

# Mineral Oil Separator

**WHPX 507 TGD - 20**  
**WHPX 508 TGD - 20**

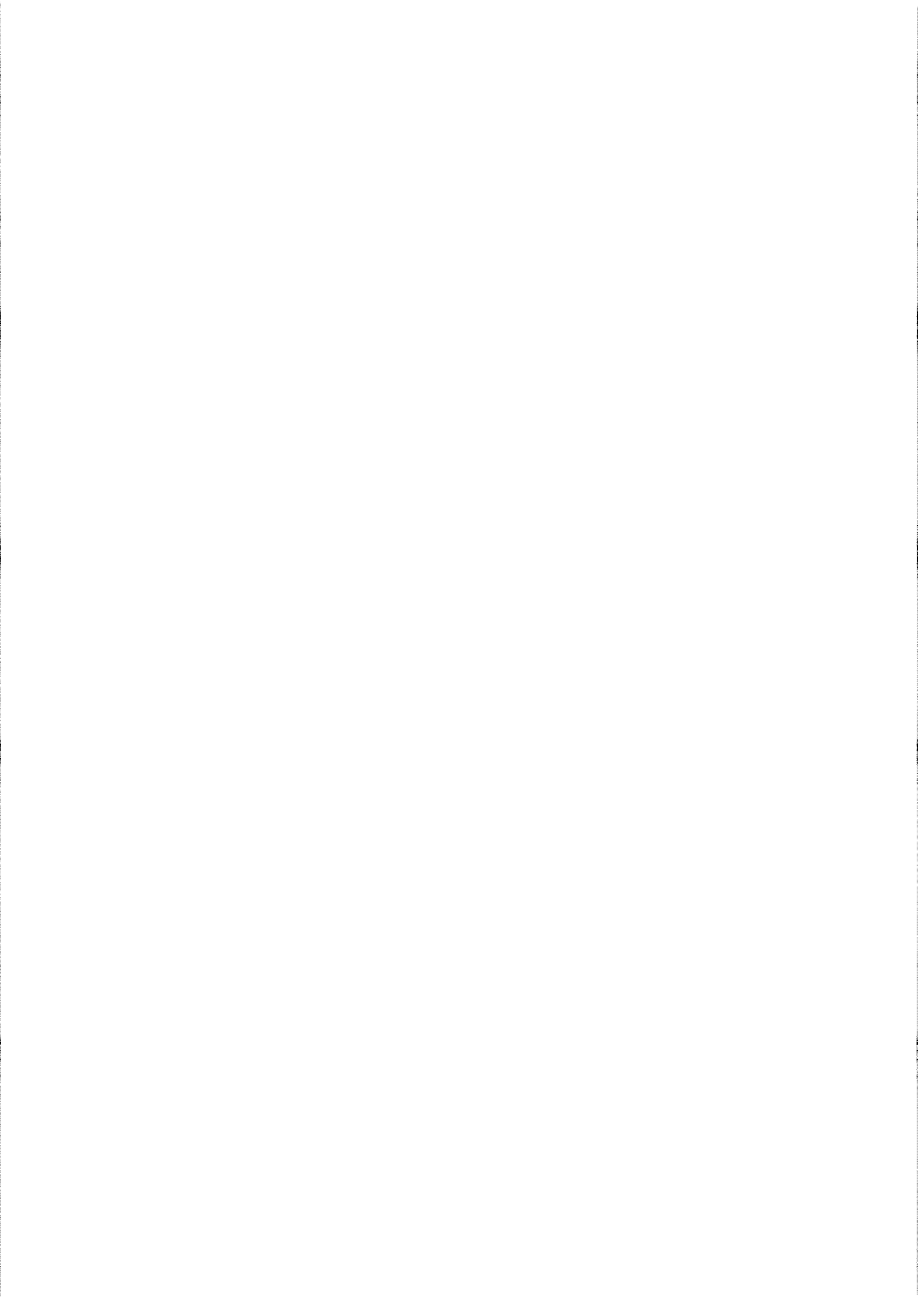
**WHPX 507 TGD - 20G**  
**WHPX 508 TGD - 20G**

**WHPX 507 TGD - 70G**  
**WHPX 508 TGD - 70G**

Book No.: MR

SO 4145E

2/8811



## **FOREWORD**

This manual is intended primarily for the maintenance personnel. It deals with the preventive maintenance as well as the disassembly and assembly of the machine.

The purpose of the manual is to enable the reader to overhaul the machine and make necessary repairs, with the exception of jobs requiring machining, heat treatment and balancing.

Knowledge of the safety precautions is important.

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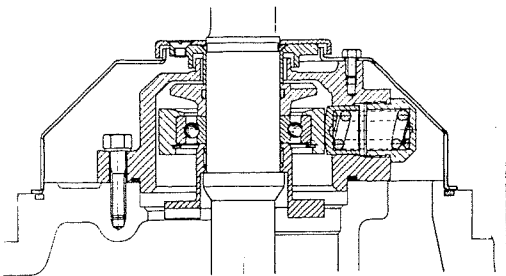
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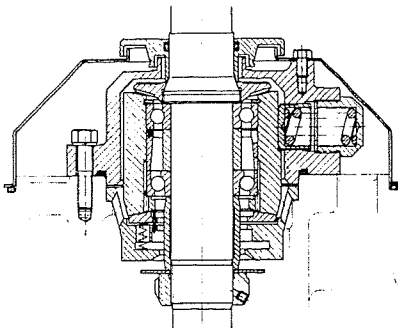
### ENGINEERING DRAWINGS

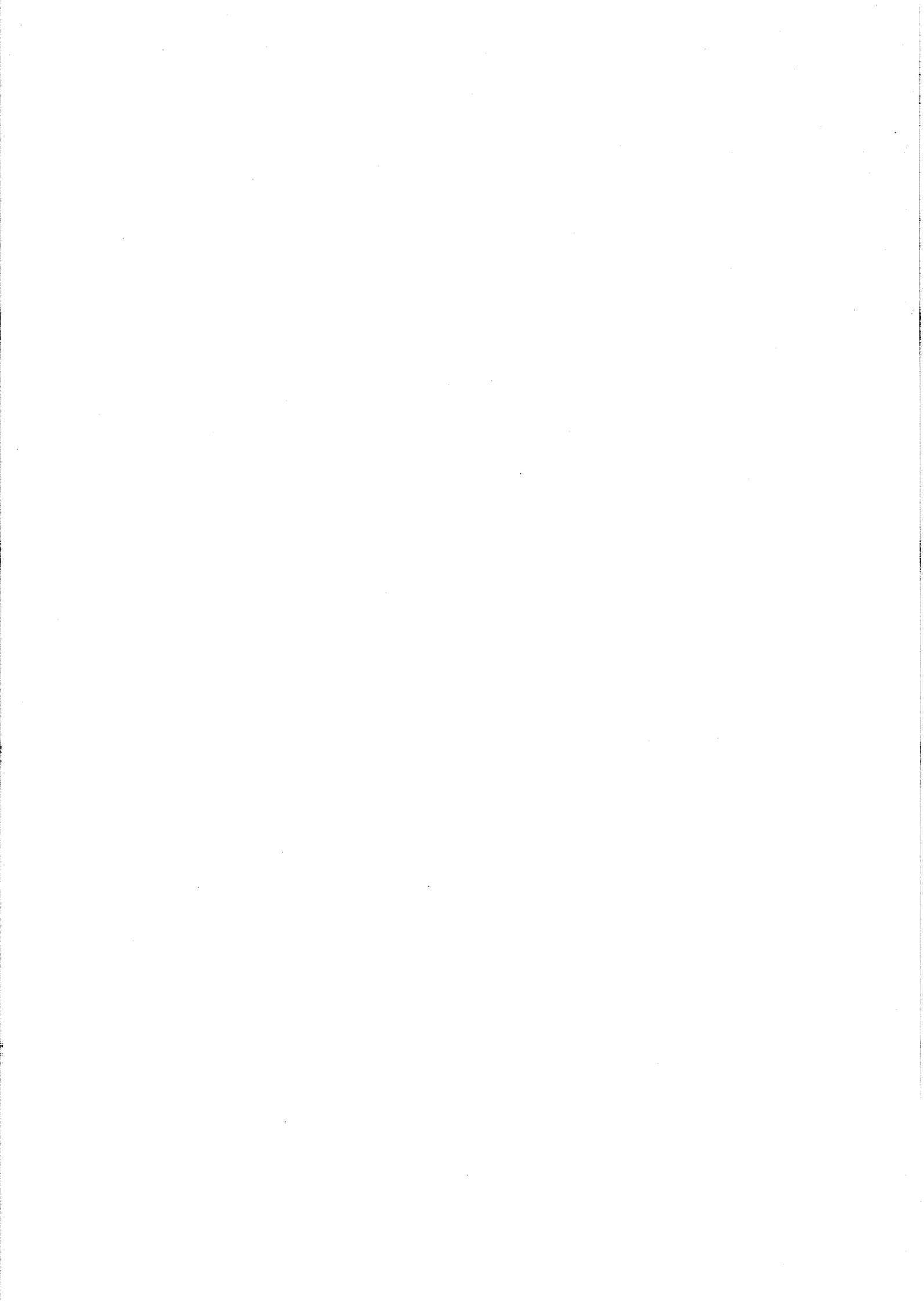
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Bowl spindle  
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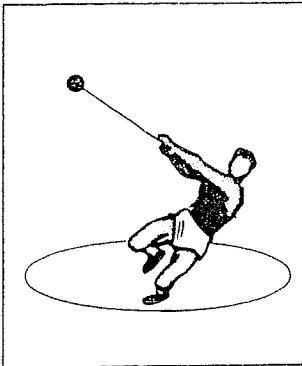






# SAFETY PRECAUTIONS

## FOR HIGH SPEED SEPARATORS



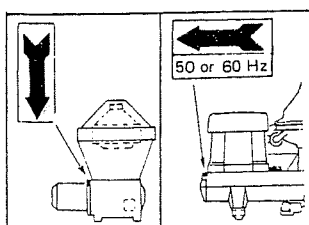
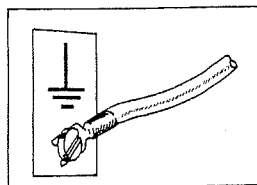
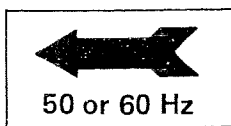
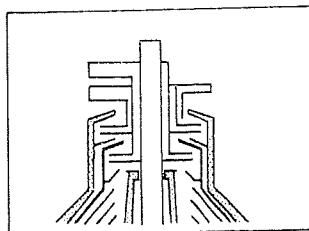
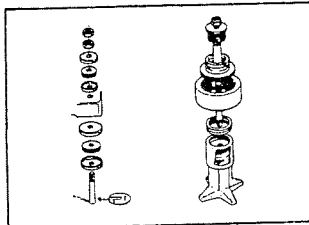
The bowl of a centrifugal separator rotates at a very high speed and great forces are generated.

To ensure the safety of personnel and equipment:

- Always carefully follow the safety instructions and precautions.
- Always carefully follow the instructions in the instruction manuals concerning installation, assembly of the components, operation and regular maintenance.
- Always use genuine Alfa-Laval spare parts and tools.
- Ensure that all operators who run and service a separator are well trained and knowledgeable about the machine and its mode of operation.

**NONCOMPLIANCE MAY CAUSE A SERIOUS ACCIDENT**

## BEFORE INITIAL START-UP OF NEW/OVERHAULED MACHINES



- Never transport or lift a separator with its bowl installed. This may cause bearing and bowl spindle damage.

- Make sure that the gear housing has been filled with the correct quantity of specified oil.

- Check that installation and tightness of rubber vibration dampers between frame and foundation is according to instructions.

- Many separators are equipped with paring disc liquid discharge. It is important that the paring device/feed tube assembly has correct height adjustment and is securely tightened before machine is operated. See instruction manual for detailed instructions.

- Be sure to check that the frequency and voltage of the current to be connected agrees with machine specifications, see figure on the arrow sign on the frame.

- Make sure that the separator frame, control boxes and cabinets are connected to earth (ground) in accordance with local regulations.

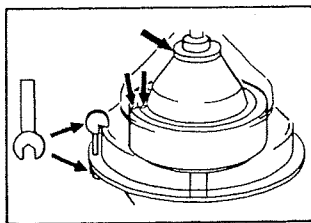
- Note that a separator must never be started without its bowl. This may damage its bearings.

- Be sure that the motor rotates in the same direction as arrow on separator frame. The lock ring(s) of the bowl may unscrew if it rotates in the wrong direction.

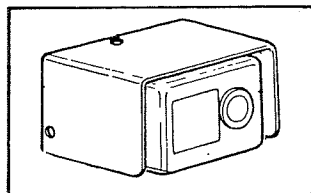
Check the operating rpm. with an empty bowl against the value specified in the instruction book. Self-cleaning separators are to be checked before the operating water is introduced (open bowl).



## OPERATION

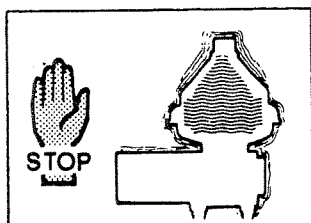


- NEVER start the machine before the lock rings of the bowl, inlet and outlet devices, frame hood, clamps, pipe couplings and other fastenings have been securely tightened. Note that the assembly mark  $\odot$  on the main lock ring must be aligned or pass the  $\odot$  mark on bowl body or bowl hood when lock ring is fully tightened. In this position there must be proper compression of disc stack.



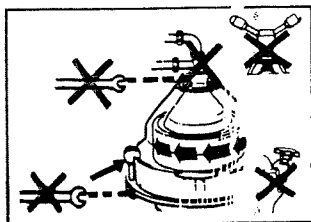
- The brake should always be released before start.

- If machine is equipped with vibration alarm unit check the setting and adjust it if necessary to individual process conditions.



- If unusual vibration occurs INCREASE IMMEDIATELY THE LIQUID FEED, PRODUCT OR WATER TO A MAXIMUM! Switch off motor, but leave the program controls on. If possible, turn the discharge frequency to OFF position and apply the brake. After the bowl has stopped completely, dismantle, clean and check all parts carefully. Do not operate until the cause of the vibration has been located and eliminated.

- Check that there is no leakage from piping connections on the separator and to/from the separator.



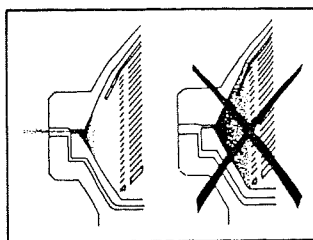
- NEVER loosen any part of the machine until the bowl has come to a COMPLETE STANDSTILL.

- NEVER use the machine for separating liquid which is more corrosive or has higher density, higher temperature, different characteristics of the solids, etc. than originally specified. Consult your ALFA-LAVAL representative.

- Follow local safety regulations concerning inflammable, toxic, or corrosive process media. Affix information and warning notices in prominent places.

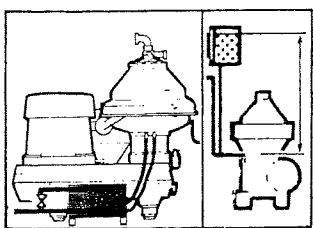


## TO BE OBSERVED FOR SAFE OPERATION OF SOLIDS-EJECTING SEPARATORS OF PX-TYPE



- The bowl has to be discharged from solids at intervals which depend on the feed rate, feed solids content of the entering product and the characteristics of the solids. To avoid excessive vibration and risk of damage the solids must be discharged before the solids space is overfilled or hard packed.

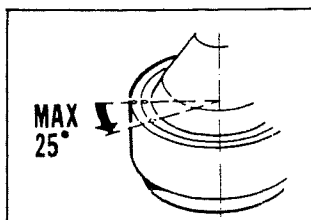
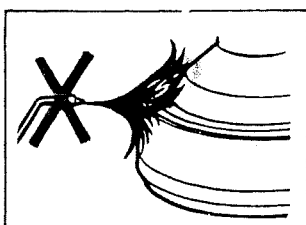
Always consult your ALFA-LAVAL representative, if possible before increasing feed rate or the solids content of feed.



- NEVER program a machine with a variable discharge program for total discharge before consulting your ALFA-LAVAL representative.
- The function of the bowl's discharge mechanism is vital for safe operation of the separator. It is therefore absolutely necessary to have an uninterrupted flow of clean, soft (dehardened) water/liquid at prescribed constant pressure. Ensure that the entering pressure cannot fall below the minimum level required and does not exceed the maximum level allowed.
- At manual operation always stop the machine with a liquid filled bowl and run it down filled until the bowl opens by itself. If your separator has been equipped with an automatic safety liquid system to ensure that the bowl is filled at feed power failure, run-down or heavy unbalance — make sure that the liquid supply is always available whenever machine is operated. This is very important to avoid heavy vibrations/damages.

## MAINTENANCE

- Switch off and, if possible, lock out the power to the machine and allow it to stop completely before starting any dismantling work. Hang up sign warning against turning on power.
- A separator bowl is balanced as a complete unit. Do not interchange the components of a bowl with those of any other bowl. Make sure that no parts are left out during assembly. All major parts are marked with the full serial number or the last three digits for identification purposes.
- NEVER heat rotating bowl parts, such as bowl body, bowl hood, lock rings, etc. with a naked flame or attempt repairs by welding. This could destroy the mechanical and structural strength of the material.

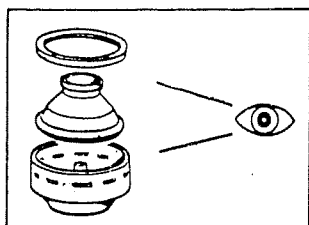


- NEVER operate the machine when the  $\phi$  assembly mark on the main lock ring can pass the corresponding mark on bowl body/bowl hood by more than 25 degrees. Consult your ALFA-LAVAL representative.





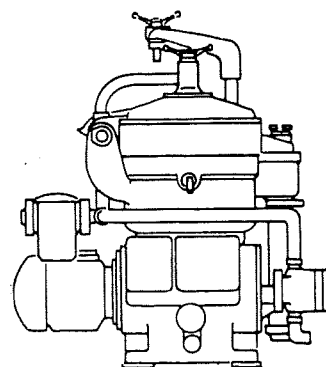
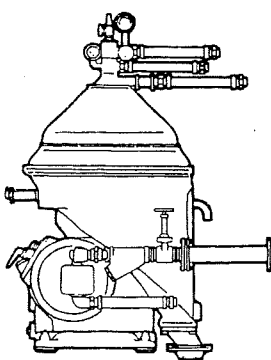
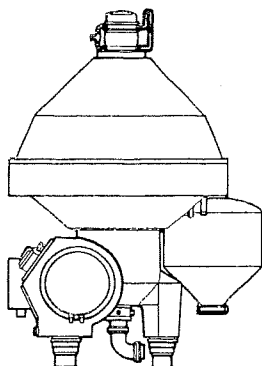
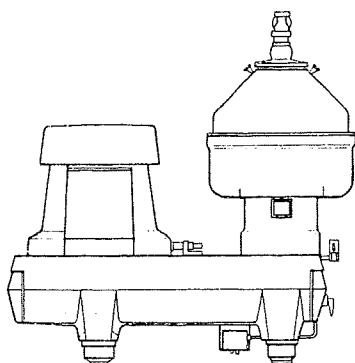
- The disc stack gradually settles and loses compression force. At each maintenance occasion check whether more disks are to be added in order to assure correct compression. NEVER remove a disc without replacing it with a new one. When reassembling, be sure to assemble slotted discs in the same order that they previously had.



- At each service occasion, yet at least every third month the most important parts should be checked for damage. Special attention should be given to bowl pillars at sludge discharge ports, threads of bowl body/main lock ring as well as the frame and the upper frame part which is permanently hit by the ejected solids and/or the operating water. If the process conditions are corrosive or erosive the frequency must be increased.
- Make sure that the brake is in good condition on machines equipped with a brake.

IF YOU ARE UNCERTAIN OF ANY POINTS,  
CONTACT YOUR ALFA-LAVAL  
REPRESENTATIVE.

## ALFA-LAVAL SERVICE



For reliability and safe operation we recommend that your separator is inspected at regular intervals by ALFA-LAVAL service engineers. These inspections will also ensure that your separator is working efficiently and economically.

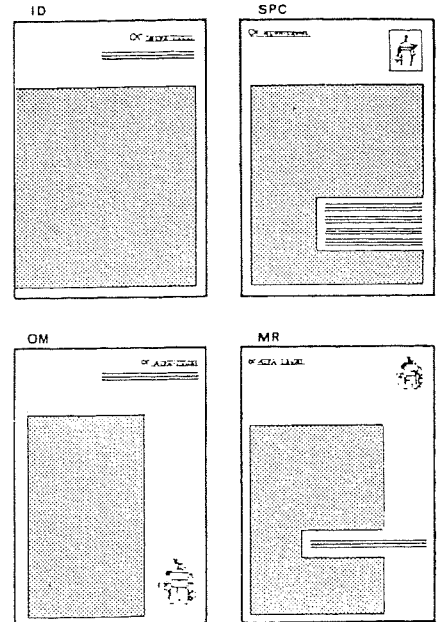
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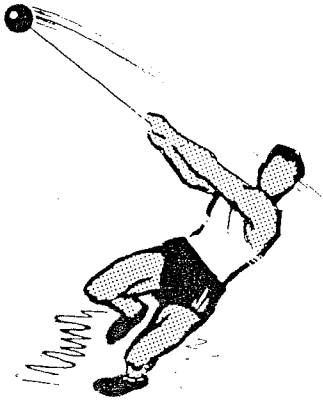
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Publikation	Innehåll	Avsedd för
<b>ID</b> Installationsdata	Installation, måttuppgifter, tekniska data	Projekttingenjörer. Konstruktörer. Installatörer. Driftsingenjörer
<b>OM</b> Driftsinstruktion	Körning och daglig skötsel	Maskinskötare
<b>SPC</b> Reservdelskatalog	Illustrerad reservdelsförteckning	Servicepersonal. Inköp
<b>MR</b> Underhållsbok	Översynsschema, demontering, montering, inställningsmått, reparation	Servicepersonal
Manual	Contents	Intended for
<b>ID</b> Installation Data	Installation, measurements, technical data	Project engineers. Design engineers. Fitters. Production engineers
<b>OM</b> Operator's Manual	Operation and daily maintenance	Machine operator
<b>SPC</b> Spare Parts Catalogue	Spare parts lists	Service personnel. Purchasing dept.
<b>MR</b> Maintenance	Maintenance schedule, disassembly, assembly, adjusting measurements, repair	Service personnel
Druckschrift	Inhalt	Beabsichtigt für
<b>ID</b> Installationsdaten	Installation, Massangaben, technische Daten	Planungsingenieure. Konstrukteure. Installateure. Betriebsingenieure
<b>OM</b> Betriebsanleitung	Betrieb, tägliche Wartung	Bedienungspersonal
<b>SPC</b> Ersatzteilkatalog	Ersatzteilverzeichnis	Wartungspersonal. Einkäufer
<b>MR</b> Wartung	Wartungsschema, Zerlegung, Zusammenbau, Einstellungsmasse, Instandsetzung	Wartungspersonal
Publication	Contenu	Destiné aux
<b>ID</b> Particularités de l'installation	Installation, mesures, particularités techniques	Ingénieurs projecteurs. Constructeurs. Installateurs. Ingénieurs de production
<b>OM</b> Guide d'utilisation	Utilisation et entretien quotidien	Utilisateurs des machines.
<b>SPC</b> Liste de pièces de rechange	Listes de pièces de rechange	Personnel d'entretien. Service d'achats
<b>MR</b> Guide d'entretien.	Planning de revision, démontage, assemblage, mesures de réglage, reparation	Personnel d'entretien
Publicacion	Contenido	Prevista para
<b>ID</b> Datos para instalación	Instalación, dimensiones, características técnicas	Ingenieros y proyectistas. Instaladores. Ingenieros de servicio
<b>OM</b> Instrucciones de funcionamiento	Funcionamiento y mantenimiento diario	Operarios de las máquinas
<b>SPC</b> Catálogo de piezas de recambio	Lista de piezas de recambio ilustrada	Personal de servicio. Sección de compras
<b>MR</b> Mantenimiento	Esquema de supervisión, desmontaje, montaje, dimensiones de ajuste, reparación	Personal de servicio



WHY PREVENTIVE MAINTENANCE?



