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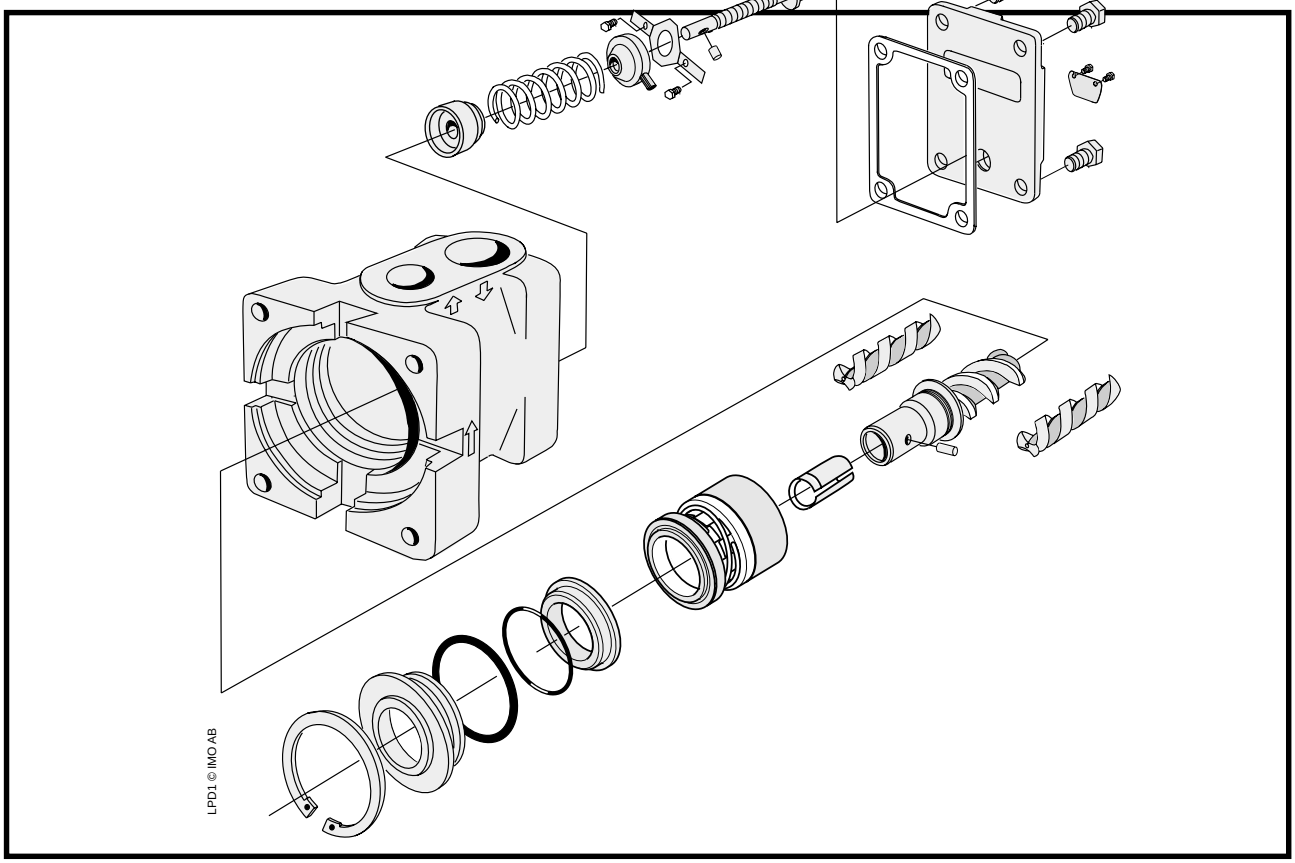
Screw pumps

LPD

Maintenance and Service Instruction



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

LPD 0604GB
March 2002

⚠ **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 LPD 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

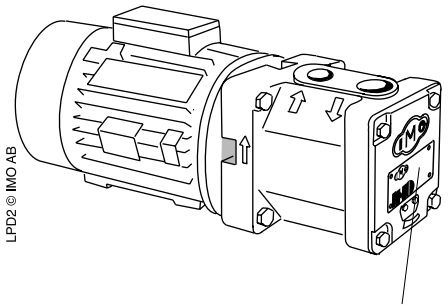
Valid for all LPD pumps, size 015 and 020. Rotor lead and generation: N1

