assist in removing blockages and to allow a visual check on the components within the suction chamber.

It is not to be considered as an additional method in dismantling the pump.

Re-assembly of the plate should be completed using new gaskets prior to the pump being switched on.

4 ASSEMBLY AND DISMANTLING

Section 3 contains the steps to dismantle and re-assemble the pump. All fastenings must be tightened securely and when identified the appropriate torque figures should be used.

4.1 USE OF ITEMS NOT APPROVED OR MANUFACTURED BY MONO PUMPS LIMITED

The pump and its components have been designed to ensure that the pump will operate safely within the guidelines covered by the legislation.

As a consequence Mono Pumps Limited have declared the machine safe to use for the duty specified as defined by the Declaration of Incorporation or Conformity that is issued with this Instruction Manual.

The use of replacement items that are not approved by or manufactured by Mono Pumps Limited may affect the safe operation of the pump and it may therefore become a safety hazard to both operators and other equipment. In these instances the Declaration provided will therefore become invalid. The guarantee referenced in the Terms and Conditions of Sale will also be invalidated if replacement items are used that are not approved or manufactured by Mono Pumps Limited.



DISPOSAL OF WORN COMPONENTS

When replacing wearing parts, please ensure disposal of used parts is carried out in compliance with local environmental legislation. Particular care should be taken when disposing of lubricants.

Routine Maintenance

5 Daily checks

- 1 - Visual check of all sealing devices and of general working.
- 2 - If a leakage from mechanical seal occurs, arrange a replacement as soon as possible in order to avoid the product enters the bearing housing.

6 Weekly checks

- 1 - Check the oil level of the pump and of the motor unit; if necessary top up by means of oil according to manufacturer instructions.
- 2 - Check the rotor case and clean it, removing possible product deposits.
- 3 - Check that no seizures between rotors or among rotors and static surfaces of rotor case have occurred.
- 4 - Check the by-pass valve, when arranged, is not blocked after long working pause. To see it, it's necessary to untighten completely the adjusting screw (59) and re-arrange it in its initial position, indicated by retainer (62).

7 Six-month checks

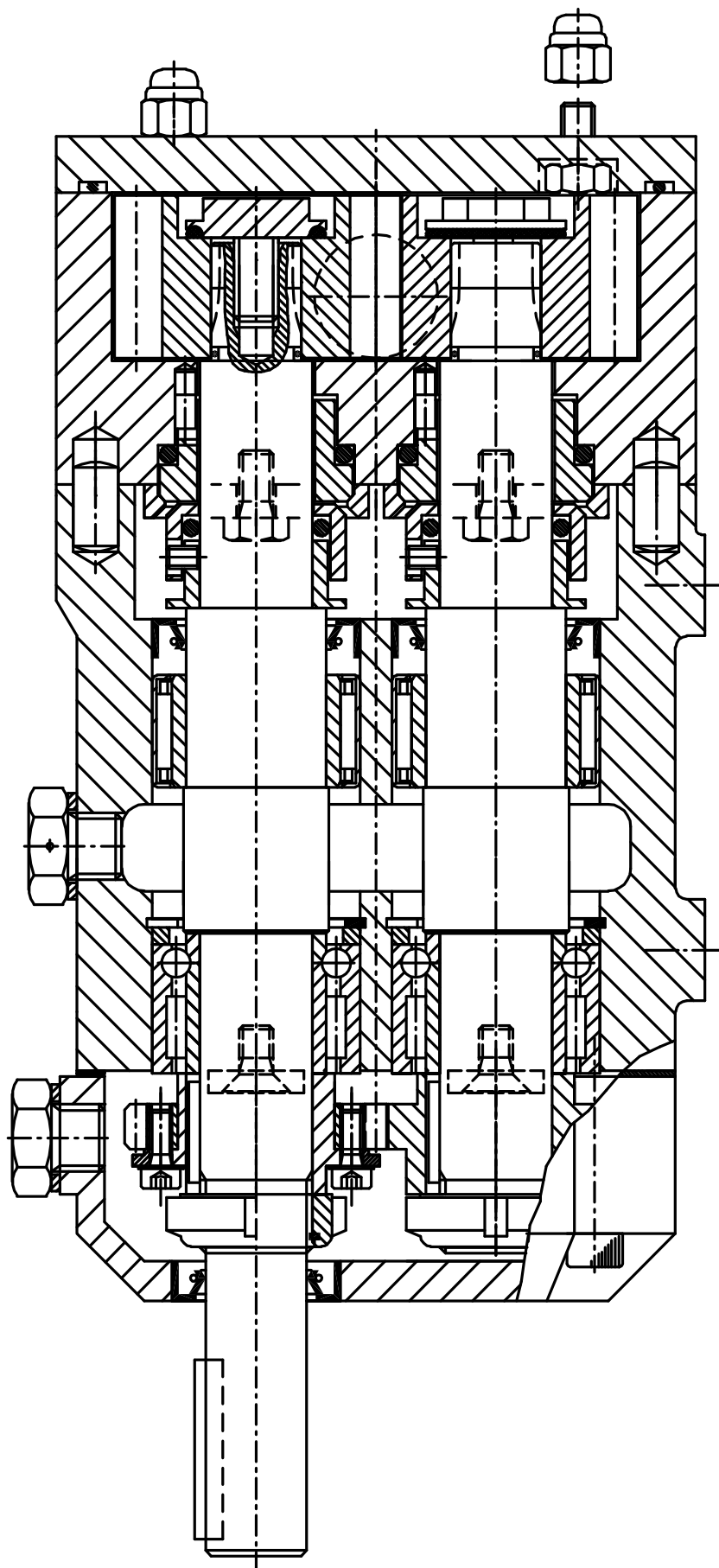
- 1 - If the pump works constantly at high temperature, over 120°C, check the lubricant oil health; if it has become dark, arrange its replacement.
- 2 - Check the timing gears don't allow the rotors get in touch; otherwise replace the worn gears.
- 3 - Check the shaft stiffness; if they show a min. axial or radial play, replace the bearings.
- 4 - Check the corrosion of the bearing housing; if necessary arrange its repainting by means of a paint, suitable to protect it from a quick wear. The MONO standard pumps are painted with:
BRIGHT EPOXID ENAMEL RAL 7032.

NOTE

If you carry out these checks systematically, the pump will keep its initial performance for many years.

Pump Assembly & Dismantling Instructions

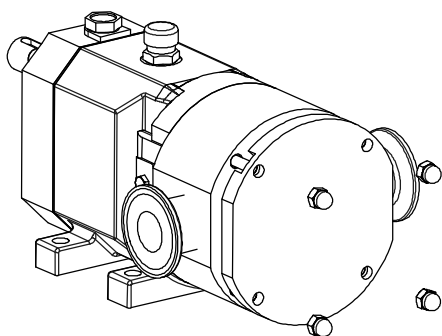
Pump assembly and disassembly instructions for pump series Mod LB100



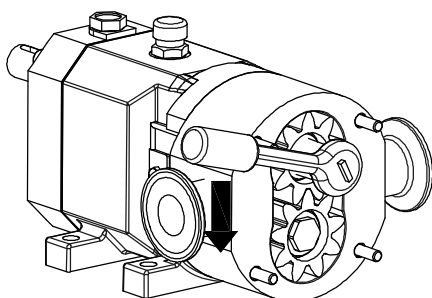
Pump Assembly & Dismantling Instructions

Rotor case disassembly Mod. LB100

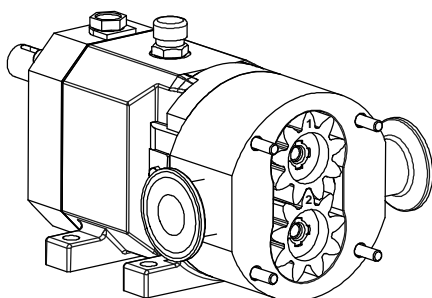
Before removing the cover, make sure that the pump and the motor are isolated, the pump is cool enough to touch it safely, all the fluids are discharged, and make sure that the rotor case is isolated and depressurized. If the end cover is provided with a by-pass valve, refer to the corresponding section. Then, proceed as follows:



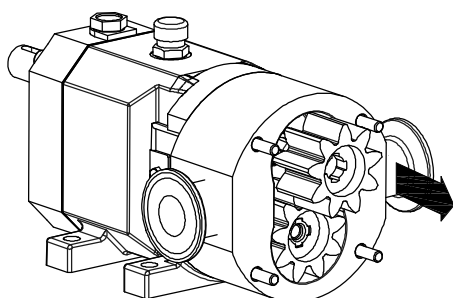
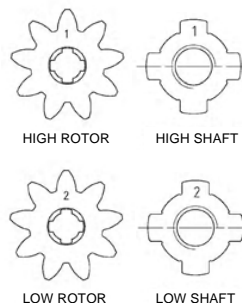
- 1 Remove the front nuts and exert leverage in the provided slots on cover



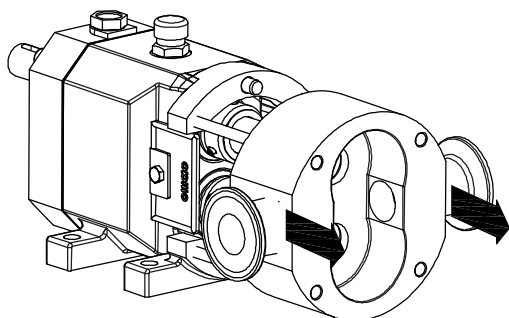
- 2 Unscrew anticlockwise the rotor nuts, interposing a non metal element between the rotors, making them stop rolling.



- 3 Take care of the reference marked on rotors and shafts (1-2) so that you will set them rightly while reassembling.

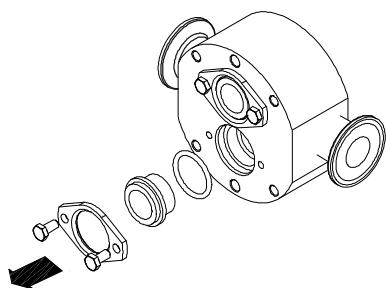


- 4 Extract the rotors, taking care you don't damage them by means of metal tools.

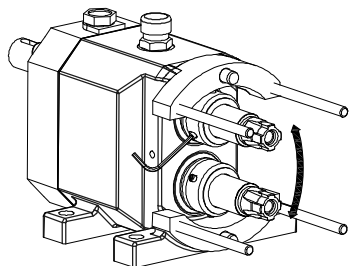


- 5 extract the rotor case

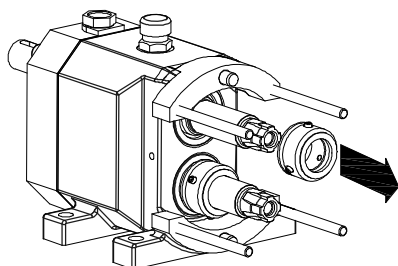
Pump Assembly & Dismantling Instructions



- 6 Extract the rotating part of the mechanical seal from the shaft, after disassembling the bearing retainers



- 7 Untighten the socket head screws on mechanical seal.



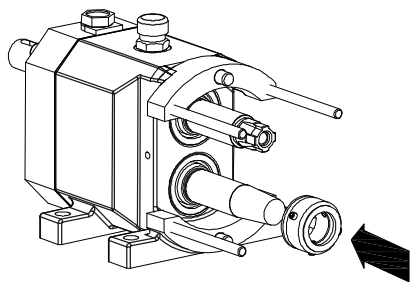
- 8 Extract the rotating part of the mechanical seal from the shaft.

Rotor case assembly Mod. LB100



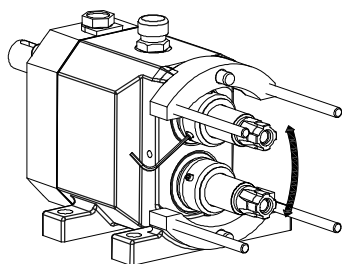
IMPORTANT

- 9 During the following operations, take care you don't damage the lapped seal surface; don't lay them on the bench and handle them with clean hands.

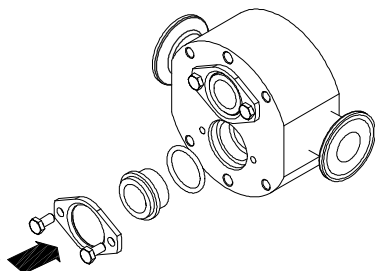


- 10 Clean carefully the shafts. Lubricate lightly the O-ring and introduce the rotating part of the seal, possibly by means of a conical bush. Exert pressure only with hands; avoid using metal tools.

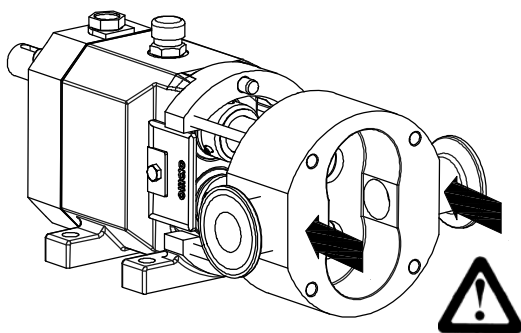
Pump Assembly & Dismantling Instructions



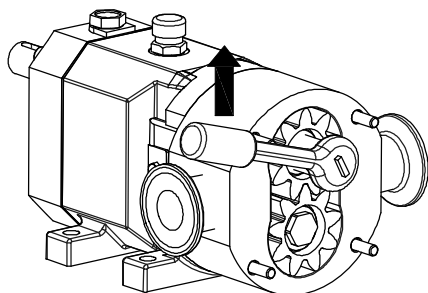
- 11** Be sure the mechanical seals stand on the shaft shoulder and tighten step by step the socket head screws.
We suggest you should use a thread locking adhesive in order to avoid their untightening on work.



- 12** Assemble the stationary part of the seal on rotor case, taking care to align the slot with the retainer pin, already arranged on seat bottom.

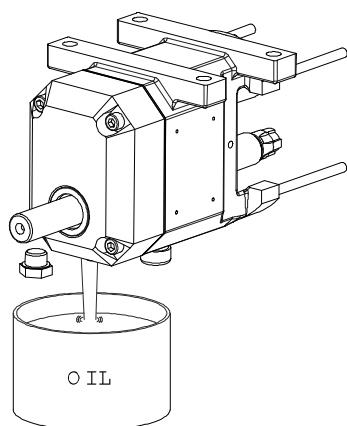


- 13** Clean carefully the seal slide surfaces and assemble the rotor case delicately in order not to damage the seals and be sure it is well set on plugs.
Clamp the back nuts.



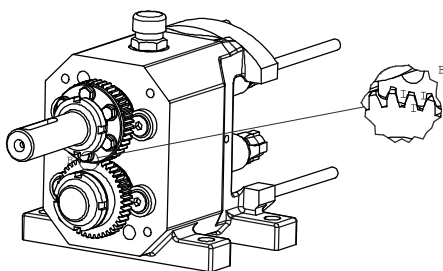
- 14** Assemble the rotors, setting them on pitch setting, according to reference marks (1-2). Clamp the rotor nuts. In order to stop turning, interpose a non metal element between rotors

Bearing housing disassembly

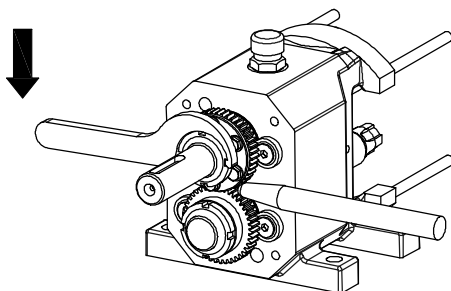


- 15** After disassembling the rotor case, drain the oil and the remove drive key on shaft.

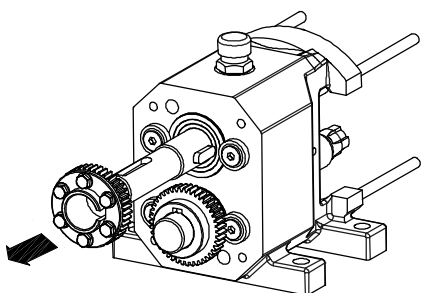
Pump Assembly & Dismantling Instructions



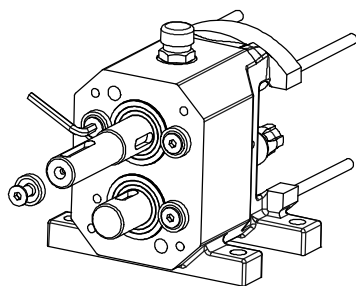
- 16** Remove the gear cover and make a reference mark on gears in order to respect the right timing while reassembling.



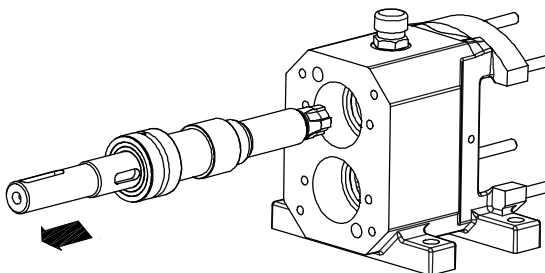
- 17** Disconnect the retainer keys on lock washers.