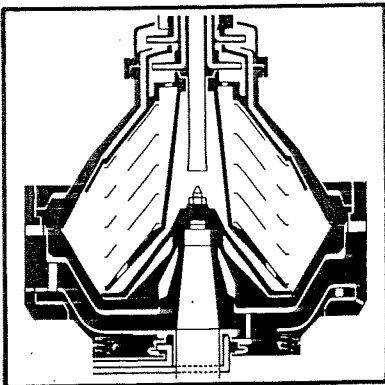
A centrifugal separator is capable of generating great forces in all directions and is subject to the law of centrifugal force.

The separator, like anything else, is subject to wear. Corrosion, erosion and just ordinary wear due to operation, all take their toll.

To continue safe and efficient operation, certain parts will by and by require replacement. Proper maintenance and operation will prolong parts life, and proper inspection will warn you when replacement is necessary.

- If the parts of the machine are worn, eroded, or improperly assembled, the forces generated may cause machine breakdown and injury to personnel.

MAJOR BOWL PARTS

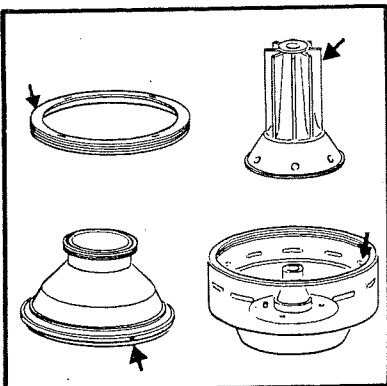


Balancing

ALFA-LAVAL separator bowls are statically and dynamically factory-balanced only as complete bowl assemblies.

- Therefore, major bowl parts cannot be replaced without re-balancing the entire bowl.

Bowl parts must never be interchanged from one machine to another. This is just as imperative where machines of the same or a similar type are concerned. The bowl parts of each machine are stamped with the machine manufacturing number or the last three digits of that number.

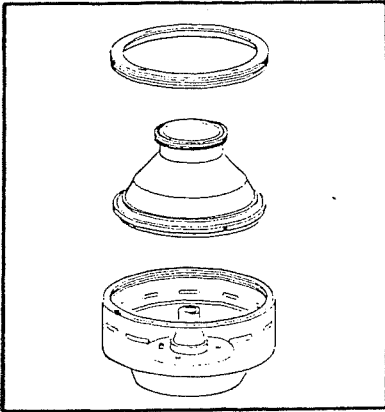


Locating means

The bowl parts are assembled in a certain relative position to each other. Alignment marks, guide pins and lugs are provided on major parts and must be undamaged and legible.

- Never operate the machine when these locating means are not in the proper relative position, or are illegible.

## CORROSION



- Corrosive attacks on bowl parts and particularly bowl body, bowl hood and lock ring should be watched with the utmost care.

**Parts of non-stainless steel and cast-iron**

Corrosion (rusting) occurs as a rule on unprotected components of non-stainless steel and cast-iron forming part of the bowl, bowl spindle and frame and exposed to the process liquid or aggressive atmosphere.

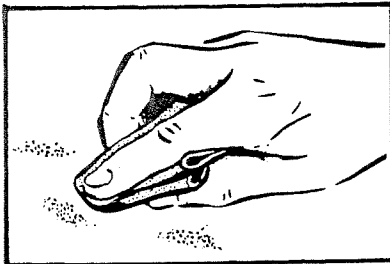
**Replace** the parts when corrosion is evidently jeopardizing their strength, relative location and play, or general function.

**Parts of stainless steel etc.**

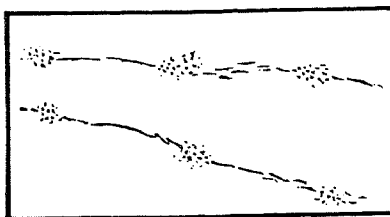
In certain circumstances corrosion can occur even on stainless bowl parts. The risk of attack will increase when the surface is isolated from the surroundings by a layer of solids.



Corrosion attacks on stainless steel are not easily detected. This applies for instance to attacks made by chlorides. Such attacks may begin merely as small dark spots.



- o **Polish** such dark spots with a fine-grain abrasive cloth. In some cases this will prevent further attacks.



- o Under special conditions corrosion on stainless steel can result in deeper attacks, so-called pits, to which special attention should be given.

Pits lying closely together or forming a regular pattern such as a straight or curved line may indicate that cracking has begun beneath the surface of the material. Such pits should be examined by an expert on materials and checked by means of crack-indicating agents — consult our representative.

- o Always watch carefully any corrosion attacks found on stainless steel. Record the observations.
- o In unfavourable circumstances even components of copper alloy and light metal etc. may become susceptible to corrosion and should, therefore, be kept under observation.

EROSION

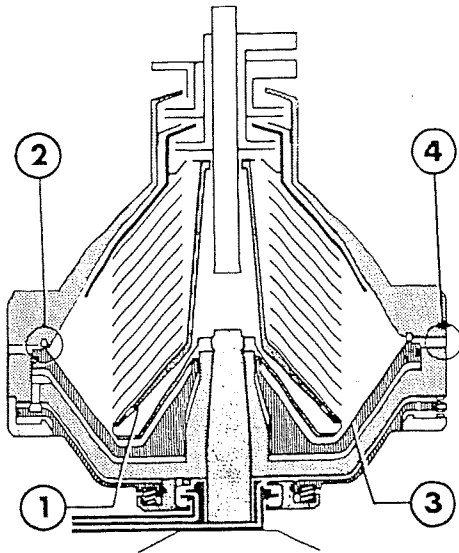
Erosion can occur for instance when particles suspended in the process liquid slide along a surface or strike against a surface while passing through the bowl.

Erosion is characterized, in the former case by burnished traces in the material, and in the latter case by dents and pits with a granular and shiny surface.

Erosion is intensified in some places by locally high flow rates.

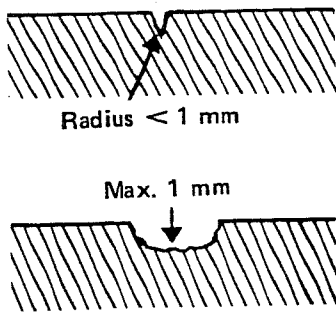
Surfaces subjected to erosion are, by way of example,

1. the underside of the distributor around the distribution holes and the wings.
2. the sealing edge of the sliding bowl bottom, and the seal ring in the bowl hood.
3. the surface of the sliding bowl bottom that faces the conical portion of the distributor.
4. the bowl wall portions ("pillars") between the sludge ports in the bowl body.

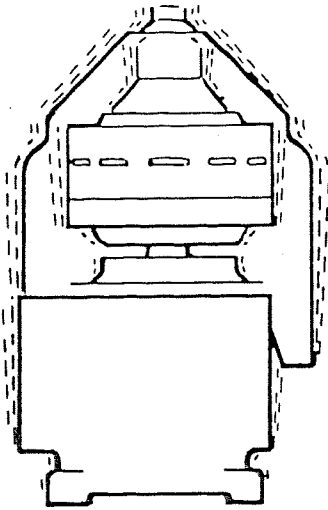


Always observe carefully any signs of erosion damage. It may deepen rapidly and weaken the bowl parts by reducing metal thickness.

<p>Erosion liner</p>	<p>Erosion liner fitted in place</p>	<p>Pay special attention to the bowl wall portions ("pillars") between the sludge ports, especially when working conditions are such as to involve a risk of severe erosion and/or corrosion. This rule holds good even if erosion liners are used.</p>
<p>If one or more of the following observations are made, consult our representative:</p> <ol style="list-style-type: none"> <li>1. that the bottom radius of the erosion trace is less than 1 mm in the narrowest place, or that coarse scratches are present,</li> <li>2. that the largest depth of the trace exceeds 1 mm,</li> <li>3. that the bowl wall portions between the sludge ports have defects presumably caused by corrosion.</li> </ol> <p>Valuable information on the nature of the damage can be given by photos, plaster impressions, and hammered-in lead.</p>		



VIBRATION

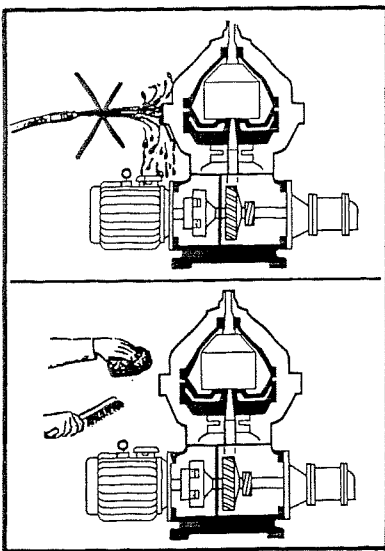


Abnormal vibration or noises are clues that something is wrong. Stop the machine and look for the cause.

If vibration analyzing equipment is available, use this equipment to periodically check and record the magnitude of vibration.

CLEANING

- When using chemical cleaning agents observe general rules and supplier's recommendations as to ventilation, personal protection etc.

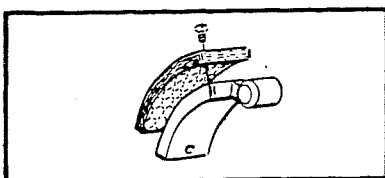


Frame/motor

Never wash down a separator with a direct water stream. Totally enclosed motors can be damaged by direct hosing to the same extent as open motors and even more than those, because:

1. many operators believe that these motors are sealed, and normally they are not.
2. a water jet played on these motors will produce an internal vacuum, which will suck the water between the metal-to-metal contact surfaces into the windings, and this water cannot escape.
3. water directed on a hot motor may cause condensation, and subsequently produce grounding and internal corrosion.

The external cleaning of the machine should be restricted to brushing sponging or wiping while the motor is running or is still hot.



Coupling pads and brake lining

To degrease pads or lining and the corresponding friction surfaces use a suitable degreasing agent.

TABLE SHOWING SUITABLE CLEANING AGENTS FOR THE VARIOUS PARTS OF THE SEPARATOR AND FOR DIFFERENT APPLICATIONS

Application	Parts	Cleaning agent able to dissolve oil and grease, e.g. white spirit, diesel oil and cleaning kerosene	Cleaning agent able to dissolve deposits. Example: ALFA-LAVAL cleaning liquid for lube-oil separators	See page 3:7
Separation of high-alkali lubricating oils	Parts of the driving devices	X		
	Bowl discs, other bowl parts as well as inlet and outlet parts		X	
	Paring disc device for operating water			X
Separation of other oils, such as fuel oil, cutting oil, etc.	Parts of the driving devices	X		
	Bowl discs, other bowl parts as well as inlet and outlet parts	X		
	Paring disc device for operating water			X

### Bowl discs

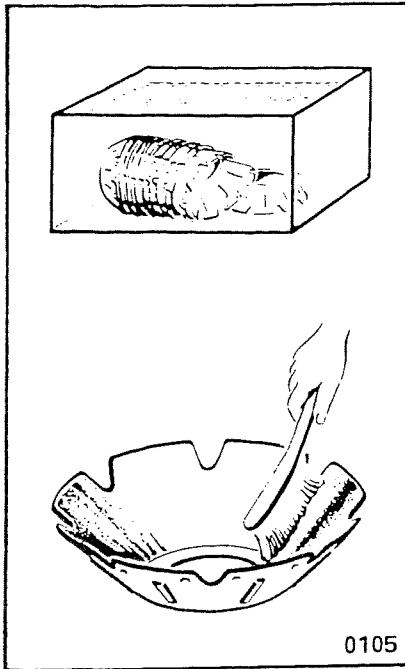
Handle the bowl discs carefully so as to avoid damages on the surfaces during cleaning.

Separation of high-alkali lubricating oils can give a coating on the bowl discs. Mechanical removal of these deposits may prove to be a time-consuming and difficult procedure. Besides, mechanical cleaning is likely to scratch the disc surfaces, causing new deposits to form quicker and adhere more firmly. An indulgent chemical cleaning is, therefore, preferred to mechanical cleaning.

The demand on a chemical cleaning agent is that it should dissolve the deposits quickly without attacking the material of the separator parts. **ALFA-LAVAL cleaning liquid for lube-oil separators** satisfies these demands. Note that carbon steel parts (e.g. lock rings) may be affected by the agent if in touch with the latter during a long time.



## GENERAL ADVICE

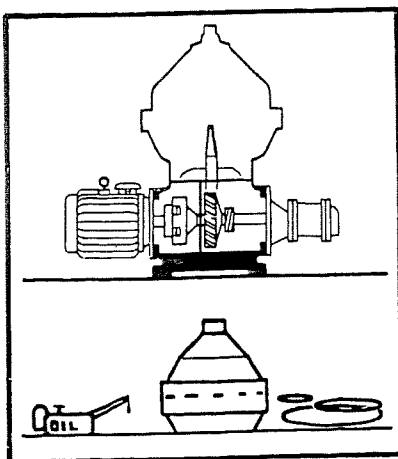


**CLEANING PROCEDURE.** Remove the bowl discs from the distributor and put them down, ONE BY ONE, in the cleaning agent. Let the discs remain in the cleaning agent until the deposits have been dissolved. This will normally take between two and four hours. Finally clean the discs with a SOFT brush.

## OILING

Protect cleaned carbon steel parts against corrosion by oiling. Separator parts that are not mounted after cleaning should be wiped and protected against dust and dirt.

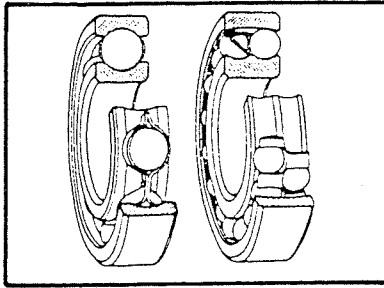
## SHUT-DOWNS



If the machine is shut down for some time, the parts in contact with liquid should be oiled. The O-rings should be removed.

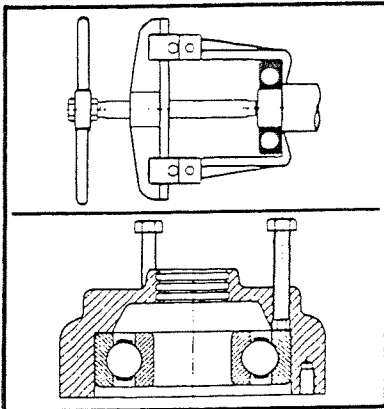
The bowl must not be left on the spindle. Vibrations in the foundation could be transmitted to the bowl and produce one-sided loading of the top bearing. The resultant indentations in the ball bearing races could cause bearing failure.

BALL BEARINGS. ROLLER BEARINGS



Use the greatest cleanliness when handling roller bearings.

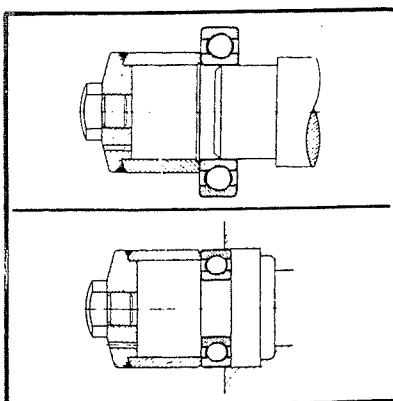
Avoid unnecessary removal of bearings. Do not re-fit a used bearing. Always replace it with a new one.



**Dismounting**

Remove the bearing from its seat by using a puller or a special tool. Do not hit with a hammer directly on the bearing.

Check the shaft end and the bearing seat in the housing for damage indicating that the bearing has rotated on the shaft, and in the housing respectively. Replace the damaged part, if the faults cannot be remedied by polishing or in some other way.

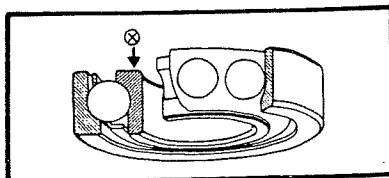


**Fitting**

Leave new bearings in original wrapping until ready to fit. The anti-rust agent protecting a new bearing need not be removed.

Fit a bearing on a shaft by pressure applied to the inner race and in a housing by pressure applied to the outer race. Use a suitable piece of pipe or a metal drift and a hammer. Never strike the bearing directly.

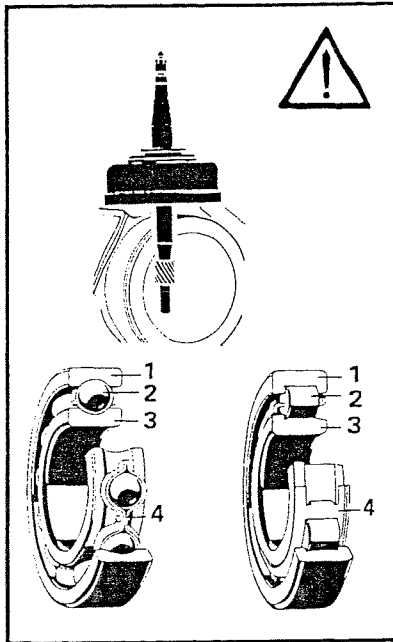
Bearings sitting with tight fit on a shaft should be heated in oil before assembly. The oil temperature should not exceed 100°C. Never leave the bearing in the oil bath longer than required for thorough heating.



**Angular contact ball bearings**

Always fit single-row angular contact ball bearings with the stamped side of the inner race facing the axial load.

BALL BEARINGS. ROLLER BEARINGS



Special design bearings for the bowl spindle

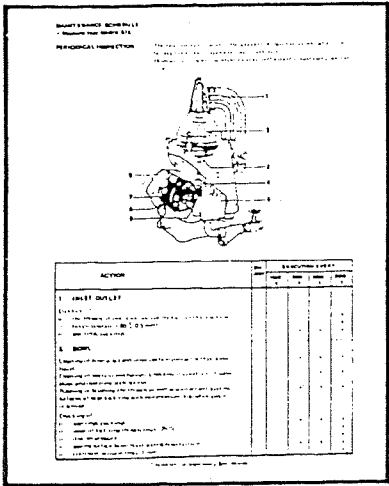
The bearings used for the bowl spindle are specifically designed to withstand the speed, vibration, temperature and load characteristics of high-speed separators.

Do not use other bearings than those stated in the Spare Parts Catalogue (SPC).

A bearing that in appearance looks equivalent to the correct bearing may be considerably different from the latter in various respects: inside clearances, design and tolerances of the cage and ball (roller) races as well as material and heat treatment. Any deviation from the correct bearing may cause a serious breakdown.

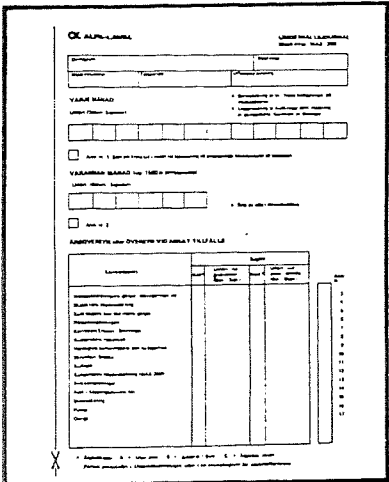
- 1 Outer race
- 2 Ball/roller
- 3 Inner race
- 4 Cage

MAINTENANCE SCHEDULE



To facilitate systematic service, we have made up a maintenance schedule. The schedule specifies the various condition checks to be performed after certain periods of operation – see page 2:2.

MAINTENANCE LOG

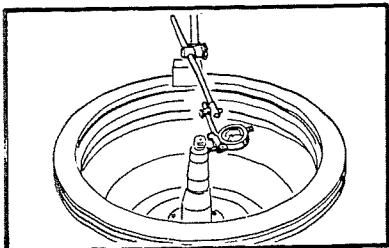


Keep a log of inspection and maintenance performed. Parts continually replaced should be given special consideration. The cause of repeated failures should be determined and corrected. Discuss your problems with our representative and, when necessary, request a visit.

Rate of corrosion and erosion should also be a part of this log. Note the extent of wear and date the log entries so that the rate of deterioration can be observed.

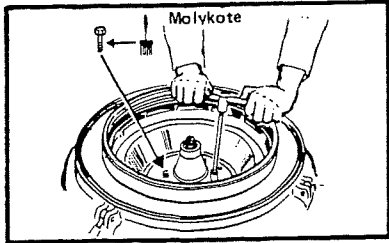
An example of a Maintenance Log with entries is found on page 2:4. Copies of the log are annexed at the end of this manual and can thus be used in your maintenance routine, if found compliant with local requirements.

CHECKPOINTS



How to perform the various condition checks is explained under »Checkpoints» – see page 3:1.

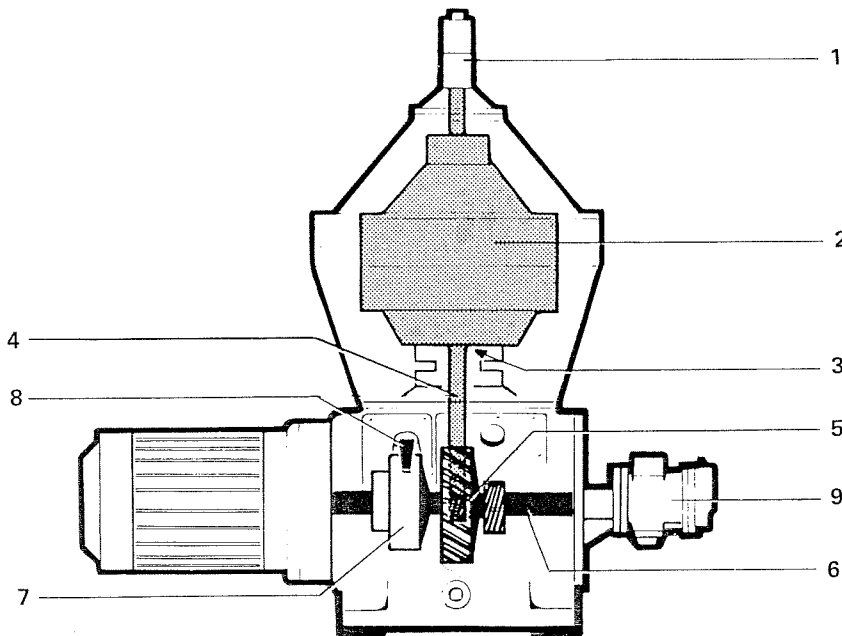
DISASSEMBLY ASSEMBLY



The identically named chapter beginning on page 4:1 describes how to disassemble and assemble the machine in the correct order by means of the proper tools.

- The chapter also indicates, at which stages of disassembly and assembly the various checks should be performed.

**PERIODICAL INSPECTION**



The time intervals stated in the schedule are guiding values, which may be adapted to local experience and conditions.