With version codes: I } V } B } P } **The version code is composed of the letters in the 4 columns.**
Example of pump designations std: LPD 020 N1 IVBP

Pos No	Part Denomination	Qty	Spare parts set: G011 Rotor set	G050 Shaft seal	G053 Minor kit	G054 Major kit	G057 Joint kit	G070 Valve element	Note
1010	Power rotor	1	x			x			
134	Locking screw	1	x		x	x	x		1
162	Shaft sleeve	1	x		x	x	x		1
201	Idler rotor	2	x			x			
401	Pump body	1							
453	Screw	4							
509	Mechanical seal	1		x	x	x			
514	Retaining ring	1							
520	Front cover	1							
521	O-ring	1			x	x	x		
551	Rear cover	1							
556	Gasket	1			x	x	x		
605	O-ring	1			x	x	x	x	
608	Valve set screw	1				x		x	
608A	Locking clamp	1				x		x	
608B	Screw	2				x		x	
608C	Pin	1				x		x	
6120	Regulating nut	1				x		x	
(613)	Tension pin	1				x		x	
614	Valve piston	1				x		x	
615	Spring	1				x		x	
622	Screw	2							
623	Plate	1							

Note: 1) Included in 1010

When ordering spare parts, please state the complete pump identification according to its name plate and required spare part set or the required parts position number.



