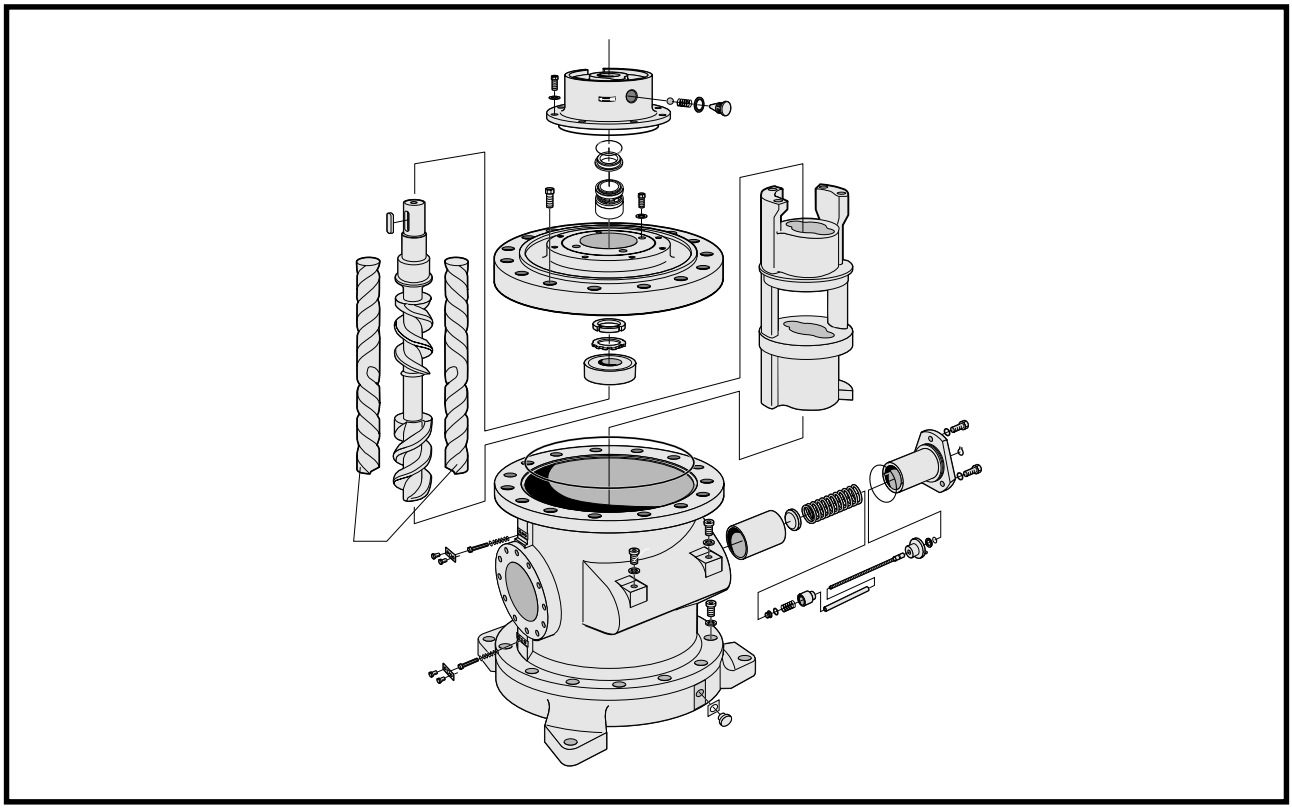
A Member of the
COLFAX PUMP GROUP

Screw pumps

LPQ

Maintenance and Service Instruction



This instruction is valid for all LPQ pump models shown on page 2

LPQ 0603GB
May 2001

⚠ Before commencing any work, read this instruction carefully! Failure to comply with these instructions may cause damage and personal injury!

For more information about the pumps identification code, technical data and performance we refer to the LPQ Product description. Fore more information about the pumps installation, Start-up and trouble shooting we refer to the IMO Installation and Start-up instruction for low pressure pumps.

List of components

Valid for all pumps in sizes: LPQ 100/110/ 125/140; Rotor diameter and generation: L1/N1/P1/J1

With version codes: I } R } T } Y } P } *Example of pump designations: LPQ 100 N1 IRYP*

PosNo	Denomination	Qty	Components included in Spare parts sets: G012	G050	G053	G057	G070	G090	Note
113	Key	1	x					x	
1020	Power rotor	1	x					x	
122	Ball bearing	1			x			x	
123	Locking washer	1			x			x	
124	Bearing nut	1			x			x	
202	Idler rotor	2	x					x	
301	Sleeve	1						x	
302	Sleeve	1						x	1
306	Plug	1						x	2
308	Guide pin	2						x	1
314	Screw	1						x	1
314A	Washer	1						x	1
361	Screw	4							
361A	Washer	4							
401	Pump body	1							
425	Screw	4							
427	Tuning cover	2							
429	Spindle	2							
430	Tuning piston	2						x	
437	O-ring	2			x	x			
437A	Washer	4							
437B	Cup spring	8							
451	Screw	8							
453	Screw	12							
453A	Washer	12							
455	Screw	3							
455A	Washer	3							
462	Plug	2							
462A	T-ring	2							
463	Drain plug	1							
463A	T-ring	1							
501	Top cover	1							
506	O-ring	1			x	x			
509	Shaft seal	1		x	x			x	
520	Seal cover	1							
520A	O-ring	1			x	x			
521	Screw	8							
521A	Washer	8							
537	Deaeration plug	1							
537A	T-ring	1			x	x			
540	Ball	1							
541	Spring	1							
551	Foot	1							
556	O-ring	1							
601	Valve cover	1					x		
602	O-ring	1			x	x	x		
605	O-ring	1			x	x	x		
608	Valve spindle	1					x		
608A	Support ring	1					x		
608B	Retaining ring	1					x		
611	Washer	1					x		
611A	Washer	1					x		1
6120	Regulating nut	1					x		

