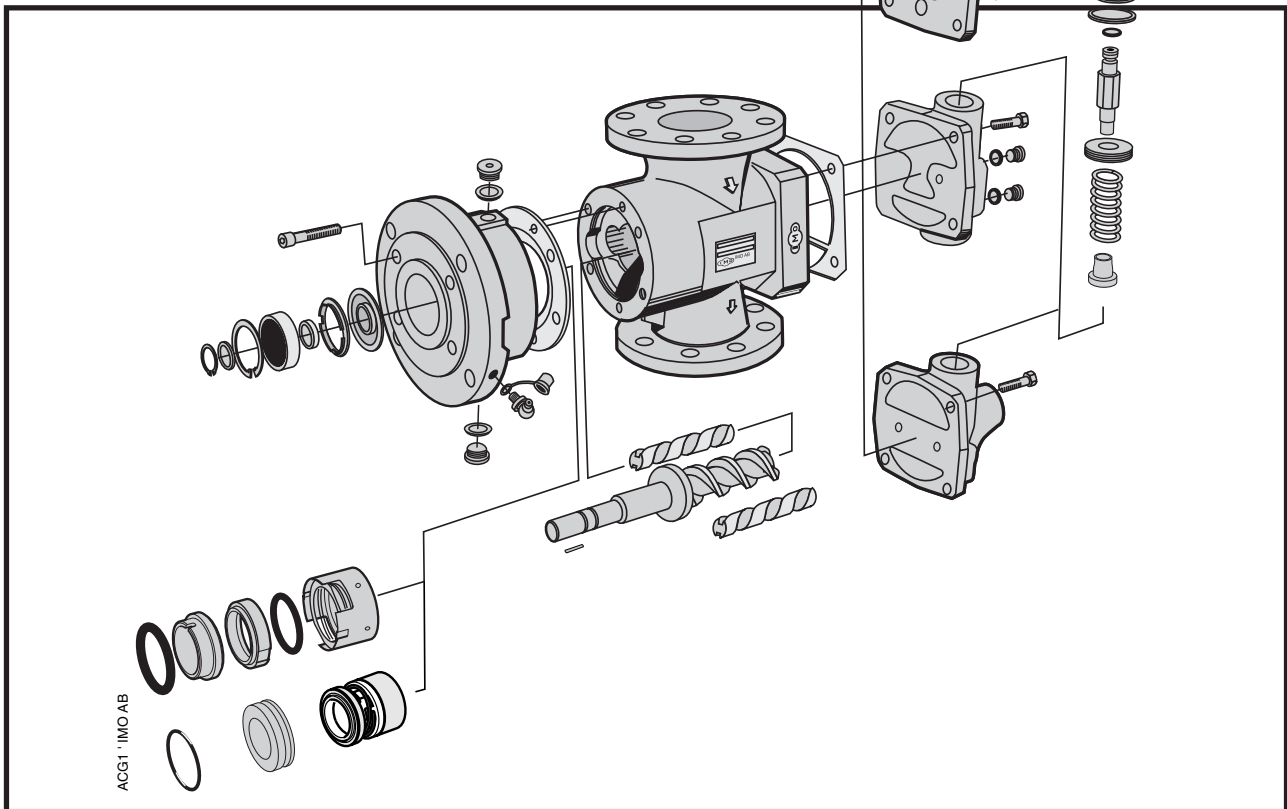


Maintenance and Service Instruction



This instruction is valid for all ACG/UCG pump models shown on page 2

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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 ACG/UCG Product description. For 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: ACG/UCG 045/052/060/070; Rotor diameter and generation: K7/N7

With version codes:

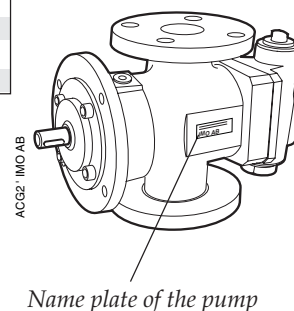
N } T } B } E }
 } V } F } P }
 } } } G }

Also valid for pump options: A101, A327, A385

Example of pump designations

std: ACG 045N7 NVBP; option ACG 070N7 NVBP A101

PosNo	Denomination	Qty	Components included in Spare parts sets:							Note	Explanations:
			G011	G012	G050	G053	G054	G057	G070		
1010	Power rotor CCW-rot.	1	x					(x)			G011: Rotor set CCW-rotation option
1020	Power rotor CW-rot.	1		x				x			G012: Rotor set CW-rotation (std)
106	Balancing piston	1	x	x				x		5	
113	Shaft key	1	x	x				x			
120	Distance sleeve	1									G050: Shaft seal
122	Ball bearing	1				x		x			
124	Retaining ring	1				x		x	x		G053: Minor kit (G050 + G057) + 122
124A	Support ring	1				x		x	x		
201	Idler rotor CCW-rot.	2	x					(x)			
202	Idler rotor CW-rot.	2		x				x			G054: Major kit consisting of: G053+G012 (G011)
359	Distance washer	1									
359A	Support ring	1				x		x	x		G057: Joint kit
401	Pump body	1									
424	Sleeve	1								4	
424A	Washer	1								4	G070: Valve element
429	Spindle	1								4	
437	O-ring	1								4	ACG Pump with DIN flanges
440	Return valve	1									
451	Screw	4/6									
453	Screw	4									UCG Pump with ANSI flanges
462	Plug	2								1	
462A	Sealing washer	2				x		x	x	1	
473	Grease nipple	1									A101: CCW
473A	Grease nipple cover	1									
480	Valve housing	1								2	A327: With Tuning
5010	Front cover	1									
502	Tension pin	1								6	A385: CCW and Tuning
502A	Plug	1								6	
506	Gasket	1				x		x	x		
509	Shaft seal	1			x	x		x			
514	Retaining ring	1				x		x	x		
537	Plug	2									
537A	Sealing washer	2				x		x	x		
551	Rear cover	1								3	
556	Gasket	1				x		x	x		5) Included in item 1020 or 1010
601	Valve cover	1								x	6) Included in item 5010
602	Sealing washer	1				x		x	x	x	7) Only sold as G070
605	O-ring	1				x		x	x	x	
608	Valve spindle	1								x	2,7
608A	Retaining ring	1				x		x	x	x	2
612	Set screw	1								x	2,7
614	Valve piston	1								x	2,7
615	Valve spring	1								x	2