Name plate of the pump

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Exploded view

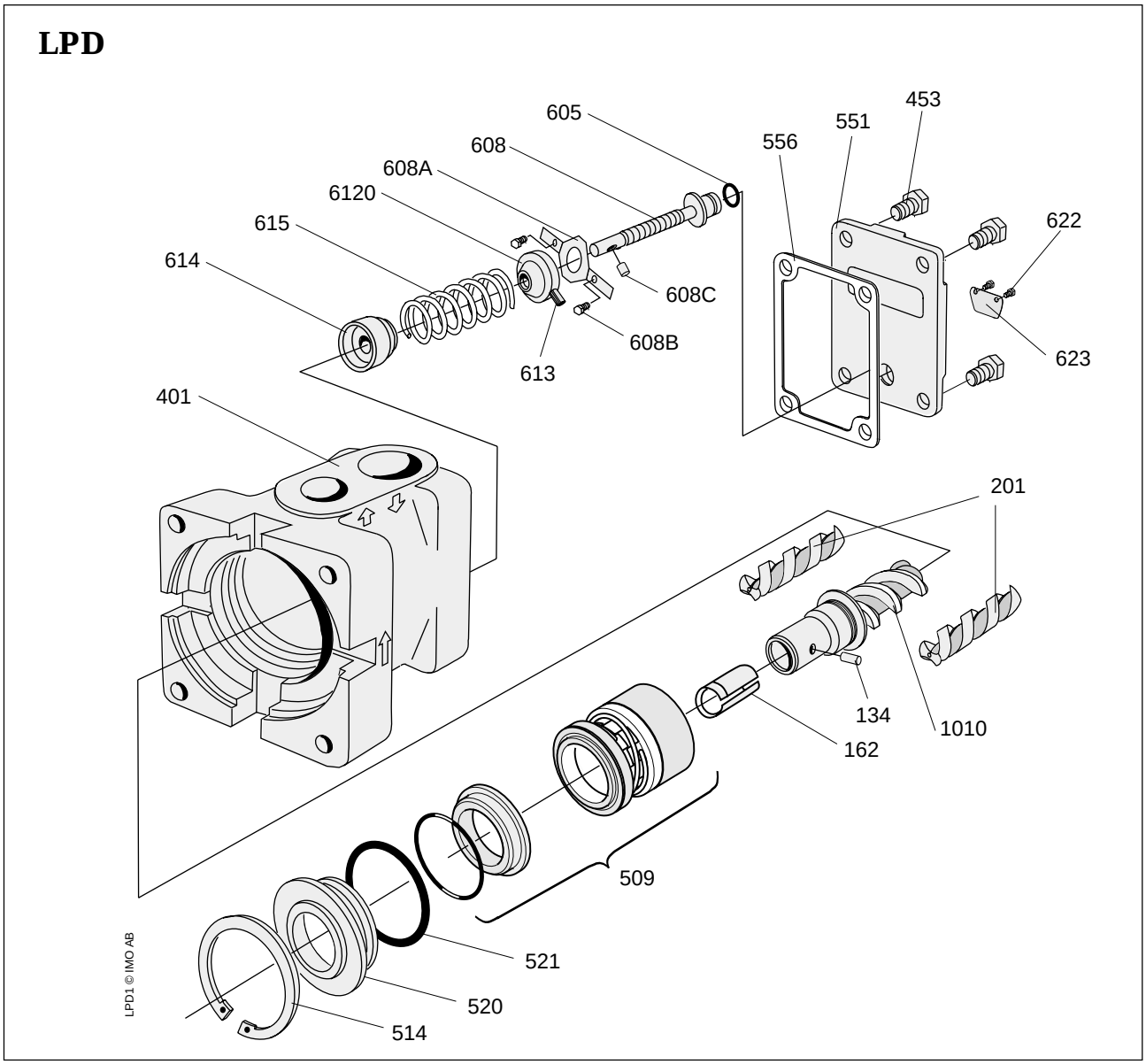

Fig. 1

Ordering code

Pos No	Spare parts sets	Part numbers, sizes 015	020
G011	Rotor set (CCW rotation)	190767	190768
G050	Complete shaft seal - version code xVxx	190334	190334
G053	Minor kit	190783	190783
G054	Major kit=G011+G053+G070		
G057	Joint kit	190740	190740
G070	Valve element	190743	190743
162	Shaft sleeve	034652	034652

Fig. 2

Ordering example:
For IMO-pump LPD 020N1 IVBP, serial number 456789: Shaft seal pos G050 p / n 190334

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

Set: / To be used:

G057 Joint kit
For dismantling of the pump.

G053 Minor kit
For service

G054 Major kit
For repair after damage or greater wear.

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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 LPD-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.

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. 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 replaced 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.

O-rings

All O-rings found to be hard or damaged shall be replaced.

ATTENTION

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

⚠ 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.

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

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

⚠ 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.

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

Inspection of rotors

If an indication of a worn pump is noticed (see service intervals above), a brief inspection of the idler rotors is recommended.
A quick inspection of the idler rotors can be made simply by removing the rear cover. Note that the driver must be deenergized and the pump hydraulically isolated before the rear cover is removed.
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.

If a more thorough investigation is needed, proceed as under ”Dismantling and reassembly”.