Explanations:
G012: Rotor set
CW-rotation (std)

G050: Shaft seal

G053: Minor kit

G057: Joint kit

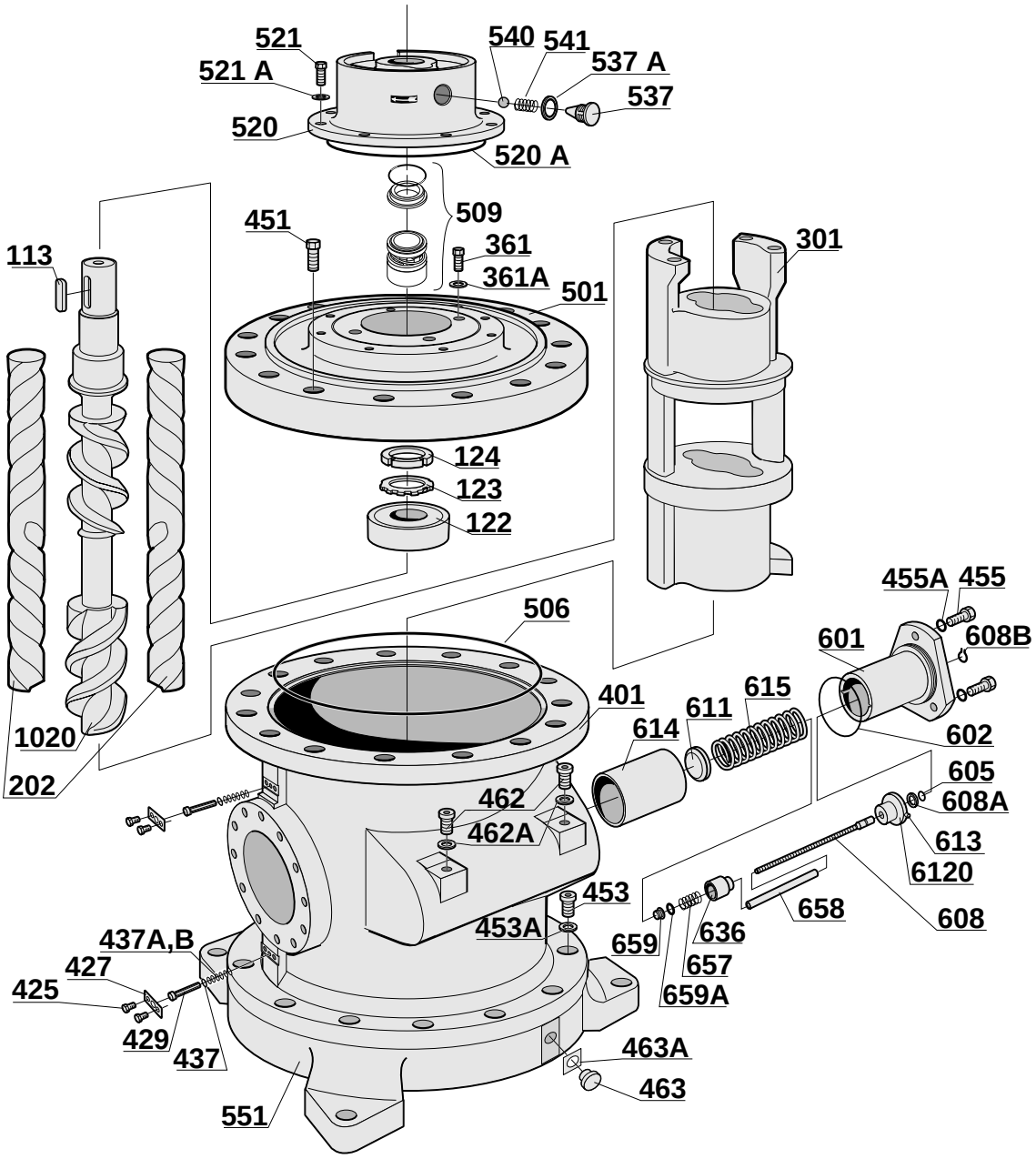
G070: Valve element

G090: Pump element

Notes:
1) Only for size 140 (See sectional view)
2) Valid for size 100-125

PosNo	Denomination	Qty	Components included in Spare parts sets: G012	G050	G053	G057	G070	G090	Note
613	Pin	1					x		
614	Valve piston	1					x		
615	Spring	1					x		
636	Damping bushing	1					x		
657	Spring	1					x		
658	Distance sleeve	1					x		
659	Locking nut	1					x		
659A	Support ring	1					x		

Exploded view size 100-125*



*Minor differences in size 140; see sectional view.