- 18** Unscrew the gear ring nut, inserting a non metal wedge between gears in order to stop turning

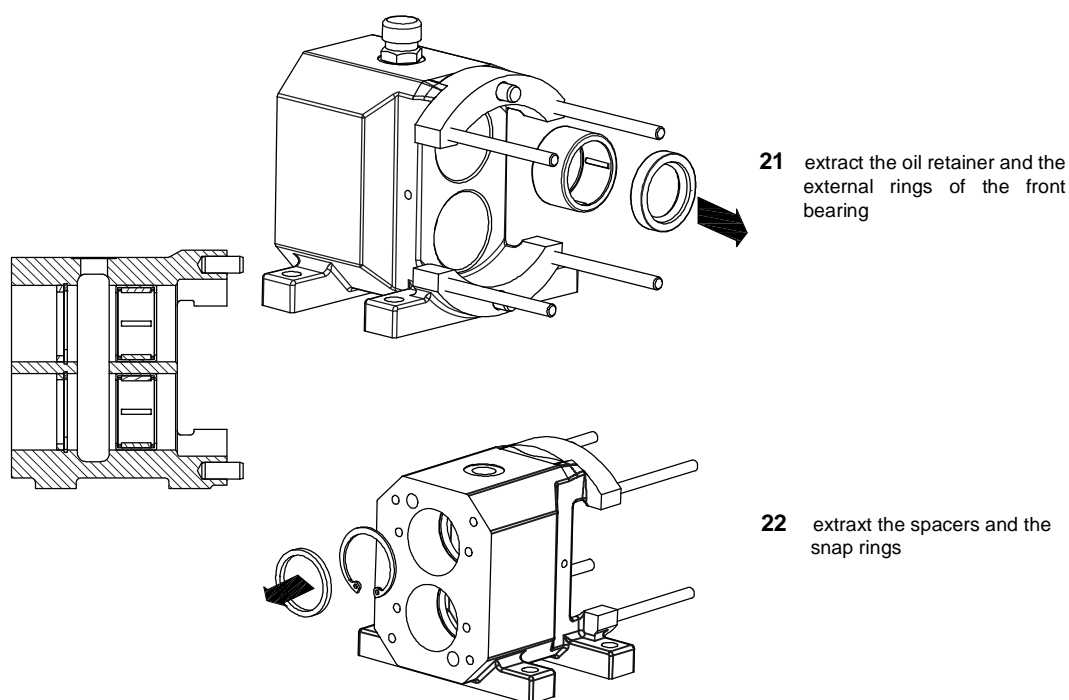


- 19** Disassemble the shafts, unscrewing the flathead screw, with the lock washer

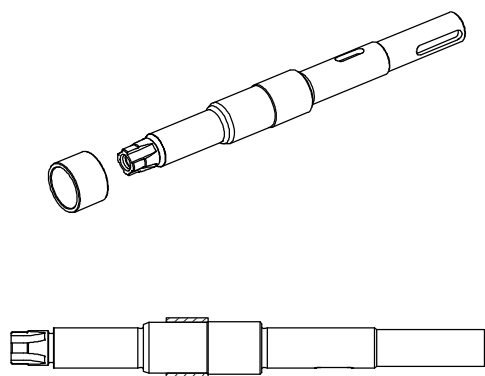


- 20** Extract the shafts by the posterior side of the pump

Pump Assembly & Dismantling Instructions

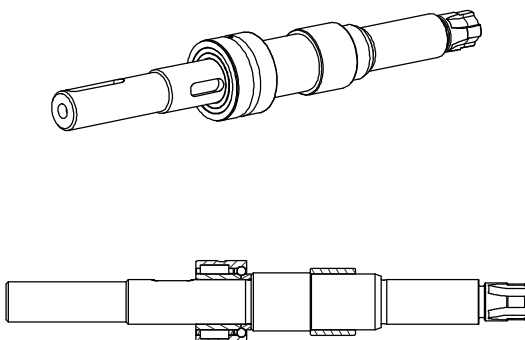


Bearing housing assembly Mod LB100 .



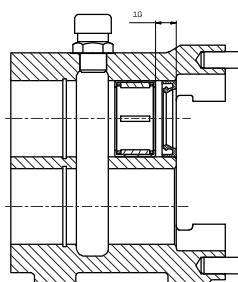
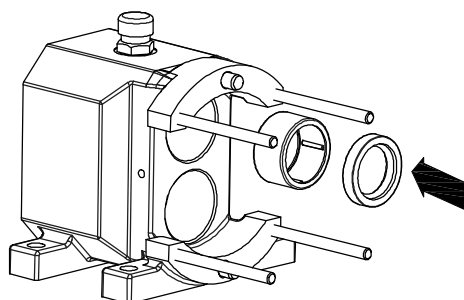
- 23 BEARING ASSEMBLING PHASE**
Prepare the shafts and the bearings, checking they are without dents and burrs

- 24** Drive the inner ring on the driving shaft.
Repeat the operation on the driven shaft

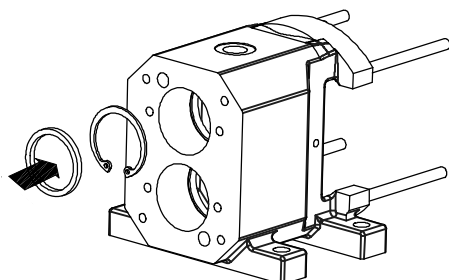


- 25** Assemble the rear bearing on the driving shaft and then on the driven one.

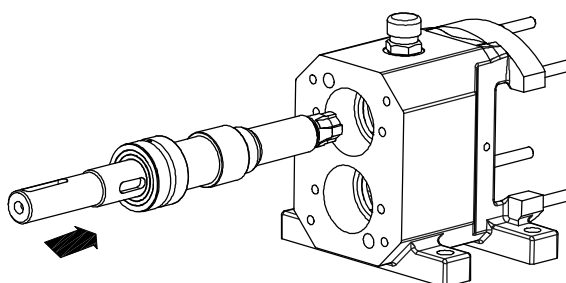
Pump Assembly & Dismantling Instructions



- 26** Drive the external bearing rings on the gear box, observing the depth on the figure (10 mm)



- 27** Insert the snap rings and the spacers for the axial setting



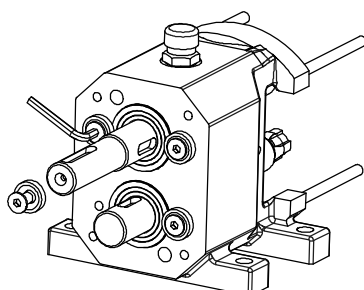
- 28** Assemble the shafts by the rear side of the pump, respecting the timing previously marked while reassembling, with the numbers marked "1" and "2" turned towards the high



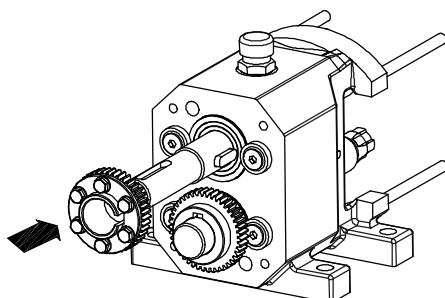
HIGH SHAFT



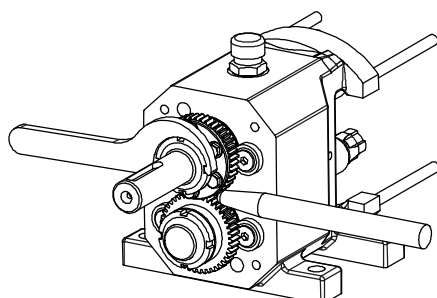
LOW SHAFT



- 29** Fixed the rear bearings with the washers and the flathead screws

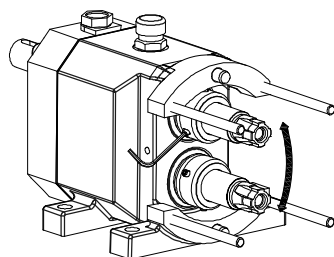


- 30** The gear couple is composed by a fixed gear and an adjustable one. Assemble the fixed gear, then the adjustable one with untightened screws, taking care to a first approximate rotor timing.



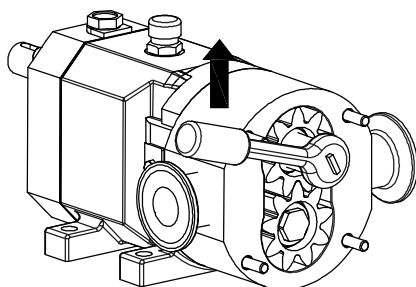
- 31** Tighten the retainer ring nuts with the corresponding safety washers and set rightly the suited retainer key. In order to avoid turning during operation insert a wedge in soft material among the gear teeth.

Pump Assembly & Dismantling Instructions

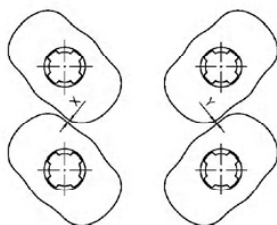


- 32** Assemble the rotor case and rotors as previously described and check the "Clearances".

If rotor clearances are not included in tolerances disassemble rotors, the rotor case and adjust the spacer according to the requested dimension.

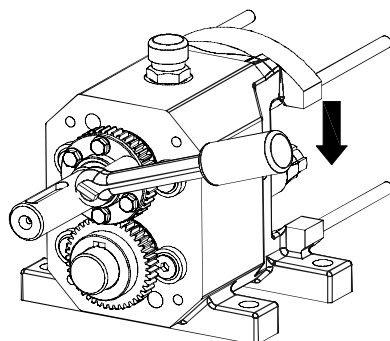


- 33** Being the wedge inserted among the gears tighten the rotor nuts, taking care of the driving torque.



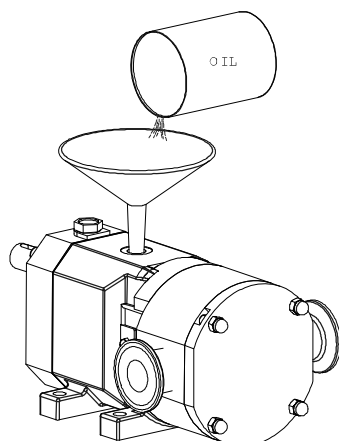
$$X = Y$$

- 34** Time perfectly the rotors and tighten the screws of the adjustable gear gradually, checking the rotor timing.



- 35** Tighten completely the adjustable gear screws taking care of the driving torque.

N.B. IN CASE OF RE-TIMING IT'S NECESSARY TO REPLACE THE PLANE WASHERS, CAVED BY PREVIOUS CLAMPING.



- 36** Assemble the gear cover, taking care to set the O-ring gasket and insert the key on the shaft. Put into bearing housing the oil quantity as per table on section 5 page 7.

Pump Assembly & Dismantling Instructions

Lip seals disassembling Mod LB100.

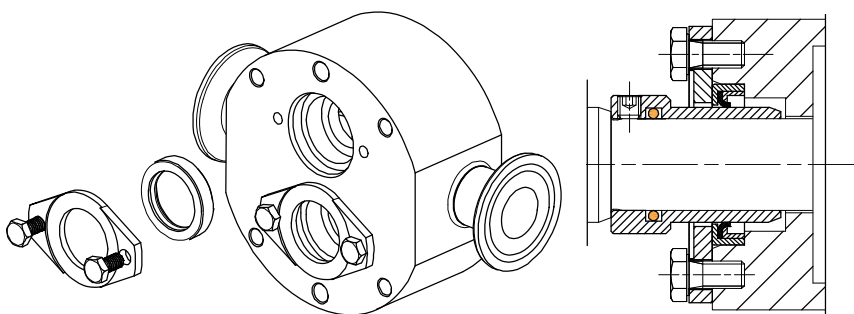


IT IS RECOMMENDED TO SUBSTITUTE LIP SEALS, IN CASE OF WEAR, TO BADLY AVOID SPILLAGES OF PRODUCT FROM THE PUMPING CASE AND THE MALFUNCTION OF THE PUMP.

Rotor case can be equipped by one of these seals:



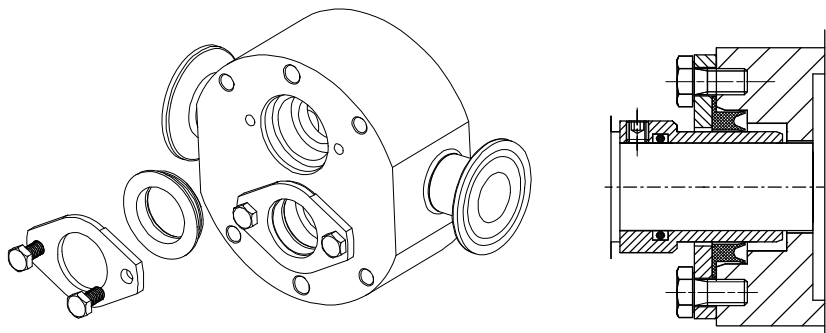
A) ELRING HN LIP SEALS :



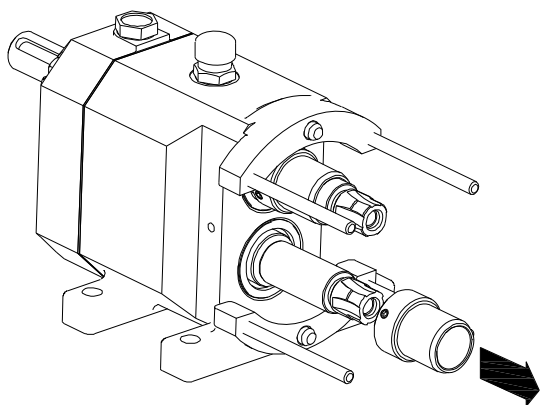
6 IN BOTH CASES
OPERATE AS FOLLOWS:
extract the stationary parts
of the seals from rotor
case, after disassembling
the retainers rings



B) SINTEK H - TPU LIP SEALS :

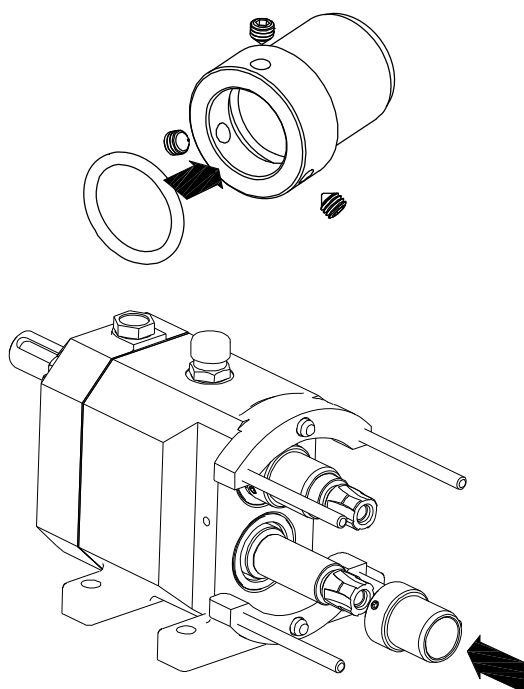


7 after untightening the security dowels, extract the
rotating part of the seal from the shaft



Pump Assembly & Dismantling Instructions

Lip seals assembling Mod LB100 .

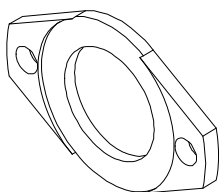


ATTENTION

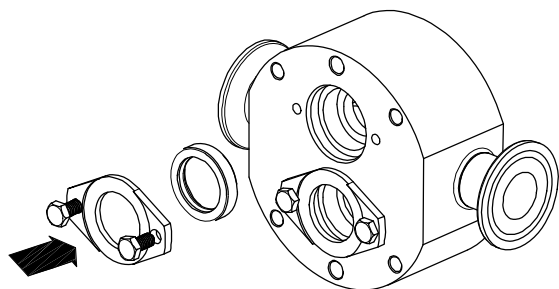
- 8** Put the O-Ring into the rotating part of the seal and screw the security dowels

- 9** Lubricate the shafts before inserting the rotating part of the seals, taking care not to damage O-Ring. Be sure the rotating part is on the shoulder of the shafts and tighten the security dowels. It is recommended using a threads-locking glue to avoid unscrewing during the rotational motion

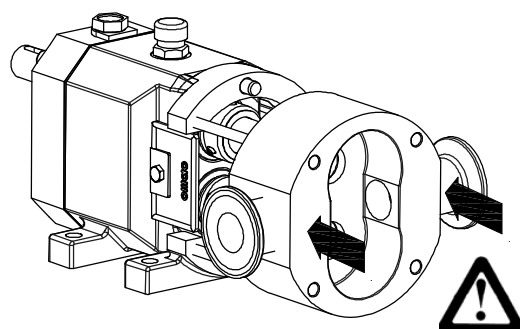
A) PUMP CASING SETTING WITH HN ELRING LIP SEALS :



TAKE CARE OF THE RIGHT POSITIONING OF THE RETAINER RING, AS FOLLOWS:

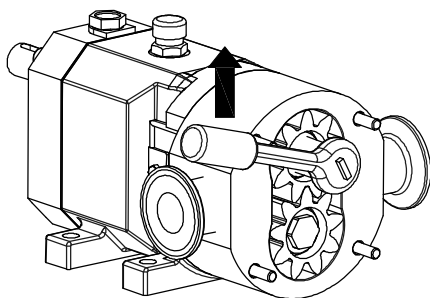


- 10** Assemble the stationary part (ELRING HN RING) on the pumping case, then assemble the retainer ring with its hexagonal-head screws



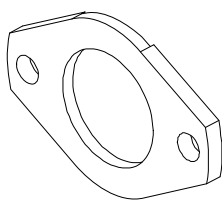
- 11** Clean carefully the seal slide surfaces and assemble the rotor case **delicately**, in order not to damage the seal and be sure it is well set on plugs. Clamp the front nuts.