Exploded view

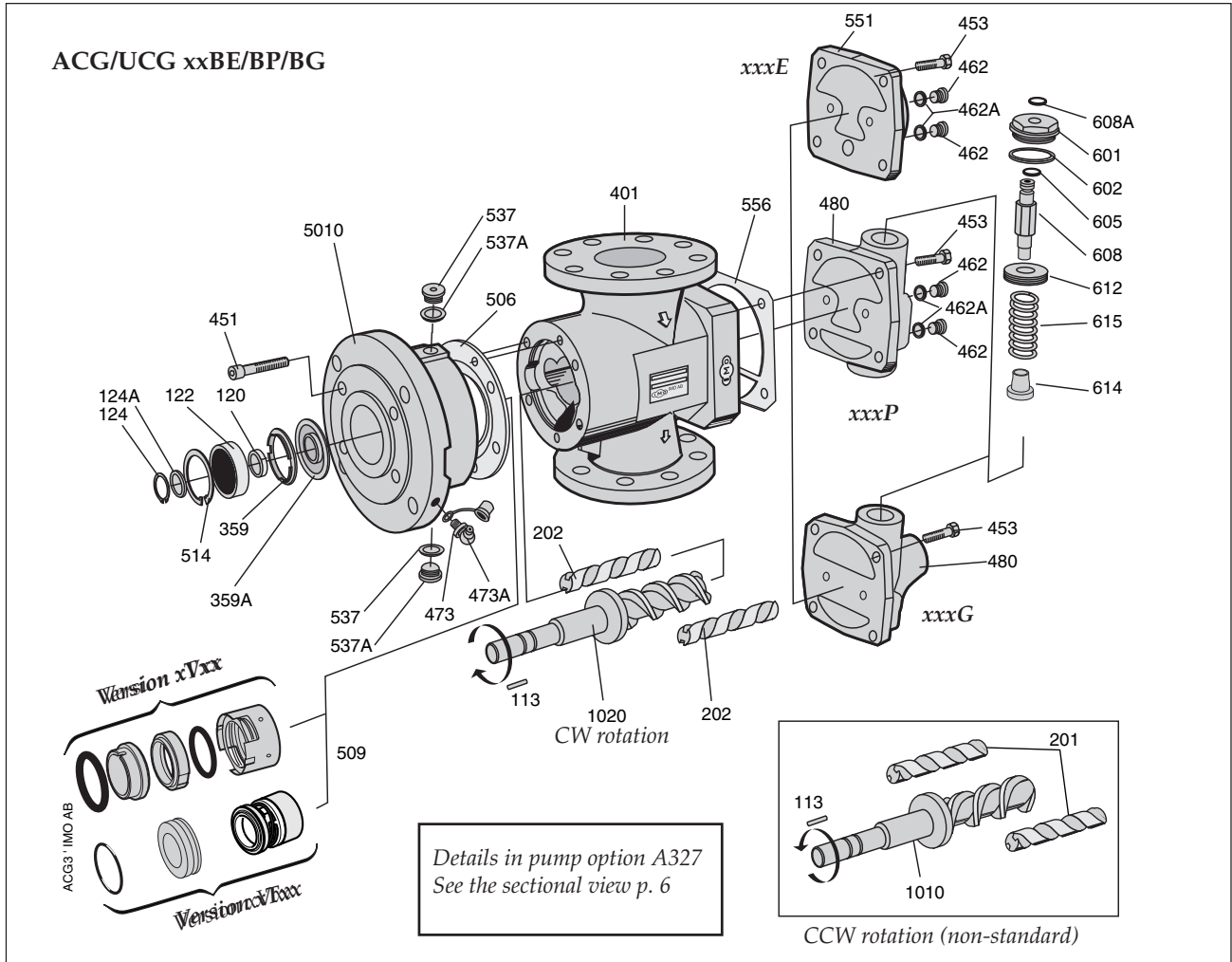


Fig. 1

Ordering code

Pos No	Spare parts sets	Part numbers, sizes			
		045	052	060	070
G012	Rotor set CW-rotation (std): Normal lead - pump version N7 Low lead - pump version K7	178913 187542	179507 187559	179515 187567	179523 187575
G011	Rotor set CCW-rotation (non-std): Normal lead - version N7 Low lead - version K7	186478 189641	186486 189642	186494 189643	186502 189644
G050	Complete shaft seal - version code xVxx " " - version code xTxx	190335 174094	190336 174102	190338 174110	190340 174128
G053	Minor kit " " - version code xVxx " " - version code xTxx	191241 191242	191243 191244	191245 191246	191247 191248
G054	Major kit=G012(G011)+G053	-	-	-	-
G057	Joint kit	191237	191238	191239	191240
G070	Valve element - version code xxxP/G	191250	191250	191251	191251
122	Ballbearing	x	x	x	x

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.

Ordering example:
For IMO-pump ACG 045N7 NVBP, serial number 456789
Shaft seal
pos G050 p/n 190335
Ballbearing
pos 122 p/n

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 ACG-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. 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