When any of the following conditions exists, the actions **A** and **B** (below) may have to be performed at considerably shorter intervals (the actual time has to be found by experience):

- o Installation inappropriate
- o For fuel oil separators
  - Separation of bad quality HFO
- o For lubricating oil separators:
  - Diesel engine condition bad
  - Trunk type diesel engine burning heavy fuel oil
  - In the case of crosshead diesel engines:
    - Separation of piston rod stuffing box oil
    - Inadequately cleaned piston rod stuffing box oil recycled to system oil.

A complete overhaul must be performed at least every second year.

ACTION	See page	EXECUTION EVERY			
		1000 h	2000 h	4000 h	8000 h
<b>1. INLET. OUTLET</b>					
Checking of:					
o the threads of inlet pipe and paring disc, and the level ring	3:1				x
o height position ( $74 \pm 0,5$ mm)	3:2				x
o seal rings, packings	—		x	x	x
<b>2. BOWL</b>					
<b>A</b> Cleaning of bowl discs and other parts in contact with process liquid.*	1:11		x	x	x
<b>B</b> Cleaning of ejection mechanism. Checking of condition of valve plugs. Cleaning of nozzles ( $\varnothing 1.3$ mm). Greasing of threads as well as contact and guiding surfaces of lock ring with molybdenum disulphide paste.	3:7 3:8		x	x	x
	4:13		x**	x	x
Checking of:					
o seal rings, packings	—		x	x	x
o wear of lock ring threads (max. $25^\circ$ )	3:3				x
o disc set pressure	3:5				x
o sealing surface bowl hood/sliding bowl bottom	3:6		x	x	x
o corrosion, erosion (max. 1 mm)	1:8				x

\* In addition a check has to be done in case a low pressure alarm occurs without an evident external reason (incorrect flow, temperature etc.).  
 \*\* however, at least every 6th month.

**MAINTENANCE SCHEDULE**  
— Machine type WHPX 507  
WHPX 508

ACTION	See page	EXECUTION EVERY			
		1000 h	2000 h	4000 h	8000 h
<b>3. PARING DISC DEVICE FOR OPERATING WATER</b>					
Checking height position of distributing cover (146 ± 1 mm).	3:9				x
Checking height position of control paring disc (12 mm).	3:9				
<b>4. BOWL SPINDLE</b>					
Applying oil onto the tapered end of spindle (a few drops only)	3:10		x*	x	x
Checking of:					
o radial wobble (max.0.04 mm)	3:11				x
o ball bearing housing (indentations max 0.5 mm) and radial buffer	3:12				x
o seal rings, packings	—				x
Replacement of ball bearings.	1:12				x
Replacement of radial buffer springs in top bearing.	3:12				x
Preloading springs and axial buffer springs in the top bearing should be replaced after 16000 operating hours (this applies to double top bearing design only).					
<b>5. WORM GEAR</b>					
Oil change in worm gear housing — see Lubrication Schedule in Operator's Manual	—	x	x	x	x
Note: In a new installation, or after replacement of gear, change the oil after 300 operating hours.					
Checking of:					
o worm and worm wheel (in connection with oil change)	3:15	x	x	x	x
<b>6. WORM WHEEL SHAFT</b>					
Checking of coupling drum and shaft	3:17				x
-----					
<b>7. COUPLING</b>					
Checking of:					
o axial play of elastic plate (ca. 2 mm)	3:18				x
o friction pads	3:19				x
o ball bearings in nave	3:19				x
Replacement of grease in nave	3:19				x
<b>8. BRAKE</b>					
Checking of:					
o lining	3:19				x
o spring and brake shoe	3:19				x
<b>9. PUMP</b>					
Cleaning of pump strainer			x	x	x
Exchange of lipseal rings					x
Checking of: relief valve, bushings, impeller shaft, wearing seals					x

\* however, at least every 6th month

*Example*

Place of operation <i>MS XXXY</i>		Machine type <i>WHPX 507</i>	
Manufac. No. <i>2222222</i>	Process liquid <i>Lubricating oil (HD)</i>	Time for job: at a total of <i>12000</i> operating hours	Job actually done after <i>12150</i> operating hours
Reason for job Preventive <input type="checkbox"/> 1000 h <input type="checkbox"/> 2000 h <input checked="" type="checkbox"/> 4000 h <input type="checkbox"/> 8000 h		Other reason ..... ..... .....	
Job ordered by: <i>H.L.</i>	Date <i>16.1.79</i>	Job done by: <i>AGW</i>	Date <i>31.1.79</i>

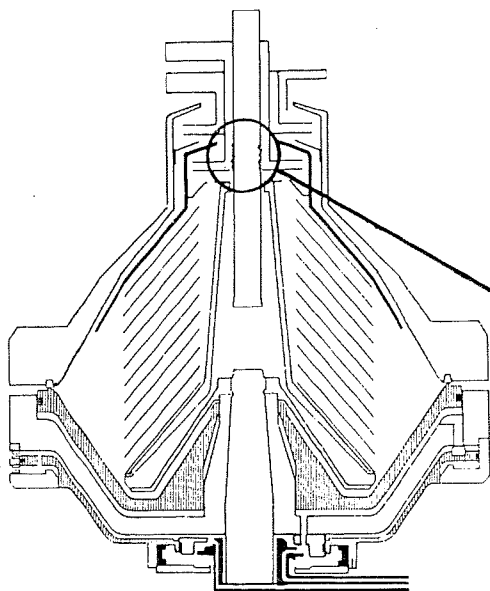
ACTION	EXECUTION EVERY			
	1000 h	2000 h	4000 h	8000 h
<b>1. INLET. OUTLET</b> Checking of: o the threads of inlet pipe and paring disc, and the level ring o height position ( $74 \pm 0.5$ mm) o seal rings, packings		x	x ✓	x x x
<b>2. BOWL</b> Cleaning of bowl discs and other parts in contact with process liquid.* Cleaning of ejection mechanism. Checking of condition of valve plugs. Cleaning of nozzles ( $\varnothing 1.3$ mm). Greasing of threads as well as contact and guiding surfaces of lock ring with molybdenum disulphide paste. Checking of: o seal rings, packings o wear of lock ring threads (max. 25 °) o disc set pressure o sealing surface bowl hood/sliding bowl bottom o corrosion, erosion (max. 1 mm)		x x x	x ✓ x ✓ x ✓ x ①	x x x x x
<b>3. PARING DISC DEVICE FOR OPERATING WATER</b> Checking height position of distributing cover ( $146 \pm 1$ mm). Checking height position of control paring disc (12 mm).				x
<b>4. BOWL SPINDLE</b> Applying oil onto the tapered end of spindle (a few drops only) Checking of: o radial wobble (max.0.04 mm) o ball bearing housing (indentations max 0.5mm) and radial buffer o seal rings, packings Replacement of ball bearings. Replacement of radial buffer springs in top bearing. Preloading springs and axial buffer springs in the top bearing should be replaced after 16000 operating hours (this applies to double top bearing design only).		x	x ✓	x x x x x

*Example*

ACTION	EXECUTION EVERY			
	1000 h	2000 h	4000 h	8000 h
<b>5. WORM GEAR</b> Oil change in worm gear housing – see Lubrication Schedule in Operator’s Manual Note: In a new installation, or after replacement of gear, change the oil after 300 operating hours. Checking of: o worm and worm wheel (in connection with oil change)	x	x	x✓	x
<b>6. WORM WHEEL SHAFT</b> Checking of coupling drum and shaft				x
<b>7. COUPLING</b> Checking of: o axial play of elastic plate (ca. 2 mm) o friction pads o ball bearings in nave Replacement of grease in nave				x x x x
<b>8. BRAKE</b> Checking of: o lining o spring and brake shoe				x x
<b>9. PUMP</b> Cleaning of pump strainer Exchange of lipseal rings Checking of: relief valve, bushings, impeller shaft, wearing seals		x	x✓	x x x
				} See special instruction book
<b>Notes:</b> ..... ① Sliding bowl bottom seal ring replaced ..... ② Bowl hood nylon ring replaced ..... ..... ..... ..... ..... ..... .....				

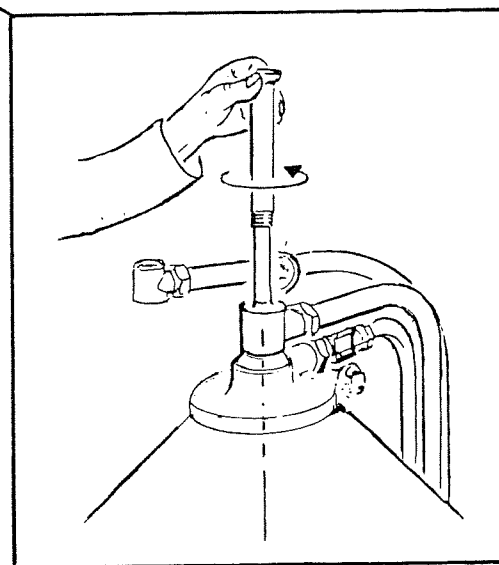


## THREADS OF INLET PIPE AND PARING DISC

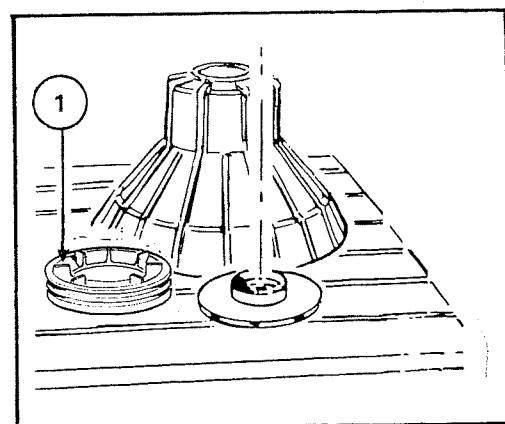


- Damage to the threads and to the top surface of the level ring may cause the paring disc to scrape against the paring chamber housing even though the height adjustment has been made correctly – see »Height position of lower paring disc«.

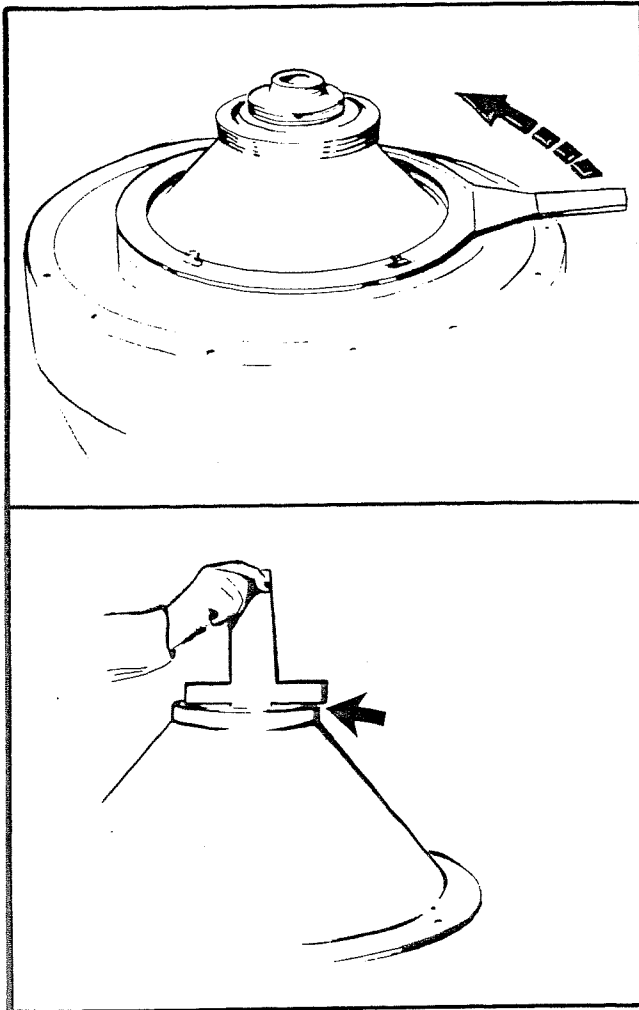
Screw the inlet pipe **counterclockwise** (left-hand thread) in the paring disc, checking that the pipe turns easily in the disc. If required, rectify the threads.



Remove any protrusions on the top surface (1) of the level ring with a file as the paring disc supports on that surface during the check.



### HEIGHT POSITION OF LOWER PARING DISC



- Incorrect height position can cause the paring disc (1) — see lowermost figure — to scrape against paring chamber housing.

The height position should be checked if the bowl spindle has been disassembled or the bowl has been replaced.

Assemble the bowl without paring chamber cover, upper paring disc, gravity disc and cover.

Tighten the large lock ring until the bowl hood is in close contact with the bowl body.

Put the frame hood in place and tighten it with the screws.

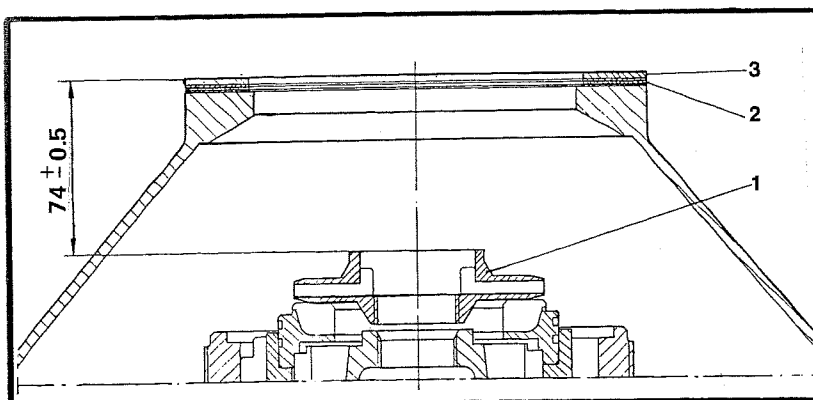
Measure the distance between the top washer (3) on the frame hood and the top face of the paring disc. Use the template of the tool kit.

Place the tongue of the template against the top washer and push the piece marked MIN. over the top face of the paring disc. There should now be a small gap between the paring disc and the template. If not, the paring disc is positioned too high.

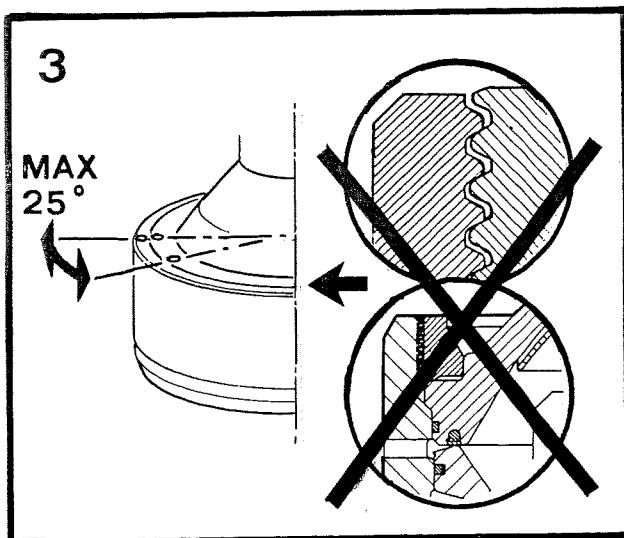
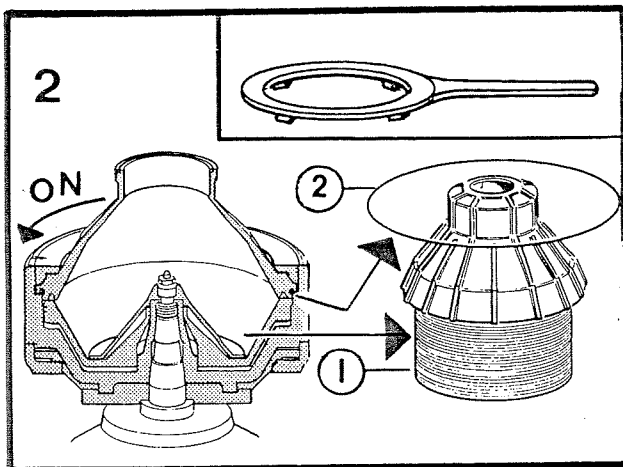
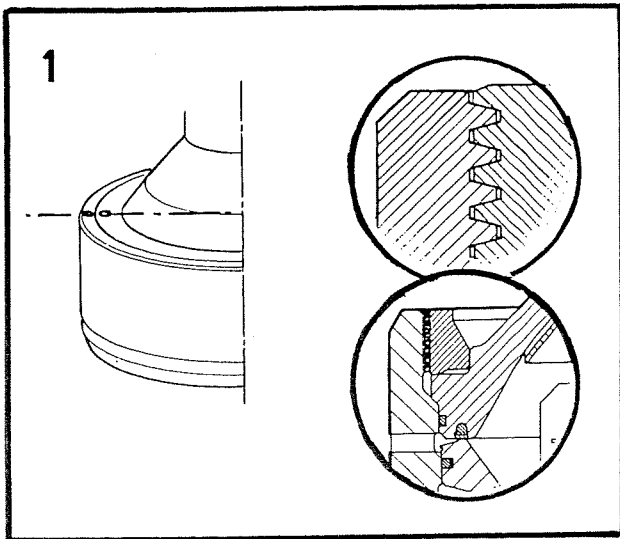
Push down the template so that the piece marked MAX. rests on the top face of the paring disc. There should now be a small gap between the top washer and the tongue of the template. If not, the paring disc is positioned too low.

The height position is adjusted by means of the height adjusting rings (2) under the top washer.

With inlet and outlet parts mounted:  
Revolve the worm wheel shaft by hand. If it turns heavily or if a scraping noise is heard, wrong height adjustment or wrong fitting of the inlet pipe may be the cause.



THREADS OF LARGE LOCK RING  
AND BOWL BODY



- Excessive wear of these threads can render the machine hazardous to personnel and plant.

1. In a new bowl, the alignment marks ( $\phi$ ) on bowl body and lock ring should be right in front of each other. However, in time these marks will pass each other due to thread wear.

2. Check the thread condition by tightening the lock ring after removing the disc set (1) and bowl hood O-ring (2) from the bowl.

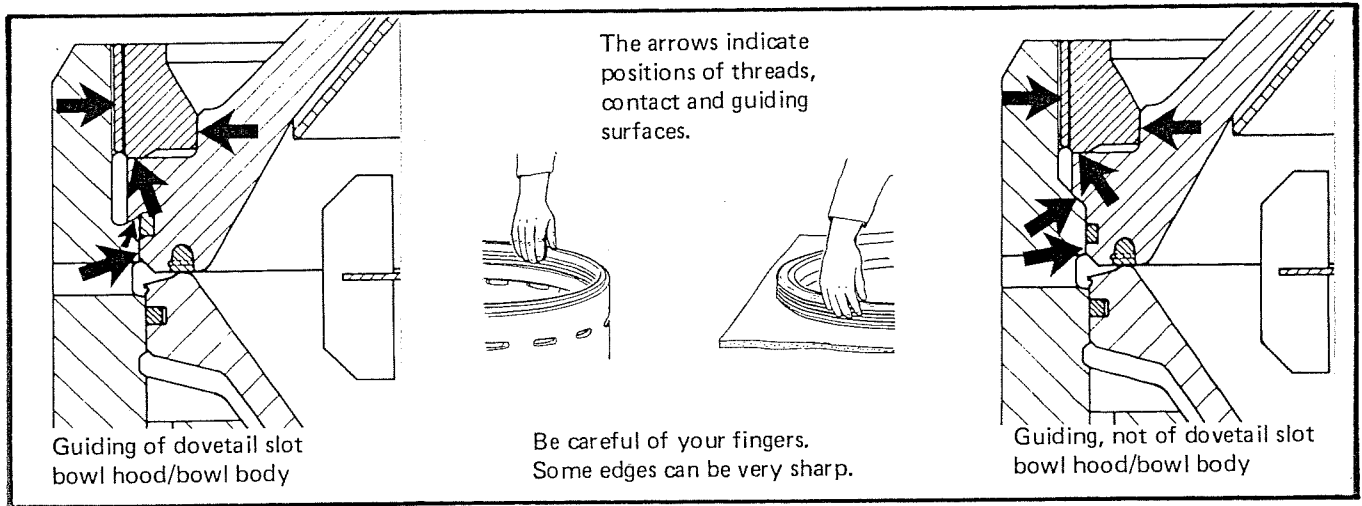
3. When mark  $\phi$  on lock ring passes the corresponding mark on bowl body by more than  $25^\circ$ : contact our representative immediately.

**Note**

- If thread wear has been observed, mark bowl body at the new position of alignment mark on lock ring, e.g. by punching.
- If marks  $\phi$  are not legible, corrosion or erosion will be the cause. Contact our representative immediately for determination of the extent of thread wear and punching of new alignment marks.

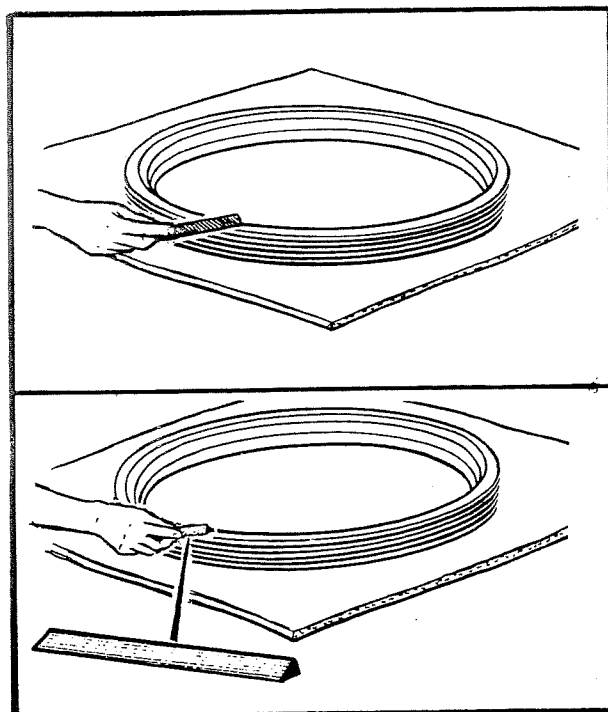
LOCK RING JOINT

- Impact marks and the like on lock ring, bowl hood, and bowl body may cause seizure damage and bad running of the separator.



Clean the threads as well as contact and guiding surfaces with a suitable defatting agent. Then check for burrs and protrusions caused by impact.

If damage is established, rectify according to following recommendations:



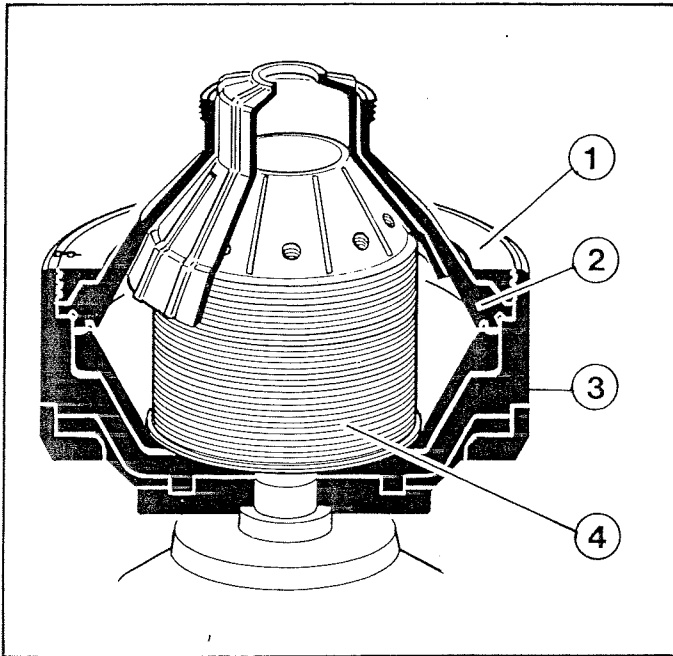
If the seizure damage is considerable, use first a fine and single-cut file, but moderately so as not to aggravate the damage.