Pump Assembly & Dismantling Instructions

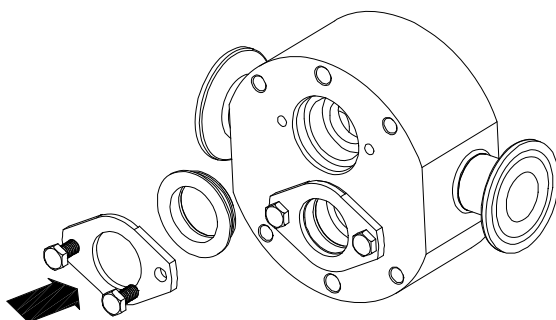


- 12** Assemble the rotors, setting them on pitch setting, according to reference marks (1-2). Clamp the rotor nuts. In order to stop turning, interpose a non metal element between rotors

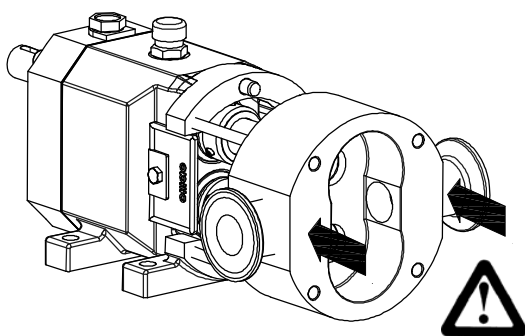
B) PUMP CASE SETTING WITH SINTEK H - TPU LIP SEALS:



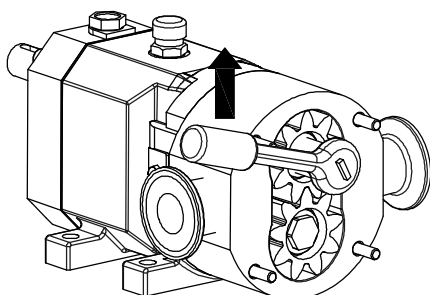
TAKE CARE OF THE RIGHT POSITIONING OF THE RETAINER RING, AS FOLLOWS:



- 10** Assemble the stationary part (SINTEK H - TPU RING) on the pumping case, then assemble the retainer ring with its hexagonal-head screws



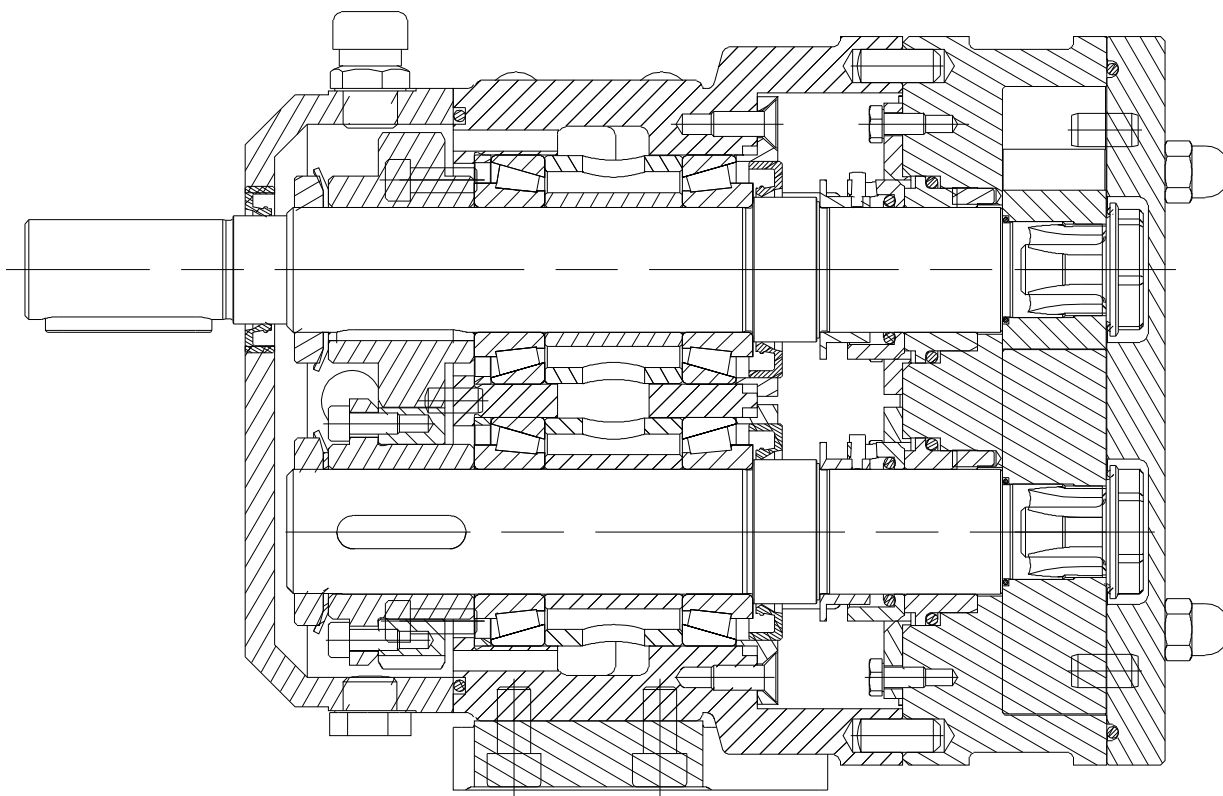
- 11** Clean carefully the seal slide surfaces and assemble the rotor case delicately, in order not to damage the seal and be sure it is well set on plugs. Clamp the front nuts.



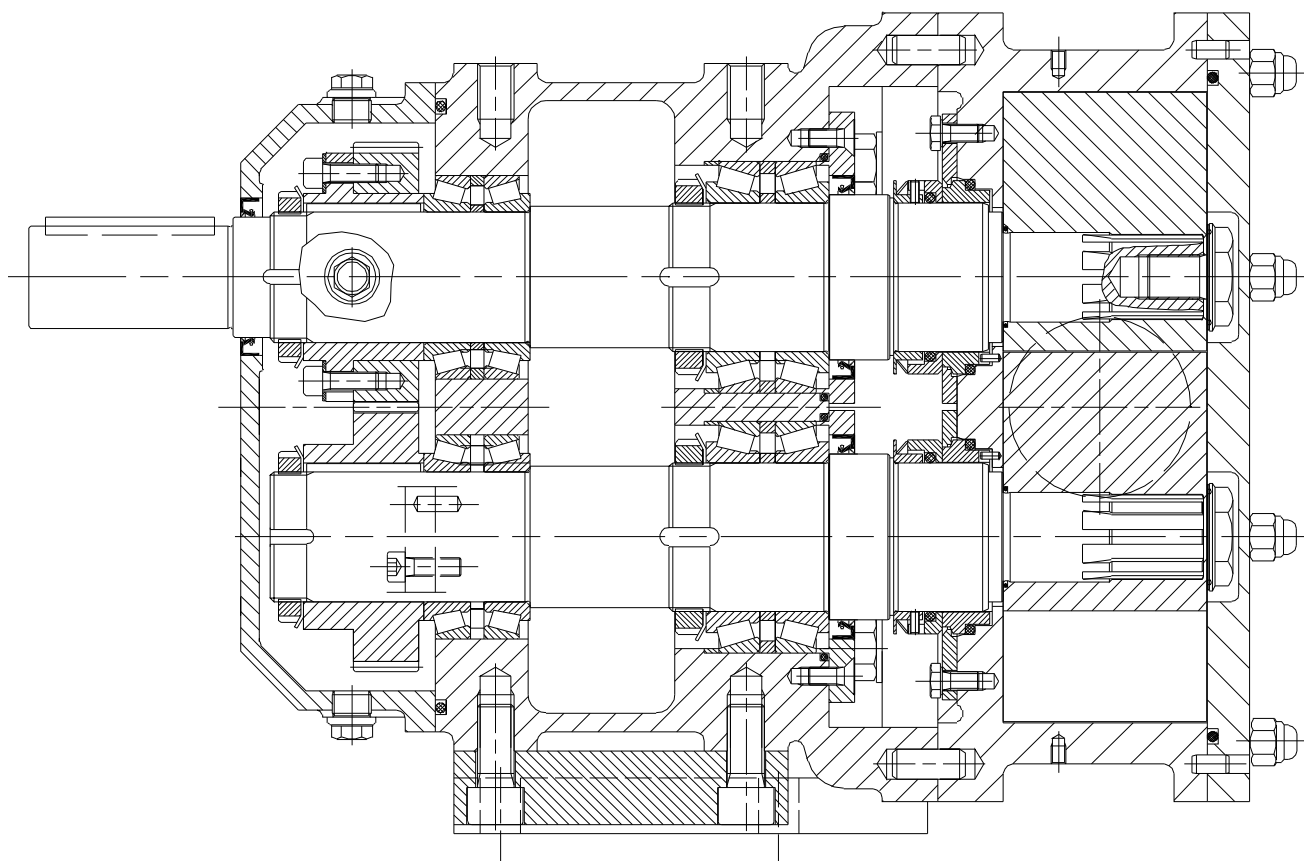
- 12** Assemble the rotors, setting them on pitch setting, according to reference marks (1-2). Clamp the rotor nuts. In order to stop turning, interpose a non metal element between rotors

Pump Assembly & Dismantling Instructions

Pump assembly and disassembly instructions for pump series LB1-LB2-LB3-LB4-LB470-LB490



LB1

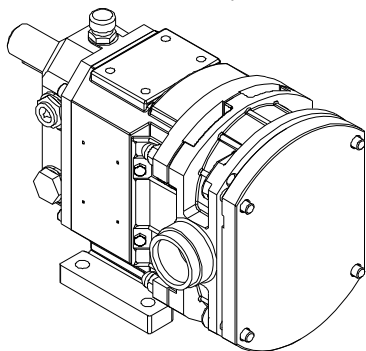


LB2 - LB3 - LB4 - LB470 - LB490

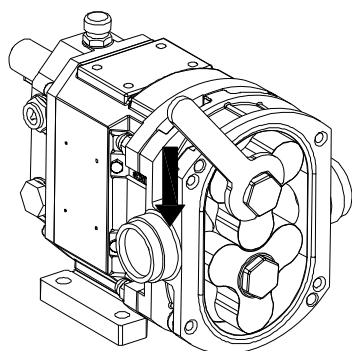
Pump Assembly & Dismantling Instructions

Rotor case disassembly Mod. LB1-LB2-LB3-LB4-LB470-LB490

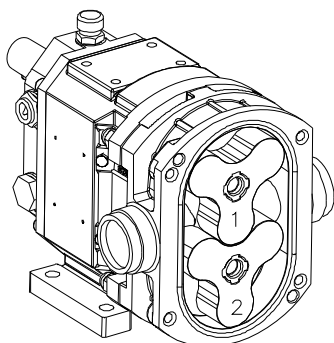
Before removing the cover, make sure that the pump and the motor are isolated, the pump is cool enough to touch it safely, all the fluids are discharged, and make sure that the pump, the flushing system of the seals and the jackets are isolated and depressurised. If the end cover is provided with a by-pass valve, refer to the corresponding section. Then, proceed as follows:



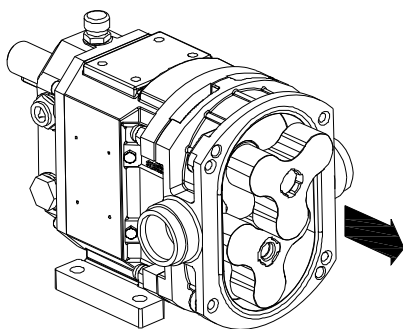
- 1 Remove the front nuts and exert leverage in the provided slots on cover.



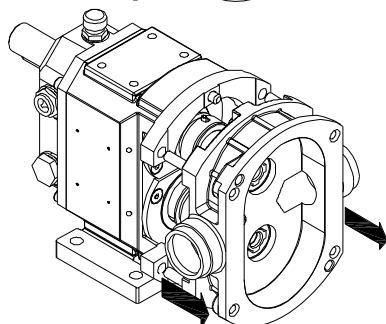
- 2 Unscrew anticlockwise the rotor nuts, interposing a non metal element between the rotors, making them stop rolling.



- 3 Take care of the reference marked on rotors and shafts (1-2) so that you will set them rightly while re-assembling.

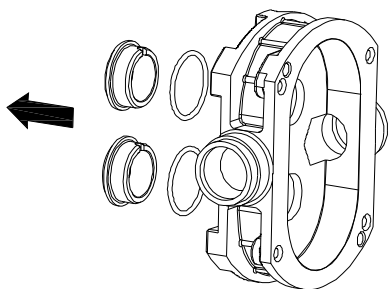


- 4 Extract the rotors, taking care you don't damage them by means of metal tools.

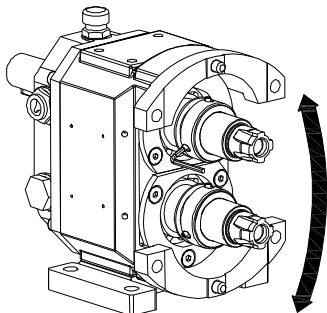


- 5 Unscrew the back nuts and extract the rotor case

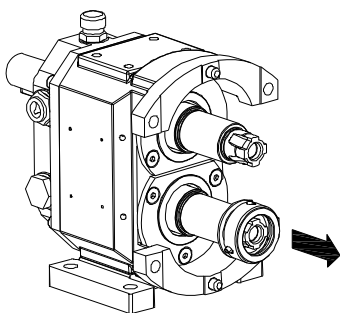
Pump Assembly & Dismantling Instructions



- 6 Extract the stationary part of the mechanical seal from rotor case



- 7 Untighten the socket head screws on mechanical seal.



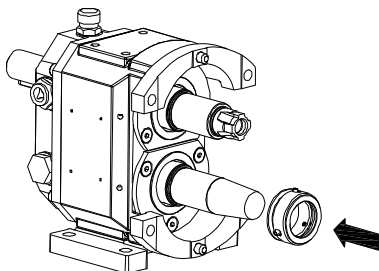
- 8 Extract the rotating part of the mechanical seal from the shaft.

Rotor case assembly Mod. LB1 -LB2 - LB3 - LB4 - LB470 - LB490

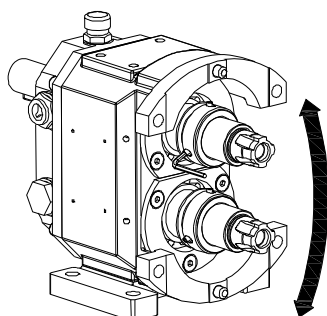


IMPORTANT

- 9 During the following operations, take care you don't damage the lapped seal surface; don't lay them on the bench and handle them with clean hands.

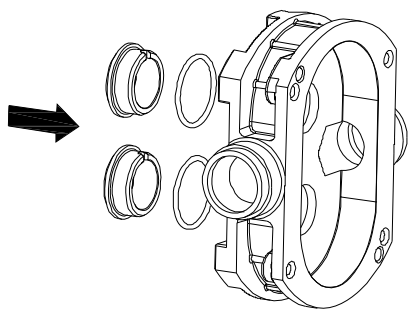


- 10 Clean carefully the shafts. Lubricate lightly the O-ring and introduce the rotating part of the seal, possibly by means of a conical bush. Exert pressure only with hands; avoid using metal tools.

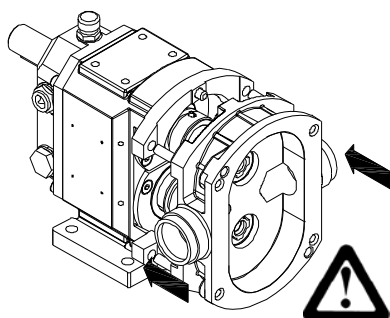


- 11 Be sure the mechanical seals stand on the shaft shoulder and tighten step by step the socket head screws. We suggest you should use a thread locking adhesive in order to avoid their untightening on work.

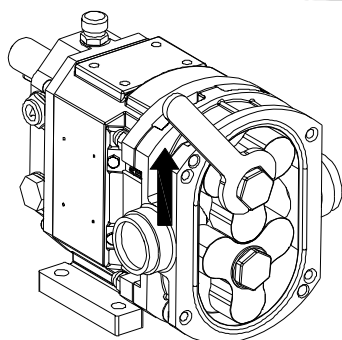
Pump Assembly & Dismantling Instructions



- 12** Assemble the stationary part of the seal on rotor case, taking care to align the slot with the retainer pin, already arranged on seat bottom.

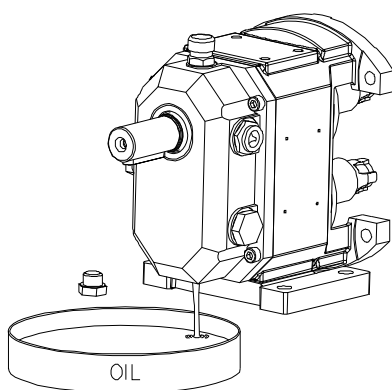


- 13** Clean carefully the seal slide surfaces and assemble the rotor case delicately in order not to damage the seals and be sure it is well set on plugs. Clamp the back nuts.

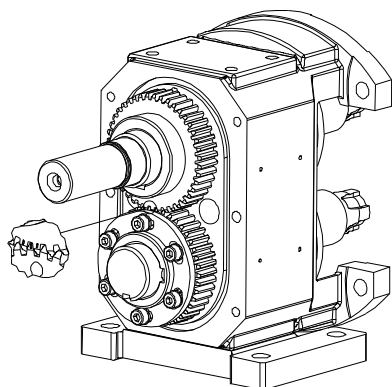


- 14** Assemble the rotors, setting them on pitch setting, according to reference marks (1-2). Clamp the rotor nuts. In order to stop turning, interpose a non metal element between rotors

Bearing housing disassembly Mod. LB1-LB2-LB3-LB4-LB470-LB490

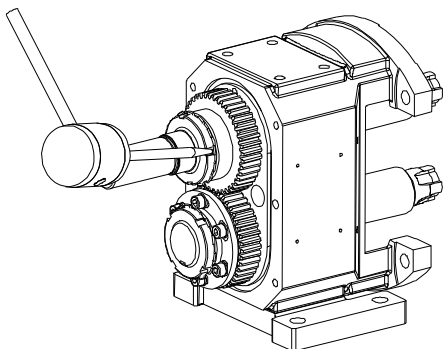


- 15** After disassembling the rotor case, drain the oil and the remove drive key on shaft.