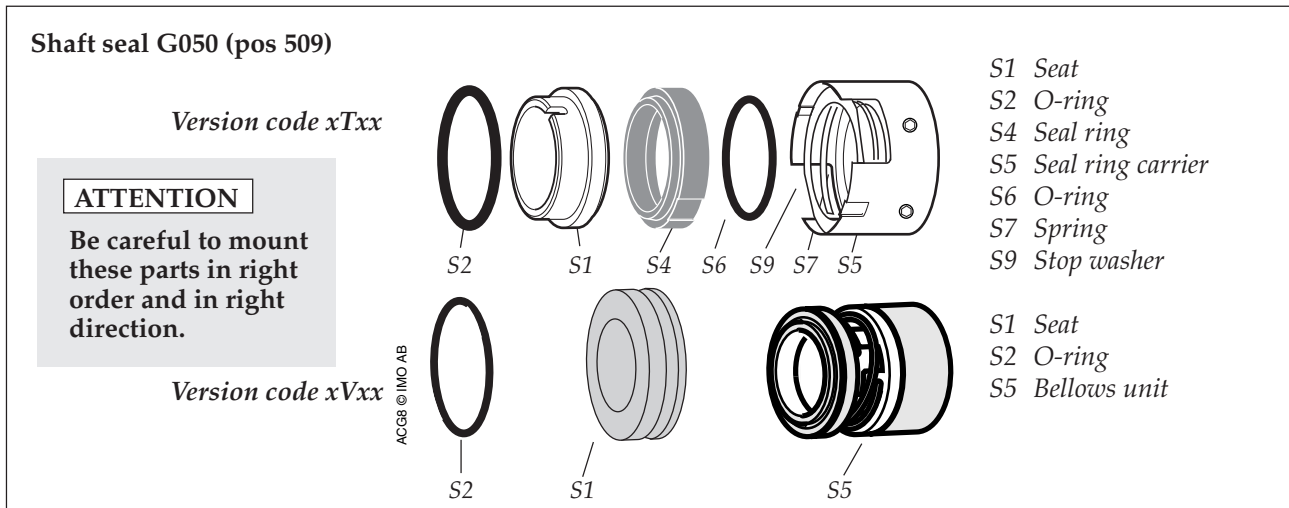


Fig. 3

Service for ball bearing

The ACG-pump is fitted with an external grease lubricated ball bearing.

When delivered from IMO AB, the ball bearings in pump version xVxx are filled with grease of type B. For version xTxx, type C is used.

Whenever the ball bearing is removed, it is recommended to exchange it for a new one.

Fit the new ball bearing properly greased and regrease it after one hour of running, while the pump is operating.

Use an appropriate type of grease, as per table and a grease gun suitable for grease nipple (pos 473) according to DIN 71 412 (ISO 6392).

On vertical mounted units the greasing intervals are reduced to half.

Installed in dusty or dirty premises or in a corrosive environment it should be lubricated at more frequent intervals.

If using others than these recommended greases check if it is possible to mix them with each other, otherwise clean before using a new grease.

Lubricating intervals in working hours

Temp max °C	Grease type	Pump sizes 045 and 052						Pump sizes 060 and 070					
		Speed, r/min						Speed, r/min					
		3500*	2900	1750	1450	1150	950	3500*	2900	1750	1450	1150	950
70	A	8500	10000	10000	10000	10000	10000	7500	8500	10000	10000	10000	10000
90	A	3350	3950	5350	5950	6350	7500	2950	3350	4750	5150	5950	6750
110	B	2650	3150	4250	4700	5000	5950	2350	2650	3750	4100	4700	5350
130	B	1050	1250	1650	1850	2000	2350	900	1050	1500	1600	1850	2100
155	C	650	750	1050	1150	1250	1500	600	650	950	1000	1150	1300

*) at rotation speed > 3 500 r/min special instructions are given by IMO AB.

Recommended greases (the availability of the greases can differ locally):

Type A: BP Energrease LS 3, Esso Beacon 2, Mobilgrease HP 222, Shell Alvania G3, Texaco Multifak EP2, SKF LGMT2, Q8 REMBRANDT EP2, CASTROL APS2, ELF ROLEXA 3, TOTAL MULTIS TIR EP3, FINA MARSON L3.

Type B: BP Energrease LC2, CHEVRON SRI GREASE 2, Esso Unirex N3, Mobilith SHC220, SHELL RETINAX LX, SHELL Albida LX, VAL-PLEX EP GREASE, Texaco Hytex EP2, SKF LGHQ 3, Q8 RUBENS, CASTROL LMX, INDUSTRIAL GREASE HEAVY, TOTAL MULTIS THT2, FINA PLUTON L2.

Type C: Mobilith SHC 460

Pump size	045	052	060	070
Grease amount (g)	4	6	7	9

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

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

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

Useful tools

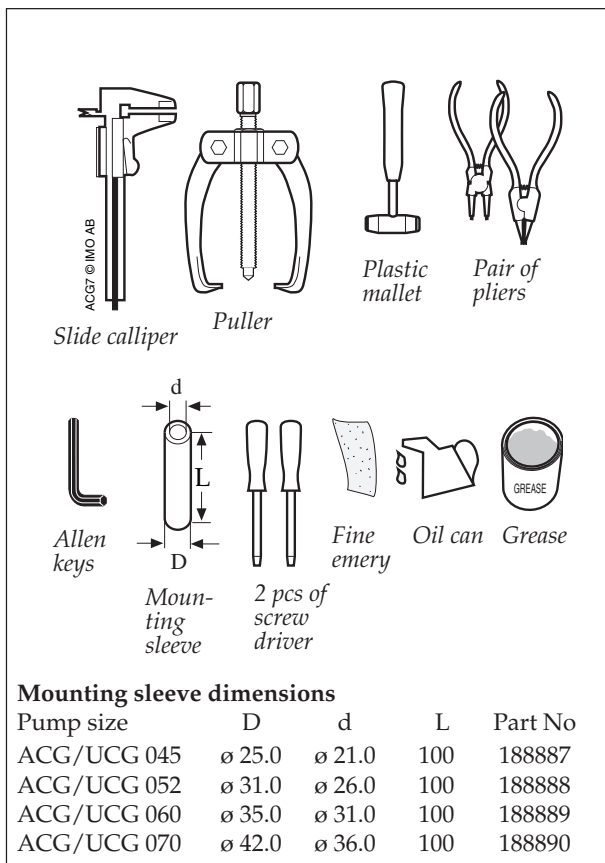


Fig. 4

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 or valve cover. Note that the driver must be deenergized and the pump hydraulically isolated before the rear cover is removed. Provisions to handle the fluid are to be made. If a more thorough investigation is needed, proceed as under "Dismantling".

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.