Fig. 1

Ordering code

Pos No	Spare parts sets	Part numbers, sizes 100	110	125	140
G012	Rotor set N-lead	188813	188814	188816	189748
	J-lead	–	–	189852	–
	L-lead	–	188768	188815	–
	P-lead	–	–	–	189844
G050	Compl. shaft seal	188530	188530	188530	188530
G053	Minor kit	189850	189850	189850	189851
G057	Joint kit	189848	189848	189848	189849
G070	Valve element	188808	188808	188808	189847
G090	Pump element				
	N-lead	188809	188810	188812	189845
	J-lead	–	–	189853	–
	L-lead	–	188769	188811	–
	P-lead	–	–	–	189846

Recommendation:
For maintenance the following spare part sets are recommended:

Set:	*To be used:*
G053	**for service**
G057	**for dismantling**

Fig. 2

Service intervals

The intervals for inspection and replacement of wear parts vary greatly with the properties of the pumped liquid and can only be determined by experience.
All internal parts of the LPQ-pump are lubricated by the pumped liquid. Pumping liquid which contains abrasive materials, or liquid that is corrosive, will significantly reduce service life and call for shorter service intervals.
Wear in the pump may be indicated by:

- Vibration
- Noise
- Loss of capacity
- Reduction in flow / pressure
- Leakage

In installations where unplanned shut downs must be avoided, it is advisable to have a complete pump available for replacement, should any malfunction occur. Furthermore we recommend planned inspection and overhaul at regular intervals, not exceeding 3 years.
It is recommended always to have the spares included in minor spare part kit available.

All work carried out on the pump has to be performed in such a manner that risks for personal injury are observed!

Inspection of shaft seal

As the seal faces of a mechanical shaft seal are lubricated by the fluid a certain leakage will always be present. Up to ten drops per hour can be considered as acceptable.
An external visual inspection of the pump is advisable at least every two days to assure that the shaft seal is not leaking too much.
Excessively leaking shaft seals should be changed without delay, as the leakage normally will grow worse and cause additional damage.
Follow the instructions in the dismantling / reassembly session.
When working with a shaft seal, cleanliness is of utmost importance. Avoid touching the seal faces. If necessary, the seal faces should be cleaned immediately prior to assembly, using a dustfree cloth and clean solvent.
Never use grease on the seal faces.

Connecting and disconnecting of electric cables must be done only by personnel authorized to do such work.

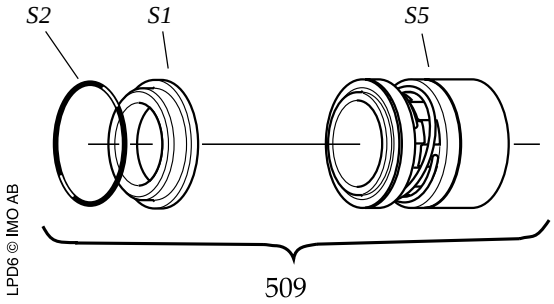
If the pumps operating temperature exceeds 60°C let the pump cool off before any service, maintenance or dismantling work is commenced to avoid burn injury.

Shaft seal – assembly drawing

Shaft seal G050 (pos 509)

ATTENTION

Be careful to mount these parts in right order and in right direction.



S1 Seat
S2 O-ring
S5 Bellows unit

Fig. 3

Oil leakage may make the floor slippery and cause personal injury.

Service for ball bearing

The ball bearing may be damaged if hit by a sledge-hammer or anything alike. Clean the ball bearing with white spirit when dismantled.

Inspection of rotors

Internal clearances in the pump, which are vital for its proper function, may have been affected by wear. Acceptable wear can be determined only by experience of the actual application. As a rule of thumb the following max clearance values may apply:

- Between rotor and bores or bushings: 0.2 mm
- Between rotor flanks: 0.4 mm

For light duties (low pressure, medium viscosity) even bigger clearances may be acceptable but for low visc. / high pressure duties the limit will be lower. Also check if there are major scratches on these parts.

Connecting and disconnecting of electric cables must be done only by personnel authorized to do such work.

When handling liquids which may involve fire hazards appropriate precautions to avoid danger are to be taken.

In case of failure for a system with elevated pressure, fluid jets may cause injury and/or damage.

When handling liquids that may harm skin use gloves and/or protective clothing.

Before any maintenance work, ensure that the driver is deenergized and the pump hydraulically isolated.