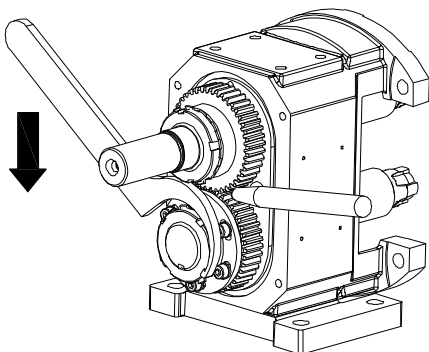


- 16** Remove the gear cover and make a reference mark on gears in order to respect the right timing while reassembling.

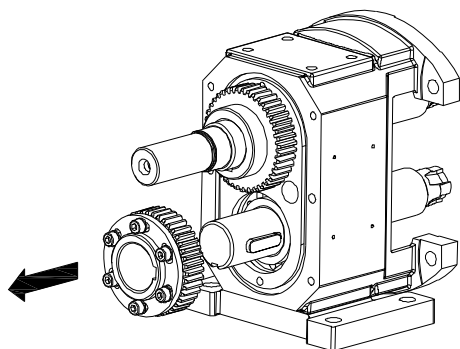
Pump Assembly & Dismantling Instructions



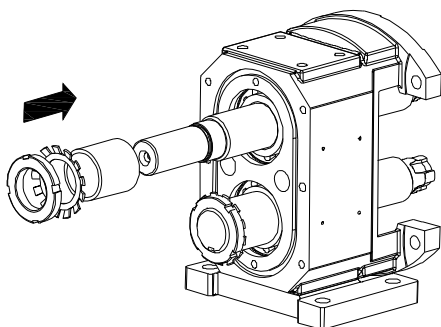
- 17** Disconnect the retainer keys on lock washers.



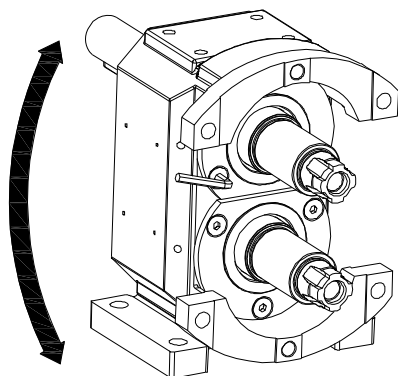
- 18** Unscrew the gear ring nut, inserting a non metal wedge between gears in order to stop turning



- 19** Extract the gears, exerting leverage between the bearing housing and the gears side, without damaging the toothing outline.

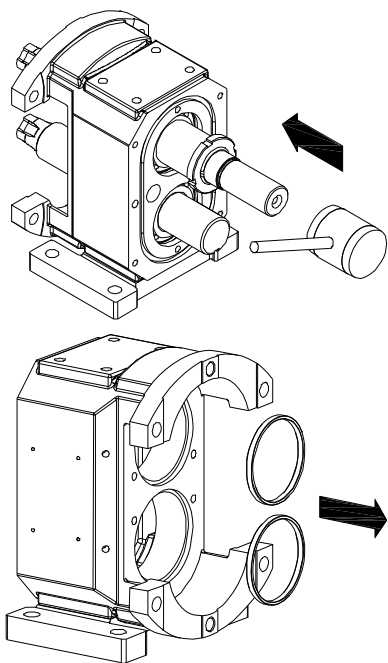


- 20** On assembling and disassembling we suggest you should replace the gears with a spacer in order not to break down the pre-assembled bearing.



- 21** Remove the bearing retainers.

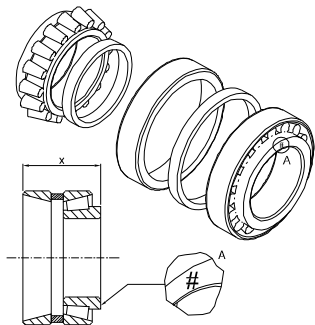
Pump Assembly & Dismantling Instructions



22 Extract the shafts by means of a non metal hammer.

23 Mark the spacers for the axial shaft adjustment, then replace them rightly while re-assembling.

Bearing housing assembly Mod. LB1-LB2-LB3-LB4-LB470-LB490

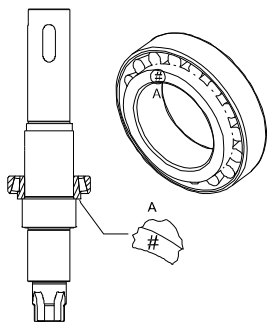


24 FRONT BEARING ASSEMBLING PHASE1

If you replace bearings with others that are not supplied by MONO, you must mark, with the electric pen, the internal ring of a bearing with the # symbol. Check with depth micrometer gauge the dimension "x" according to the table, take it without the inner spacer and the inner ring with roller set on the opposite side of #.

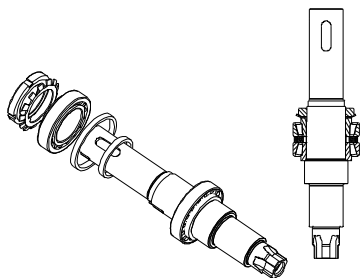
LB1	LB2	LB3	LB4	LB470 LB490
63	39.5	41.4	50.9	59

Value of the measurement "X" (+/- 0.02)



25 PHASE 2

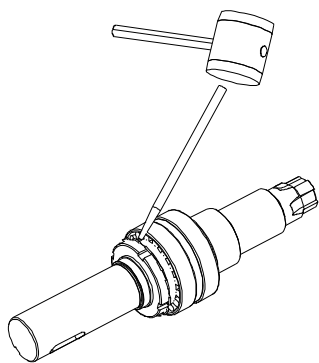
USE GLOVES. Heat the inner ring # up to 150° C and assemble it on the shaft.
Wait for the temperature to drop to room temperature



26 PHASE 3

Assemble the bearing. Insert the inner spacer the first time just lapped with lapping machine. Consider the axial clearance between the rollers and carry out another lapping until you obtain a preloading on the bearings of about 0,05 mm. The best assembling is obtained when the bearings, tightened with the ring nut, roll freely and the outer spacer is slightly blocked but moves exerting a radial pressure with fingers.

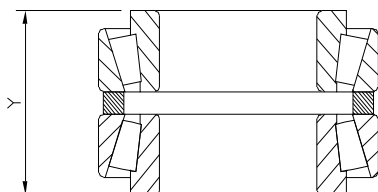
Pump Assembly & Dismantling Instructions



- 27** Assemble the pre-assembled front bearing, tighten firmly the ring nut and set the retainer key in the ring nut slot

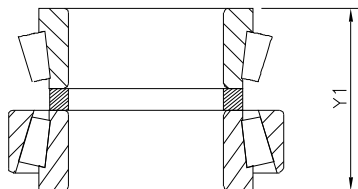
IMPORTANT

Put all keys of the safety washer up to the ring nut in order to let the spacer pass for the axial adjustment.



- 28 REAR BEARING ASSEMBLING PHASE1**

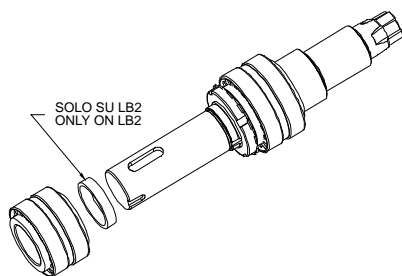
Measurement of the "Y" dimension without the inner spacer.



- 29 PHASE 2**

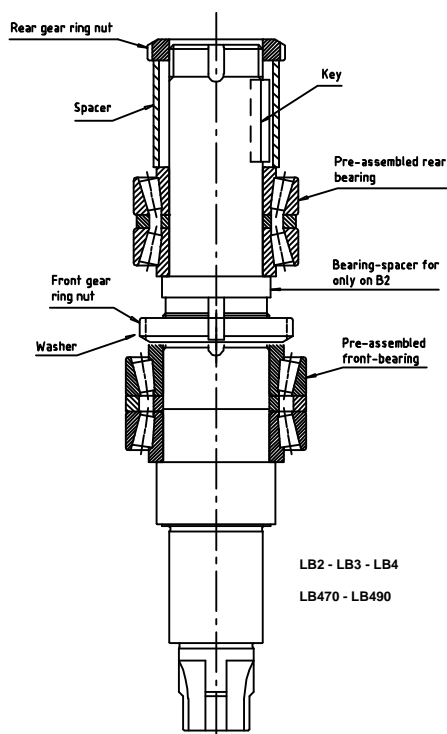
Measurement of the "Y1" dimension without the outer spacer, without an outer ring and with the inner spacer, which must be inserted the first time just lapped, then the second time with the correct measure in such a way that:

$$Y1 = Y - 0,05$$

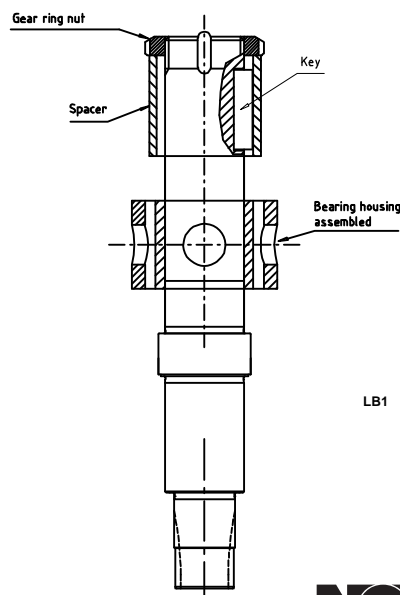


- 30 ATTENTION**

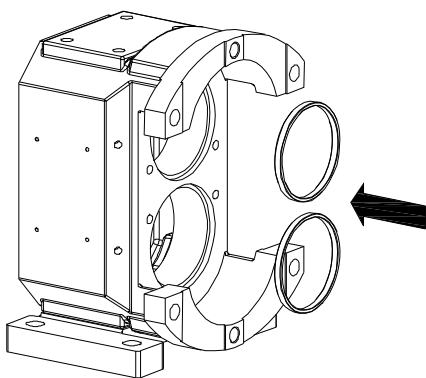
Bearing spacer has to be placed only on B2 size.



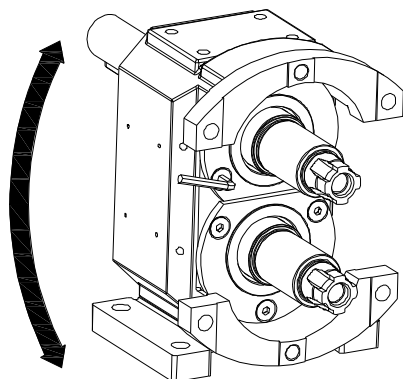
- 31** Assemble the pre-assembled rear bearing, tighten the ring nut inserting a spacer suitable for replacing the gear, in order to keep assembled the bearing during the assembling operations.



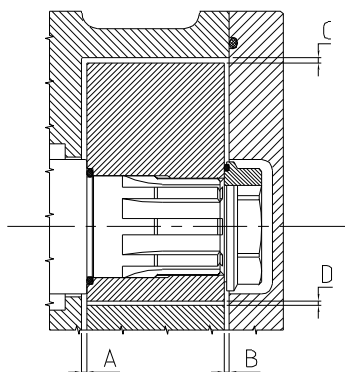
Pump Assembly & Dismantling Instructions



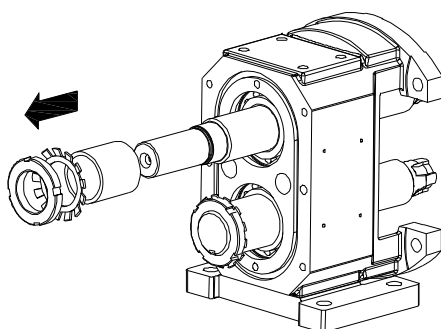
- 32** Set the spacers for axial shaft adjustment and assemble the shafts with the already fixed bearings.



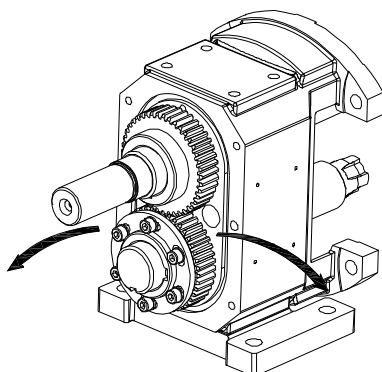
- 33** Set the O-ring gasket in its seat and assemble the bearing retainers with oil lip seal already fixed. Assemble the rotor case and rotors as previously described and check the "Clearances".



- 34** If rotor clearances are not included in tolerances, disassemble rotors, the rotor case and adjust the spacer according to the requested dimension.
N.B. A spacer set can be requested to the manufacturer company.

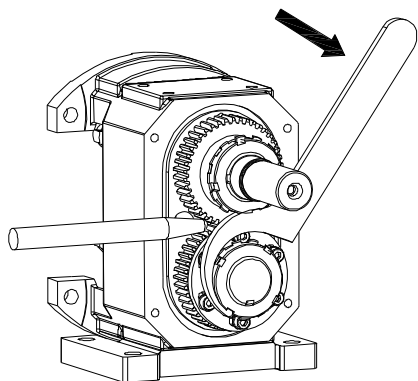


- 35** Remove the spacers used for the assembly and insert the keys for gear drive in their seats with a lightly forced connection.

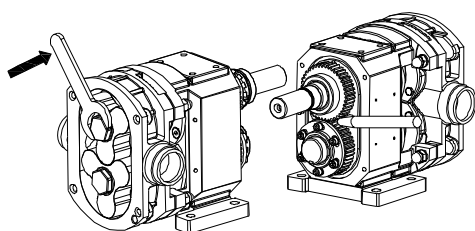


- 36** The gear couple is composed by a fixed gear and an adjustable one. Assemble the fixed gear, then the adjustable one with untightened screws, taking care to a first approximate rotor timing.

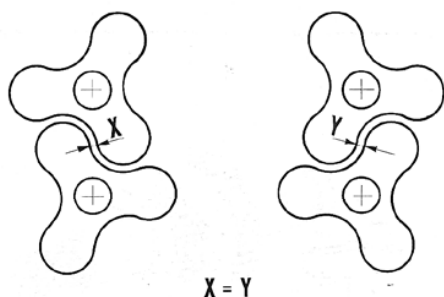
Pump Assembly & Dismantling Instructions



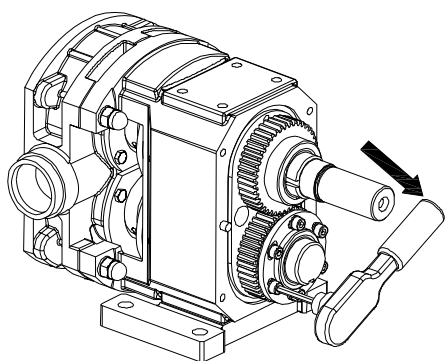
- 37** Tighten the retainer ring nuts with the corresponding safety washers and set rightly the suited retainer key. In order to avoid turning during operation insert a wedge in soft material among the gear teeth.



- 38** Being the wedge inserted among the gears tighten the rotor nuts, taking care of the driving torque.

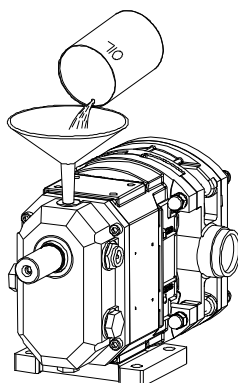


- 39** Time perfectly the rotors and tighten the screws of the adjustable gear gradually, checking the rotor timing.



- 40** Tighten completely the adjustable gear screws taking care of the driving torque.

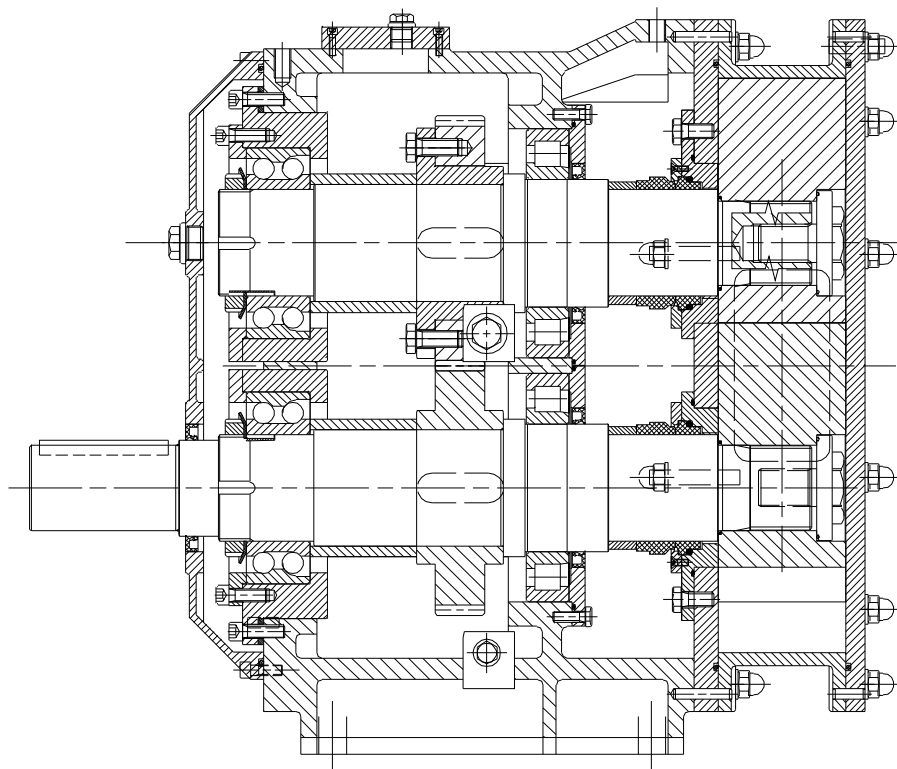
N.B. IN CASE OF RE-TIMING IT'S NECESSARY TO REPLACE THE PLANE WASHERS, CAVED BY PREVIOUS CLAMPING.