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Sectional view

LPD

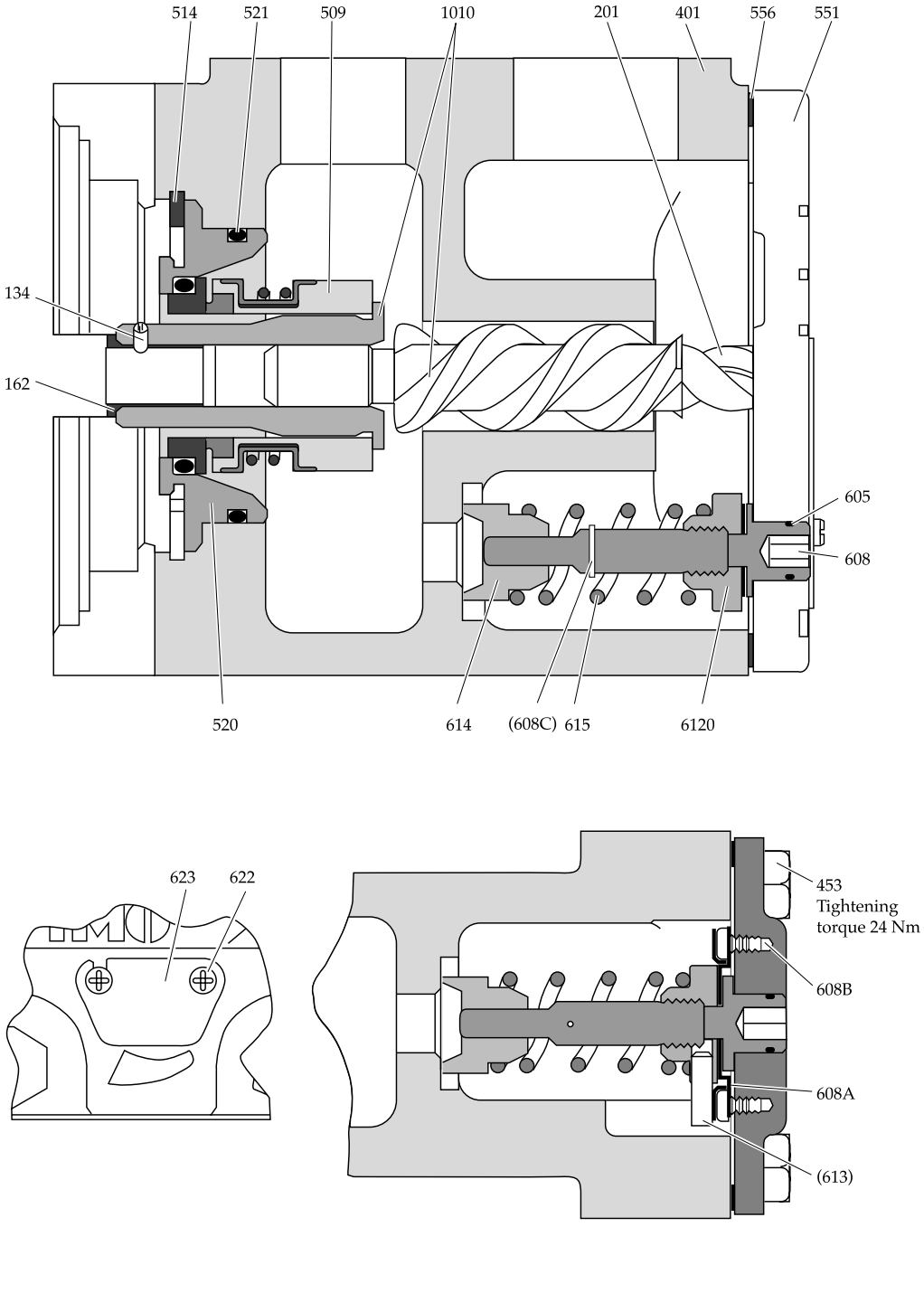

Fig. 3

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Useful tools

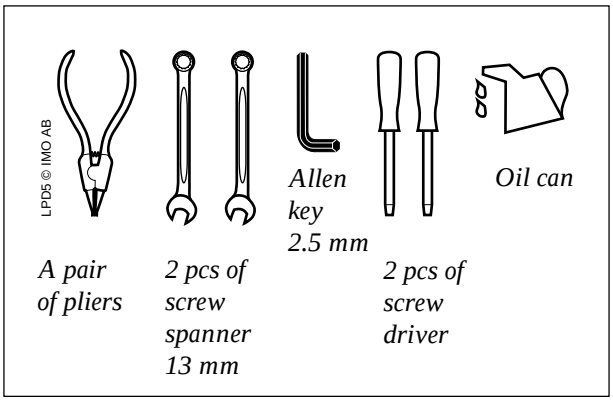


Fig. 4

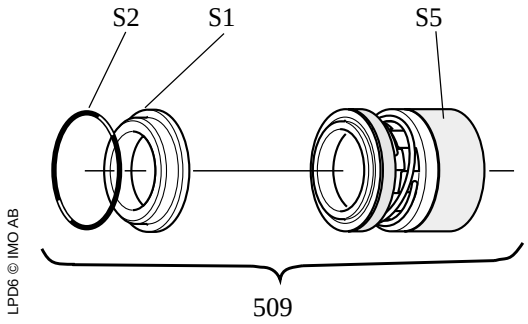
Before any maintenance work, ensure that the driver is deenergized and the pump hydraulically isolated.