List of tools necessary for dismantling and reassembly

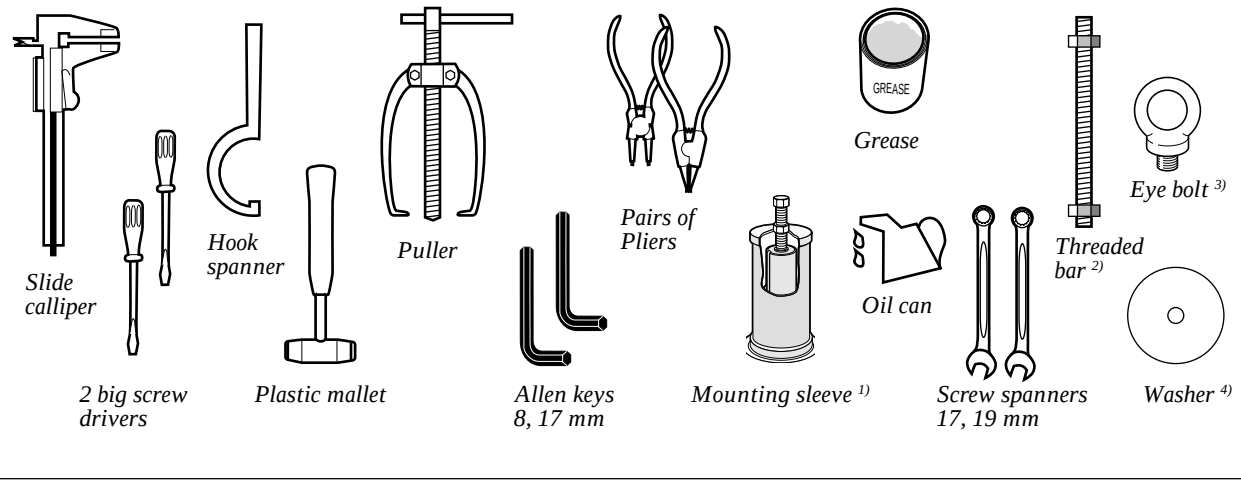


Fig. 4

Remarks: 1) D_i min 91 mm-max 95 mm, length min 250 mm
2) M16 length 200 mm, 2 nuts M16
3) M16 and M20
4) D_i 16,5 mm, D_y min 100 mm, thickness min 5 mm