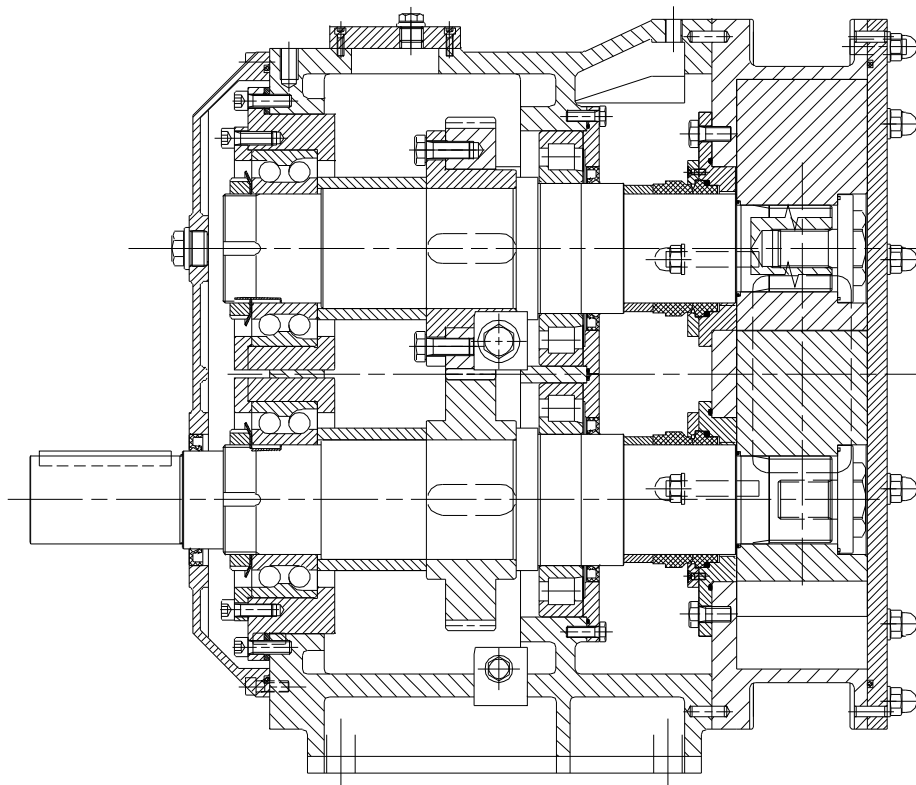
- 41** Assemble the gear cover, taking care to set the O-ring gasket and insert the key on the shaft. Put into bearing housing the oil quantity as per section 5 page 7.

Pump Assembly & Dismantling Instructions

Pump assembly and disassembly instructions Mod. LB550-LB660-LB680



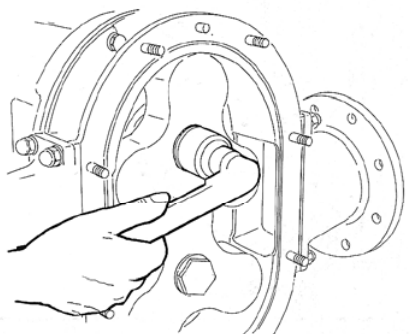
Cross section type LB660 - LB680



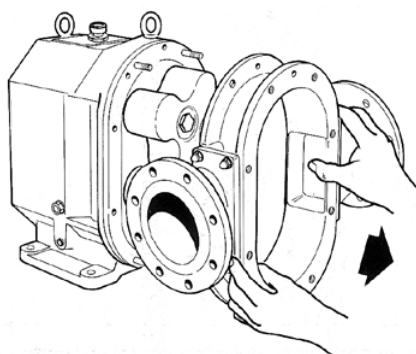
Cross section type LB550

Pump Assembly & Dismantling Instructions

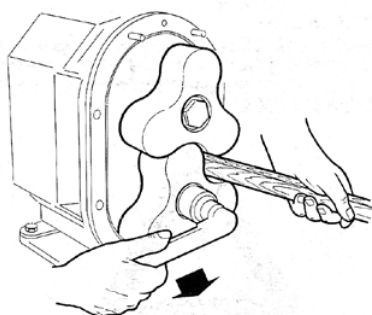
Rotor case disassembly pump type LB660-LB680 (for model LB550 see page 20)



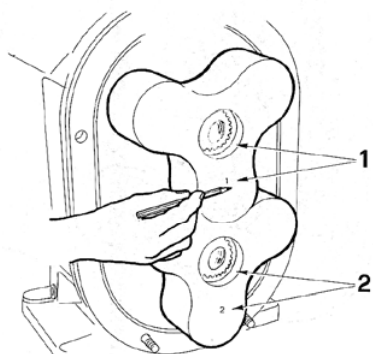
- 1 Remove the end cover and untighten the two locking nuts of the rotors.



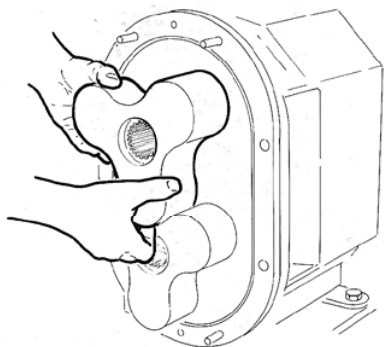
- 2 Untighten the back nuts and remove the rotor case



- 3 Unscrew anticlockwise the rotor nuts, interposing a non metal element between the rotors, making them stop rolling.

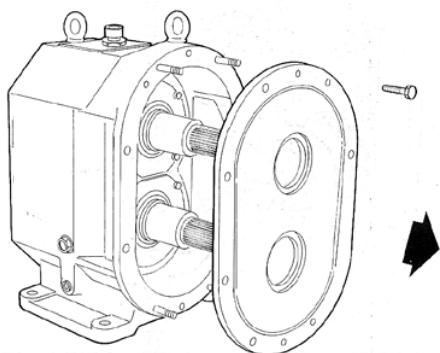


- 4 Take care of the reference marked on rotors and shafts (1-2) so that you will set them rightly while re-assembling.

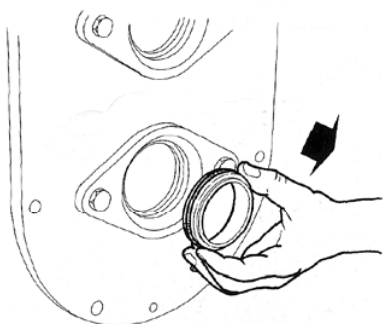


- 5 Extract the rotors, taking care you don't damage by means of metal tools.

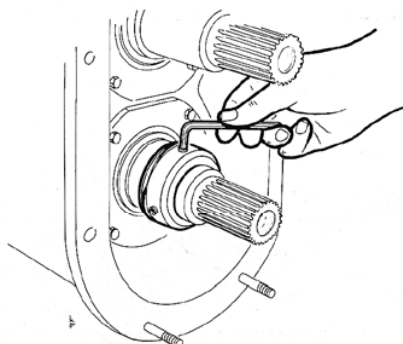
Pump Assembly & Dismantling Instructions



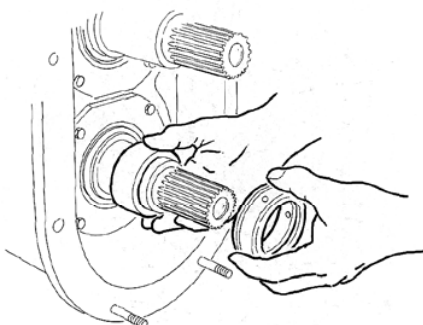
- 6 Untighten the two security screws and remove the seal flange.



- 7 Extract the stationary part of the seal from the support fixed on seal flange.



- 8 Untighten the socket head screws on mechanical seal.



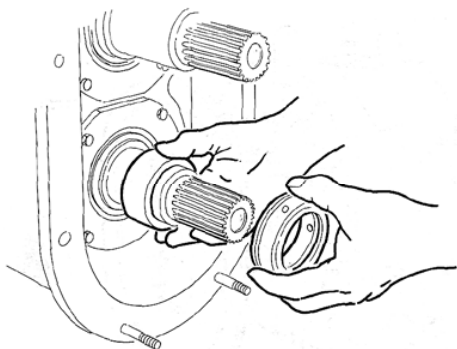
- 9 Extract the rotating part of the seal from the shaft.

Rotor case assembly (for mod. LB550 see page 20)

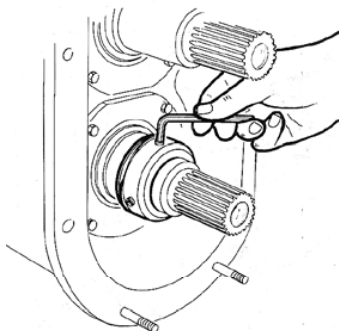


- 10 **IMPORTANT!**
During the following operations, take care you don't damage the lapped seal surfaces; don't lay them on the bench and handle them with clean hands.

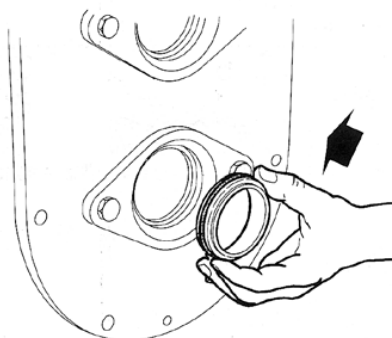
Pump Assembly & Dismantling Instructions



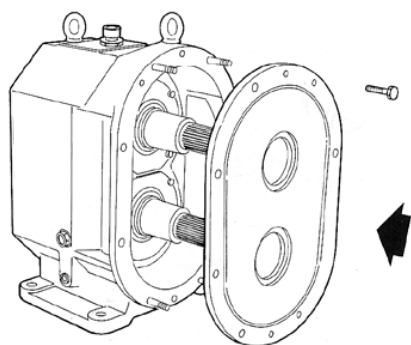
- 11** Clean carefully the shafts. Be sure the spacers for the seals are set (295). Lubricate lightly the O-rings and insert the rotating part of the seals on the shafts. Exert pressure only with hands; avoid using metal tools.



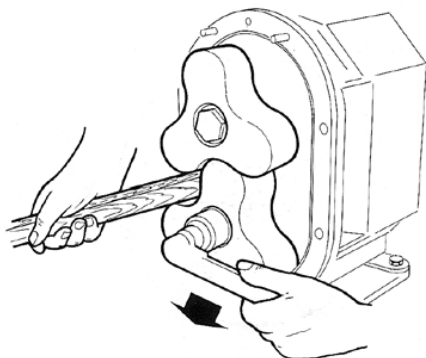
- 12** Be sure the mechanical seals stand on the shaft shoulder and tighten by degrees the socket head screws. We suggest you should use a thread locking adhesive in order to avoid their untightening on work.



- 13** Assemble the stationary part of the seals on supports, taking care to align the slot with the retainer pin. Assemble these supports on seal flange, setting the O-ring.

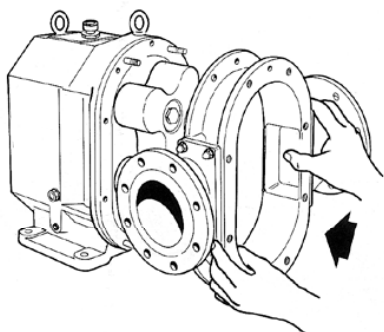


- 14** Clean carefully the seal slide surface and assemble the seal flange delicately in order not to damage the seals. Be sure the flange is set according to reference pins and tighten the suited screws



- 15** Assemble the rotors, setting them on pitch according to the reference marks (1-2). Clamp the rotors nuts (see tab. 14). In order to stop turning, interpose a non metal element between rotors. Tighten the rotor nuts.

Pump Assembly & Dismantling Instructions

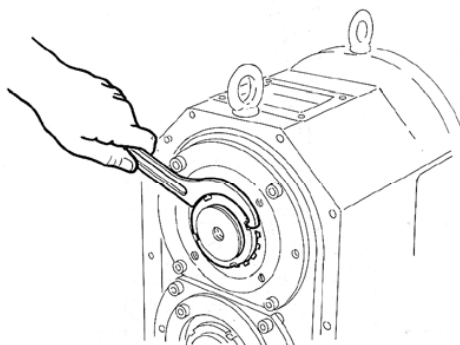


- 16** Assemble the rotor case, setting the O-ring.

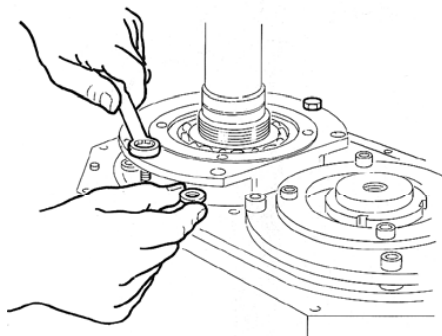
Bearing housing disassembly Mod. LB550-LB660-LB680



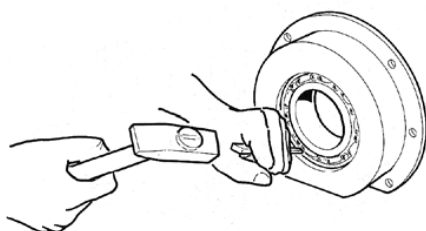
- 17** After disassembling the rotor case remove the oil and the drive key on shaft.



- 18** Remove the gear cover, disconnect the retainer keys of the lock washer and unscrew the ring nuts.



- 19** Stand the pump upright and extract the two bearing supports, making use of the threaded holes for removal. Doing so you will remove the spacers for axial adjustment too, which should be marked and separated for a right re-setting while assembling.

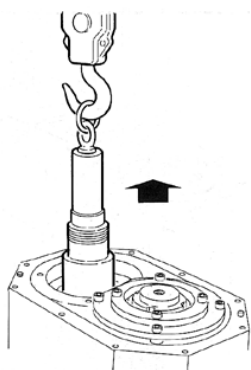


- 20** Remove the ball bearing from its support, taking away the bull ring.

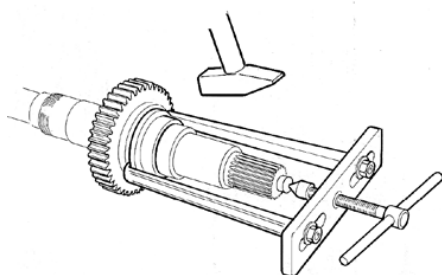
Pump Assembly & Dismantling Instructions



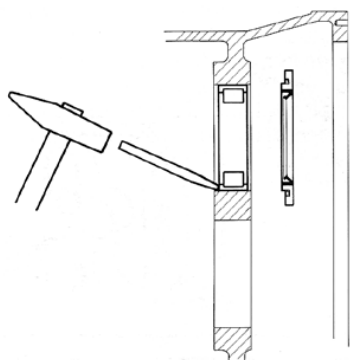
- 21** Mark the gears in order to set them rightly while reassembling.



- 22** Withdraw the shafts, with the gears, still inserted. For this operation we suggest a mechanical lifting equipment, which can use the threaded holes arranged on shaft ends.

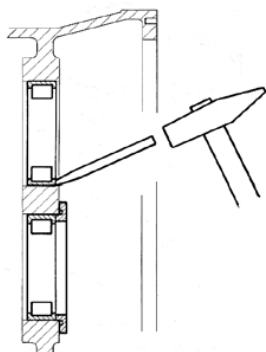


- 23** Remove the inside ring of the roller bearing by means of an extractor. Remove the gear taking care not to damage the toothing outline.



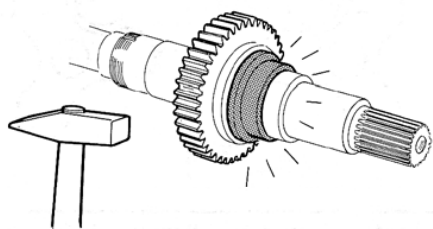
- 24** Remove the bearing retainer and extract the outer ring of the roller bearing from the bearing housing.

Bearing housing assembly Mod. LB550-LB660-LB680

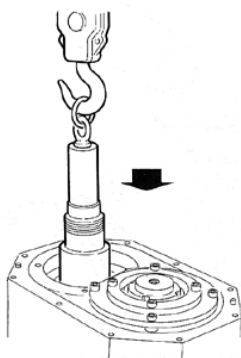


- 25** Assemble the outer rings of the roller bearings on the bearing housing, using a bearing retainer to set them axially, because no counterboring is arranged. Assemble the bearing retainer without seal rings.