If possible, avoid using the file!

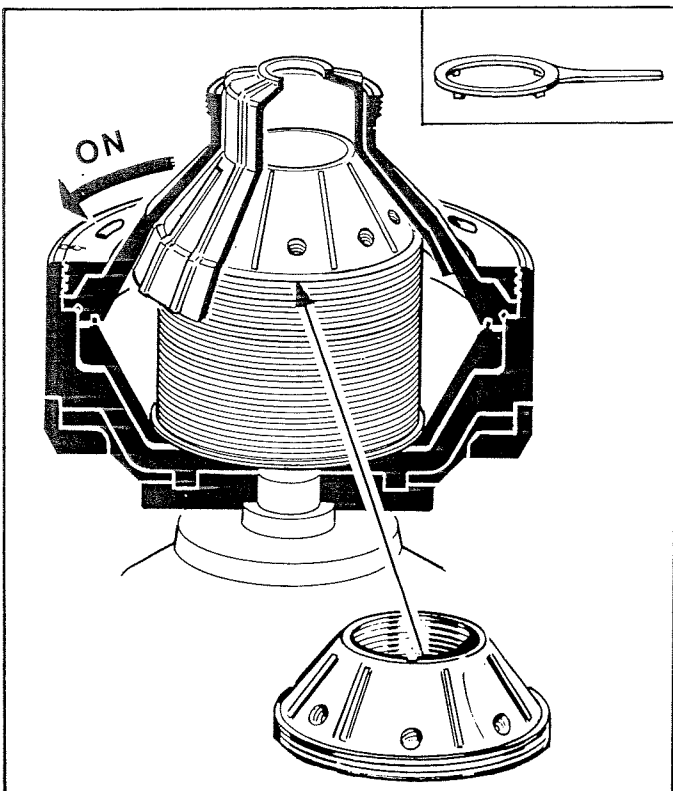
Then use a whetstone (by way of suggestion grain size 240). Use fine emery cloth if whetstones are not available.

DISC SET PRESSURE

- Insufficient pressure in the disc set may affect the bowl balance, which in turn will cause abnormal machine vibration.



The lock ring (1) should press the bowl hood (2) firmly against the bowl body (3), the hood in turn should exert a pressure on the disc set (4) clamping the latter in place.

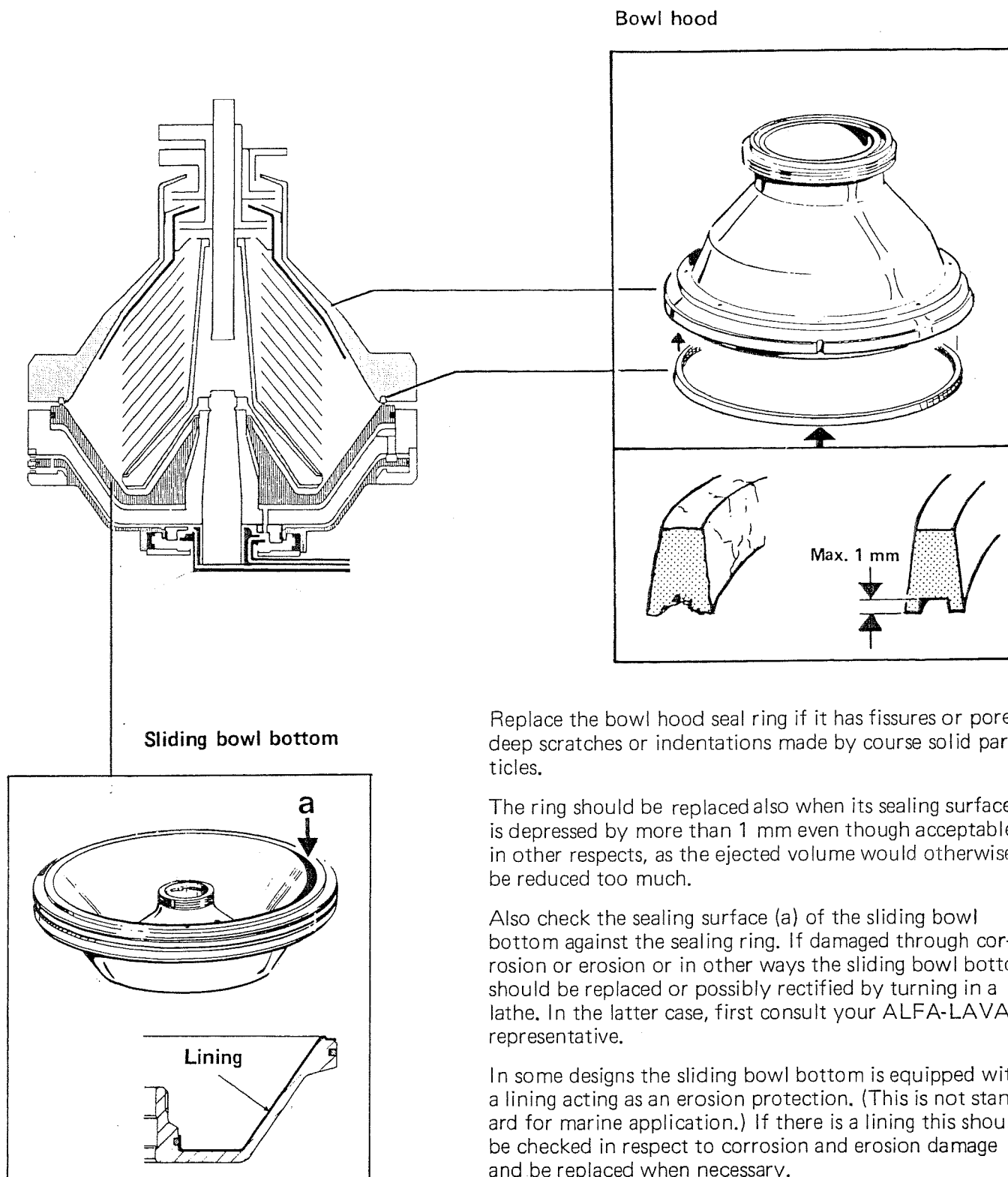


If the lock ring can be tightened without resistance until the bowl hood lies tightly against the bowl body:

increase the pressure by adding one or more discs to the top of bowl disc set beneath the top disc!

**BOWL HOOD/ SLIDING BOWL BOTTOM**

- Poor sealing between the bowl hood seal ring and the sealing edge of the sliding bowl bottom will cause a leakage of process liquid from the bowl.



Replace the bowl hood seal ring if it has fissures or pores, deep scratches or indentations made by coarse solid particles.

The ring should be replaced also when its sealing surface is depressed by more than 1 mm even though acceptable in other respects, as the ejected volume would otherwise be reduced too much.

Also check the sealing surface (a) of the sliding bowl bottom against the sealing ring. If damaged through corrosion or erosion or in other ways the sliding bowl bottom should be replaced or possibly rectified by turning in a lathe. In the latter case, first consult your ALFA-LAVAL representative.

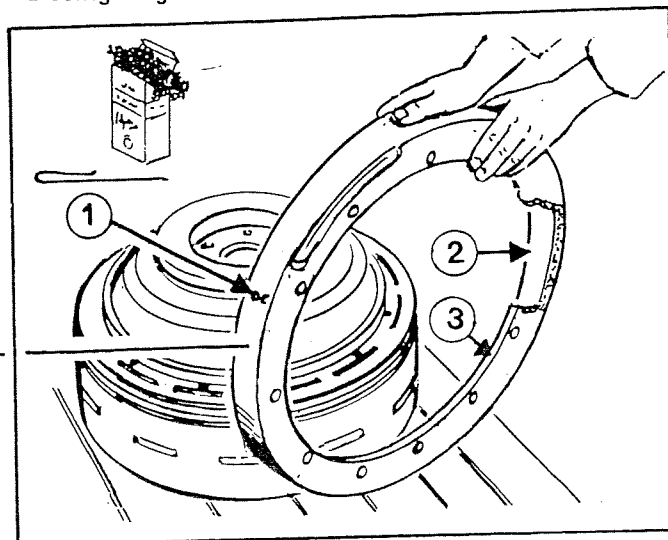
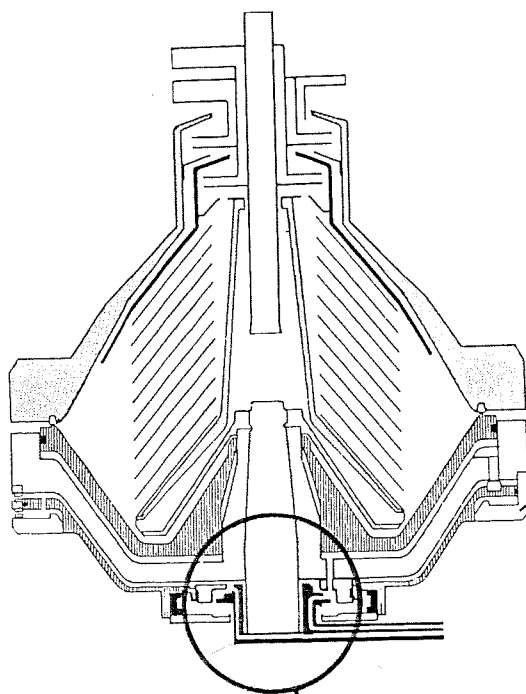
In some designs the sliding bowl bottom is equipped with a lining acting as an erosion protection. (This is not standard for marine application.) If there is a lining this should be checked in respect to corrosion and erosion damage and be replaced when necessary.

– Bowl. Paring disc device for operating water

EJECTION MECHANISM

- Dirt and lime deposits in the ejection mechanism may cause bad ejecting function or non at all.

Dosing ring

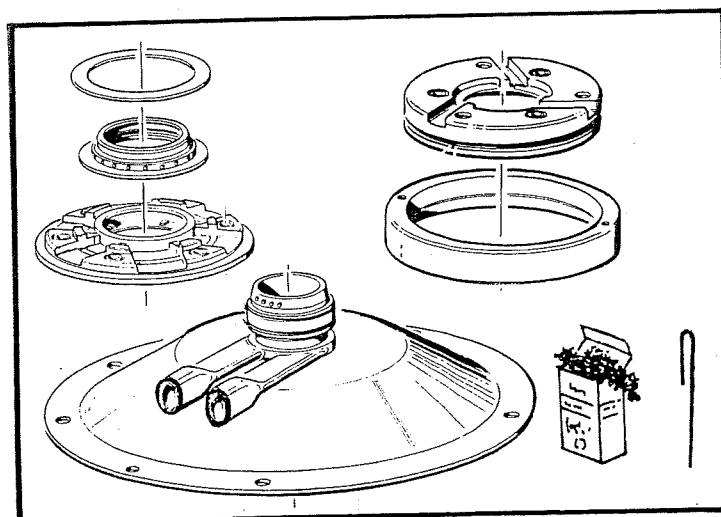
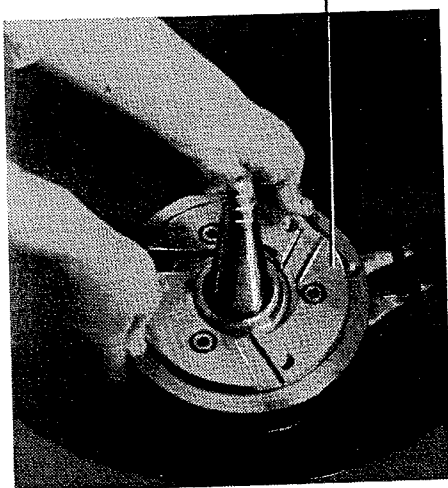


Clean the nozzles (1) of the dosing ring (inner diameter 1.3 mm) with a soft iron wire or the like. Polish the surface (2) with steel wool.

Inspect the surface (3) in contact with the operating slide. Remove any marks with whetstone (grain size 240).

**Note.** The dosing ring screws must be tightened with a torque of 0.9 kpm (8.8 Nm). Firmer tightening may jam the operating slide.

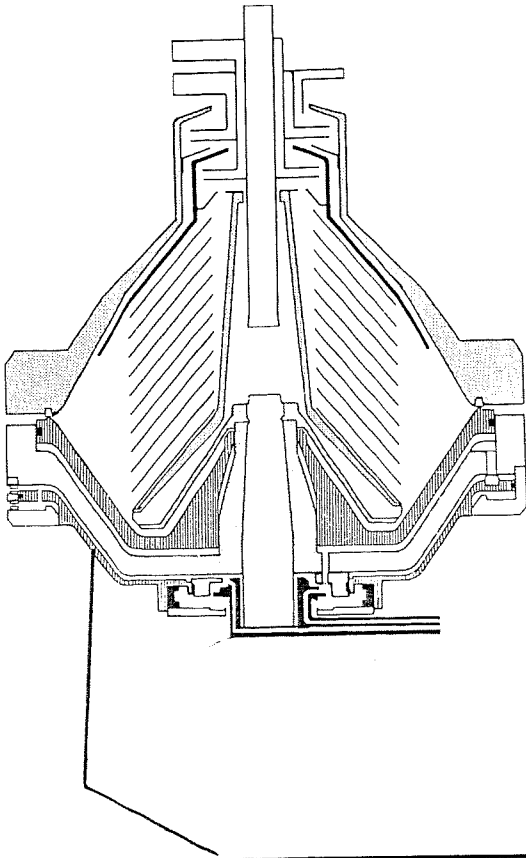
Paring disc device for operating water



Clean the channels and orifices of the paring disc device. Remove any lime deposits with steel wool.

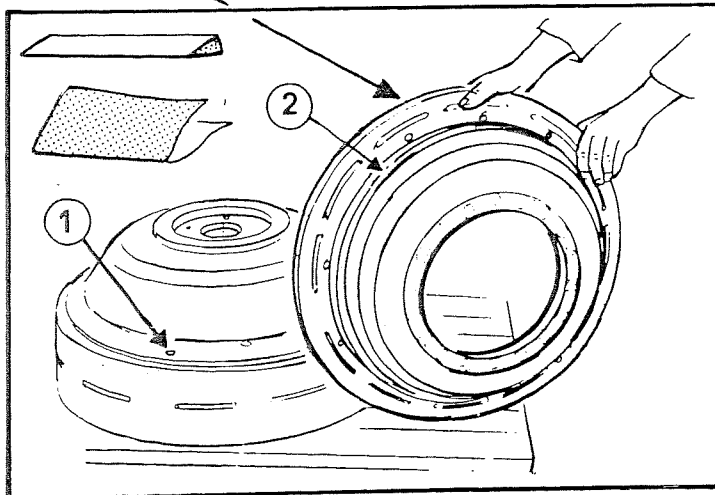
**Note!** Lime deposits can to advantage be dissolved in a 10 % acetic acid solution which should first be heated to 80 ° C.

(Ejection mechanism . . .)



#### Operating slide

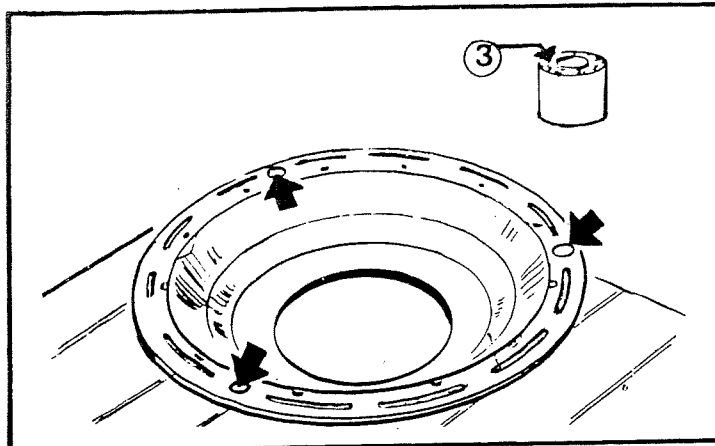
- Poor sealing between the valve plugs of the operating slide and the bowl body may prevent complete closing of the bowl.



Examine the three sealing surfaces (1) of the bowl body in contact with the valve plugs. Remove any marks and lime deposits with a **very fine-grain** emery cloth.

Inspect the guiding surface (2) in contact with the dosing ring. Remove any marks with whetstone (grain size 240).

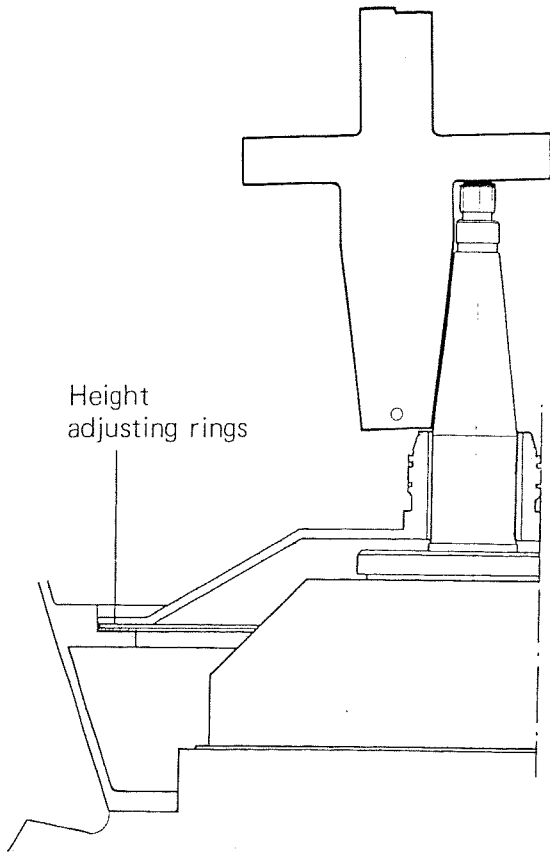
#### Valve plugs



Check the sealing surface (3) of the three valve plugs. Preferably replace all plugs even if only one of them is defective (scratches, pores). **In an emergency** the plugs can be turned around and utilized a second time. An absolute condition is, however, that the damaged surfaces are only scratched (no deep indentations) and that the "new" surfaces are intact.



**HEIGHT POSITION OF DISTRIBUTING COVER**



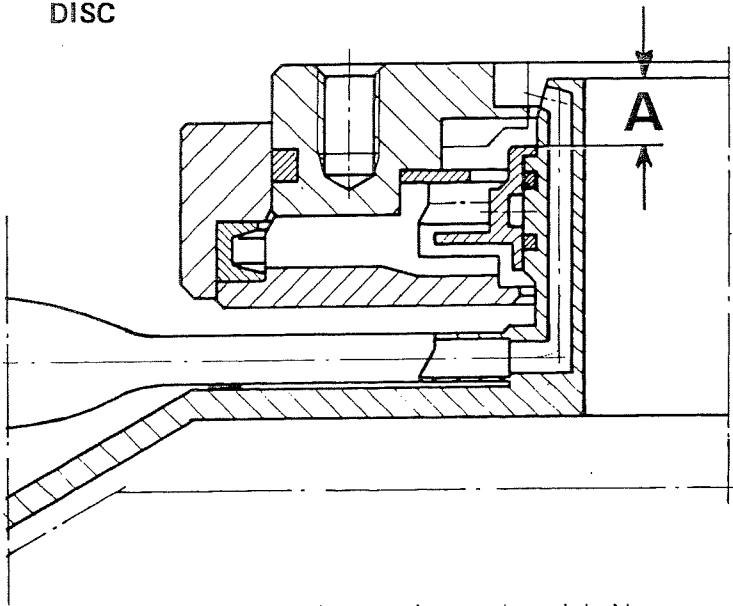
Check the height position if the bowl spindle has been dismantled.

Place the template on top of the spindle with the 145-mm dimension facing the spindle. There should be a small gap between the bottom of the template and the top face of the cover neck. If not, the distributing cover is too high.

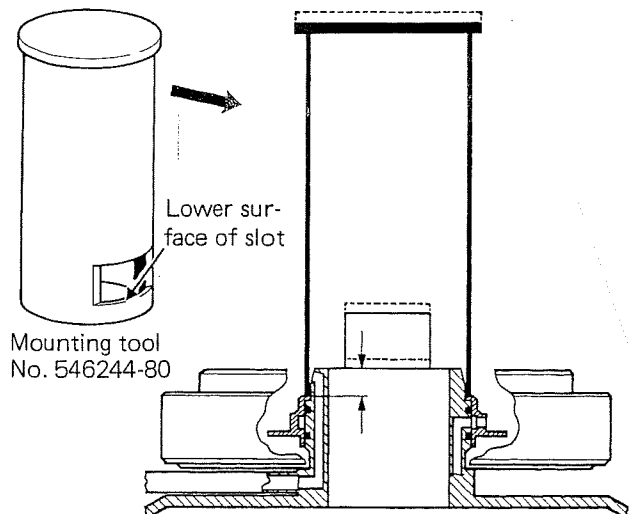
Turn the template so that the 147-mm dimension is facing the spindle and the bottom rests on the top face of the cover neck. There should be a small gap between the tongue of the template and the top of the spindle. If not, the distributing cover is too low.

The height position is adjusted by adding or removing rings under the distributing cover.