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

Shaft seal – assembly drawing

Shaft seal G050 (509)

Version code IVBP



S1 Seat
S2 O-ring
S5 Rotating member

Fig. 5

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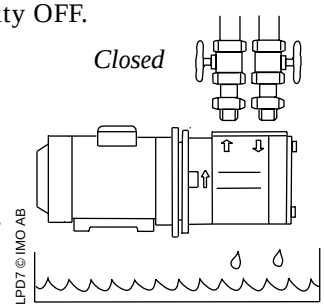
Dismantling

A.

- Turn the electricity OFF.



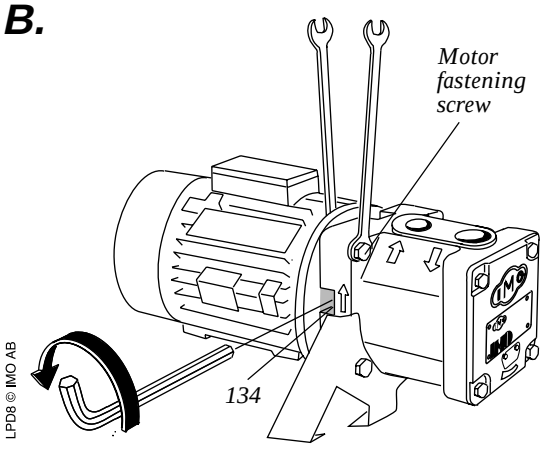
- Close the valves.
- Remove pump from the system.

ATTENTION

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

Fig. 6

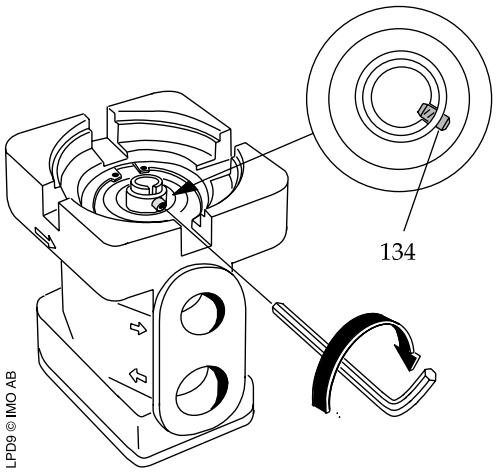
B.



- Turn the el-motor fan till the stop screw is visible in any of the flange ports.
- Untighten the locking screw 134.
- Remove the motor fastening screws.
- Remove the motor and the angle bracket.

Fig. 7

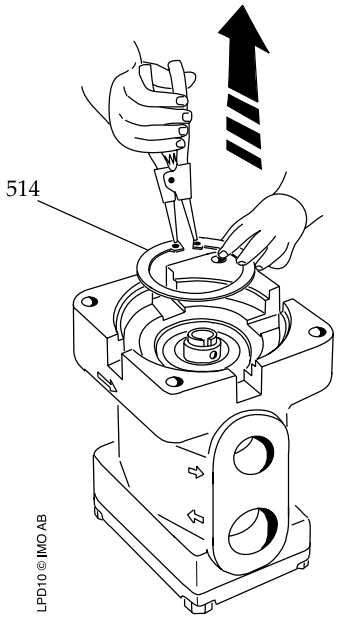
C.



- To ease dismantling hide the locking screw 134 into the shaft by turning it clockwise.

Fig. 8

D.



- Remove the retaining ring 514.