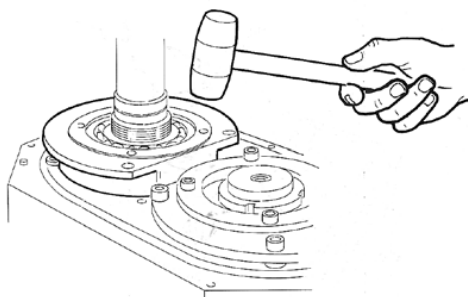
Pump Assembly & Dismantling Instructions



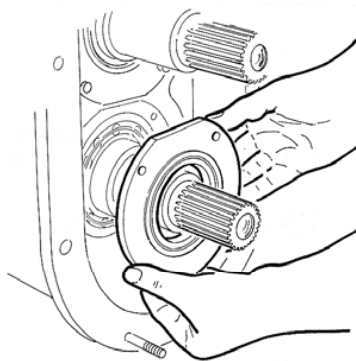
- 26 USE GLOVES.** The inner ring of the roller bearing is assembled with a interference, therefore we suggest a shrink fitting, heating the ring in 90 °C oil bath, in order to avoid any seizure. Insert the gear keys in their seats with a lightly forced connection. **IMPORTANT:** Assemble the adjustable gear on the shaft, which will be set up on the pump.



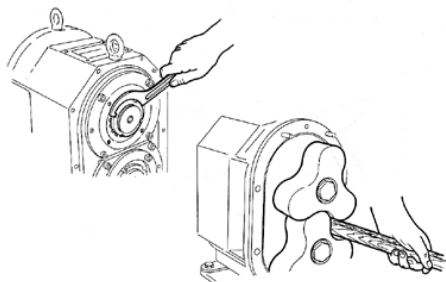
- 27** Assemble the shafts. If the gears haven't been removed from the shafts, respect the timing previously marked while re-assembling.



- 28** Insert the spacers (10) on the shafts and assemble the supports (75) with the ball bearings already connected. Set the spacers for axial adjustment (11) and tighten the screws.

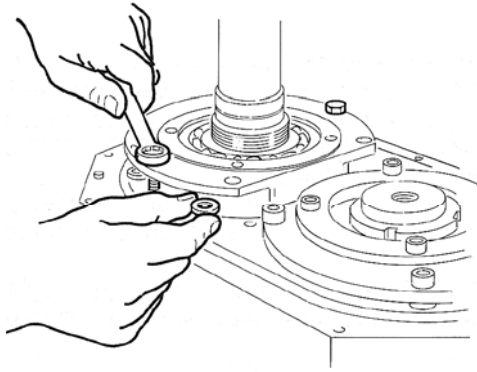


- 29** Assemble the seal rings (18) on bearings retainers (9).

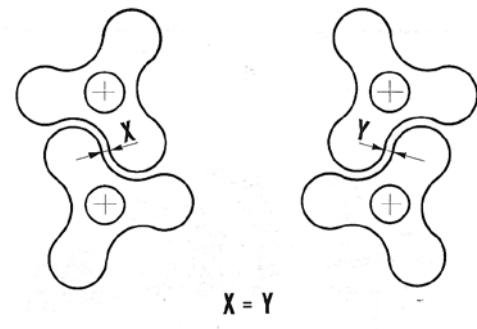


- 30** Assemble the rotor case as previously described; tighten the retainer ring nut with the corresponding lock washers and set rightly the retainer keys. In order to avoid turning during operation insert a non metal wedge between rotors.

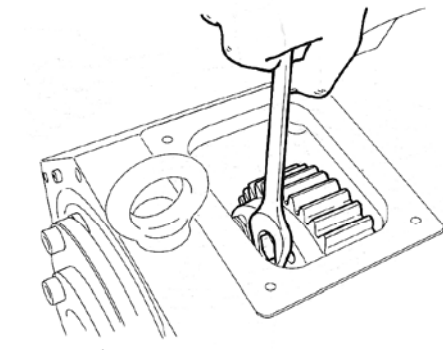
Pump Assembly & Dismantling Instructions



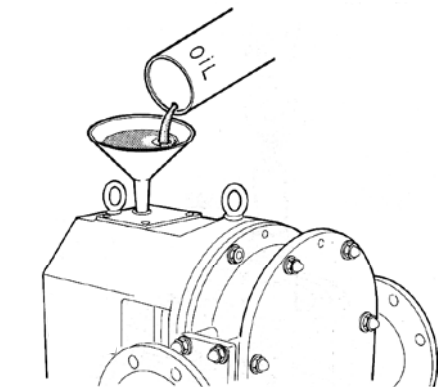
- 31** If clearance are not included in tolerances, untighten the screws which lock the back bearing supports, remove the spacers and adjust them according to the requested dimension.
N.B. a spacer set can be requested to the manufacturer company.



- 32** Time perfectly the rotors and tighten the screws of the adjustable gear gradually checking the rotor timing. You can reach the adjustable gear through a window arranged on the top of the bearing housing.



- 33** Tighten completely the adjustable gear screws taking care of the driving torque.
N.B. IN CASE OF RE-TIMING IT'S NECESSARY TO REPLACE THE PLANE WASHERS, CAVED BY PREVIOUSLY CLAMPING.



- 34** Assemble the gear cover, taking care to set the O-ring and insert the key on the shaft. Put into gear box the oil quantity as per section 5 page 7.

DRIVING SHAFT INVERSION - PUMP TYPE LB550 - LB6

- 1 - To invert the drive shaft position it's necessary to remove the shafts from bearing housing, as previously described.
IMPORTANT! Ref. operation n°20: Mark the rotors B, the bearing supports (75) and the axial adjustment spacers (11) in order to re-set them rightly on the same shaft while re-assembling.
- 2 - Re-assemble the inverted shafts, each with the corresponding marked details on disassembly. The gears must mesh with the same gear and tooth space, previously marked, in order to respect timing.
Being completely assembled, check clearances and rotor timing are included in tolerance table.

Spare Parts List

LB100 PARTS LIST - SPARE CODE

Pos.	Descriptions	Qty	Code
Key No.		No. Req.	Part. No.
1	Bearing Housing G25	1	2001G007
2	Gear cover	1	2001L037
3	Standard driving shaft	1	2004B061
4	Standard driven shaft	1	2004B062
5	Fixed gear	1	2008M013
6	Adjustable gear	1	2008M017
7	Adjustable gear bush	1	2008M038
8	Scw	6	410F04x10
9	Split ring	2	421F371
10	Plane washer	4	412F06G17
11	Axial adjustment spacer	2	2014M030
12	Screw	4	411A06x35
13	Screw	4	411F06x12Z
15	Gear cover seal	1	404T100
17	Oil seal ring	1	403Y18307D
18	Oil seal ring	2	403Y25377D
19	Key	2	418F06x18
20	Key	1	418A06x30
23	Gear ring nut	2	415F20AUT
25	Oil cap vent	1	407L14S
26	Oil cap	1	407L14T
29	Front bearing	2	2019M020
30	Rear bearing	2	406FNATB5904
40	Rotor case	1	23 B14
41	316 S.S. gear rotor ST	2	2005B086
41	316 S.S. 2 lobe ST	2	2005B089
41	Rubber coated 316 S.S. 5 lobe	2	2005B098
41	S.S. anti-seizure alloy gear rotor	2	2005&089
41	S.S. anti-seizure alloy 2 lobe	2	2005&089
42	Locking nut for rotor	2	2004B107
43	O-ring	2	404T3075
44	Standard end cover	1	2006B007
45	Cover O-ring	1	404T4337
47	Stud	4	419A06X80
48	Pin	2	417A08X16
50	O-ring	2	404T2056
51	Cap nut	4	414A06
52	Nut	2	413A06
55	Plane washer	6	412F04
111	End cover for heating version	1	2006B058

Pos.	Descriptions	Qty	Code
Key No.		No. Req.	Part. No.
113	End cover jacket	1	2006B167
114	Screw	4	411A06X16
115	O-ring	1	404T176
200	Retainer pin	2	2014B200
201	Mechanical seal UNITEN 7K- X7XZ7-HX	2	4U020U7KXZ7
201	Mechanical seal UNITEN 7K- XYXZY-HX	2	4U020U7KXZY
201	Mechanical seal UNITEN 7K- XFXZ5-HX	2	4U020U7KXZ5
201	Mechanical seal UNITEN 7K- X73Z7-HX	2	4U020U7K3Z7
201	Mechanical seal UNITEN 7K- XY3ZY-HX	2	4U020U7K3ZY
201	Mechanical seal UNITEN 7K- XF3Z5-HX	2	4U020U7K3Z5
201	Mechanical seal UNITEN 7K- X7337-HX	2	4U020U7K337
201	Mechanical seal UNITEN 7K- XY33Y-HX	2	4U020U7K33Y
201	Mechanical seal UNITEN 7K- XF335-HX	2	4U020U7K335
201	Mechanical seal UNITEN 7K- XYDKKY-HX	2	4U020U7KKKY
210	Balancing ring for seal	2	2014B015
218	Screw	4	410A06x12
239	Seal protection	2	4034Y005
240	Viton® seal ring	4	402V35255
240	EPDM seal ring	4	402U35255
240	SINTEK H-TPU polymer lip seal	2	402Q35256
240	HN Elring lip seal	2	402HN25357
241	Stuffing box - SINTEK H-TPU - HN ELRING - UM seal bush	2	2004B170
242	Bush O-ring	2	404T3081
243	Screw	6	420A05X05
244	Seal ring support	2	2014B058
244	SINTEK H-TPU / HN ELRING lip seal support	2	2014B065
245	Screw	4	410A06X12
246	Screw	4	410A06X14
280	Packing ring kit	1	205P25355
288	Register	2	2014B108
289	Screw	4	410A06x16
295	Spacer	2	2014B045
302	Screw	2	410A05X10
304	Name plate	1	44301026
305	Rivet	4	44301027

Spare Parts List

PART LIST-SPARE CODE B105 - LB110 - LB115 - LB215 - LB220 - LB325 - LB330 - LB390 - LB430 - LB440 - LB470 - LB490 - LB550 - LB660 - LB680

POS.	No.	DESCRIPTION	PART No. BY MODEL																Qty
			LB105	LB110	LB115	LB215	LB220	LB325	LB330	LB390	LB430	LB440	LB470	LB480	LB550	LB660	LB680		
1	BEARING HOUSING	1	2001G001	2001G001	2001G001	2001G002	2001G002	2001G003	2001G003	2001G003	2001G004	2001G004	2001G008	2001G008	2001G005	2001G006	2001G006		
2	GEAR COVER	1	2001L031	2001L031	2001L031	2001L032	2001L032	2001L033	2001L033	2001L033	2001L034	2001L034	2001L038	2001L038	2001G035	2001G036	2001G036		
3	STANDARD DRIVING SHAFT	1	2004B001	2004B001	2004B002	2004B003	2004B004	2004B005	2004B006	-	2004B007	2004B008	2004B063	2004B065	2004B010	2004B011	2004B012		
	DUPLEX DRIVING SHAFT	1	2004D001	2004D001	2004D002	2004D003	2004D004	2004D005	2004D006	2004D006	2004D007	2004D008	2004D009	2004D010	-	2004D011	-		
	DOUBLE FLUSH MECH SEAL DRIVING SHAFT	1	2004D015	2004D015	2004D016	2004D017	2004D018	2004D019	2004D020	-	2004D021	2004D022	2004D023	2004D024	-	-	-		
4	STANDARD DRIVEN SHAFT	1	2004B029	2004B029	2004B030	2004B031	2004B032	2004B033	2004B034	-	2004B035	2004B036	2004B064	2004B066	2004B038	2004B039	2004B040		
	DUPLEX DRIVEN SHAFT	1	2004D029	2004D029	2004D030	2004D031	2004D032	2004D033	2004D034	2004D034	2004D035	2004D036	2004D037	2004D038	-	2004D039	-		
	DOUBLE FLUSH MECH SEAL DRIVEN SHAFT	1	2004D045	2004D045	2004D046	2004D047	2004D048	2004D049	2004D050	-	2004D051	2004D052	2004D053	2004D054	-	-	-		
5	FIXED GEAR	1	2008M001	2008M001	2008M001	2008M002	2008M002	2008M003	2008M003	2008M003	2008M004	2008M004	2008M014	2008M014	2008M005	2008M006	2008M006		
6	ADJUSTABLE GEAR	1	2008M007	2008M007	2008M007	2008M008	2008M008	2008M009	2008M009	2008M009	2008M010	2008M010	2008M015	2008M015	2008M011	2008M012	2008M012		
7	ADJUSTABLE GEAR BUSH	1	2008M031	2008M031	2008M031	2008M032	2008M032	2008M033	2008M033	2008M033	2008M034	2008M034	2008M037	2008M037	2008M035	2008M036	2008M036		
8	SCREW	6	411F05X14	411F05X14	411F05X14	411F06X16	411F06X16	411F08X20	411F08X20	411F08X20	411F10X25	411F10X25	411F10X30	411F10X30	410F16X45	410F16X45	410F16X45		
9	BEARING RETAINER	2	2001C051	2001C051	2001C051	2001C052	2001C052	2001C053	2001C053	2001C053	2001C054	2001C054	2001C057	2001C057	2001C055	2001C056	2001C056		
10	BEARING SPACER	2	-	-	-	2014M021	2014M021	2014M021	2014M021	-	-	-	-	-	2014M022	2014M023	2014M023		
11	AXIAL ADJUSTMENT SPACER	2	2014M024	2014M024	2014M024	2014M025	2014M025	2014M026	2014M026	2014M026	2014M027	2014M027	2014M044	2014M044	2014M028	2014M029	2014M029		
12	SCREW	4	411A06X16	411A06X16	411A06X16	411A08X20	411A08X20	411A08X25	411A08X25	411A08X25	411A10X30	411A10X30	411A10X30	411A10X30	411A08X20	411A10X30	411A10X30		
13	GEAR COVER PIN	2	417A6X14	417A6X14	417A6X14	417A6X14	417A6X14	417A6X16	417A6X16	417A6X16	417A6X16	417A6X16	417A08X16	417A08X16	417A08X20	417A10X30	417A10X30		
14	SCREW	8	411A06X16S	411A06X16S	411A06X16S	411A08X20S	411A08X20S	411A08X20S	411A08X20S	411A08X20S	411A10X25S	411A10X25S	411A10X25S	411A10X25S	411A08X20	411A10X30	411A10X30		
15	GEAR COVER O-RING	1	404T4437	404T4437	404T4437	404T4562	404T4562	404T4675	404T4675	404T4675	404T4800	404T4900	404T81050	404T81050	404T001	404T002	404T002		
16	BEARING RETAINER O-RING	2	404T3218	404T3218	404T3218	404T3268	404T3268	404T3312	404T3312	404T3312	404T4437	404T4437	404T4500	404T4500	404T4562	404T4675	404T4675		
17	OIL SEAL RING	1	403Y26377	403Y26377	403Y26377	403Y32457	403Y32457	403Y37528	403Y37528	403Y37528	403Y55720	403Y55720	403Y65610D	403Y65610D	403Y66010	403Y66010	403Y66010		
18	OIL SEAL RING	2	403Y35527D	403Y35527D	403Y35527D	403Y45608D	403Y45608D	403Y60758D	403Y60758D	403Y60758D	403Y81008D	403Y81008D	403Y81010D	403Y81010D	403Y81010D	403Y81010D	403Y81010D		
19	KEY	2	418F08X30M	418F08X30M	418F08X30M	418F10X30M	418F10X30M	418F12X40M	418F12X40M	418F12X40M	418F18X50M	418F18X50M	418F20X60M	418F20X60M	418F20X60M	418F20X60M	418F20X60M		
20	KEY	1	418F08X40	418F08X40	418F08X40	418F08X40	418F08X40	418F10X50	418F10X50	418F10X50	418F14X70	418F14X70	418F16X90	418F16X90	418F16X90	418F22X120	418F22X120		
21	BEARING RING NUT	2	-	-	-	415F40	415F40	415F40	415F40	415F40	415F50	415F50	415F50	415F50	-	-	-		
22	WASHER	2	-	-	-	416F40	416F40	416F50	416F50	416F50	416F70	416F70	416F80	416F80	-	-	-		
23	GEAR RING NUT	2	415F30	415F30	415F30	415F35	415F35	415F40	415F40	415F40	415F60	415F60	415F70	415F70	415F70	415F100	415F100		
24	WASHER	2	416F30	416F30	416F30	416F35	416F35	416F40	416F40	416F40	416F60	416F60	416F70	416F70	416F70	416F100	416F100		
25	OIL VENT CAP	1	407L14S	407L14S	407L14S	407L12S	407L12S	407L12S	407L12S	407L12S	407L12S	407L12S	407L12S	407L12S	407L12S	407L12S	407L12S		
26	OIL CAP	2	407L14T	407L14T	407L14T	407L12T	407L12T	407L12T	407L12T	407L12T	407L12T	407L12T	407L12T	407L12T	407L12T	407L12T	407L12T		
27	OIL LEVEL	1	407L38L	407L38L	407L38L	407L12L	407L12L	407L12L	407L12L	407L12L	407L12L	407L12L	407L12L	407L12L	407L12L	407L12L	407L12L		
28	FOOT	1	2001G101	2001G101	2001G101	2001G102	2001G102	2001G103	2001G103	2001G103	2001G104	2001G104	2001G105	2001G105	-	-	-		
29	ASSEMBLED FRONT BEARING	2	2019M001	2019M001	2019M001	2019M002	2019M002	2019M003	2019M003	2019M003	2019M004	2019M004	2019M008	2019M008	406FNU2216E	406FNU224	406FNU224		
30	ASSEMBLED REAR BEARING	2	-	-	-	2019M005	2019M005	2019M002	2019M002	2019M002	2019M007	2019M007	2019M004	2019M004	406F3220	406F3220	406F3220		
31	VERTICAL FOOT	2	2001A301	2001A301	2001A301	2001A302	2001A302	2001A303	2001A303	2001A303	2001A304	2001A304	2001A305	2001A305	-	-	-		
32	SCREW	8	411A08X20	411A08X20	411A08X20	411A10X20	411A10X20	411A12X25	411A12X25	411A12X25	411A14X30	411A14X30	411A20X40	411A20X40	-	-	-		
33	COUNTERFLANGE FOR ENLARGED INLET PORT	1	-	-	-	2006B045	2006B046	-	2006B047	-	-	2006B048	-	-	2006B049	-	-		
34	O-RING	1	-	-	-	404T3281	-	-	404T4500	-	-	404T4650	-	-	404T4725	-	-		
40	ROTOR CASE ©	1	23...01	23...02	23...03	23...04	23...05	23...06	23...07	23...17	23...08	23...09	23...15	23...16	23...11	23...12	23...13		
41	316 STAINLESS STEEL 3 LOBE ST	2	-	2005B002	2005B003	2005B004	2005B005	2005B006	2005B007	2005B006	2005B008	2005B009	2005B090	2005B092	2005B011	2005B012	2005B013		
	316 STAINLESS STEEL 2 LOBE ST	2	-	2005B026	2005B027	2005B028	2005B029	2005B030	2005B031	2005B032	2005B033	2005B034	2005B036	2005B038	2005B035	2005B036	2005B037		
	316 STAINLESS STEEL 3 LOBE SM	2	-	2005B014	2005B015	2005B016	2005B017	2005B018	2005B019	2005B020	2005B021	2005B022	2005B024	2005B025	2005B026	2005B027	2005B028		
	316 STAINLESS STEEL 2 LOBE SM	2	-	2005B038	2005B039	2005B040	2005B041	2005B042	2005B043	2005B044	2005B045	2005B046	2005B048	2005B049	2005B050	2005B051	2005B052		
	RUBBER COATED 316 S.S. 3/61 LOBE	2	2005B099	2005B099	2005B099	2005B099	2005B099	2005B099	2005B099	2005B099	2005B099	2005B099	2005B099	2005B099	2005B099	2005B099	2005B099		
	RUBBER COATED 316 S.S. 2 LOBE	2	-	2005B062	2005B063	2005B064	2005B065	2005B066	2005B067	2005B068	2005B069	2005B070	2005B071	2005B072	2005B073	2005B074	2005B075		
	ANTI-SEIZURE ALLOY DUAL WING ROT PLATE	2	2005S087	2005S087	2005S087	2005S087	2005S087	2005S087	2005S087	2005S087	2005S087	2005S087	2005S087	2005S087	2005S087	2005S087	2005S087		
	ANTI-SEIZURE ALLOY 3 LOBE	2	-	2005S002	2005S003	2005S004	2005S005	2005S006	2005S007	-	-	-	-	-	2005S011	2005S012	2005S013		
	316 STAINLESS STEEL GEAR ROTOR	2	2005B001	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	ANTI-SEIZURE ALLOY GEAR ROTOR	2	2005S001	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
42	LOCKING NUT FOR STANDARD ROTOR	2	2004B101	2004B101	2004B101	2004B102	2004B102	2004B103	2004B103	2004B103	2004B104	2004B104	2004B104	2004B104	2004B105	2004B106	2004B106		
43	O-RING	2	404T3100	404T3100	404T3100	404T3118	404T3118	404T3162	404T3162	404T3162	404T3200	404T3200	404T3200	404T3200	404T3225	404T3225	404T3225		