Sectional view

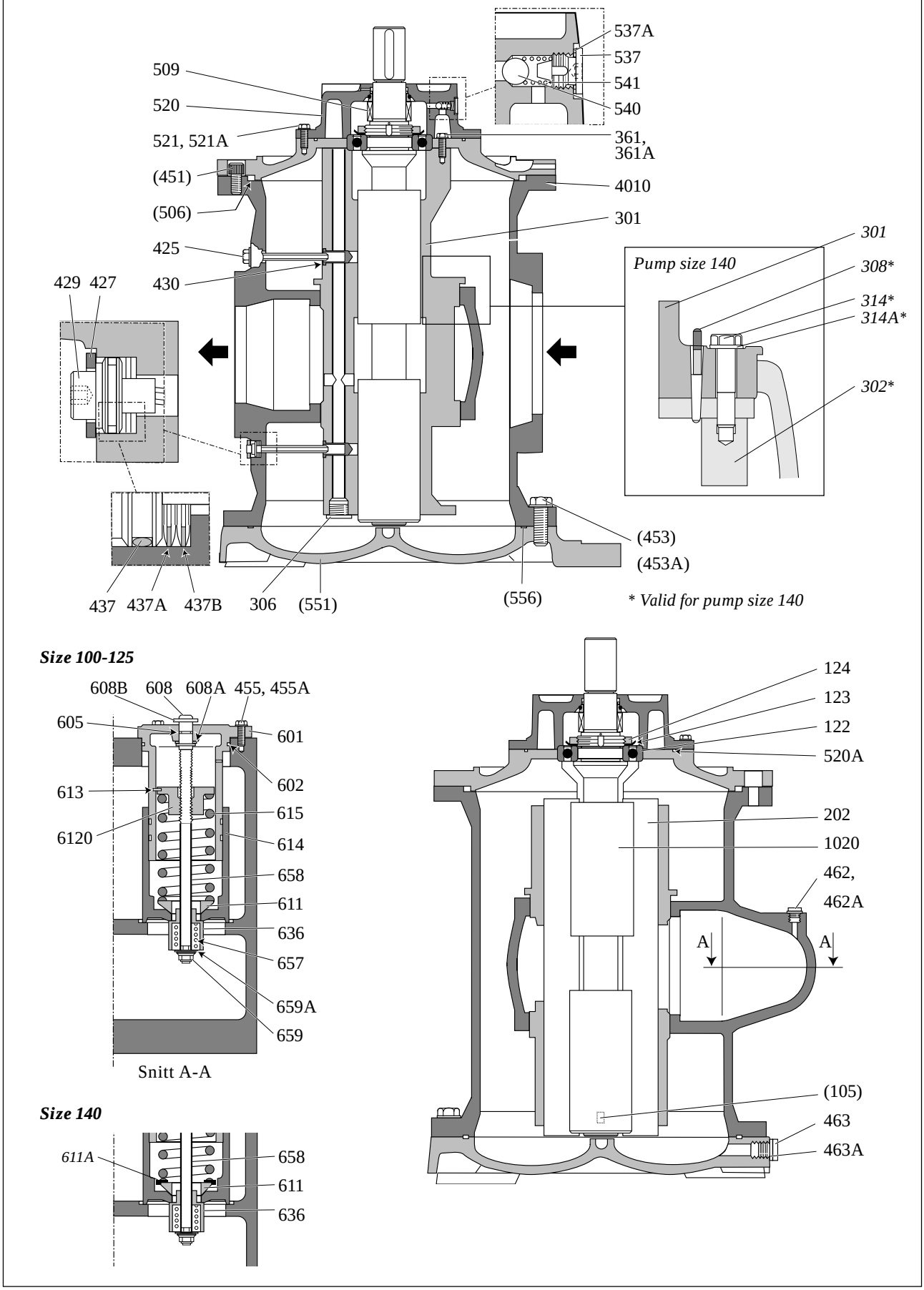


Fig. 5

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Replacing shaft seal

A.

- Turn the electricity OFF.
- Close the valves.
- Lift off the motor incl. motor stand from the pump.

ATTENTION

Use appropriate vessels to collect oil spillage when removing and opening the pump.

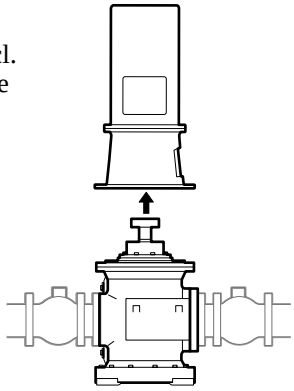
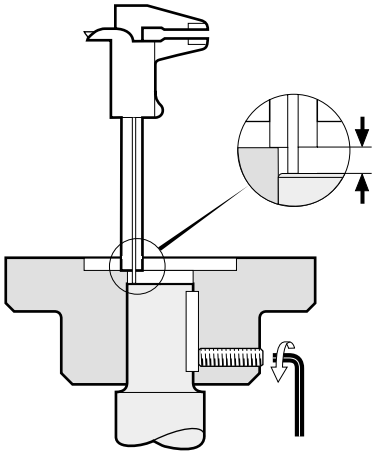


Fig. 6

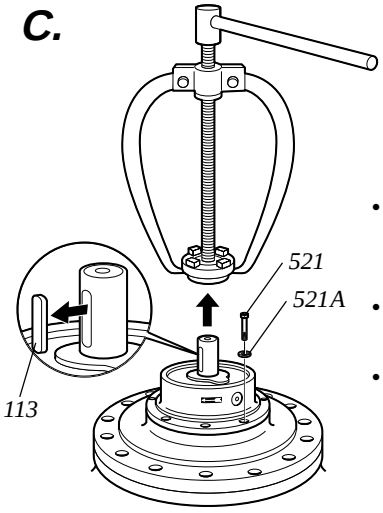
B.



- Note the axial position of the shaft coupling.
- Release the stop screw.

Fig. 7

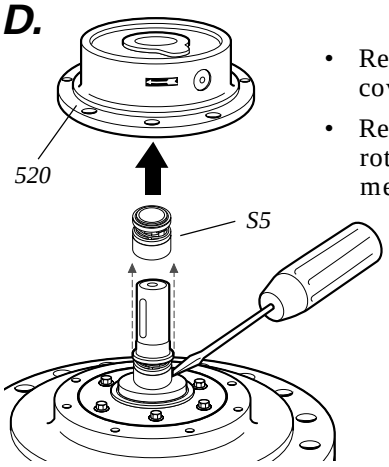
C.



- Remove the shaft coupling with a puller.
- Remove the key 113.
- Remove the screws 521 and the washers 521A.

Fig. 8

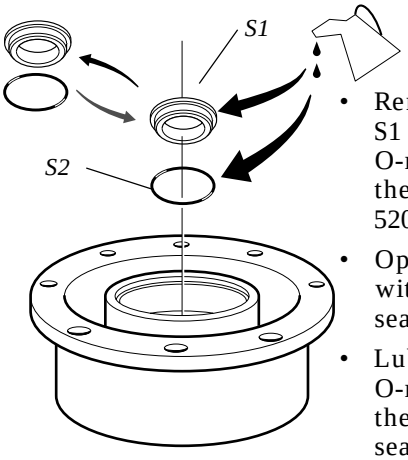
D.



- Remove the seal cover 520.
- Remove the rotating member S5.

Fig. 9

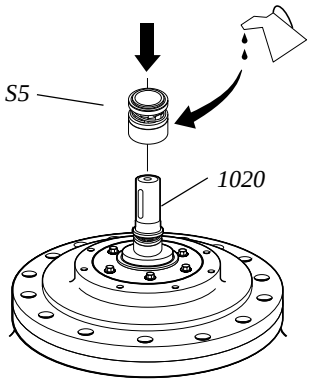
E.



- Remove the seat S1 and the O-ring S2 from the seal cover 520.
- Open a package with a new shaft seal 509.
- Lubricate the O-ring S2 and the recess of the seal cover 520.
- Fit a new S1 and S2 in the seal cover.