**HEIGHT POSITION OF CONTROL PARING DISC**



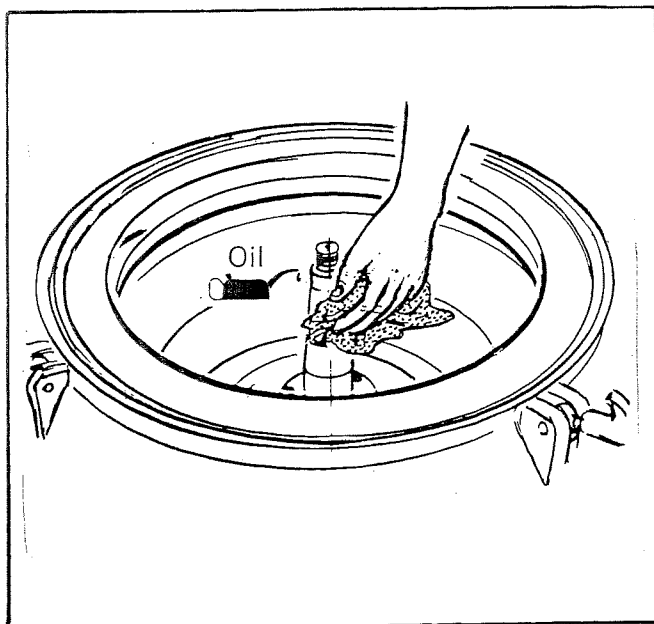
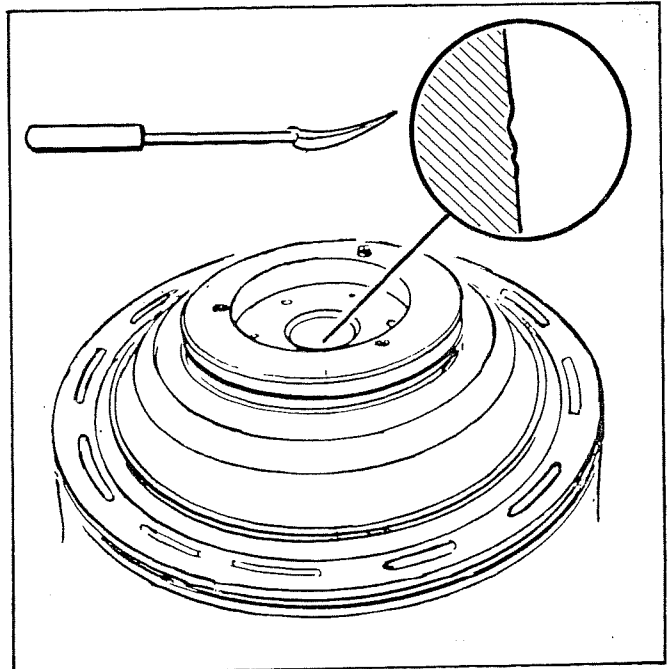
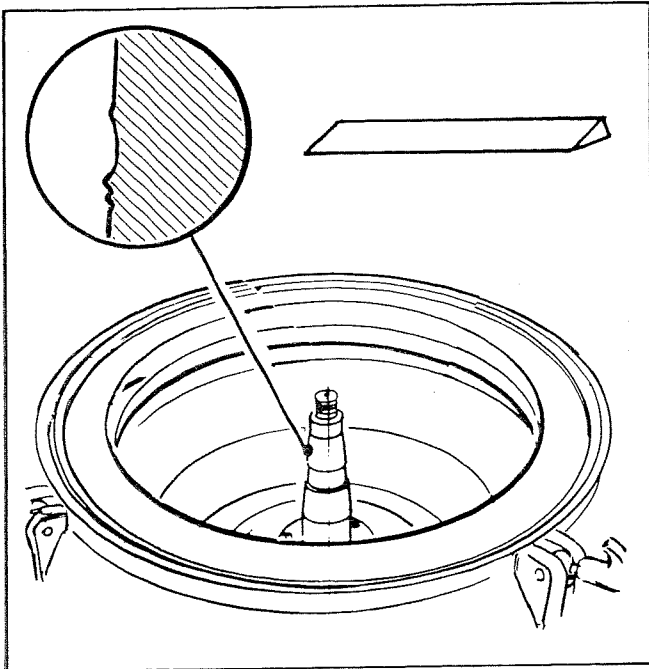
The control paring disc must make contact with the shoulder on the distributing cover neck. The distance A in the figure must then be approx. 12 mm. Check this distance with a vernier caliper every time the movable unit of the paring disc device is mounted on the neck.



When using Alfa-Laval mounting tool, article No. 546244-80, the paring disc is in its correct position when the lower surfaces of the slots are in line with the upper surface of the distributing cover neck.

BOWL SPINDLE CONE/BOWL BODY NAVE

- Impact marks and similar on the spindle cone and/or in the nave may cause bad bowl run.  
Heavy rusting may cause the bowl body to stick firmly to the spindle cone and can thus obstruct disassembly.

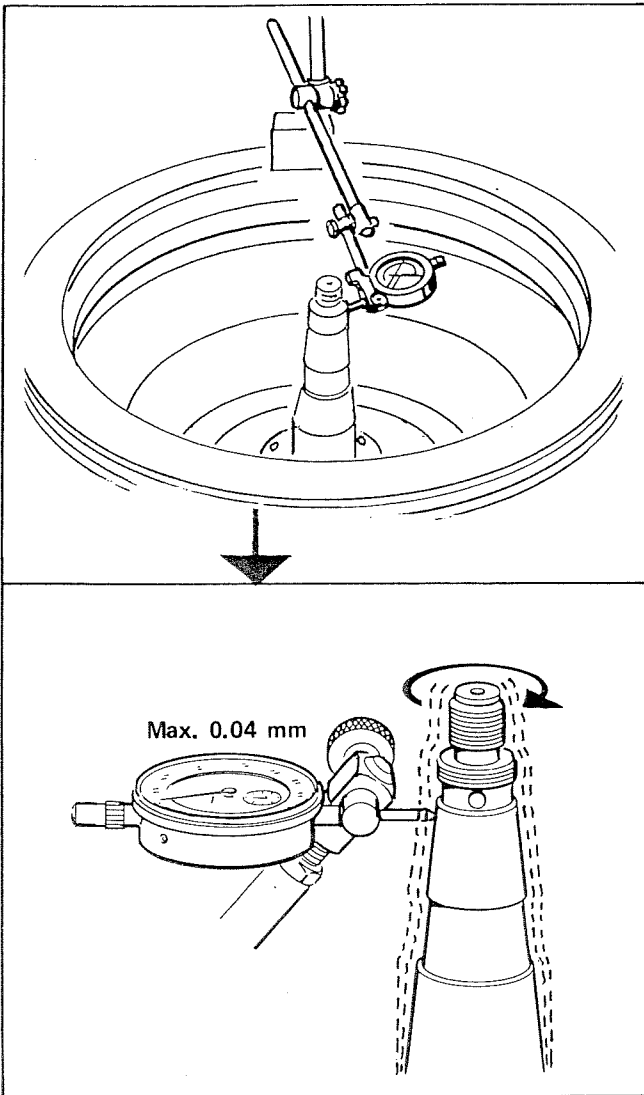


Clean spindle cone and bowl body nave with a suitable defatting agent. Remove any impact marks on nave and cone with a scraper, and an oil-stone respectively. Remove any rust with a fine-grain emery cloth (e.g. No. 320). Finish with polishing paper (e.g. No. 600).

Note. Always use the scraper with great care.  
The conicity must not be marred.

Prevent the bowl body from seizing on the spindle by applying a few drops of oil onto the tapered end of the spindle. Smear the oil over the surface and wipe it off with a clean cloth.

RADIAL WOBBLE OF BOWL SPINDLE



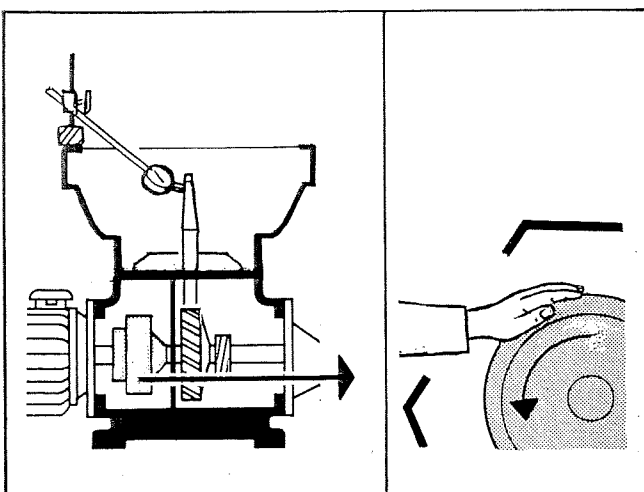
- Excessive spindle wobble is indicated by rough bowl run (vibration).

Clamp a dial indicator e.g. in a support, and fasten the latter to the bowl casing of frame.

Measure the wobble at the top of the spindle tapered end. Maximum permissible radial wobble: 0.04 mm.

First check the wobble before dismounting the spindle. If wobble is too large: replace ball bearings in top and bottom bearings.

Remeasure wobble after assembly. If it is still excessive, the spindle is probably damaged and must be replaced.



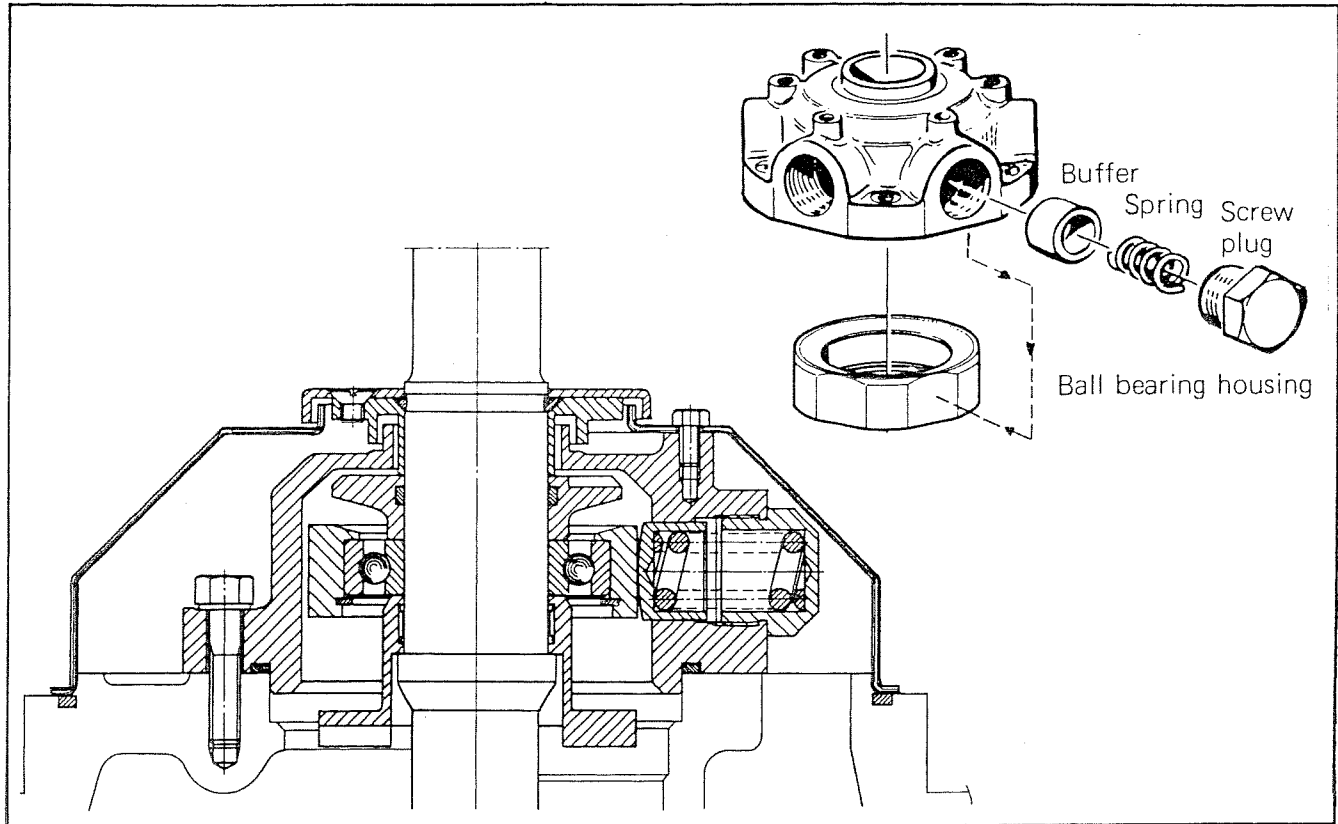
**IMPORTANT!**

During indication the spindle must be revolved by hand using the worm wheel shaft.

Before measuring make sure the buffer plugs are properly tightened – see »Top bearing springs - - «.

### TOP BEARING SPRINGS and BALL BEARING HOUSING

- Weakened or broken buffer springs as well as defective contact surfaces for the buffers on the ball bearing housing may give rise to machine vibration (rough bowl running).



#### Springs

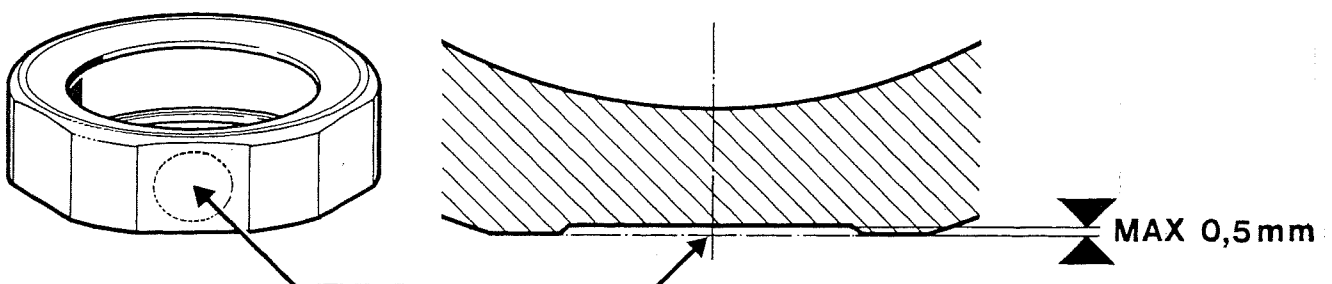
It is difficult to determine the condition (stiffness) of a spring without special testing equipment. So, an estimation of the spring condition must be based on the experience of the machine run before the overhaul.

It is recommended, however, that all springs be replaced at the annual overhaul.

In case of sudden spring fracture, the complete set should be replaced even if only one spring is broken.

#### Ball bearing housing

Examine the contact surface for the buffers on the ball bearing housing. In case of defects (indentations deeper than 0.5 mm) replace the housing as well as buffers and springs.



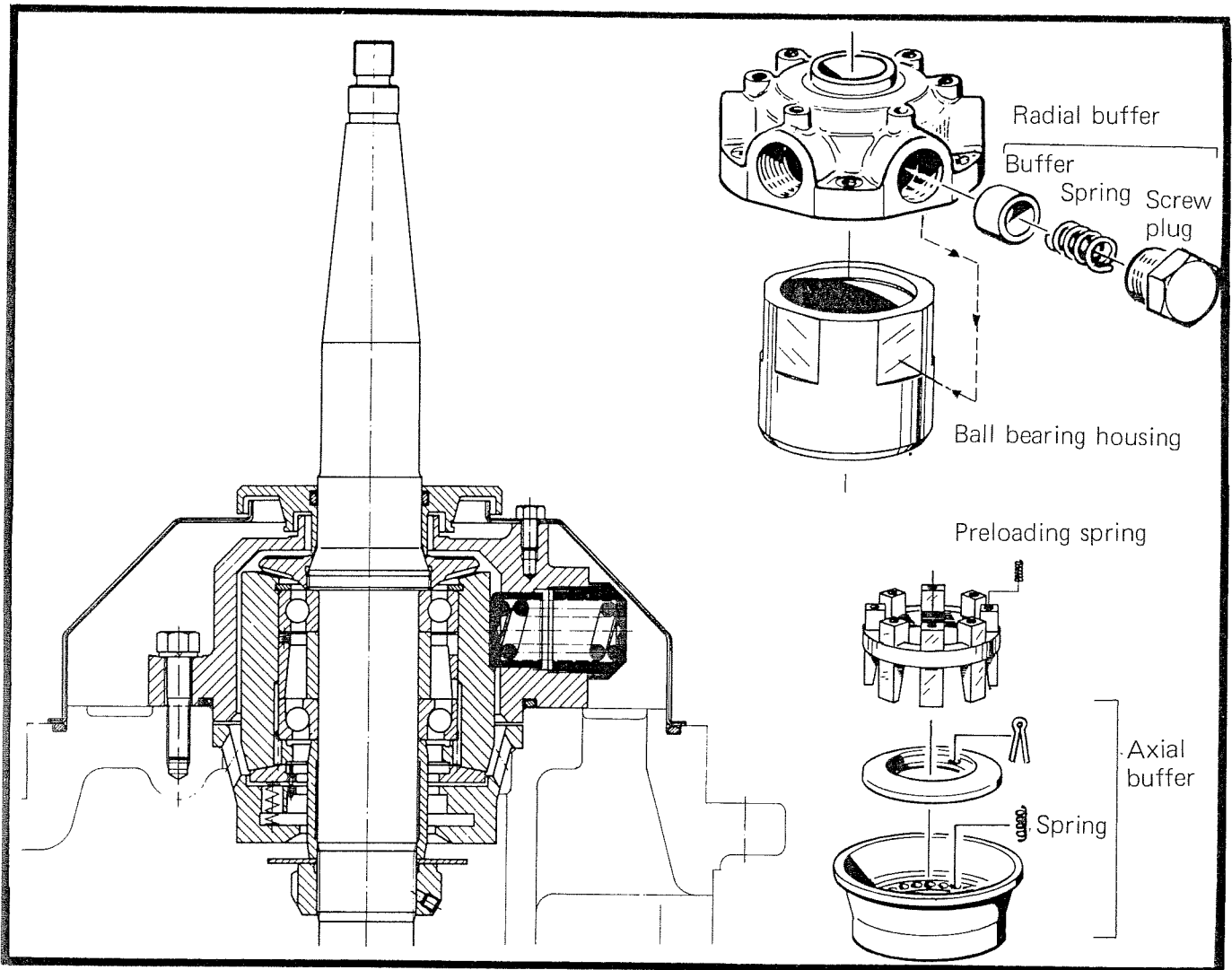


## CHECKPOINTS

– Bowl spindle, double top bearing design

### TOP BEARING SPRINGS and BALL BEARING HOUSING

- Weakened or broken radial buffer springs as well as defective contact surfaces for the buffers on the ball bearing housing may give rise to machine vibration (rough bowl running).



### Springs

The condition (stiffness) of a spring can hardly be determined without using special testing equipment. So, an estimation of the spring condition must be based on the knowledge of the machine run before the overhaul.

It is recommended, however, to replace the radial buffer springs at the annual overhaul.

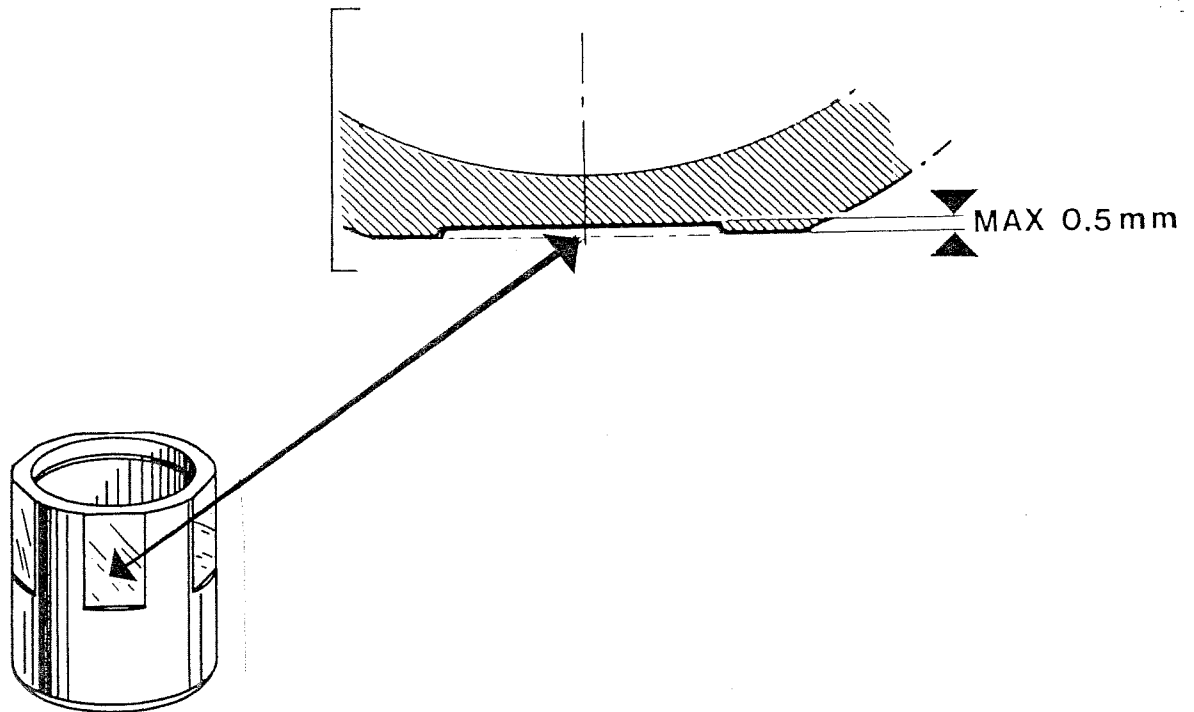
Preloading springs and axial buffer springs should be replaced at every second annual overhaul.

In case of a sudden spring fracture, the complete set should be replaced even when only one spring has broken.

(cont.)

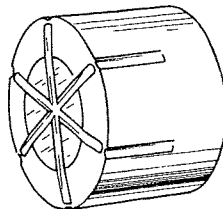
## BALL BEARING HOUSING

Examine the contact surface for the buffers on the ball bearing housing. In case of defects (indentations deeper than 0.5 mm) replace the housing as well as buffers and springs.

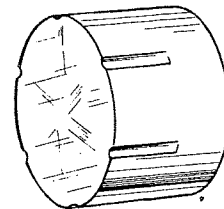


## RADIAL BUFFERS

Replace the buffers when the oil grooves in the contact surface against the ball bearing housing are worn out. (Original depth of the grooves = 0.5 mm). **REPLACE ALL BUFFERS.**

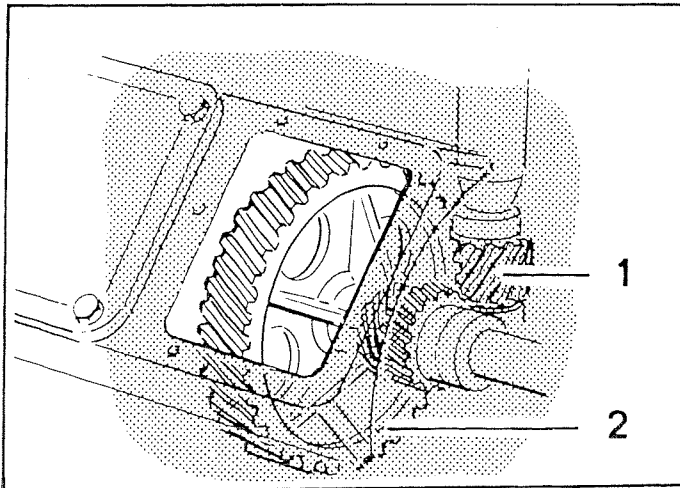


Buffer with oil grooves in the contact surface against the ball bearing housing.



Buffer on which the oil grooves are worn out.

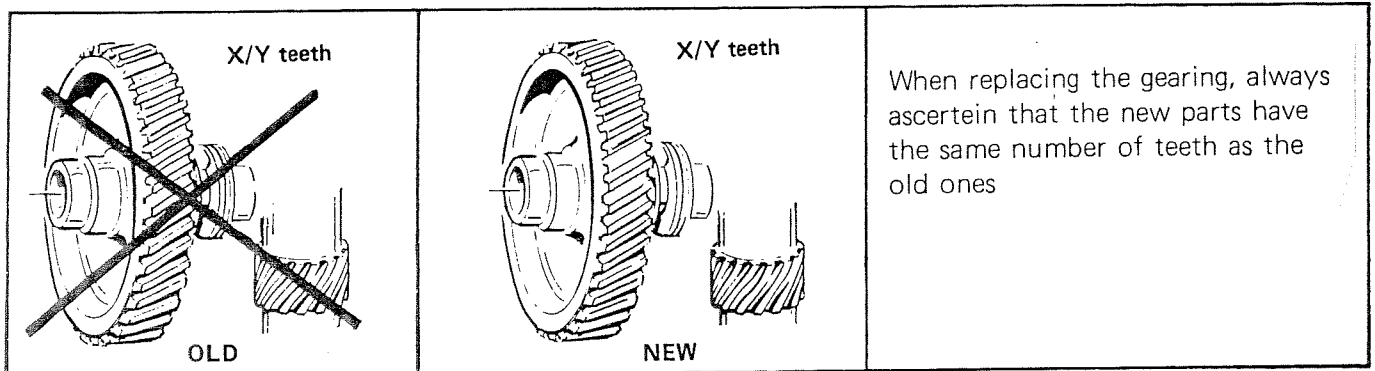
### WORM AND WORM WHEEL (WORM GEARING)



1 Worm                      2 Worm wheel

Check the teeth of worm wheel and worm for wear. Examine the contact surfaces and compare the tooth profiles. The gearing may work satisfactorily even when worn to some degree.