Fig. 9

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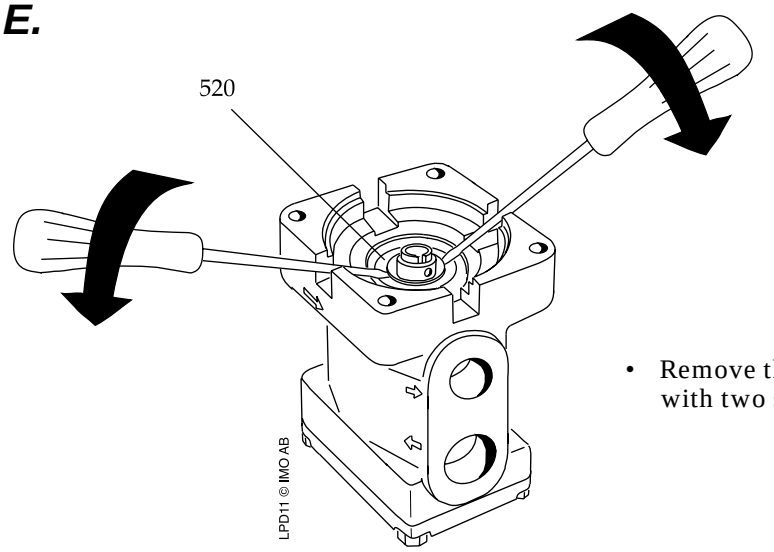
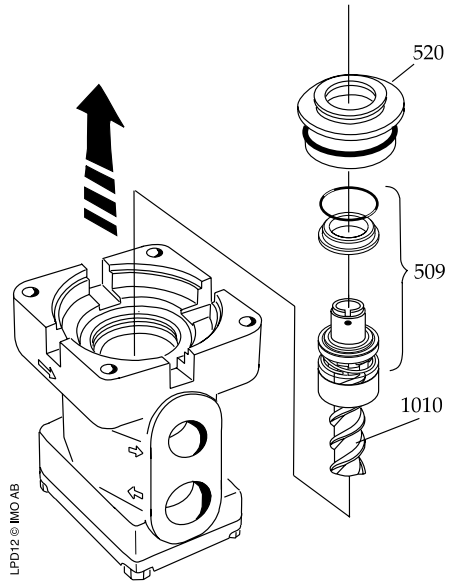
E.



- Remove the front cover 520 by pressing it up with two screw drivers.

Fig. 10

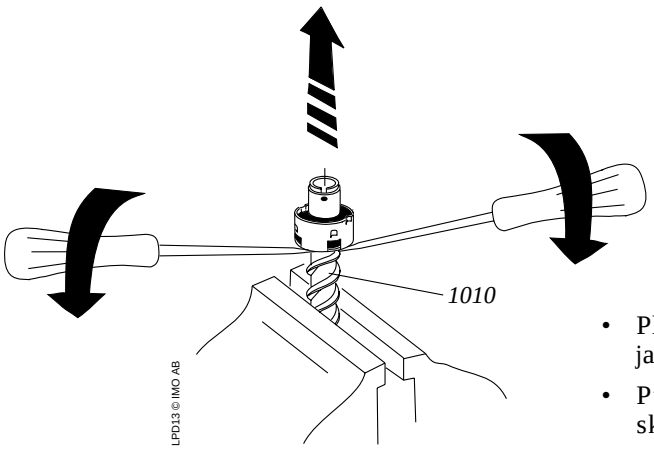
F.



- Remove the power rotor 1010 including the shaft seal 509.
- Remove the seat and O-ring.

Fig. 11

G.



- Place the rotor 1010 into the jaw vice with soft jaws or a column drilling machine.
- Push with two screw drivers as shown on the sketch, to remove the rotating member S5.

Fig. 12

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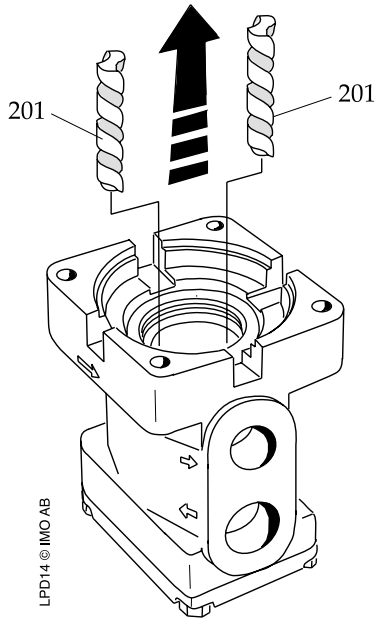
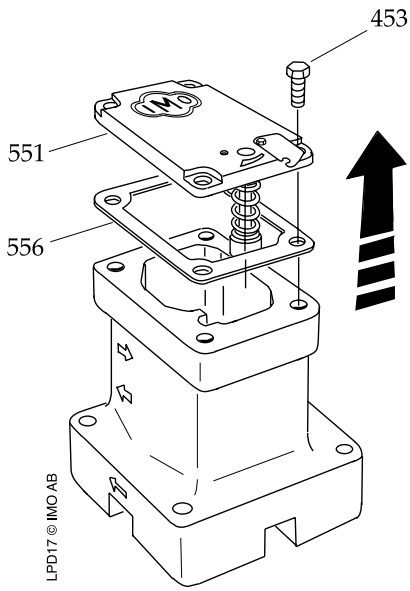
H.