Fig. 10

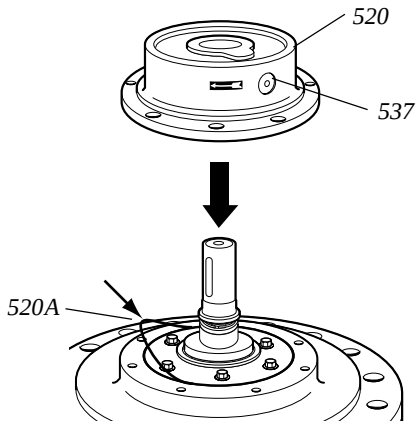
F.



- Lubricate the power rotor 1020 and the inner diameter of the rotating member S5.
- Push S5 down to the bottom of the thinner part of the shaft.

Fig. 11

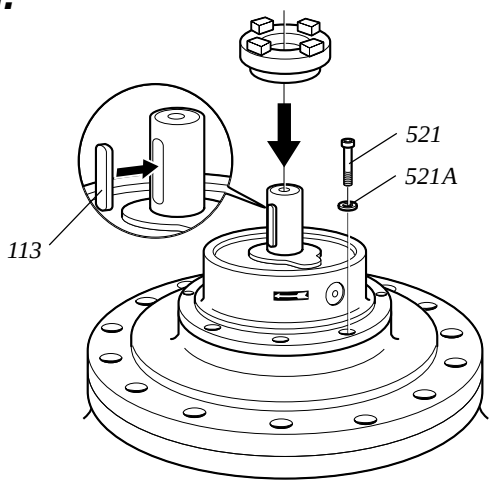
G.



- Check the O-ring 520A and replace it if it is damaged or hard.
- Fit the seal cover 520 back with the deaeration plug 537 positioned in the same direction as the opening in the motor stand will be placed.

Fig. 12

H.



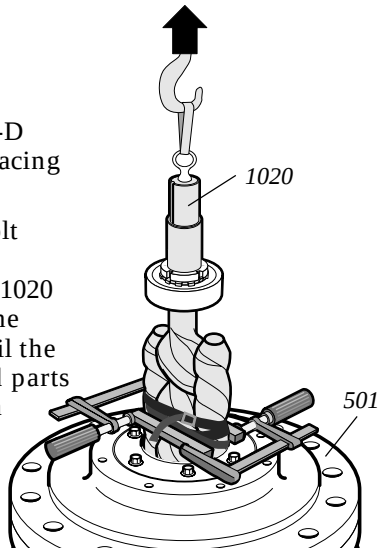
- Fit the screws 521 and washer 521A crosswise.
- Fit the key 113.
- Fit the shaft coupling to its original position.
- Fit the motor back to the pump and proceed according to instructions under ”Start-up” in the installation manual.

Fig. 13

Inspection of rotors and replacing ball bearing

A.

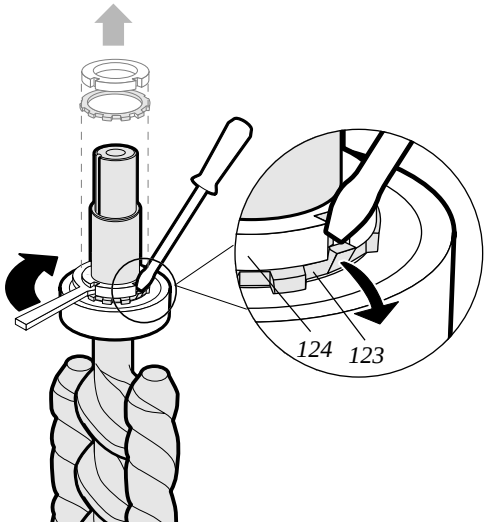
- Start with A-D under ”Replacing shaft seal”.
- Fit an eye bolt (M16) in the power rotor 1020 and lift up the rotor set until the top threaded parts are free from the top cover 501.



- Fix the rotors together by using a strap, clamps and iron bars. (See fig. 17).
- Lower the rotor set until the iron bars rests on the top cover.
- Remove the eye bolt.

Fig. 14

B.



- Unlock the locking washer 123 with a screw driver.
- Loosen the bearing nut 124 with a hook spanner.
- Remove the bearing nut 124 and the locking washer 123.

Fig. 15

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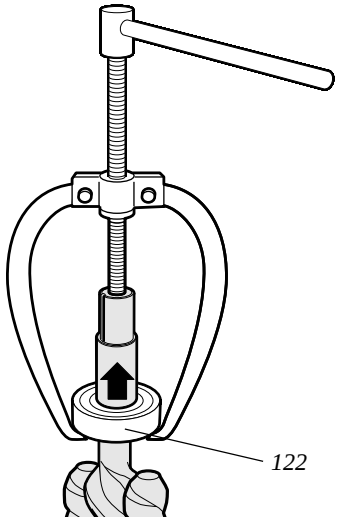
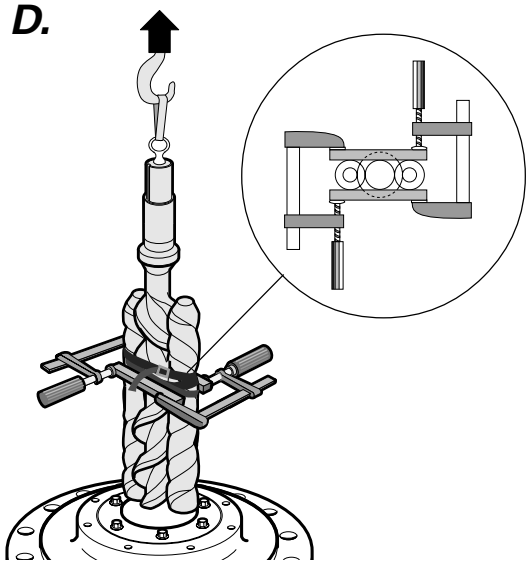
C.