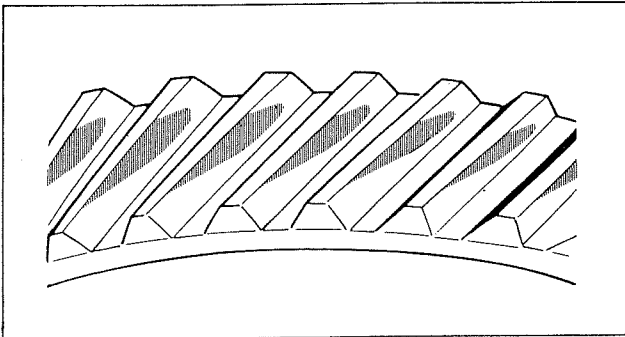
- Replace worm wheel and worm at the same time, even if only one of the parts is considerably worn.
- By removing the revolution counter cap during assembly, a visual check can be made that the gears are meshing correctly and are not damaged.



Presence of metal chips in the oil bath is an indication that the worm wheel is wearing abnormally.



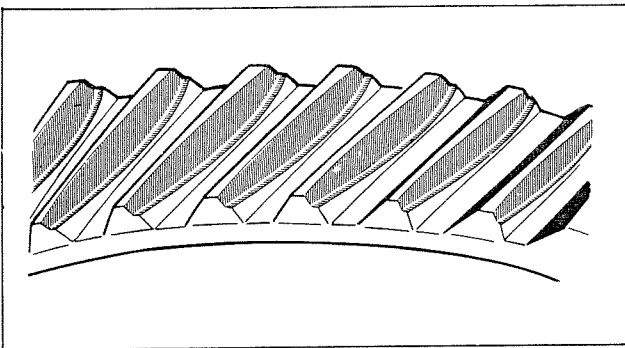
Examples of various tooth appearances after operation



Satisfactory teeth

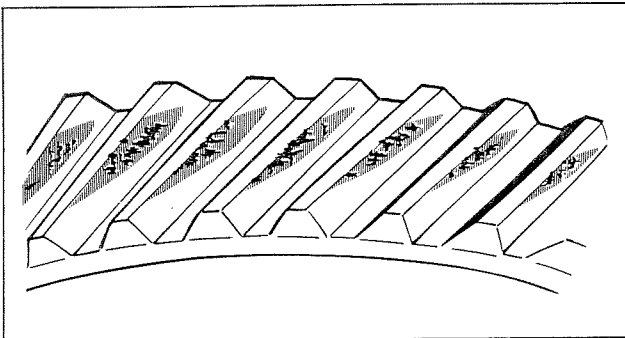
Uniform wear of contact surfaces. Surfaces are smooth.

Good contact surfaces will form on the teeth when the gearing is subjected only to moderate load during a running-in period.



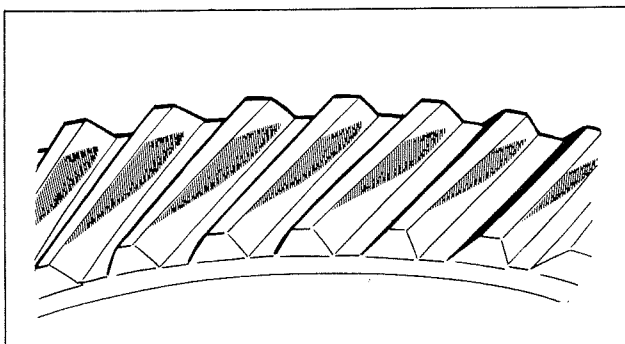
Worn teeth

Tooth wear, sometimes occurring only on some of the teeth. If the wear has advanced as far as shown in the illustration, replace worm wheel and worm.



Spalling

Small bits of the teeth have split off, so-called spalling. Generally due to excessive load or improper lubrication. Damage of this type need not necessitate immediate replacement, but careful checking at short intervals is imperative.



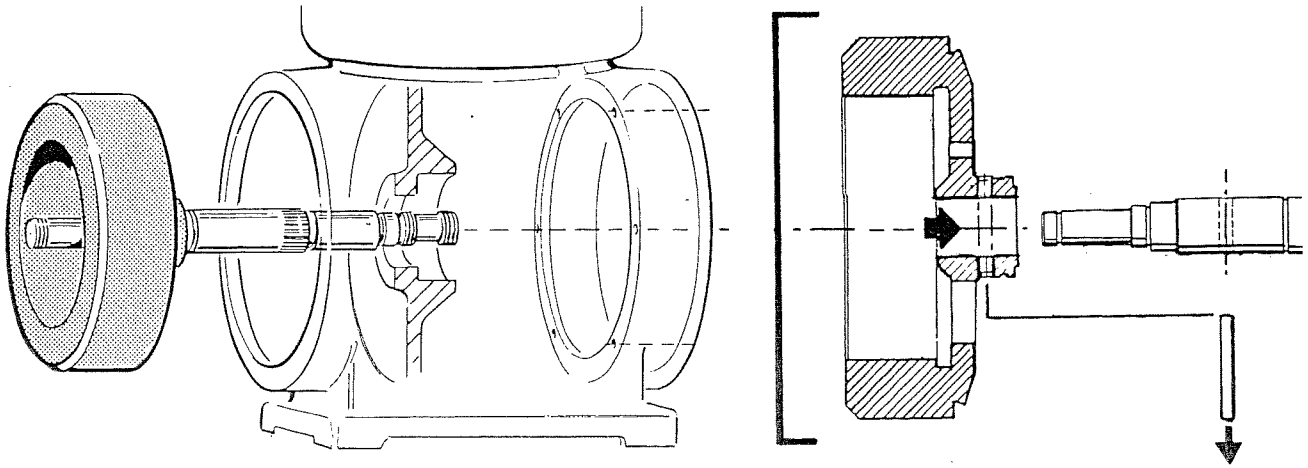
Pitting

Small cavities in the teeth, so-called pitting. Can occur through excessive load or improper lubrication. Damage of this type need not necessitate immediate replacement, but careful checking at short intervals is imperative.

**CHECKPOINTS**  
 – Worm wheel shaft

- If the worm wheel shaft has been damaged, a new shaft can be fitted in the coupling drum. It is a condition, however, that suitable equipment is available, so that the

measures and tolerances indicated below can be maintained. Otherwise, a shaft assembly including the drum must be ordered.



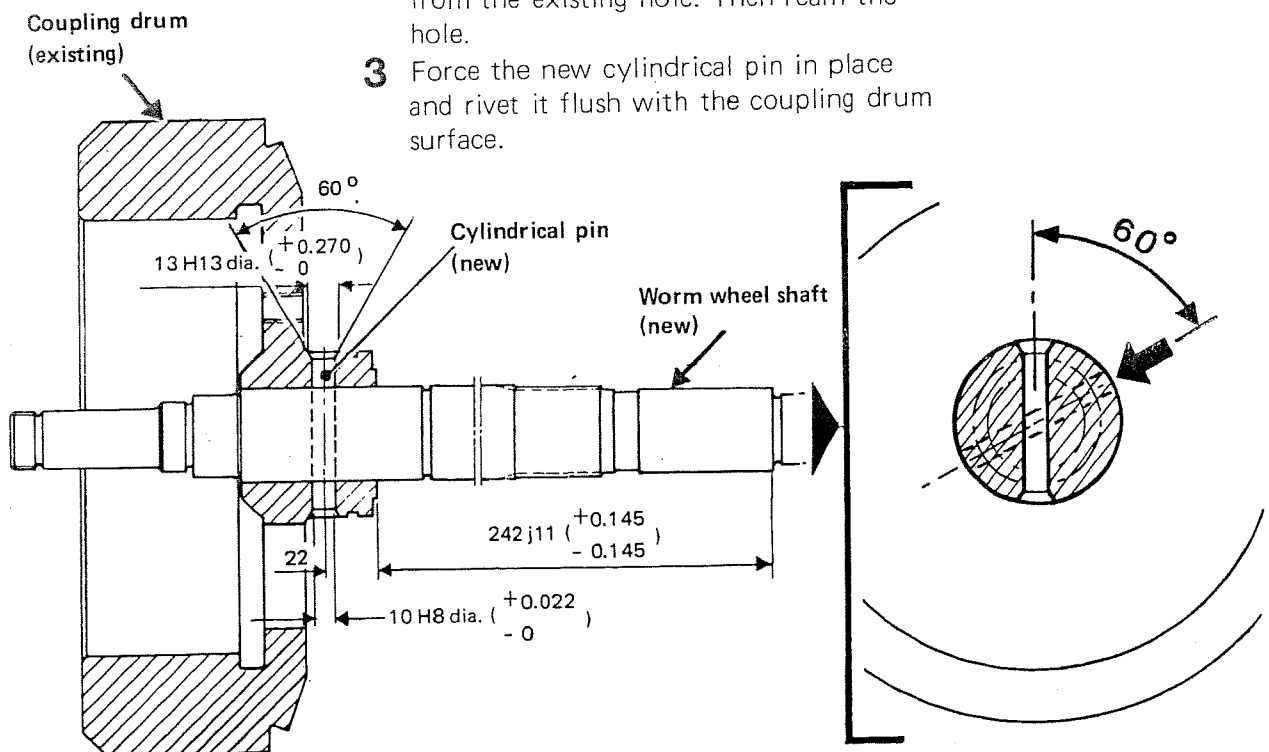
**Removal of shaft**

Drill one riveted end of the cylindrical pin.  
 Ease out the pin.

Press or knock the shaft out of the drum.

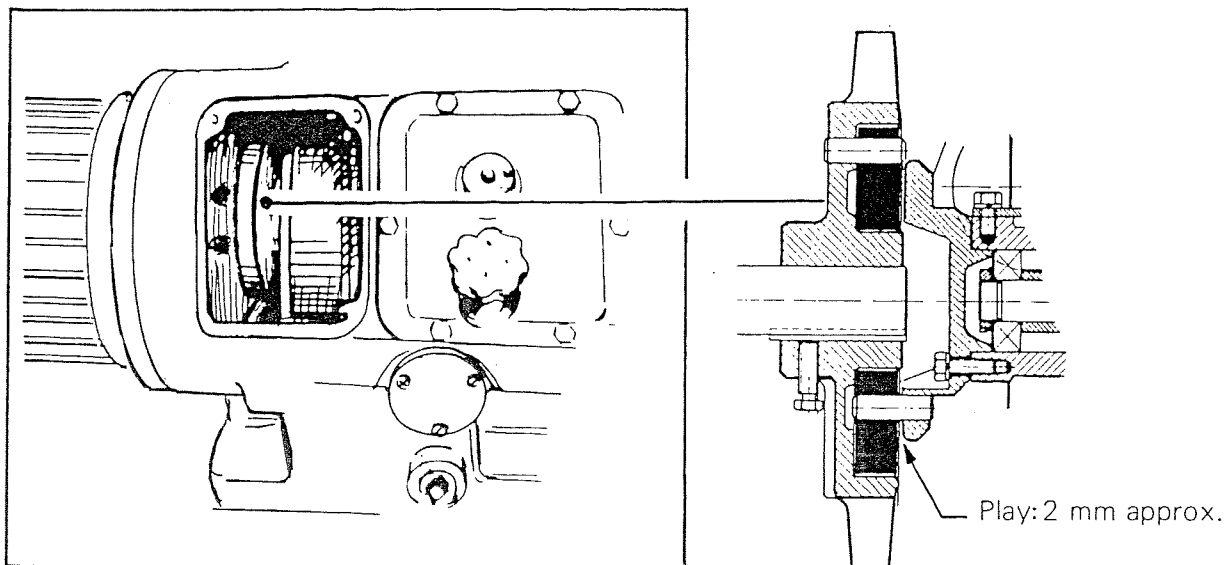
**Fastening the new shaft**

- 1 Fix the new shaft in the correct position according to drawing.
- 2 Drill a new hole through the coupling drum and the worm wheel shaft  $60^\circ$  from the existing hole. Then ream the hole.
- 3 Force the new cylindrical pin in place and rivet it flush with the coupling drum surface.

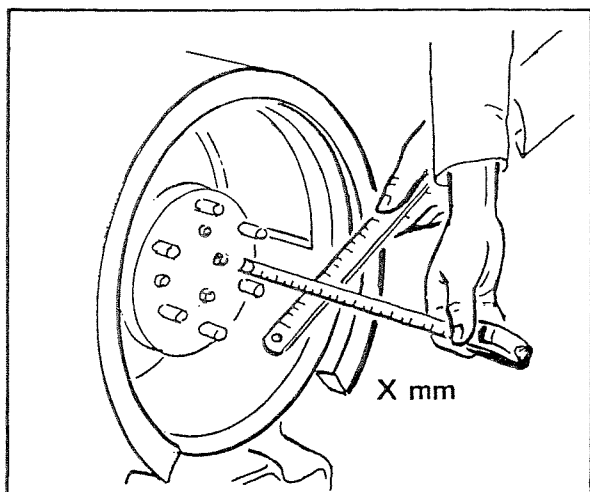


AXIAL PLAY OF ELASTIC PLATE

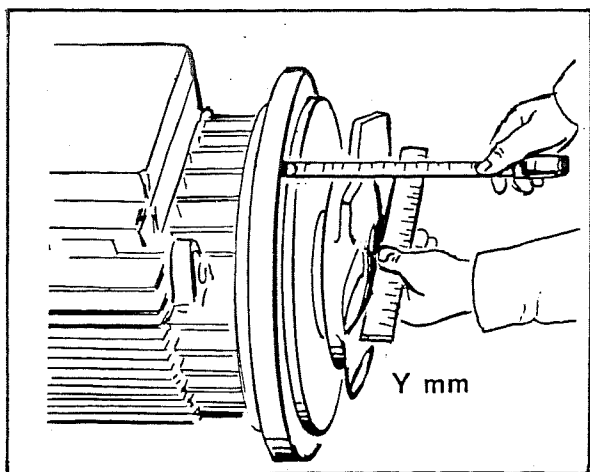
- The axial play of the elastic plate should be 2 mm (approx.).



Check the play as follows:



- 1 Measure the distance from frame ring to coupling disc of the machine.

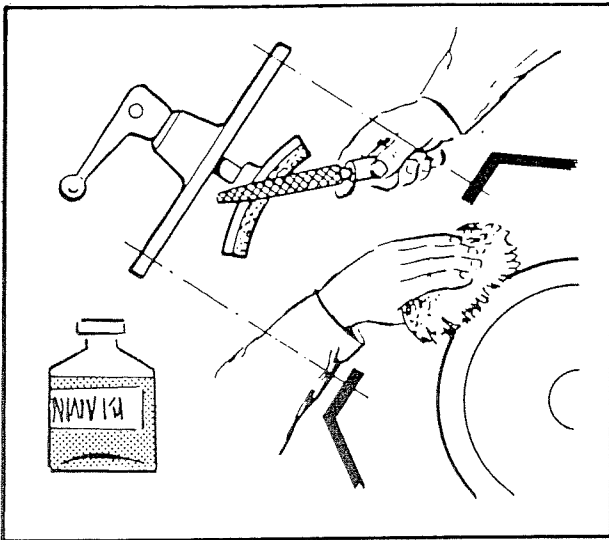


- 2 Measure the distance from motor coupling disc to motor flange.
- 3  $X \text{ mm} - Y \text{ mm} = 2 \text{ mm}$ .

If required, adjust the position of the motor coupling disc.

**BRAKE**

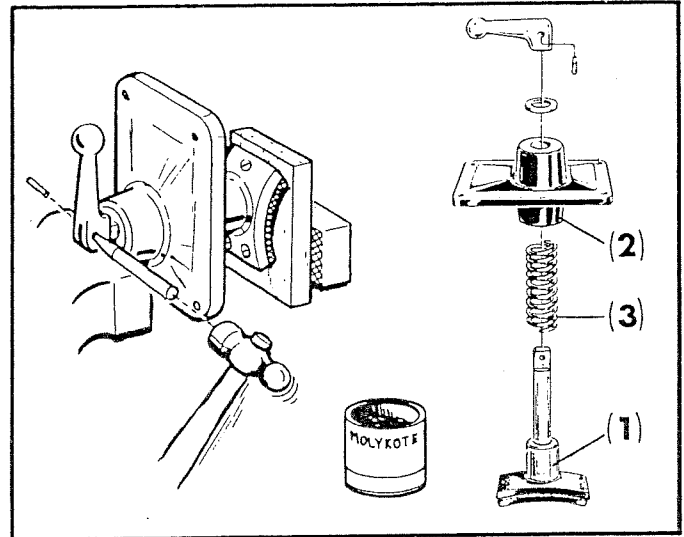
- A worn or oily lining will lengthen the braking period.



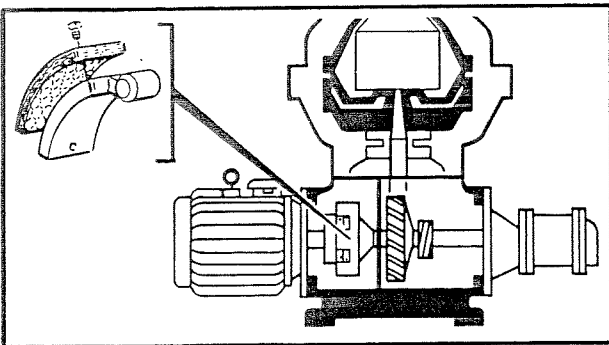
If oiliness is the fault: clean the lining and the coupling drum with a suitable defatting agent.

Roughen the friction surface of the lining with a coarse file.

- Formation of rust on the brake parts may cause the brake to jam.



Remove any rust from the surface (1) of the brake shoe and the corresponding guiding surface in the cap (2). Rub the surfaces for instance with Molykote 1000 Universal Paste. Replace the spring (3) if it has lost its stiffness. Oil the spring when mounting.

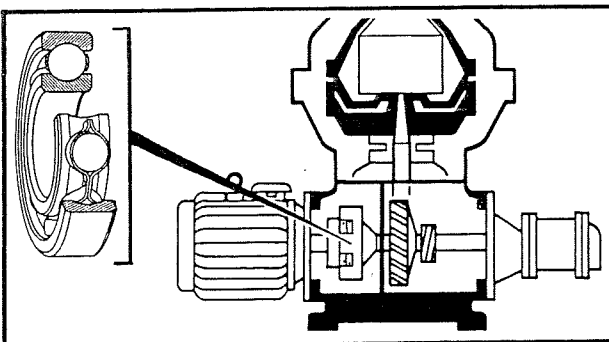


**FRICTION PADS**

- Worn or oily pads will cause a long acceleration period.

Replace all pads even if only one is worn.

If pads are only oily: clean the pads and the inside of the coupling drum with a suitable defatting agent. Roughen friction surfaces of pads with a coarse file.




**NAVE OF COUPLING DISC**

When renewing the grease or when fitting new bearings, grease must be applied only to the respective bearing in the nave. Thus the nave proper must not be packed with grease, as superfluous grease might ooze out of the nave and adhere to the friction blocks.

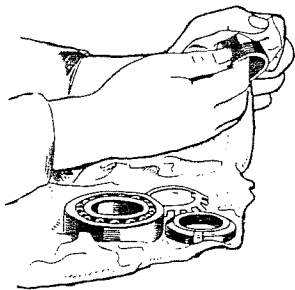


This chapter describes how to disassemble and assemble the machine in the correct order by means of the proper tools. The relative positions of the parts appear from the machine drawings inserted at the end of the manual. Each part is illustrated and its part number is stated in the Spare Parts Catalogue.

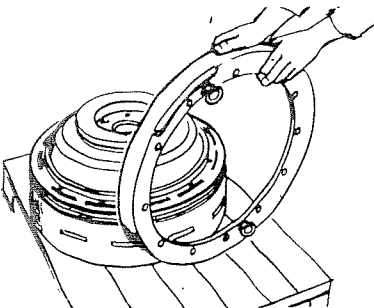
The symbol  appear here and there in text and illustrations. It refers to the page where description of the checking method/ recommendation is found.



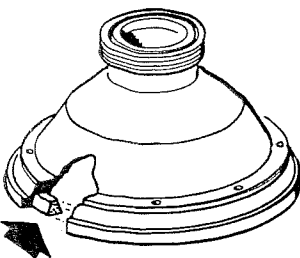
**REMINDER**



- Handle the parts with care. Protect them against damage, dust, and dirt. Make sure the parts are clean and free of burrs when mounting.



- Don't place parts directly on the floor. Use a clean rubber mat, fibreboard or a suitable pallet as base.



- Be specially careful of the bowl hood seal ring. It may easily get scratched if the hood is put down carelessly and on a dirty base.



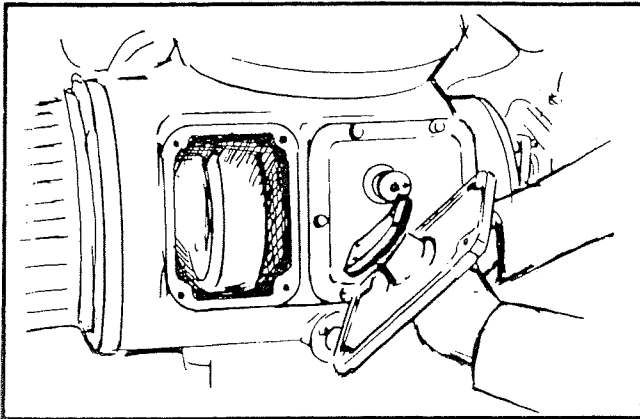
- Position the hoisting device very exactly when assembling and disassembling. **Never** use a hoisting device that works jerkily.

An electrically operated hoist should have two speeds; 1.5 metre/minute and 6 meters/minute approx.

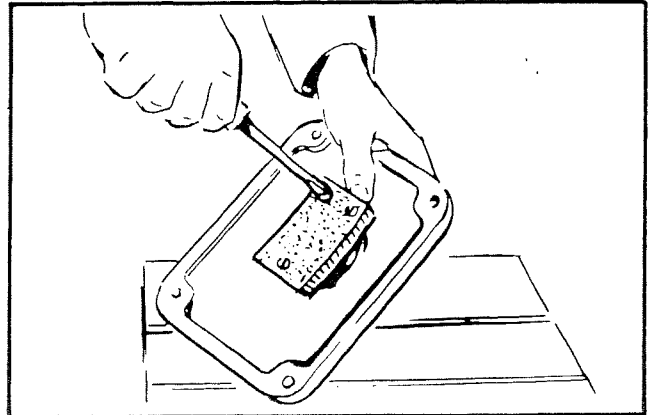
The lower speed is used when lifting the parts out of the machine, and into it respectively.

### EXCHANGE OF BRAKE LINING

👁 page 3:19



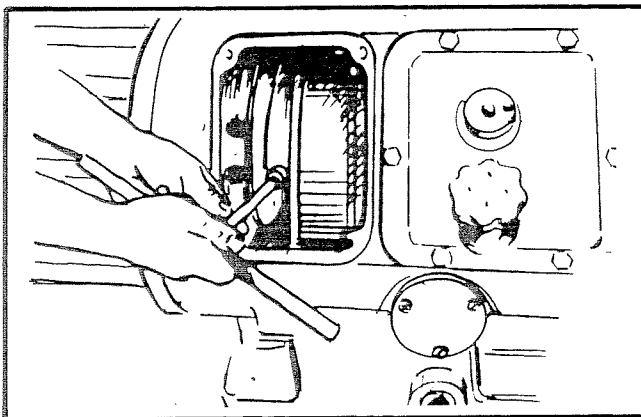
1. Remove the brake cap.