- Remove the idler rotors 201.
- Inspect all parts. Only minute and evenly distributed wear marks should be allowed. Replace defective parts.
- Clean all parts that are going to be used again.

Fig. 13

I.

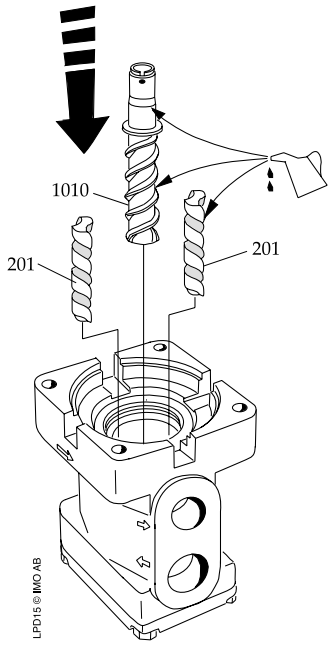


- Open the cover 623, hiding the pressure relief valve set screw.
- Release the valve spring tension by turning the set screw CCW.
- Remove the screws 453, the rear cover 551, the gasket 556 and the valve assembly.
- Fit the rear cover with at least two screws but without gasket.

Fig. 14

Reassembly

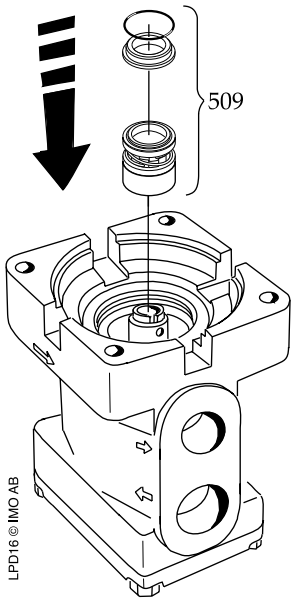
A.



- Lubricate the idler rotors 201 and fit them into the pump body.
- Lubricate the power rotor 1010 and fit it into the pump body.

Fig. 15

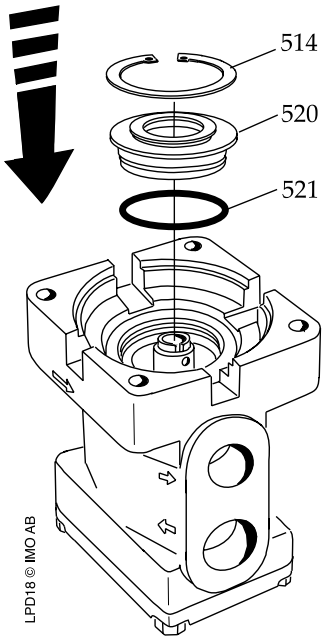
B.



- Fit the new shaft seal parts 509 onto the power rotor 1010 as shown on the sketch.