- Pull off the ball bearing 122 with a puller.

Fig. 16

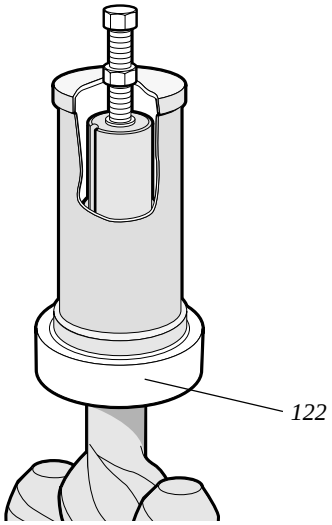
D.



- Fix the eye bolt back to the power rotor 1020 and lift up the rotor set completely.
- Inspect the rotors by separating them.
- Fix the rotors together as described in ”A” and lower them back into the pump until position in ”A”.
- Remove the eye bolt.

Fig. 17

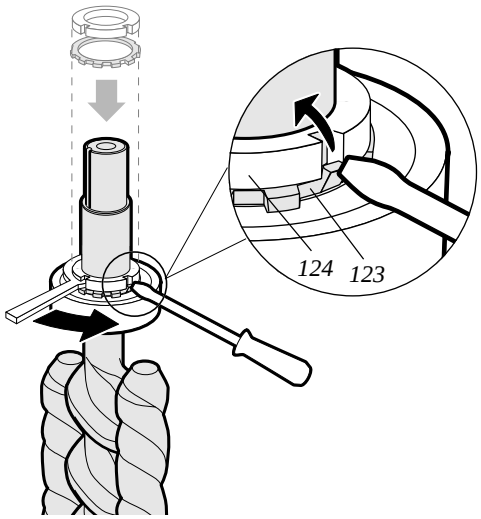
E.



- Fit the new ball bearing 122 with a mounting sleeve, washer and a threaded bar (M16) with two nuts.

Fig. 18

F.

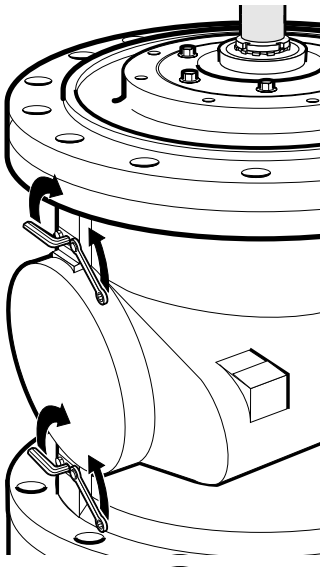


- Fit the locking washer 123 and the bearing nut 124.
- Lock the washer 123.
- Fit the eye bolt back to the power rotor.
- Lift the rotor set a few cm and remove the strap, bars and clamps.
- Lower the rotors to its normal position.
- See ”Replacing shaft seal” F-H.

Fig. 19

Replacing pump element G090

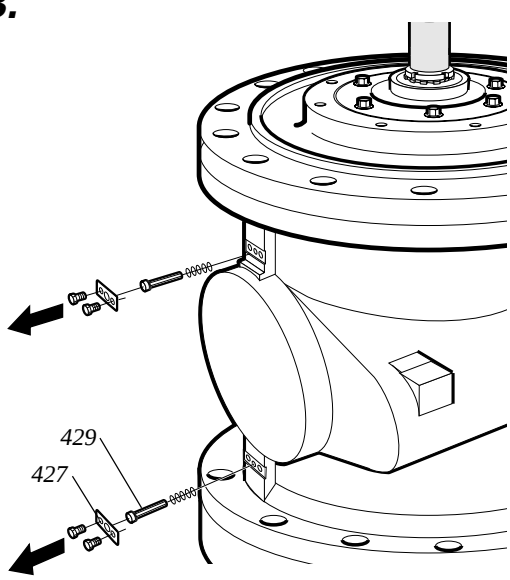
A.



- Start with A-D under ”Replacing shaft seal”.
- Check that the two tuning valves (top and bottom) are closed and remove the tuning covers 427.

Fig. 20

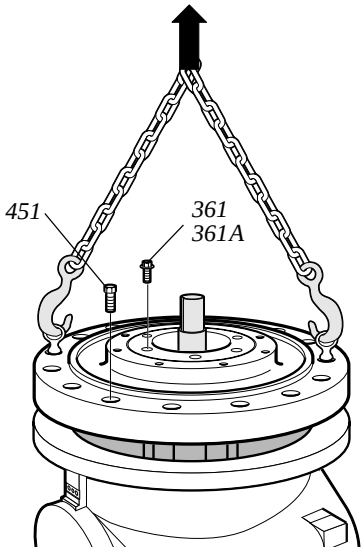
B.