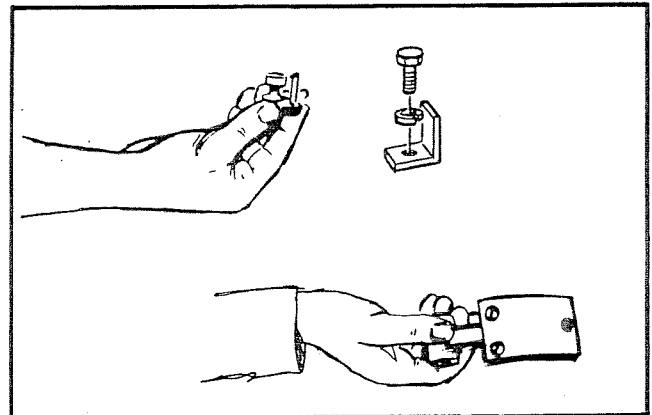
2. Remove the screws and exchange the lining.  
Note. The screws are slotted in both ends

### EXCHANGE OF FRICTION PADS

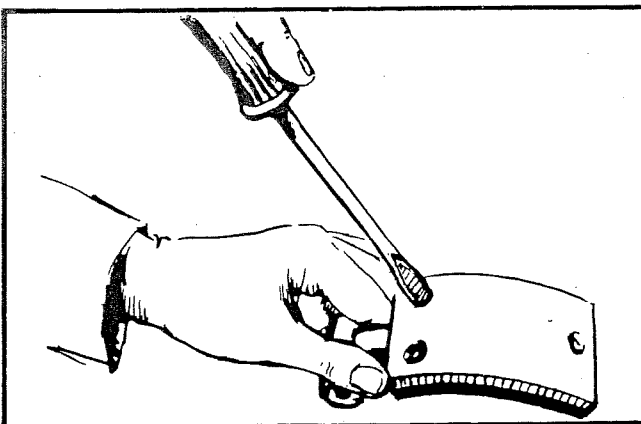
👁 page 3:19



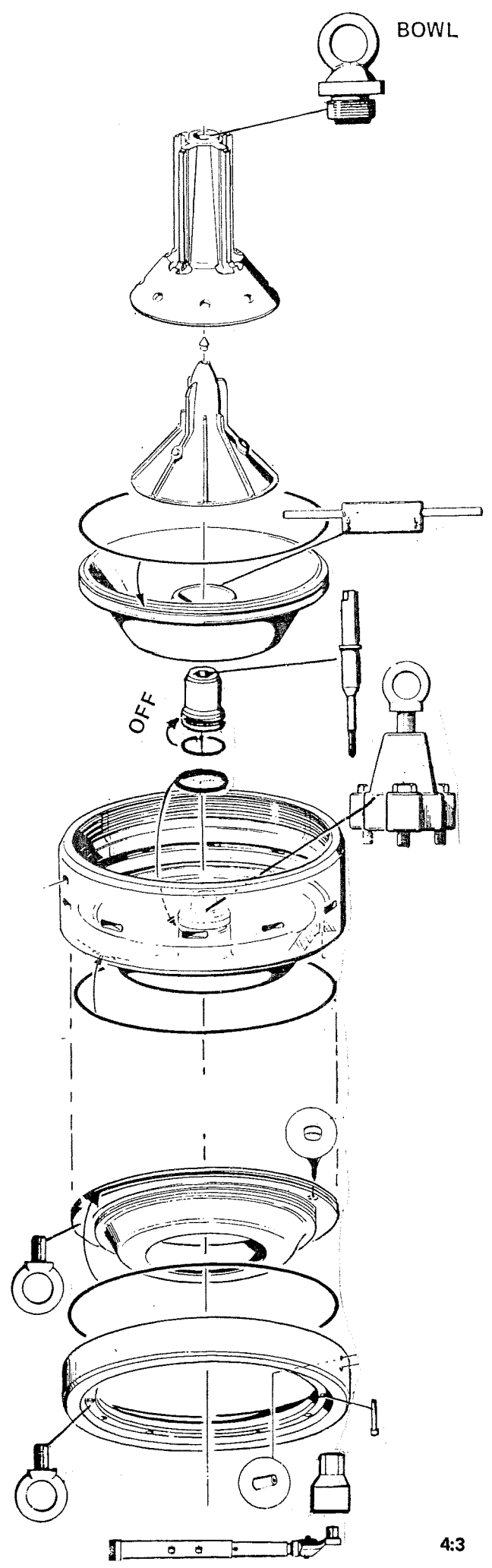
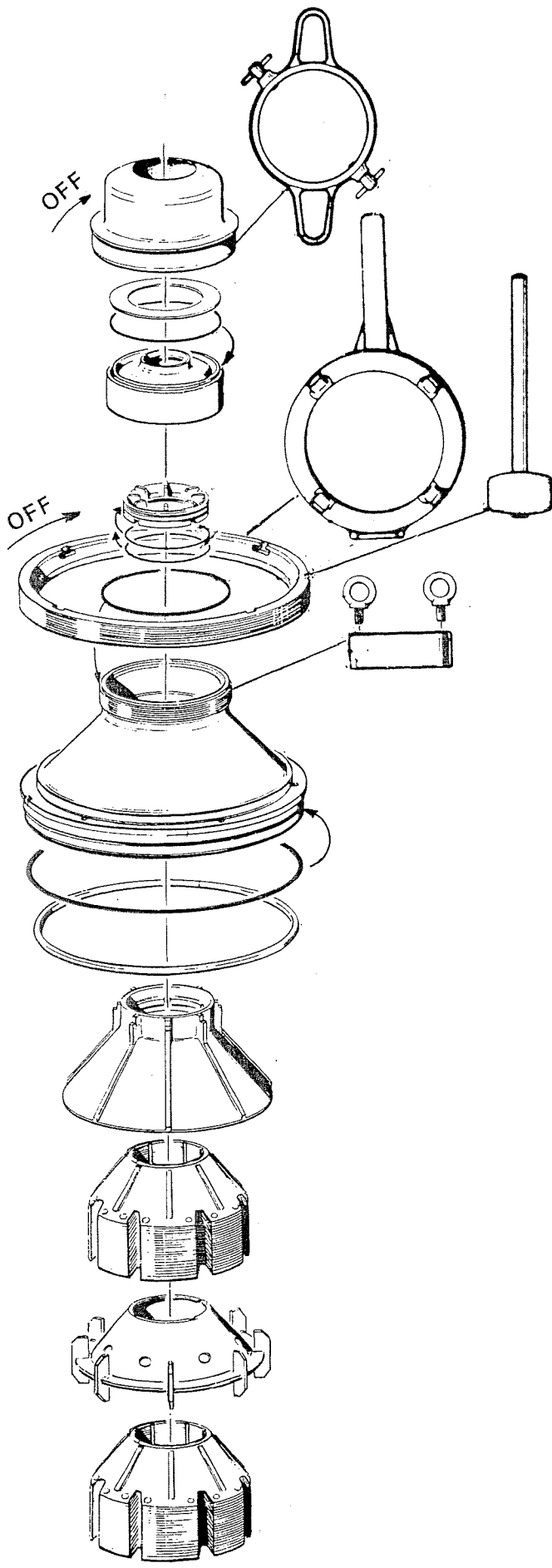
1. Remove the brake cap. Unscrew the screws of holding brackets.



2. Remove holding brackets and friction blocks.

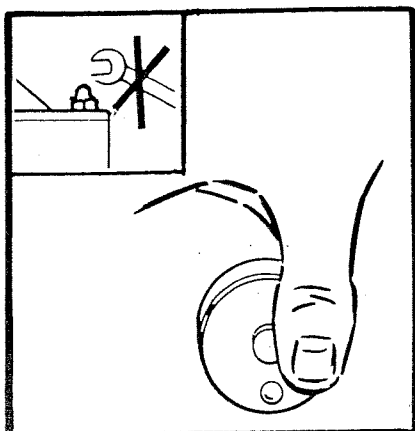


3. Exchange the friction pads.  
Note. The screws are slotted in both ends.

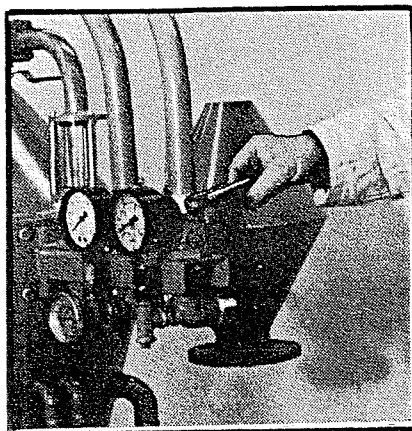




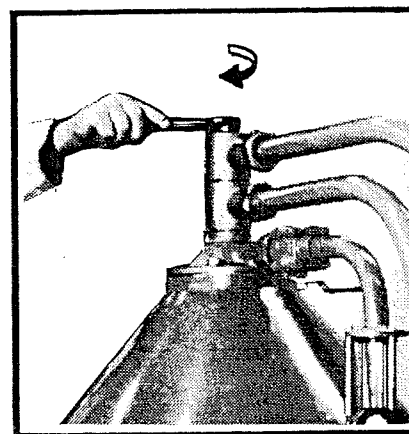
## DISASSEMBLY



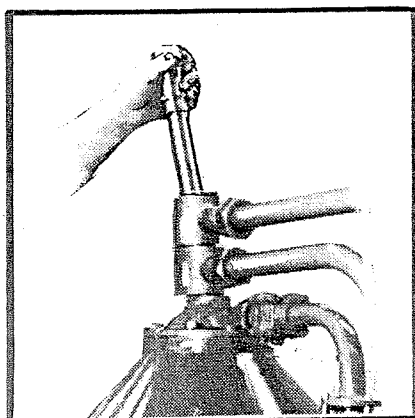
1 **Important!** Never start disassembly until the bowl is stationary.



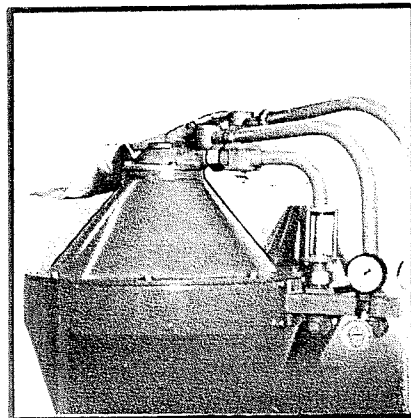
2 Undo the coupling nuts of inlet and outlet piping at the pipe support. The outermost pipe has two nuts. Undo the top one.



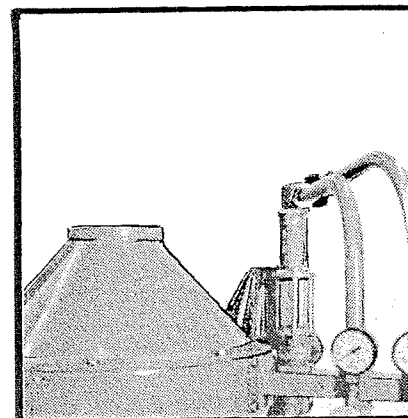
3 Unscrew the inlet pipe **clockwise** (left hand thread) with a wrench.



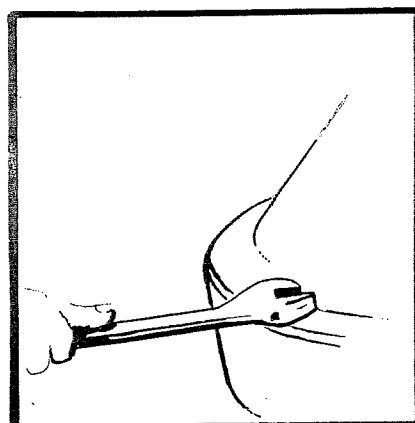
4 Remove the inlet pipe.



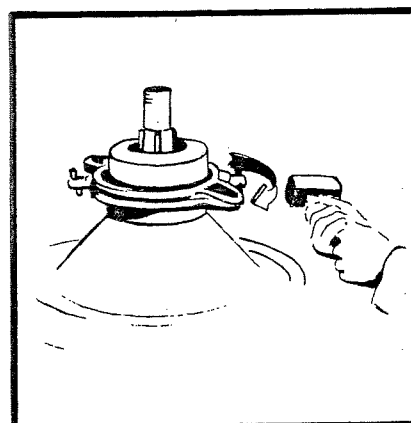
5 Swing aside the two outer pipes. Save the packing between pipe attachments.



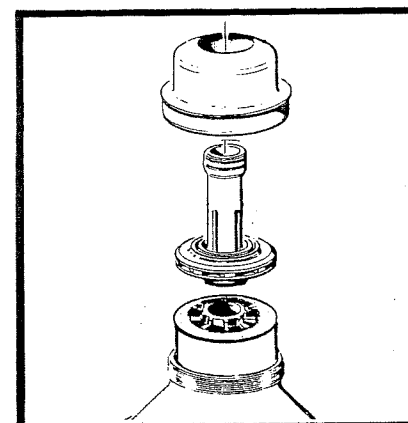
6 Remove the connecting housing and swing aside the inner pipe.



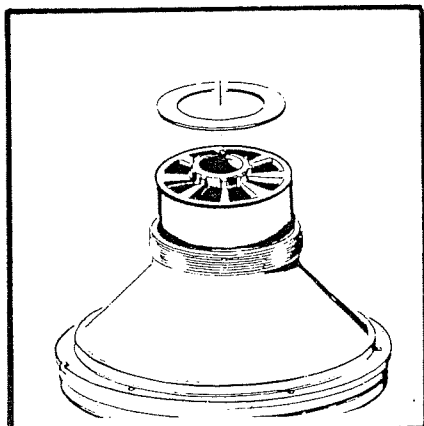
7 Undo and lift off the frame hood. If it is firmly attached, use lifting tackle. There are M8 tapped holes in the top for lifting eyes.



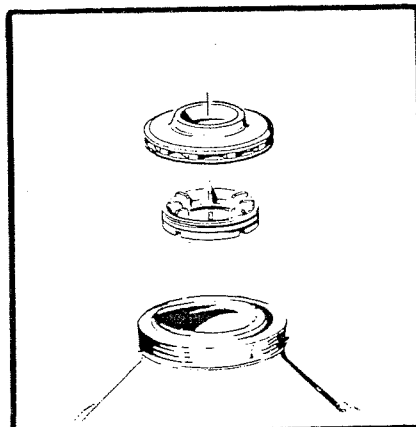
8 Unscrew paring chamber cover **clockwise** (left hand thread).




9 Remove paring chamber cover and top paring disc.

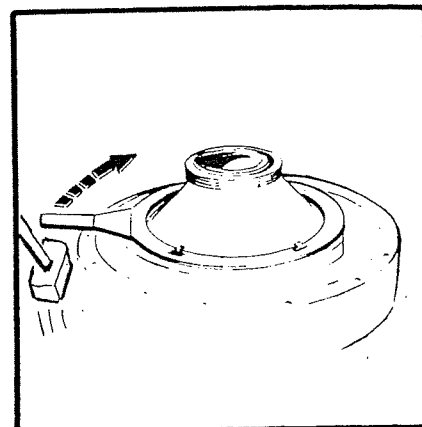


10 Remove gravity disc and cover, (if the cover sticks: knock it cautiously loose by means of a soft hammer).

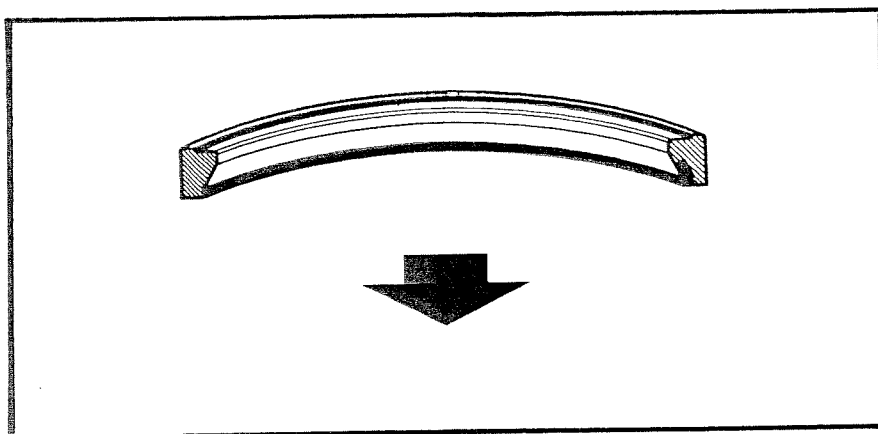


11 bottom paring disc and level ring.

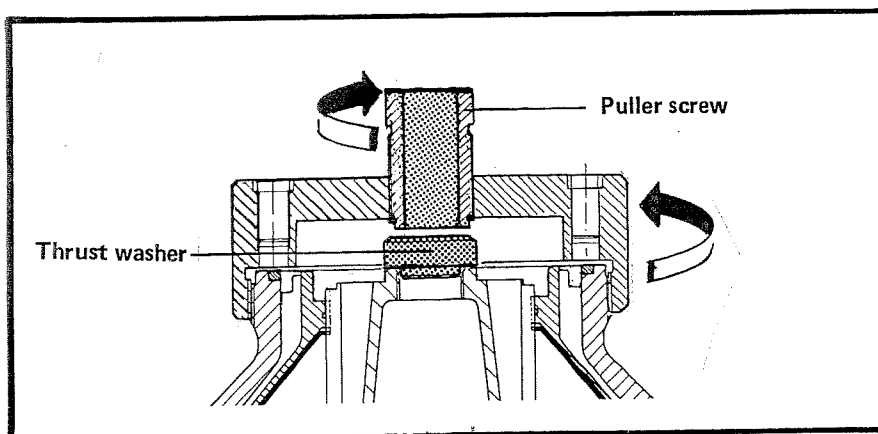
 Paring disc threads—page 3:1.



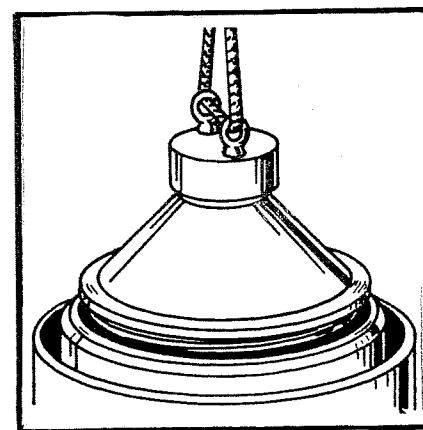
12 Unscrew the large lock ring **clockwise** (left hand thread).



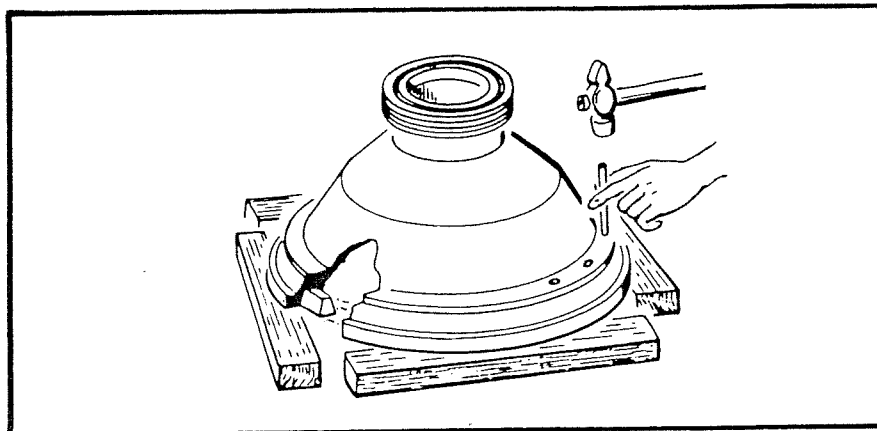
13 Lift out the lock ring and place it with the top face downwards. This will reduce the risk of damage (scratches) on the face in contact with the bowl hood. Protect this face with plastic film etc.



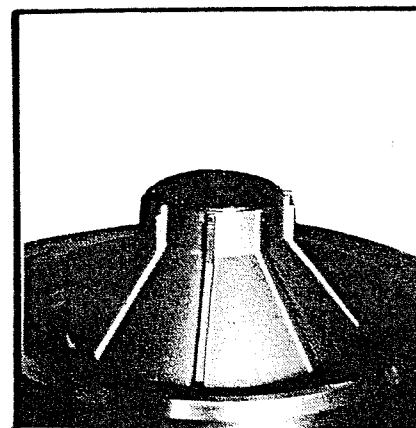
14 Insert the thrust washer of the tool in the distributor hole. Screw the housing anticlockwise (left hand thread) on to the bowl hood. Force off the bowl hood by screwing down the puller screw clockwise.



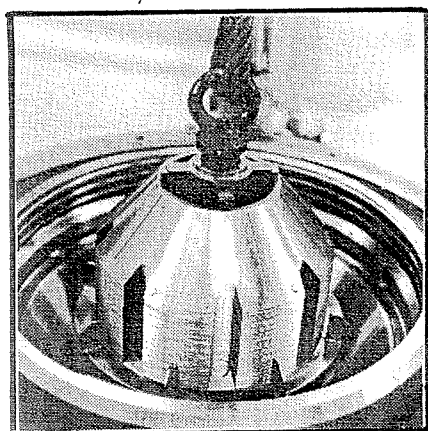
15 Screw in the lifting eyes and lift out the bowl hood. Check if the top disc joins the hood. If so, knock loose the disc with some easy blows from a soft hammer.



16 If seal ring in lower edge of bowl hood needs replacement, force out the ring by means of a pin, inserting it alternately in the holes intended for this purpose. When the seal ring has been forced out of that part of the groove which is situated under the holes, pull it off by hand.



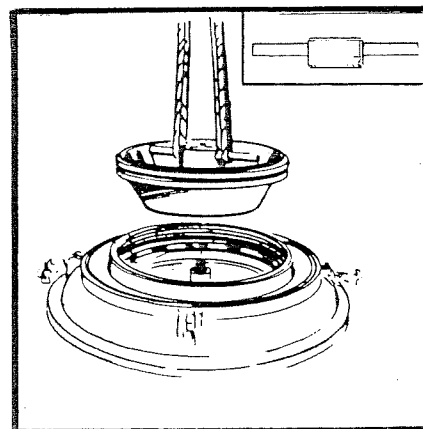
17 Lift out the top disc by hand (if it not had joined the bowl hood when the latter was lifted out).



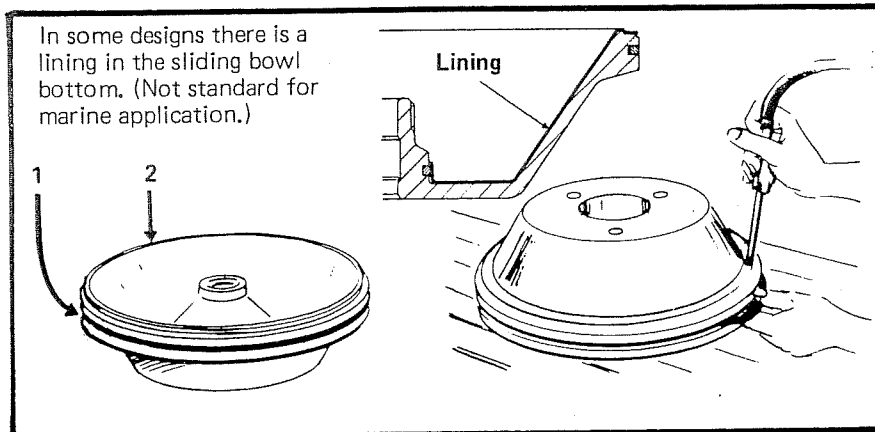
18 Lift out the distributor with disc set. Check if the distributing cone joins the distributor. If so knock loose the cone with some easy blows from a soft hammer.  
 ⦿ Bowl disc cleaning—p.1:11.