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

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

Sectional view

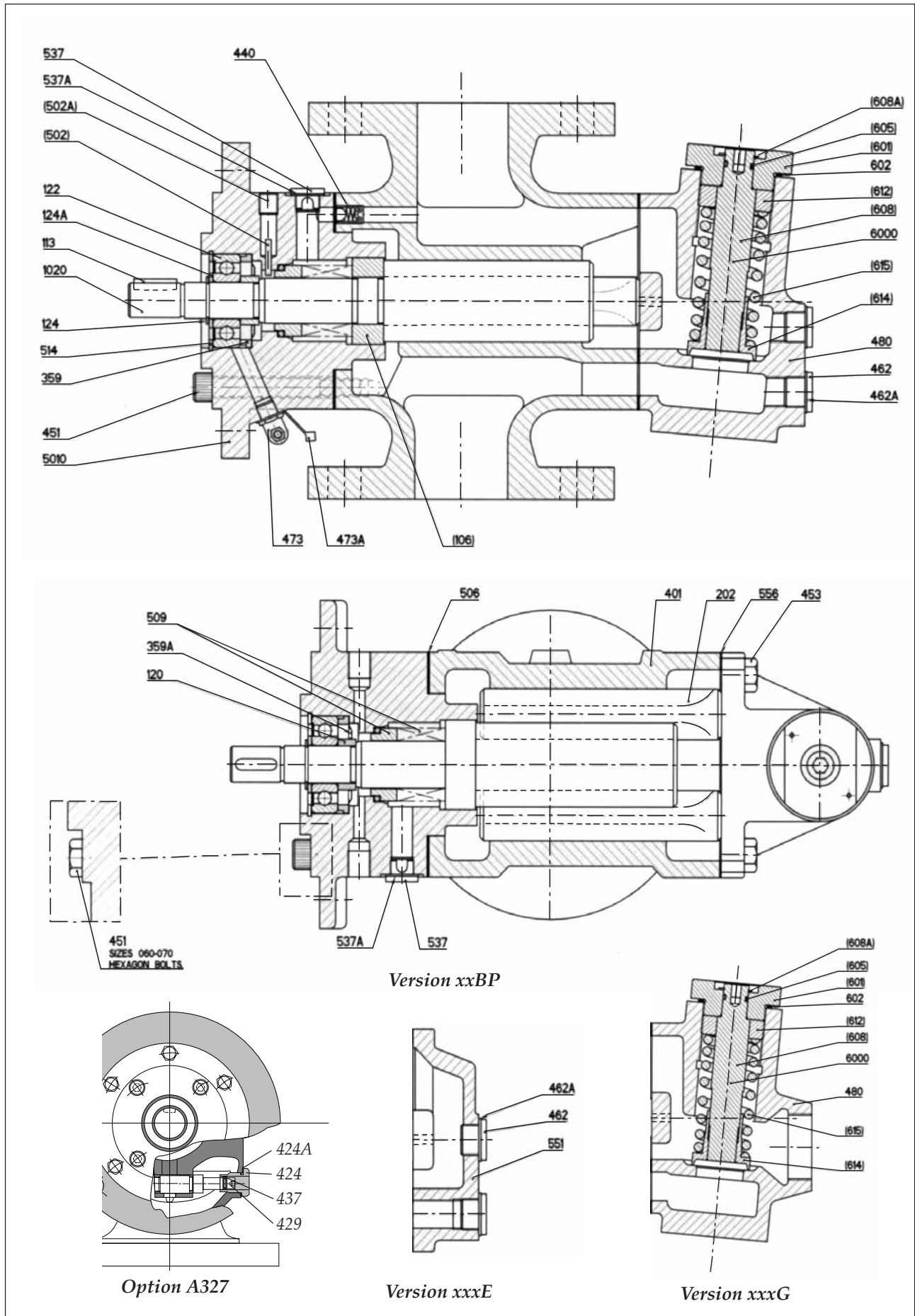


Fig. 5

Dismantling

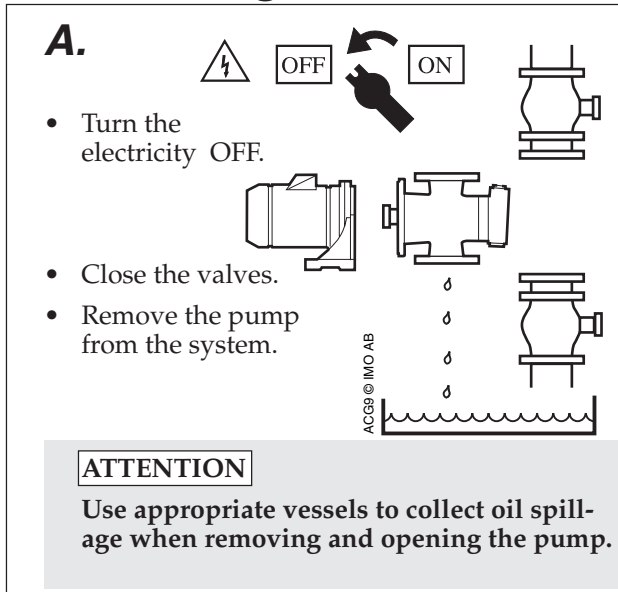


Fig. 6

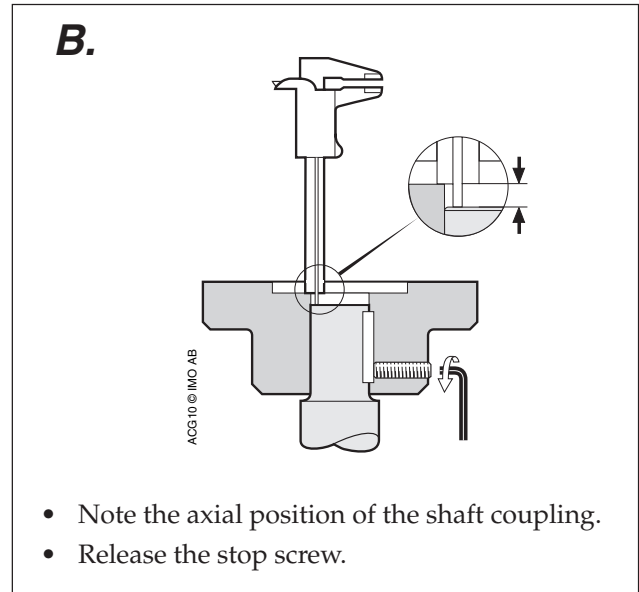