- Pull straight out the tuning spindles 429 without turning them.
- Check that both two washers and all four cup springs come out with the spindle.

Fig. 21

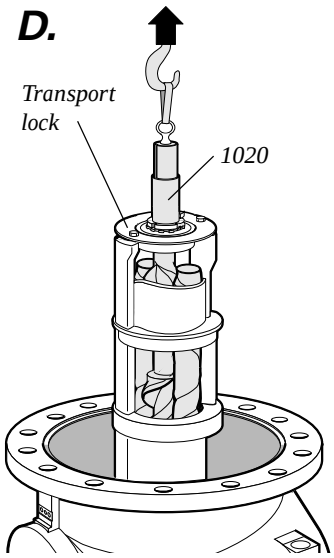
C.



- Untight and remove the screws 361 and the washers 361A (the rotor set will fall down a few mm.)
- Untight and remove the screws 451.
- Fit two eye bolts (M20) and lift off the top cover.

Fig. 22

D.



- Fit the eye bolt to the power rotor 1020.
- Remove the transport lock from the new pump element G090 and fit it on the old one.
- Lift up and remove the complete pump element.
- Put the transport lock back on the new pump element.
- Fit the eye bolt to the power rotor 1020.
- Check that the tuning valves are closed.
- Lift the new pump element carefully into the pump. (Note the position of the tuning valves).
- Remove the eye bolt and the transport lock.

Fig. 23

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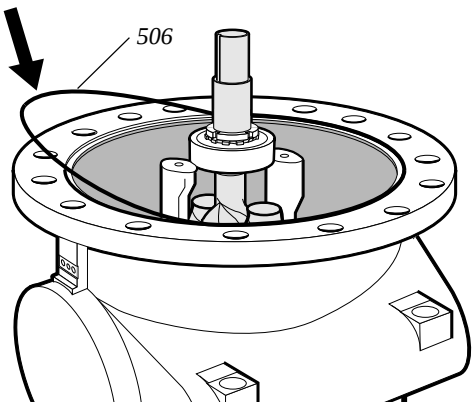
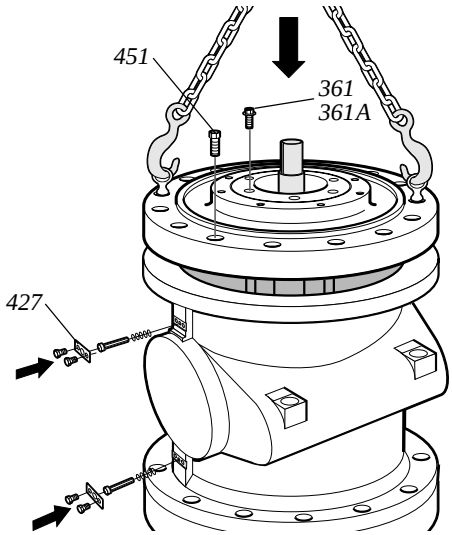
E.



- Check the O-ring 506. Replace it if it is damaged or hard.

Fig. 24

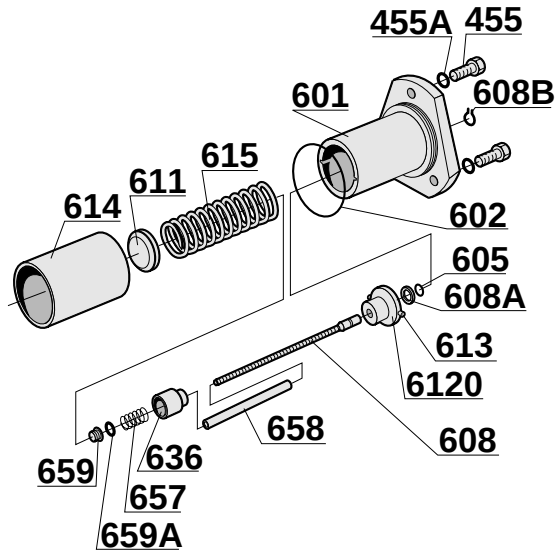
F.



- Fit the top cover so that the bolt holes matches together.
- Fit the screws 361 with washers 361A and tight them crosswise. (The rotors will rise a few mm).
- Fit the screws 451 crosswise.
- Put the tuning spindles with washers and cup springs back into the pump. Lock the tuning covers 427 in their places with their screws.
- Proceed as E-H under ”replacing shaft seal”.

Fig. 25

Inspection of valve elements



- Release spring tension by turning the valve spindle 608 CCW.
- Remove screws 455 and washers 455A.
- Use two big screwdrivers and pull out the valve assembly.
- Remove the retaining ring 608B with a pair of pliers.
- Remove the valve cover 601 from the spindle.
- Remove the locking nut 659 and separate the rest of the parts.
- Replace damaged parts and o-rings 602 and 605.
- Reassemble in the reverse order. Make sure that the pin 613 enters freely into the groove in the seal cover 601.

Fig. 26

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