(2) FOR LB470 - B490 - B5 - B6

(1) FOR LB5 - LB6



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(1) FOR LB6 (2) FOR LB1 - LB2 (3) FOR LB470 - LB490 - LB570

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Spare Parts List

POS.	No.	DESCRIPTION	Qty	PART No. BY MODEL																		
				LB105	LB110	LB115	LB215	LB220	LB325	LB330	LB390	LB430	LB440	LB470	LB490	LB550	LB660	LB680				
241	2	SEAL RING BUSH FOR HN ELRING	2	2004B191	2004B191	2004B191	2004B192	2004B192	2004B193	2004B193	2004B193	2004B194	2004B194	-	-	-	-					
242	2	BUSH O-RING	2	404T3118	404T3118	404T3118	404T3137	404T3137	404T4200	404T4200	404T4200	404T168	404T168	404T181	404T168	404T4400	404T4400					
242	2	HN ELRING BUSH O-RING	2	404T3118	404T3118	404T3118	404T149	404T149	404T4237	404T4237	404T4237	404T168	404T168	-	-	-	-					
243	6	SCREW	6	420A05X05	420A05X05	420A05X05	420A06X06	420A06X06	420A06X06	420A06X06	420A06X06	420A06X06	420A06X06	420A08X10	420A08X10	420A06X06	420A08X10					
243	6	HN ELRING SCREW	6	420A05X05	420A05X05	420A05X05	420A05X05	420A05X05	420A05X05	420A05X05	420A05X05	420A06X06	420A06X06	-	-	-	420A08X10					
244	2	UJ SEAL RING SUPPORT	2	2014B061	2014B061	2014B061	2014B062	2014B062	2014B063	2014B063	2014B063	2014B064	2014B064	2014B067	2014B057	2014B056	2014B056					
244	2	SI SEAL RING SUPPORT	2	2014B111	2014B111	2014B111	2014B112	2014B112	2014B113	2014B113	2014B113	2014B114	2014B114	-	-	-	-					
244	2	HN ELRING SEAL RING SUPPORT	2	404T3218	404T3218	404T3218	404T168	404T168	404T4312	404T4312	404T4312	404T4437	404T4437	404T4500	404T4437	404T4625	404T4625					
245	2	O-RING	2	404T3218	404T3218	404T3218	404T168	404T168	404T4312	404T4312	404T4312	404T4437	404T4437	-	-	-	-					
245	2	HN ELRING O-RING	2	404T3218	404T3218	404T3218	404T168	404T168	404T4312	404T4312	404T4312	404T4437	404T4437	-	-	-	-					
246	6	SCREW	6	410A05X14	410A05X14	410A05X14	410A06X12	410A06X12	410A06X14	410A06X14	410A06X14	410A10X25	410A10X25	410A10X30	410A10X30	410A10X25	410A14X20					
246	6	SCREW	6	410A05X10	410A05X10	410A05X10	410A06X12	410A06X12	410A06X14	410A06X14	410A06X14	410A10X25	410A10X25	410A10X16	410A10X16	410A10X25	-					
246	6	SCREW	6	410A05X16	410A05X16	410A05X16	410A06X20	410A06X20	410A06X20	410A06X20	410A06X20	410A10X25	410A10X25	-	-	-	-					
247	4	UJ SEAL RING PIN	4	-	-	-	-	-	417A06X16	417A06X16	417A06X16	417A08X15	417A08X15	417A08X16	417A08X16	417A08X15	-					
247	4	HN ELRING SEAL PIN	4	417A06X10	417A06X10	417A06X10	417A06X12	417A06X12	417A06X16	417A06X16	417A06X16	417A08X16	417A08X16	-	-	-	-					
280	1	PTFE PACKING RING KIT	1	205P38506	205P38506	205P38506	205P45576	205P45576	205P60768	205P60768	205P60768	205P60968	205P60968	205P10012010	205P10012010	205P60968	205P1013412					
281	2	STUFFING BOX SEAL BUSH	2	2004B161	2004B161	2004B161	2004B162	2004B162	2004B163	2004B163	2004B163	2004B164	2004B164	2004B169	2004B169	2004B164	2004B165					
282	2	BUSH O-RING	2	404T3118	404T3118	404T3118	404T4137	404T4137	404T4200	404T4200	404T4200	404T168	404T168	404T181	404T181	404T168	404T4400					
283	6	SCREW	6	420A05X05	420A05X05	420A05X05	420A06X06	420A06X06	420A06X06	420A06X06	420A06X06	420A06X06	420A06X06	420A08X08	420A08X08	420A06X06	420A08X10					
284	2	STUFFING BOX SEAL SUPPORT	2	2014B071	2014B071	2014B071	2014B072	2014B072	2014B073	2014B073	2014B073	2014B074	2014B074	2014B083	2014B083	2014B076	2014B076					
285	2	SUPPORT O-RING	2	404T3218	404T3218	404T3218	404T168	404T168	404T4312	404T4312	404T4312	404T4437	404T4437	404T4500	404T4500	404T4625	404T4625					
286	-	SCREW	-	411A05X14	411A05X14	411A05X14	411A06X16	411A06X16	411A06X20	411A06X20	411A06X20	411A10X16	411A10X16	411A10X25	411A10X25	419A14X110	419A14X110					
287	4	PIN	4	417A06X08	417A06X08	417A06X08	417A06X10	417A06X10	417A06X10	417A06X10	417A06X10	417A08X12	417A08X12	417A08X12	417A08X12	-	-					
288	2	PACKING GLAND	2	2014B101	2014B101	2014B101	2014B102	2014B102	2014B103	2014B103	2014B103	2014B104	2014B104	2014B107	2014B107	2014B106	2014B106					
289	-	SCREW	-	410A05X16	410A05X16	410A05X16	410A06X20	410A06X20	410A06X20	410A06X20	410A06X20	410A10X25	410A10X25	410A10X25	410A10X25	413A14	413A14					
290	1	PTFE FLUSHED PACKING RING NUT KIT	1	201P38506	201P38506	201P38506	201P45576	201P45576	201P60768	201P60768	201P60768	201P60968	201P60968	201P10012010	201P10012010	201P60968	201P1013412					
291	2	FLUSHED STUFFING BOX SEAL SUPPORT	2	2014B077	2014B077	2014B077	2014B078	2014B078	2014B079	2014B079	2014B079	2014B080	2014B080	2014B084	2014B084	2014B080	2014B082					
292	2	HYDRAULIC RING	2	2014B121	2014B121	2014B121	2014B122	2014B122	2014B123	2014B123	2014B123	2014B124	2014B124	2014B126	2014B126	2014B125	2014B125					
295	2	SPACER	2	-	-	-	-	-	-	-	-	-	-	2014B131	2014B132	2014B132	2014B132					
296	2	MECHANICAL SEAL SUPPORT	2	-	-	-	-	-	-	-	-	-	-	-	-	2014B092	2014B092					
297	2	SUPPORT O-RING	2	-	-	-	-	-	-	-	-	-	-	-	-	404T4625	404T4625					
298	4	SCREW	4	-	-	-	-	-	-	-	-	-	-	-	-	410A14X20	410A14X20					
299	2	PIN	2	430A05X10	430A05X10	430A05X10	430A05X10	430A05X10	430A06X12	430A06X12	430A06X12	430A08X18	430A08X18	430A08X20	430A08X20	430A08X18	430A08X18					
302	4	SCREW	4	410A05X10	410A05X10	410A05X10	410A05X10	410A05X10	410A05X10	410A05X10	410A05X10	410A05X10	410A05X10	410A05X10	410A05X10	410A06X16	410A06X16					
303	4	PLUG	4	44301020	44301020	44301020	44301022	44301022	44301023	44301023	44301023	44301024	44301024	44301025	44301025	-	-					
304	1	NAME PLATE	1	44301026	44301026	44301026	44301026	44301026	44301026	44301026	44301026	44301026	44301026	44301026	44301026	44301026	44301026					
305	4	RIVET	4	44301027	44301027	44301027	44301027	44301027	44301027	44301027	44301027	44301027	44301027	44301027	44301027	44301027	44301027					
306	2	EYEBOLT	2	-	-	-	-	-	-	-	-	-	-	-	-	432F16	432F16					

Exploded Views

In order to check the pump type refer to data sheet or pump name plate.

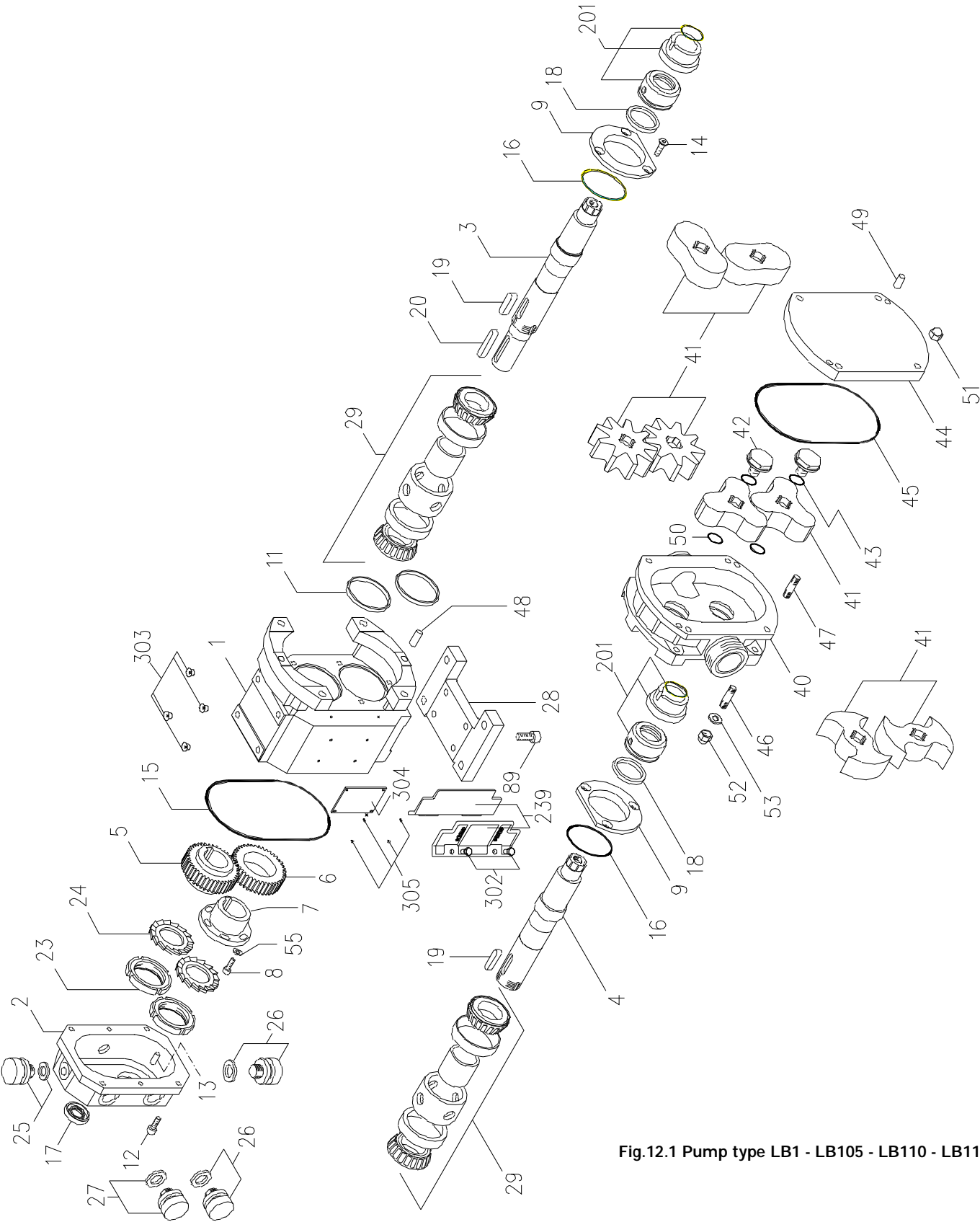


Fig.12.1 Pump type LB1 - LB105 - LB110 - LB115

Exploded Views

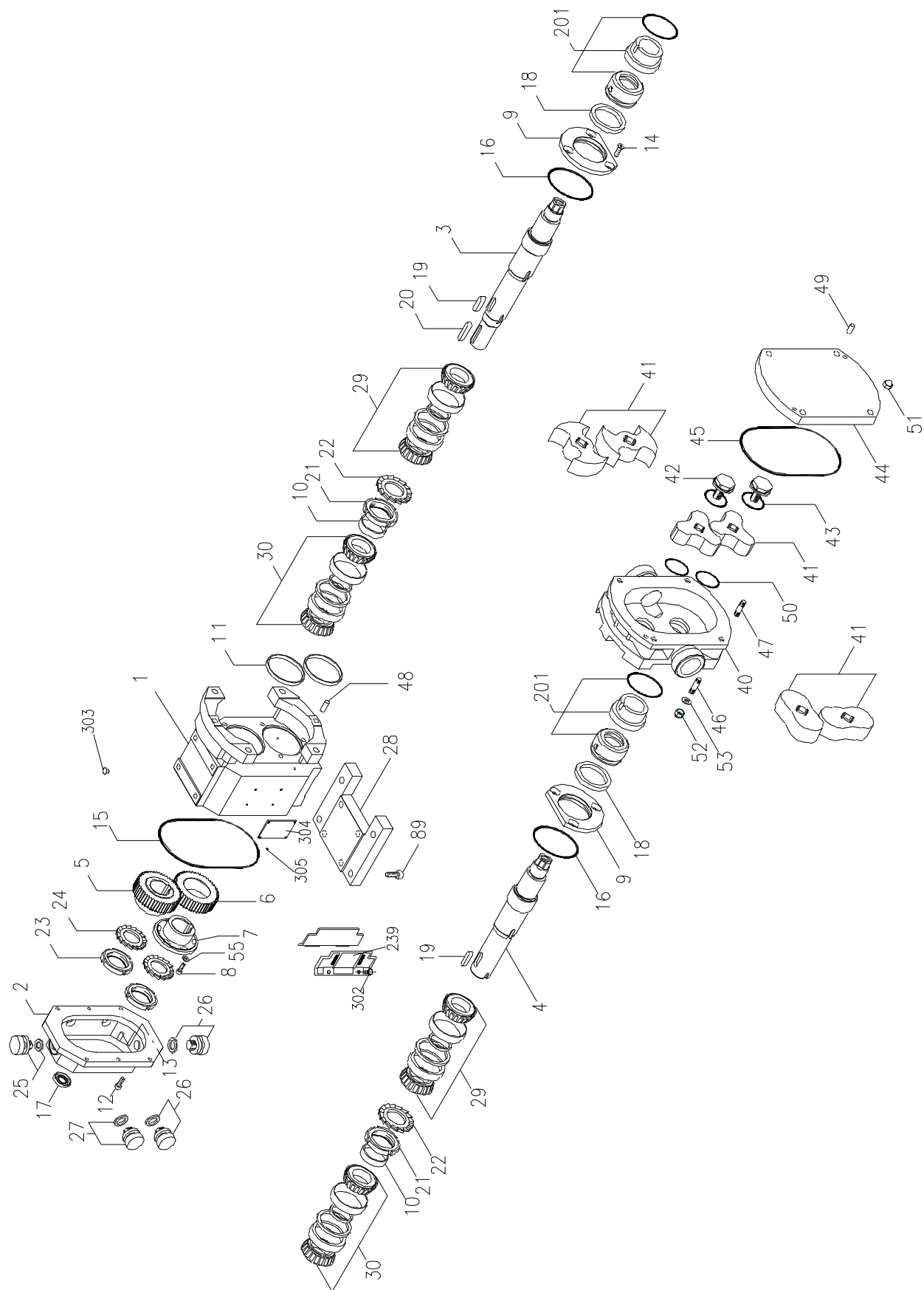


Fig.12.2 Pump type LB2 - LB215 - LB220 - LB325 - LB330 - LB430 - LB440 - LB470 - LB490