Fig. 7

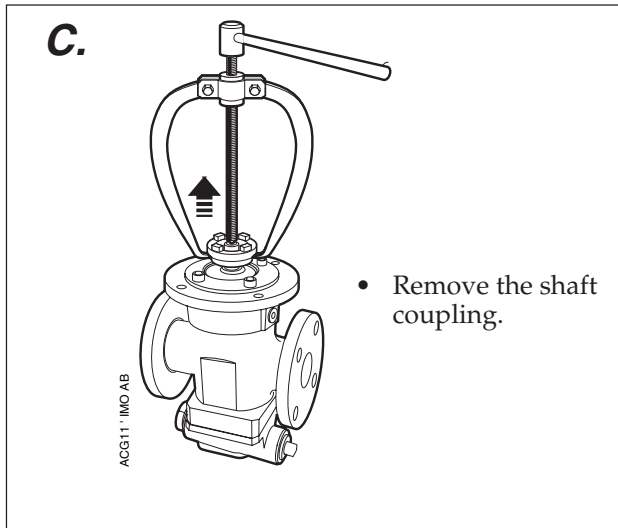


Fig. 8

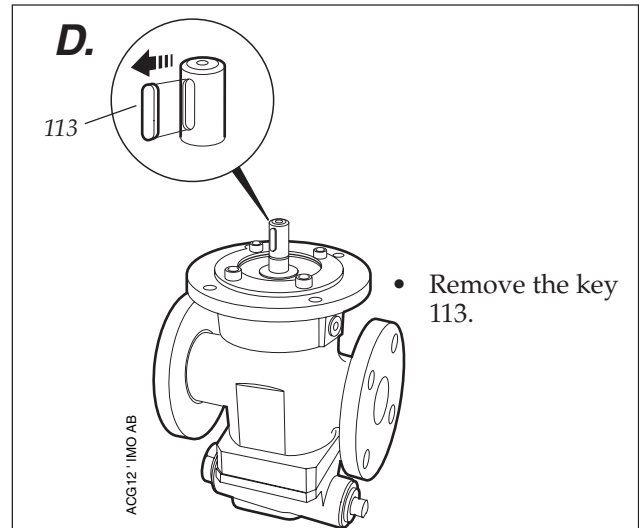


Fig. 9

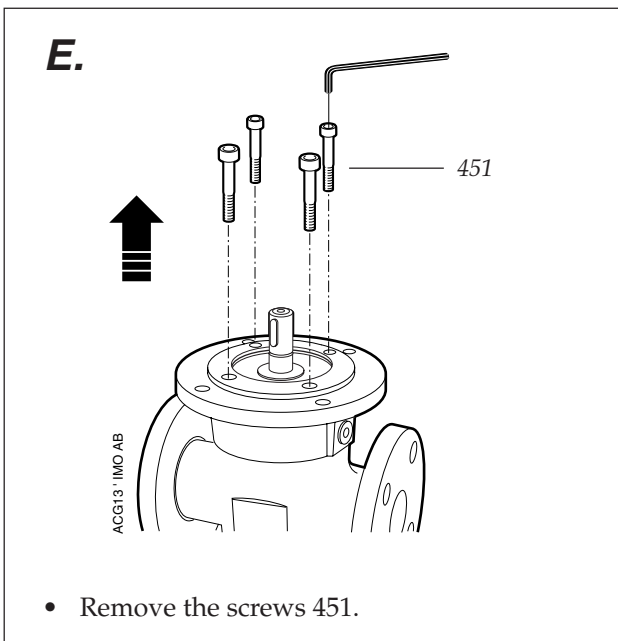


Fig. 10

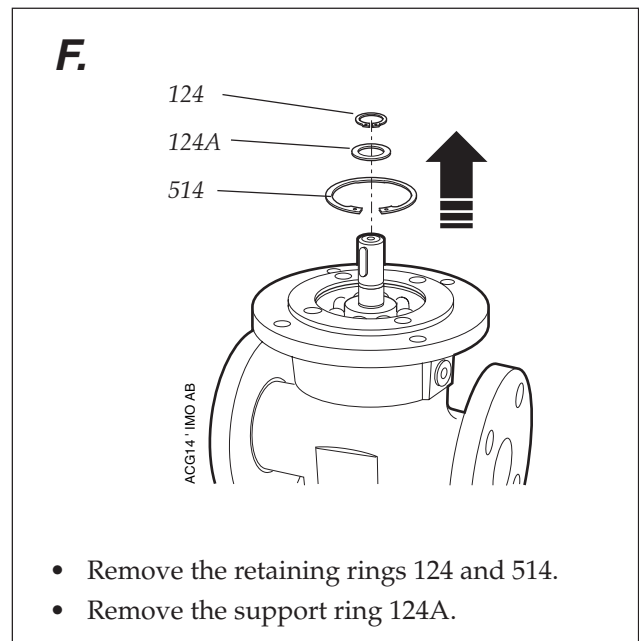


Fig. 11

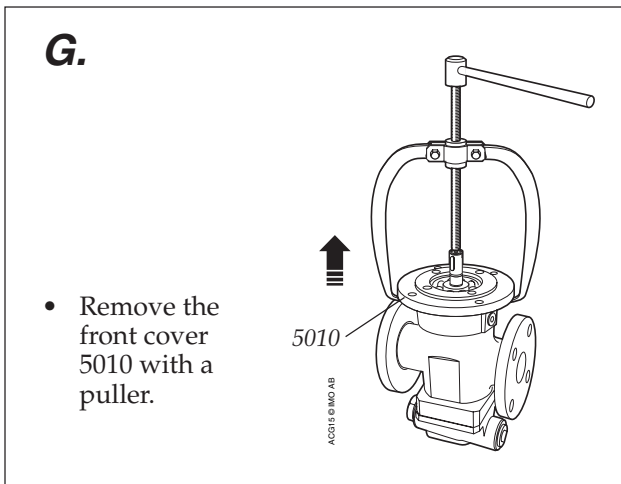


Fig. 12