Fig. 16

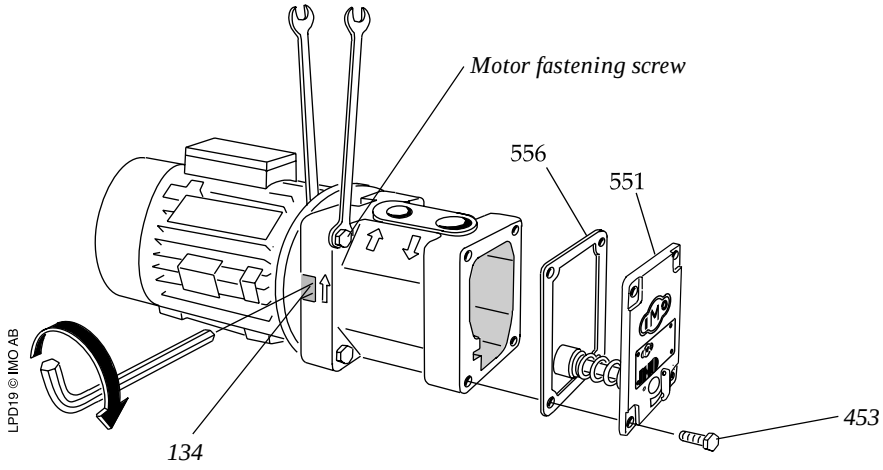
C.



- Fit the o-ring 521 onto the front cover 520 and fit the front cover 520 as shown on the sketch.
- Fit the retaining ring 514.

Fig. 17

D.



- Fit the electric motor and the angle bracket. Make sure that the locking screw 134 has entered the motor shaft key slot.
- Tighten the motor fastening screws.
- Tighten the locking screw 134.
- Remove the rear cover 551.
- Push the valve assembly into its position in the rear cover (o-ring grip).
- Fit the gasket 556 and put the rear cover 551 back in place. The tension pin 613 must fit into the groove in the pumpbody.
- Tighten the screws 453 crosswise.
- Put the pump back into the system. Proceed according to the instructions in the IMO AB Installation and Start-up instruction for low pressure pumps.

Fig. 18

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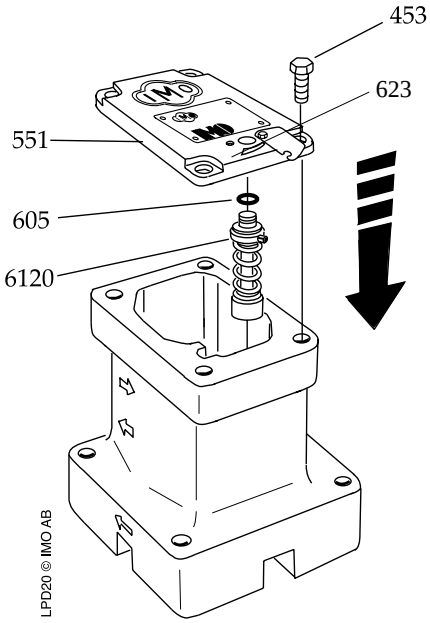
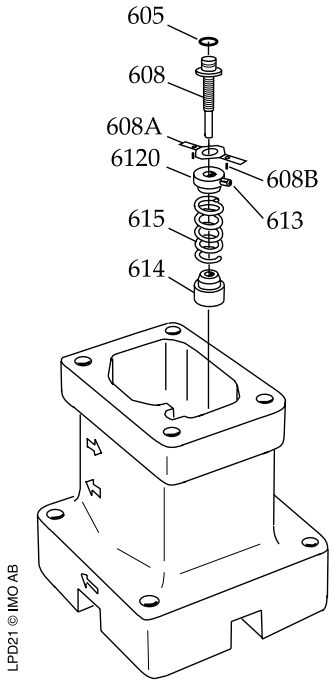
Pressure relief valve

A.





- Open the cover 623, hiding the pressure relief valve set screw 608.
- Release the valve spring tension by turning the set screw CCW.
- Remove the screws 453.
- Remove the rear cover 551 and the gasket 556. (The valve is mounted into the rear cover 551)
- Bend up the wings of the locking clamp 608A. Remove the screws 608B.
- Pull out the valve assembly.

- Replace the valve parts if necessary and reassemble the valve unit and push it into the rear cover 551 (o-ring grip).
- Fasten the screws 608B and bend the wings of the locking clamp 608A over the screws 608B.
- Fit the gasket 556 and the rear cover 551 with the screws 453. Tight the screws crosswise.

  NOTE!
  The tension pin 613 must fit into the groove in the pump body.

Fig. 19

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