Exploded Views

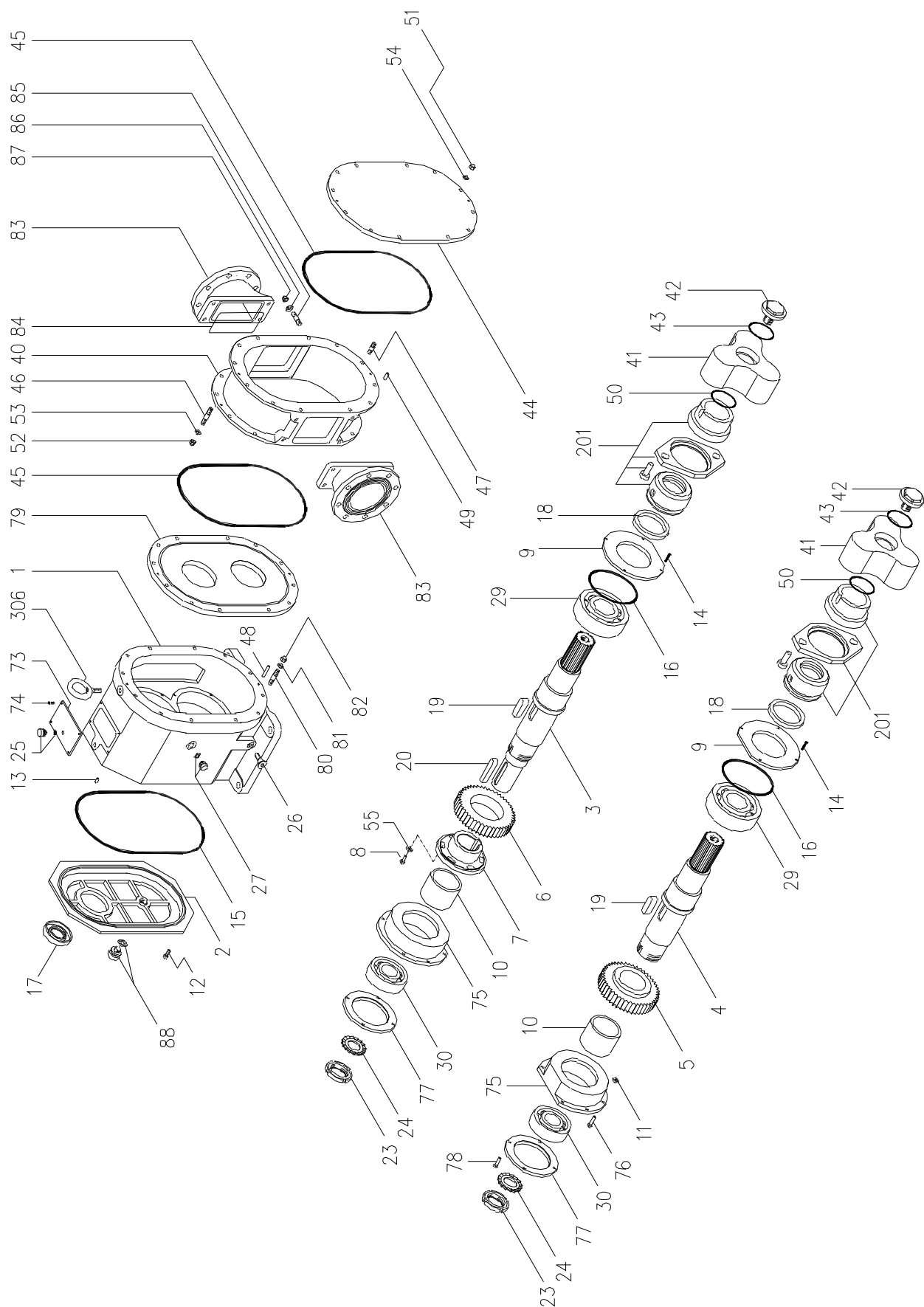


fig.12.3 Pump type LB550 - LB660 - LB680

Exploded Views

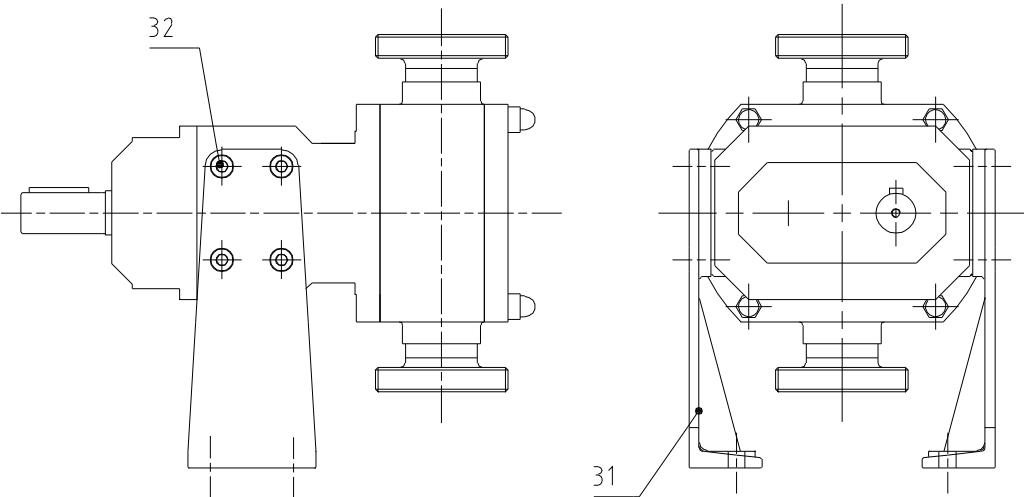


Fig.12.4 Pump with vertical feet

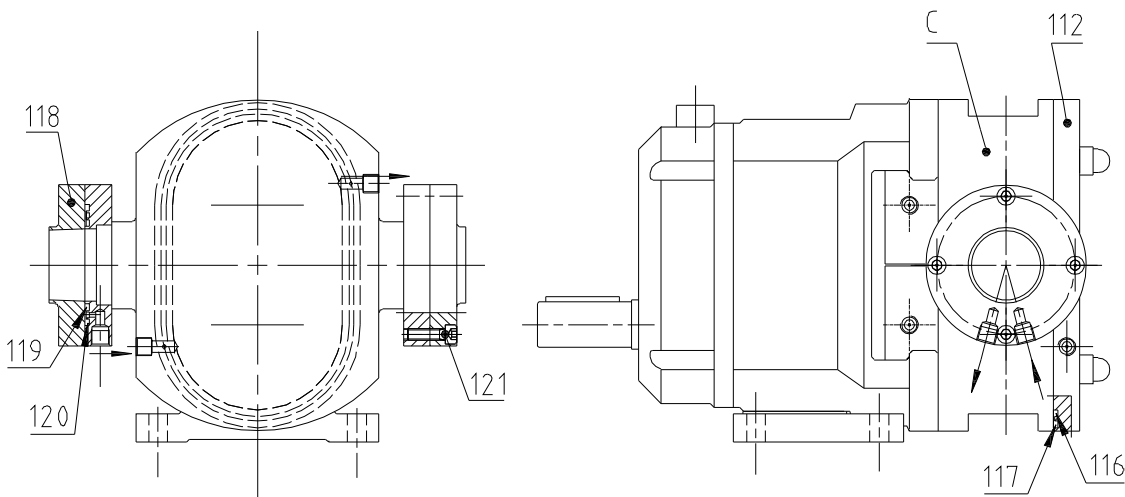
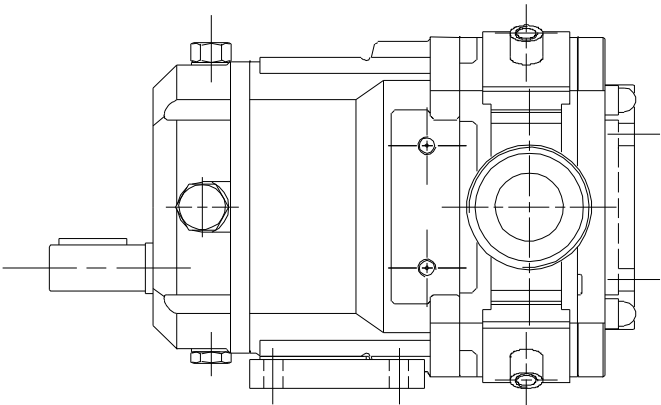
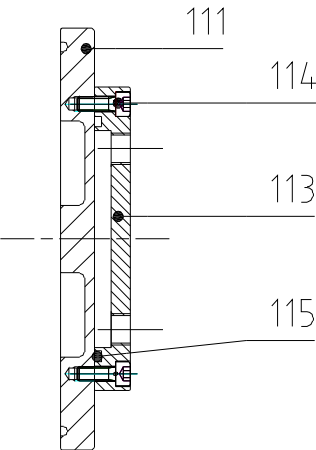


Fig.12.5 Aseptic version rotor case

Fig.12.6 End cover with jacketed

Fig.12.7 Rotor case with jacket



Exploded Views

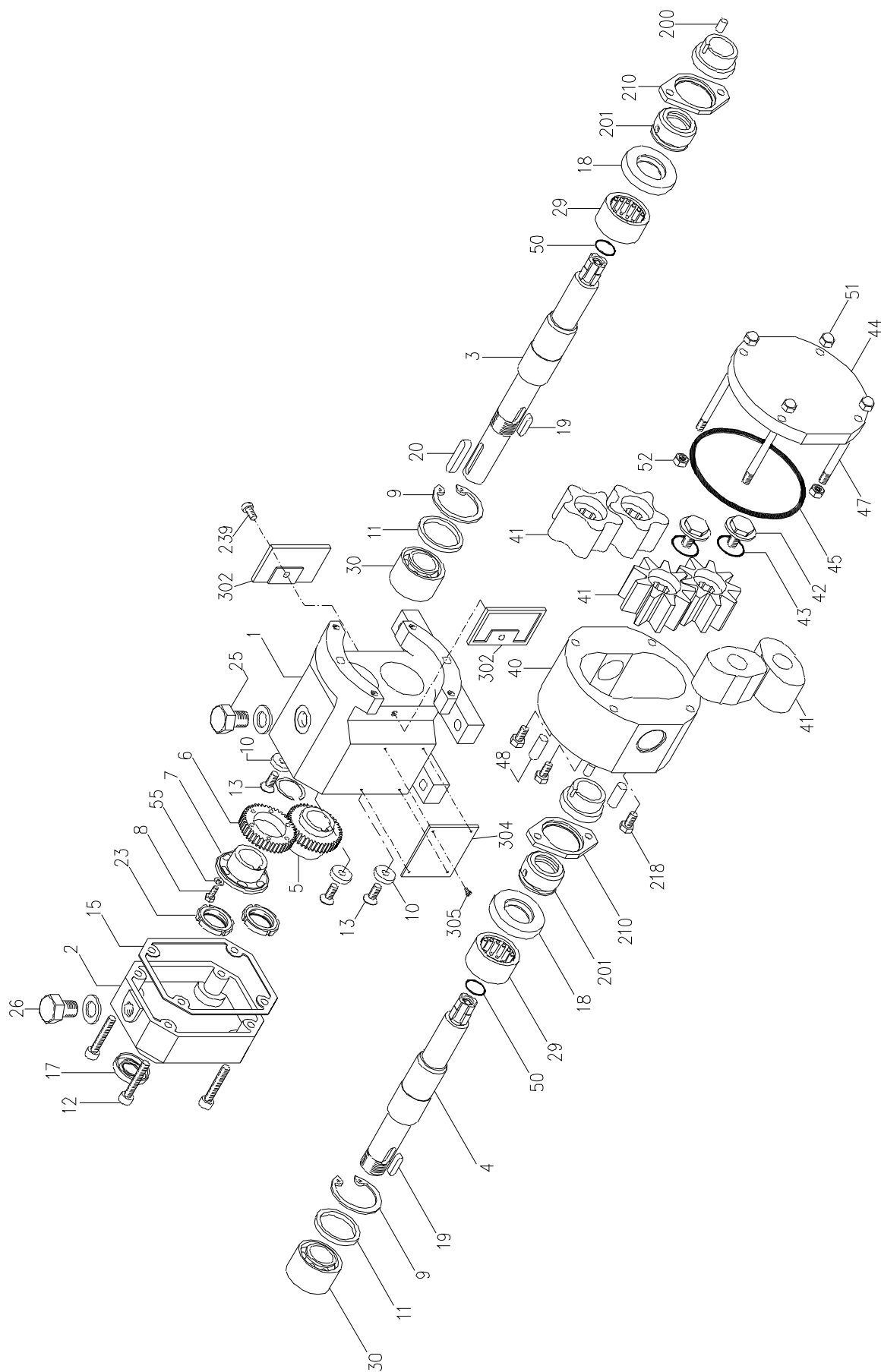
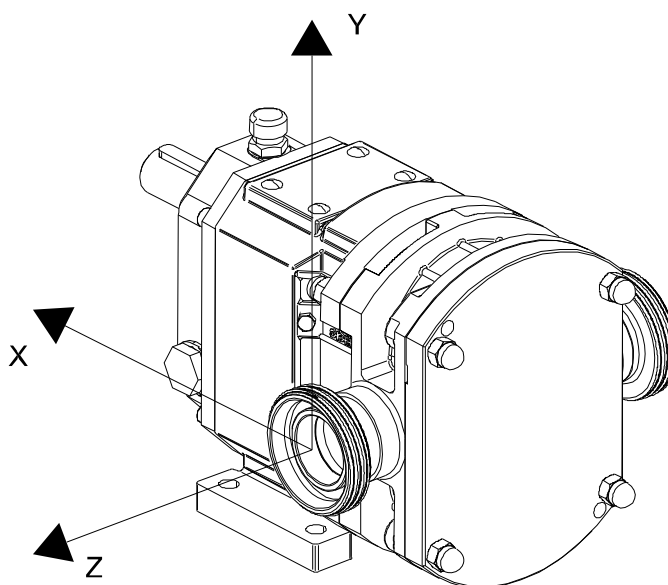


Fig.12.9 Pump type LB100

Maximum Nozzle Loads

Pump type	FORCES				TORQUE			
	F _x (N)	F _y (N)	F _z (N)	EF (N)	M _x (Nm)	M _y (Nm)	M _z (Nm)	EM (Nm)
LB100	65	55	75	113	110	85	70	140
LB110/115	105	95	120	186	125	100	90	164
LB215	145	130	160	252	130	110	95	172
LB220	190	180	220	342	140	115	100	183
LB325	210	200	250	383	150	120	110	197
LB330/390	240	230	280	435	160	130	110	206
LB430/440	255	245	300	464	175	150	130	230
LB470/490	260	250	305	472	180	150	130	234
LB550	340	340	355	598	190	160	150	255
LB660/680	405	405	440	722	200	180	170	276



Recommended Lubrication & Service Intervals

Lubricants

BRAND	WORKING TEMPERATURE	
	from -20°C a +90°C (*)	from +90°C a +150°C (*)
ESSO	SPARTAN EP 68	SPARTAN EP 150
SHELL	OMALA OIL 68	OMALA OIL 150
CASTROL	ALPHA SP 68	ALPHA SP 150
BP	ENERGOL GR-XP 100	ENERGOL GR-XP 150
MOBIL	MOBILGEAR 600 XP 68	MOBILGEAR SAE 85W/140
AGIP	BLASIA 68	BLASIA 150
FINA	GIRAN 100	GIRAN 150
NYE	SYNTHETIC OIL 271	

Advised lubricants

PUMP MODEL	LITRES
(*) LB100	0,2
(*) LB105 - LB110 - LB11	0,5
(*) LB215 - LB 220	1
(*)LB325 - LB330 - LB390	2,2
(*) LB430 - LB440	4,5
(*) LB470 - LB490	6,7
(**) LB550	15
(**) LB660 - LB680	30

Oil quantity

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