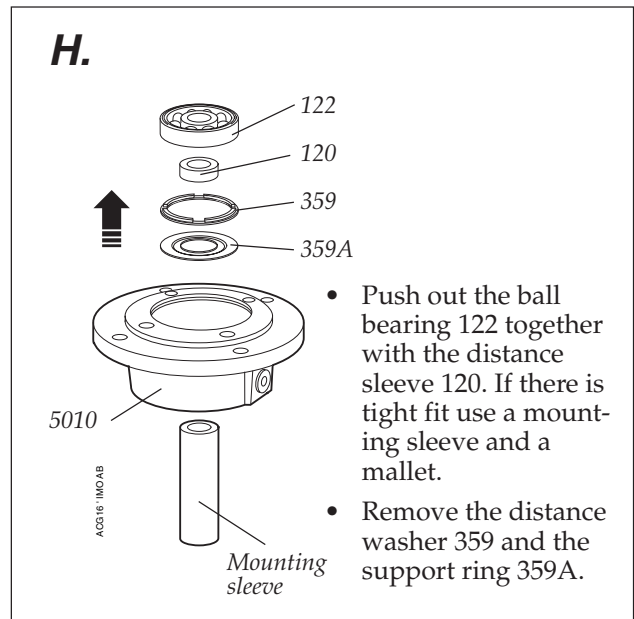


Fig. 13

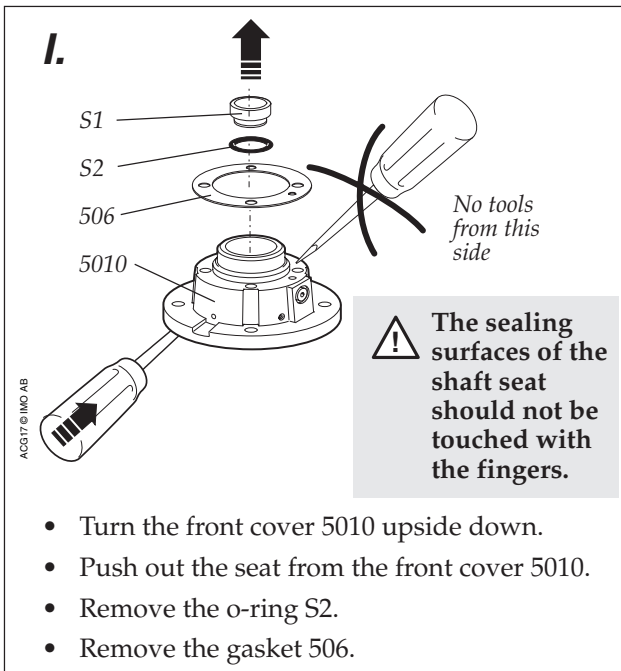


Fig. 14

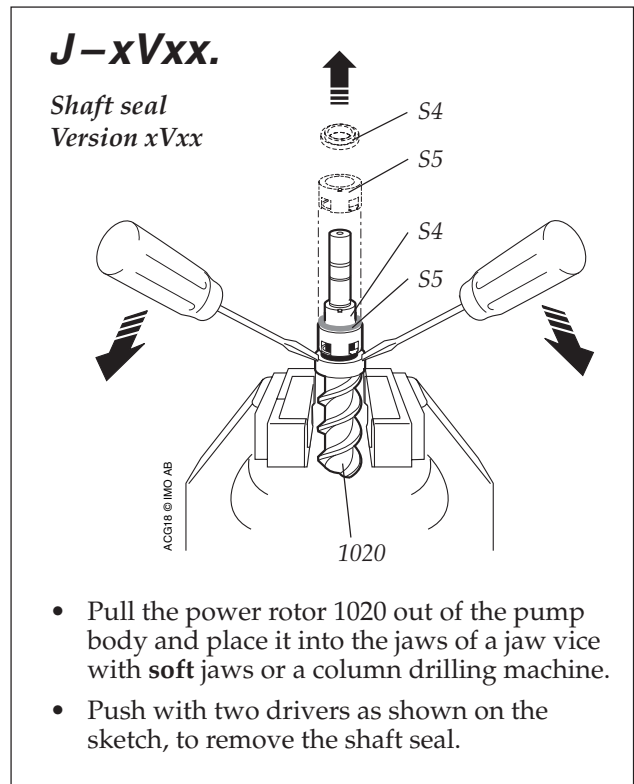


Fig. 15

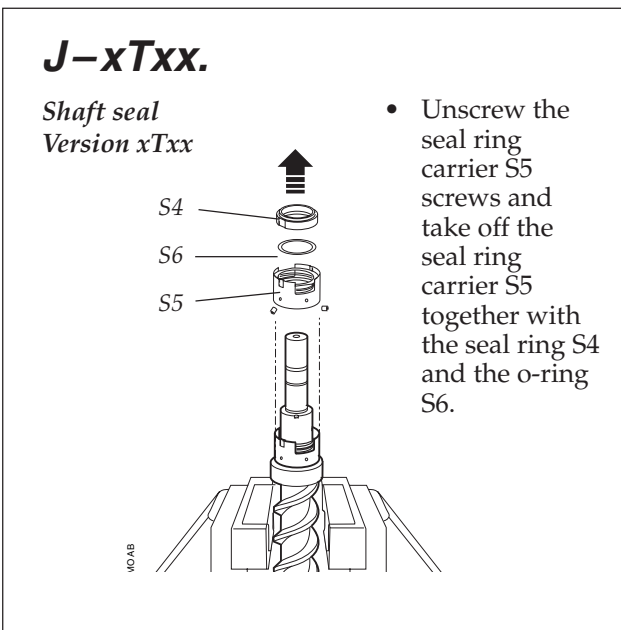


Fig. 16

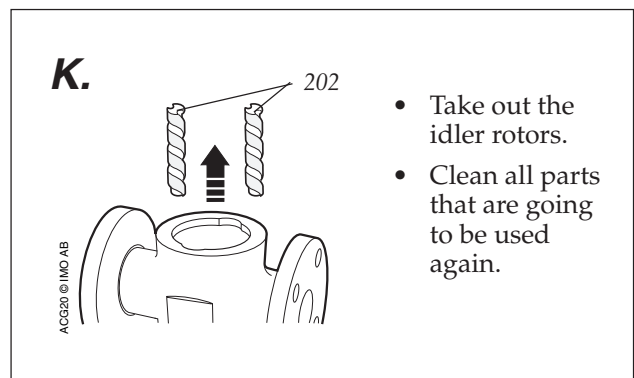


Fig. 17

Reassembly

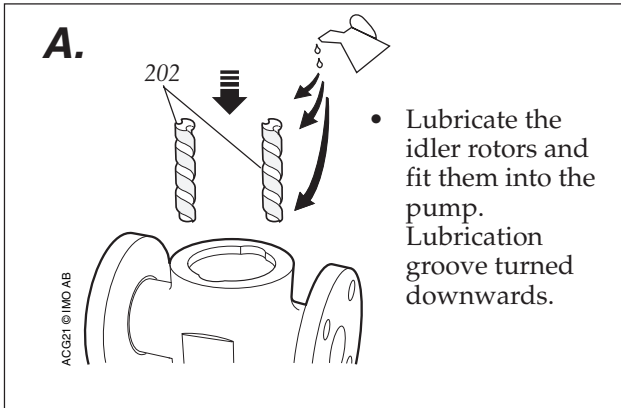


Fig. 18

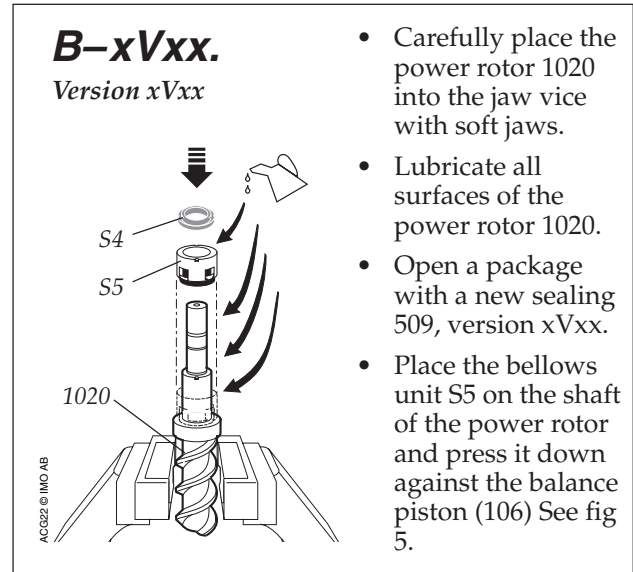


Fig. 19

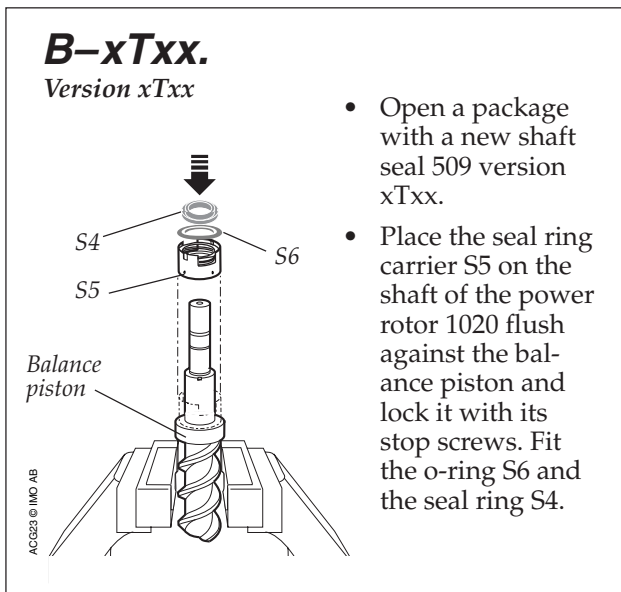


Fig. 20

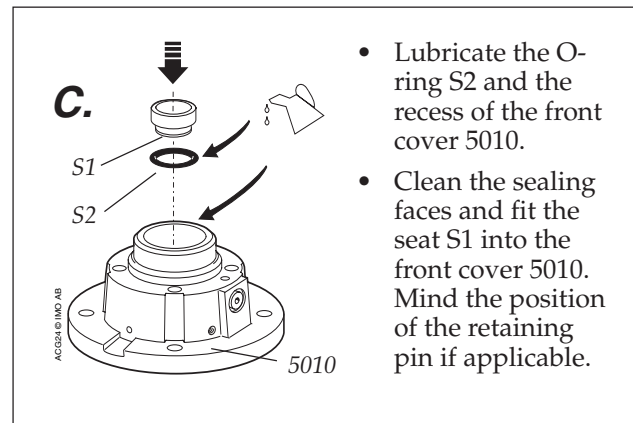


Fig. 21

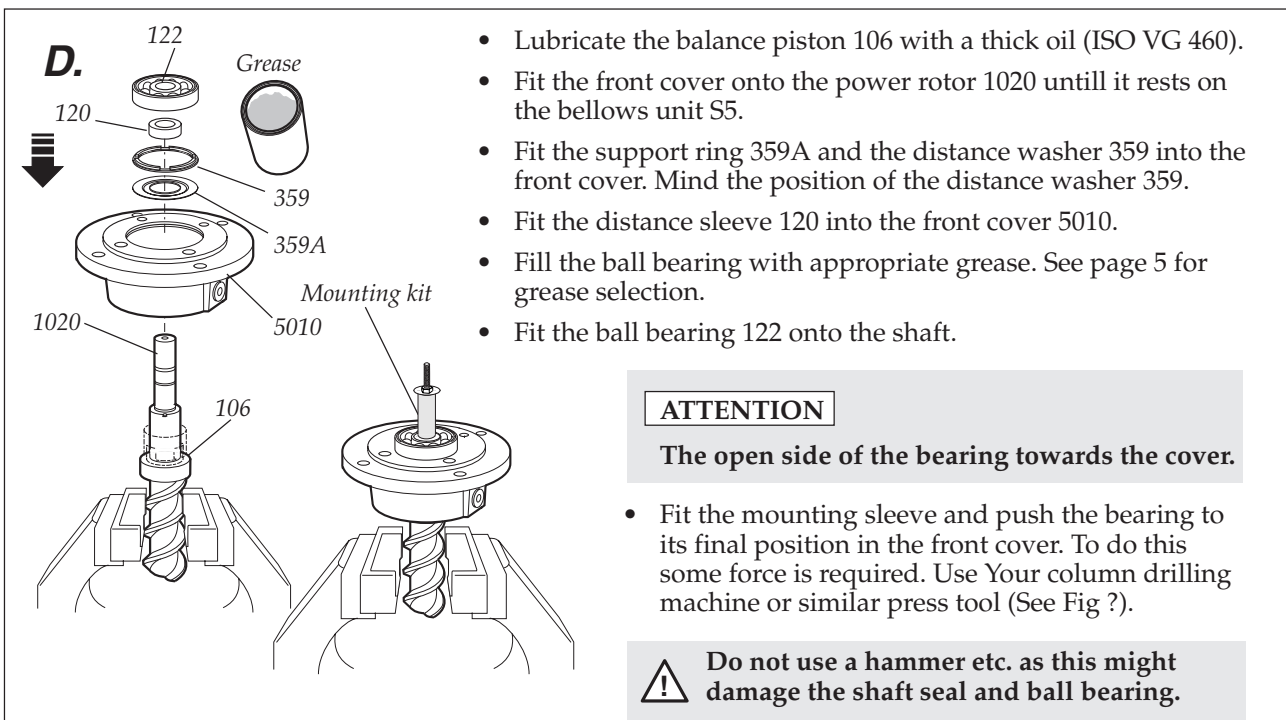
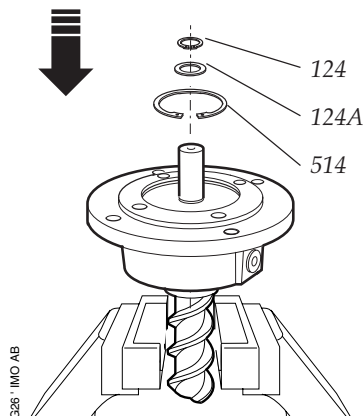


Fig. 22

E.



- Fit the support ring 124A and the retaining ring 124 on the shaft.
- Fit the retaining ring 514 back in place.

Fig. 23

F.

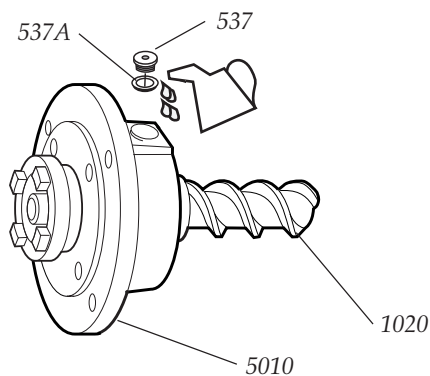
- Fit the key back in position, see fig. 9.
- Fit the shaft coupling back into place (see fig. 7 and 8) in the same way used when fitting the ball bearing.



Do not use a hammer etc. as this might damage the shaft seal and ball bearing.

Fig. 24

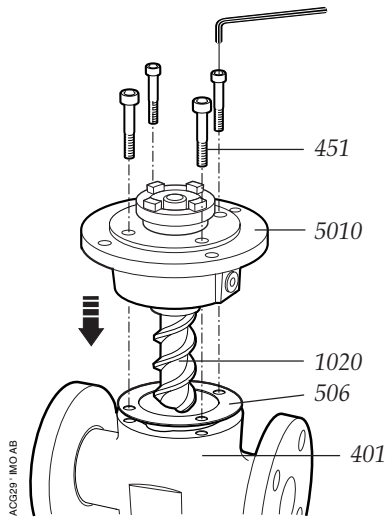
G.



- Remove the plug 537 and washer 537A.
- Hold the rotor unit horizontally with the bore for 537 upwards. Carefully fill the space completely with thin oil (f. ex. ISO VG 46).
- When the oil is flooding, reassemble the above parts in reverse order.
- Slowly turn the shaft a few turns to make sure it moves freely (a certain resistance from the shaft seal is normal but it must be the same during the turns).

Fig. 25

H.



- Place the gasket 506 on the pump body 401.
- Lubricate the power rotor 1020 and fit the front cover 5010 together with the rotor set into the pump body. Mind the position of the tension pin 545.
- Fit the screws 451 and tighten them cross-wise.

Fig. 26

I.

- Put the pump back into the system and proceed according to instructions under "Start-up" in the installation manual.

Fig. 27

Pressure relief valve

Replacement of O-ring 605

- To avoid changing the setting of the valve, use an Allen key to prevent spindle 608 to turn. Unscrew cover 601 and pull up unit 601/608.
- Remove retaining ring 608A and pull the spindle 608 out of cover 601. Replace O-ring 605 and assemble the unit 601/608 in reverse order. Replace retaining ring 608A if necessary and washer 602.
- Fit the unit 601/608 in the valve. Make sure the 608 enters the set screw 612 and use the Allen key to prevent 608 to turn when cover 601 is tightened.

Replacement of Valve Element G070

- Release the spring tension by turning the spindle 608 CCW with an Allen key. Use the Allen key to prevent spindle 608 to turn and unscrew cover 601 but do not remove it yet.
- Remove the set screw 612 by turning the spindle 608 CCW. Pull out the valve piston/spring unit 614/615.
- Fit the valve element in reverse order with a new washer 602. Turn the spindle 608 CW until the set screw leave enough room for cover 601. Use the Allen key to prevent 608 to turn further when cover 601 is tightened.
- Adjust the valve setting according to the "Installation and Start-up Instruction for IMO Low pressure pumps".

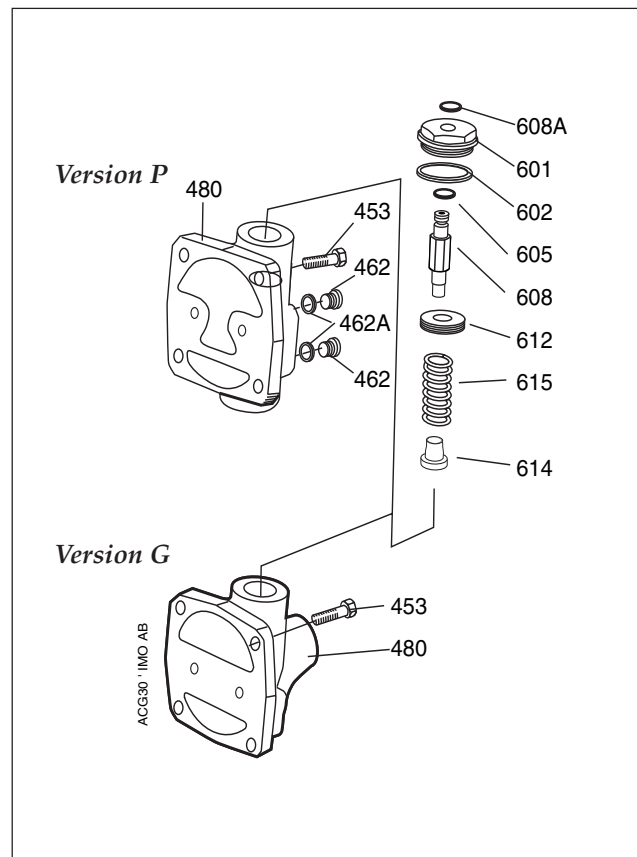


Fig. 28



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