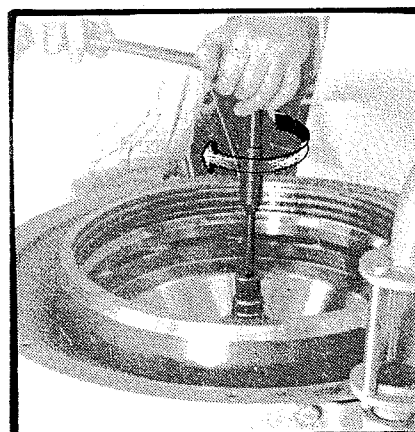
19 Lift out the distributing cone by hand (if it not had joined the distributor when the latter was lifted out).  
 ⦿ Lock ring threads—p.3:3.



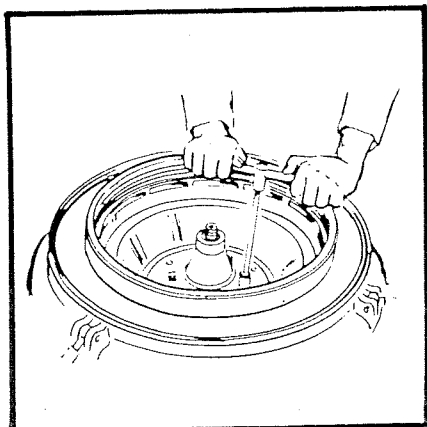
20 Lift out the sliding bowl bottom.  
 ⦿ Corrosion.Erosion—p.1:8.  
 Sealing surface of sliding bowl bottom against bowl hood — p. 3:6.



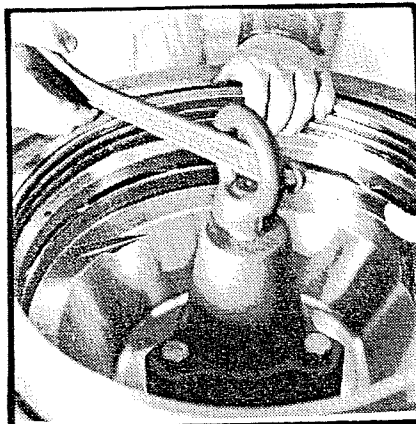
In some designs there is a lining in the sliding bowl bottom. (Not standard for marine application.)  
 1  
 2  
 21 If seal ring (1) of sliding bowl bottom should be replaced and compressed air is available, turn bottom upside down and inject compressed air through hole on underside. This will press the ring outwards far enough to be easily gripped.  
**Take care not to scratch sealing edge (2).**



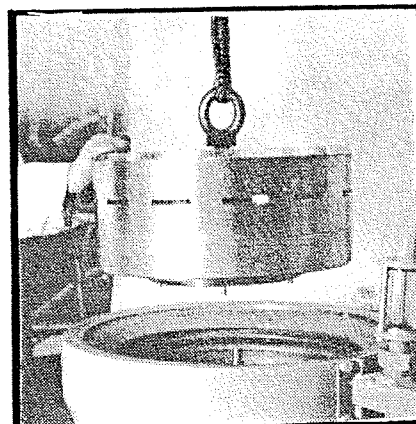
22 Unscrew cap nut **clockwise** (left hand thread).



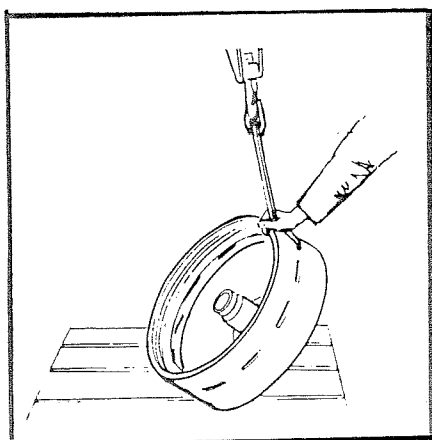
23 Unscrew the three screws from the bowl body.



24 Ease off bowl body with central screw of lifting tool. If necessary, insert a lever in the eye.

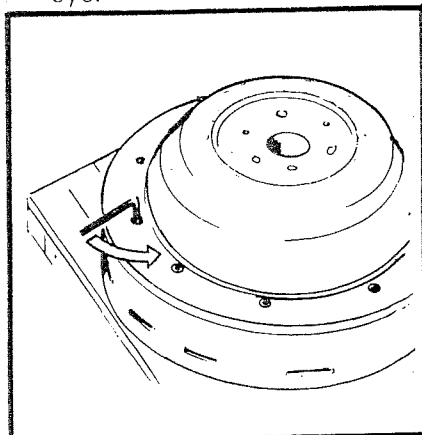


25 Lift out the bowl body.  
 👁 Bowl body hub/  
 Bowl spindle cone—p.3:10.

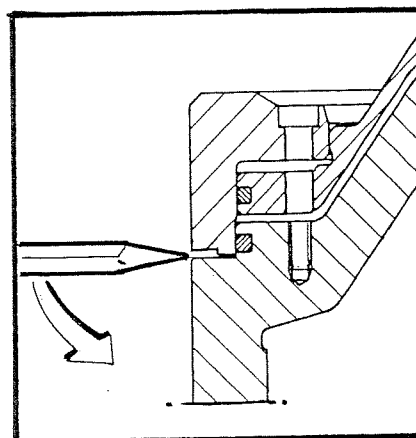


26 To take apart the ejection mechanism, turn bowl body upside down, preferably as follows:

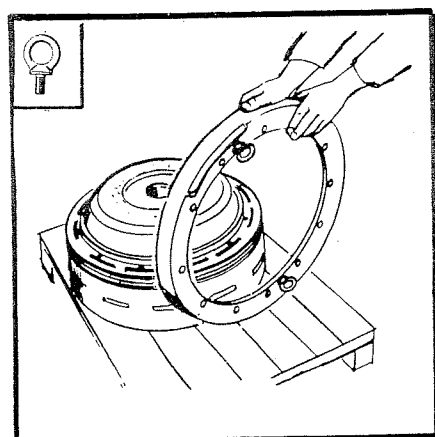
- o put a strap through a sludge port
- o lift bowl body and turn it around.



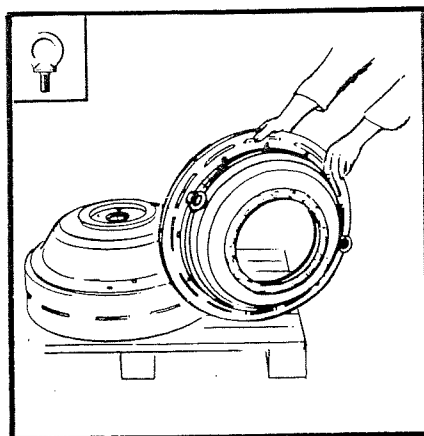
27 Undo the screws of the dosing ring.



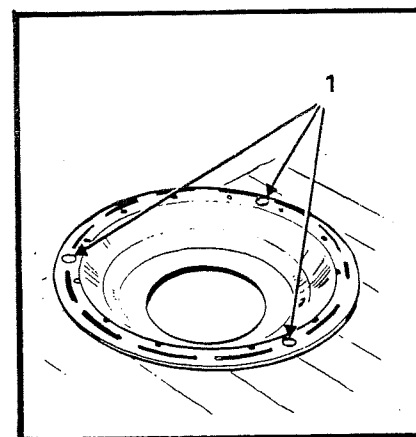
28 If the dosing ring is firmly attached, prise it off with a screwdriver etc. inserted in the gap between ring and bowl body.



29 Lift out the dosing ring with the eye nuts.  
 👁 Cleaning of nozzles  
 — page 3:7

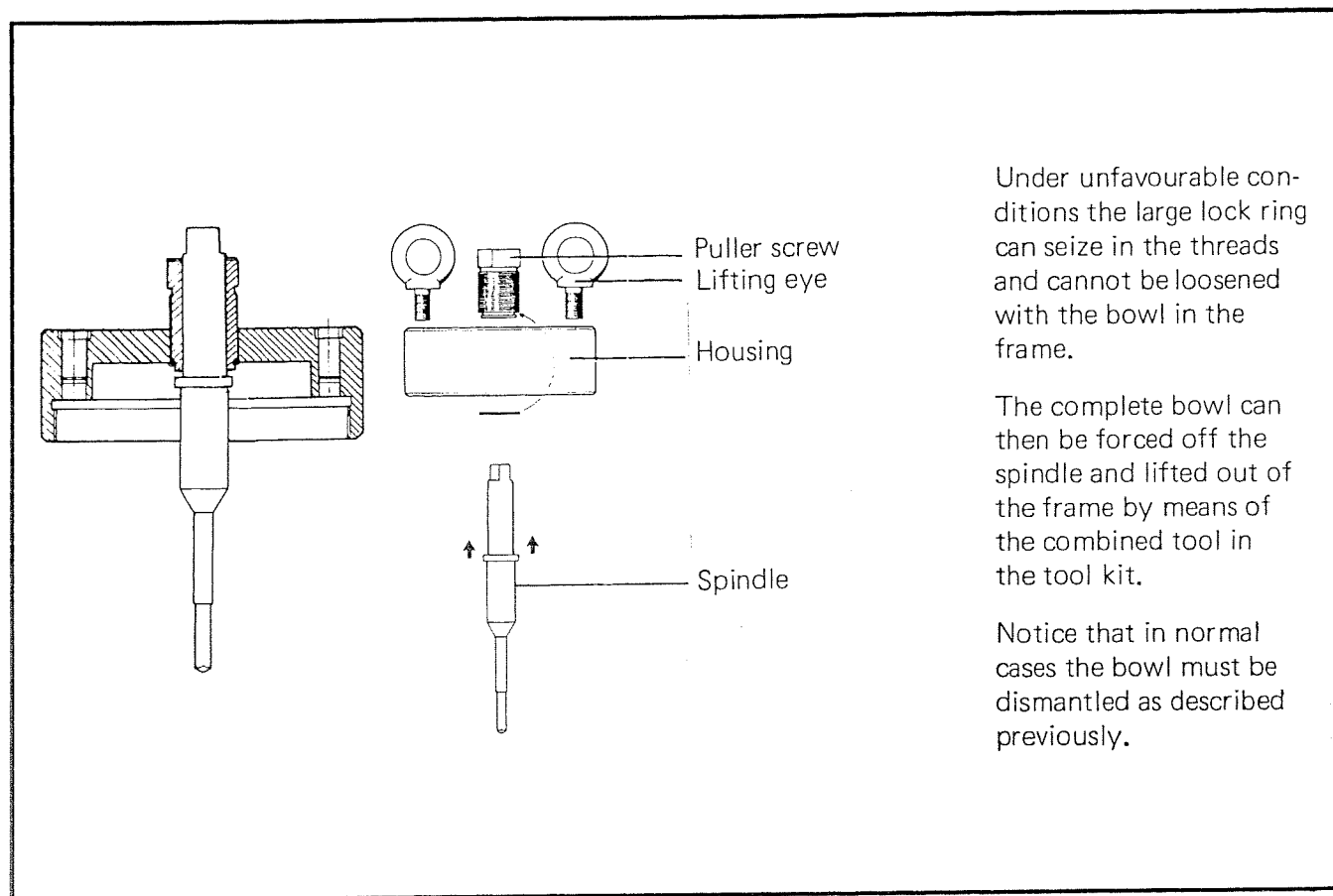


30 Remove operating slide, using the eye nuts.



31 Place the slide with valve plugs (1) facing upwards.  
 👁 Valve plugs  
 — page 3:8

## EMERGENCY PROCEDURES FOR DISASSEMBLY



## REMOVAL OF BOWL WHEN THE LARGE LOCK RING CANNOT BE UNDONE

(Fig. 1 - 4 — see next page)

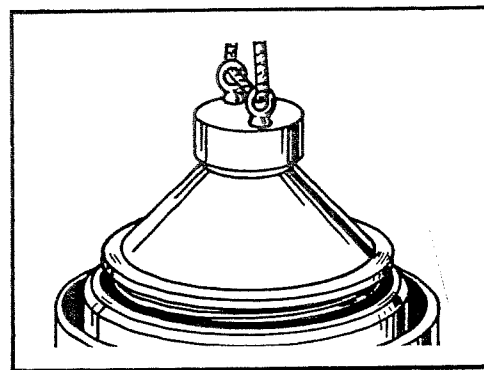
All parts on top of the bowl must be removed (operations 1 — 11).

Remove the plastic plug A with the aid of the tool spindle — Fig. 1.

Insert the spindle in the cap nut and unscrew this clockwise (left hand thread) — Fig. 2.

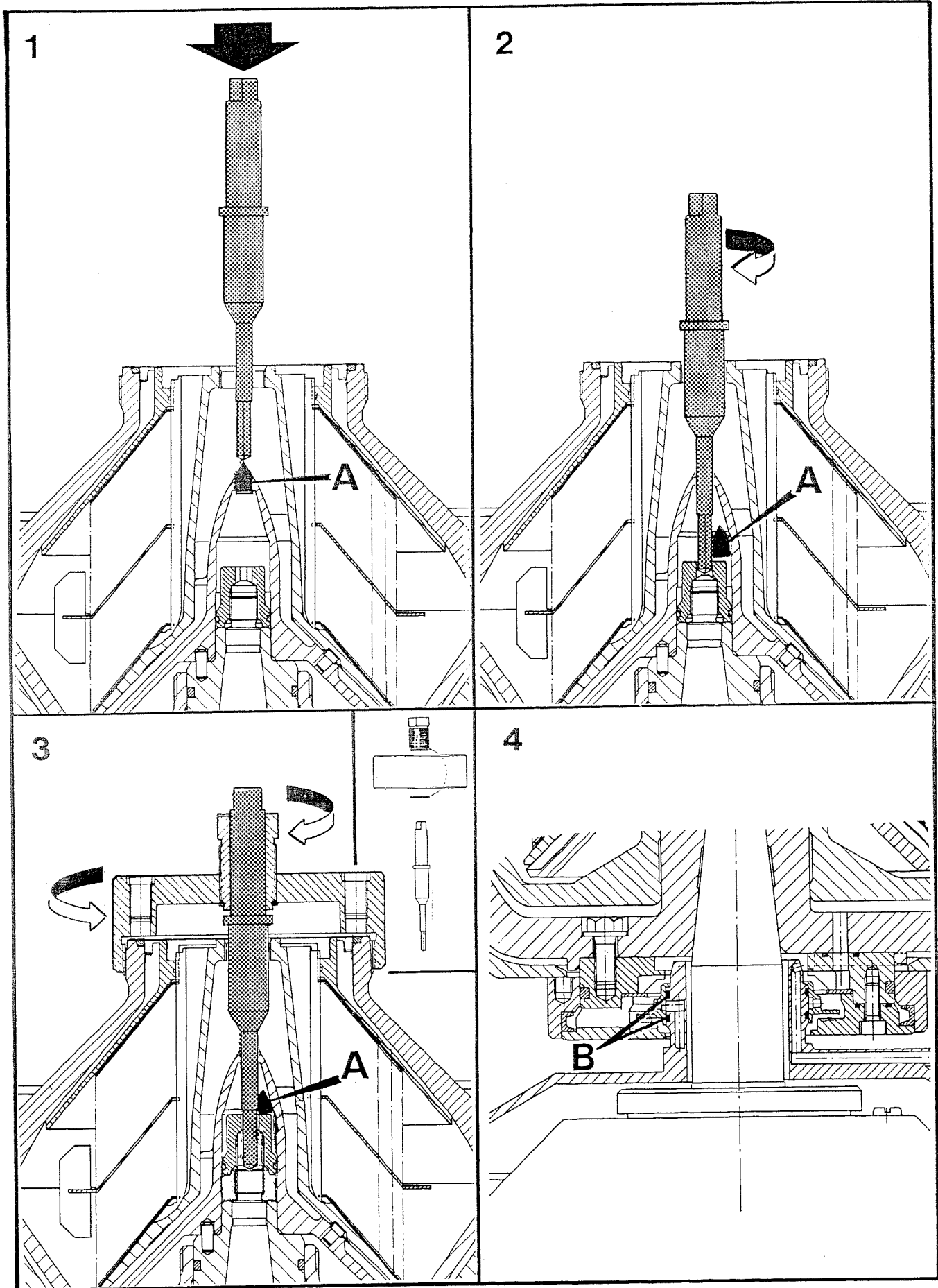
Let the spindle remain in the bowl and screw the tool housing anticlockwise (left hand thread) on to the bowl hood. Force the bowl off the bowl spindle by screwing down the puller screw clockwise — Fig. 3.

Screw in the lifting eyes and lift out the bowl.



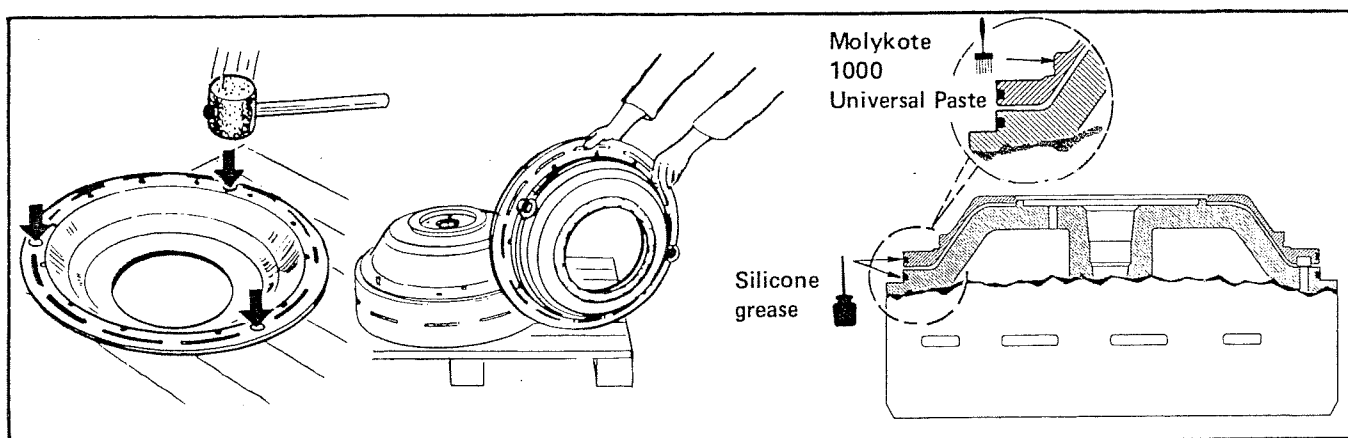
To begin with, this should be done very slowly and carefully. Parts of the paring disc device for operating water under the bowl will also be raised with the bowl and the clearance between these parts and those remaining is very small.

When the bowl has been lifted out of the frame in this way, the plastic plug A in the distributing cone must be changed. Check the O-rings B on the distributing cover neck — Fig. 4.

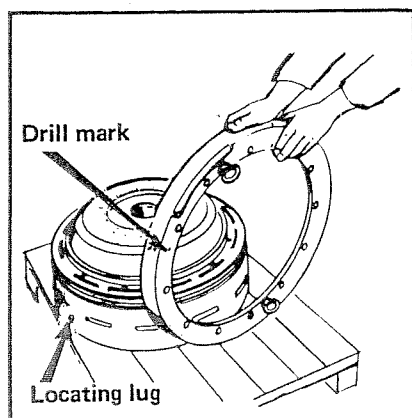




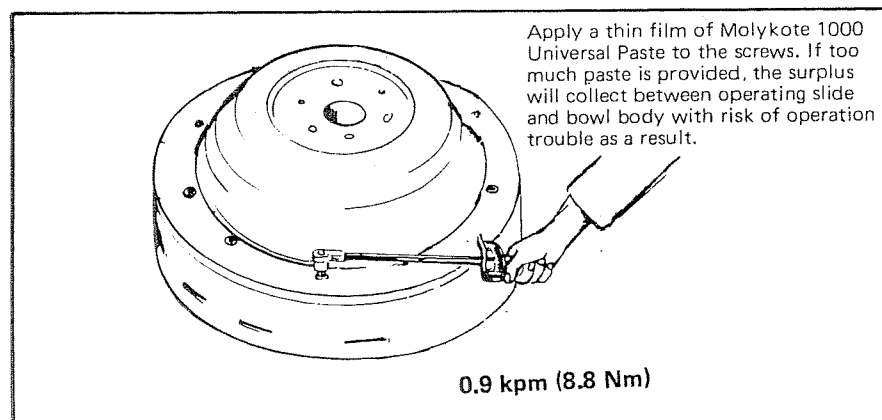
## ASSEMBLY



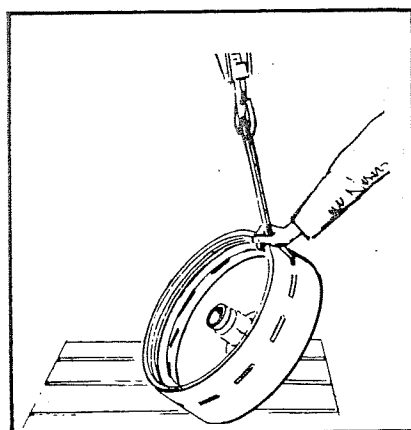
- 1 Any new valve plugs should be knocked in with a rubber mallet to avoid damaging the sealing surface.
- Fit the operating slide. The hole in the slide must fit over a corresponding locating pin on the bowl body.



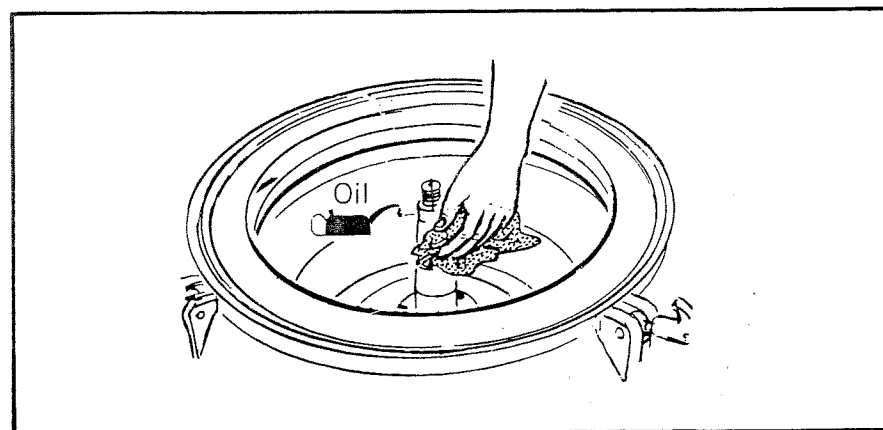
- 2 Fit the dosing ring. Notice that it fits in one position only. The drill mark must be level with the body locating lug.




- 3 It is absolutely necessary to use a dynamometric wrench when tightening the dosing ring screws. First tighten diametrically, then all around.

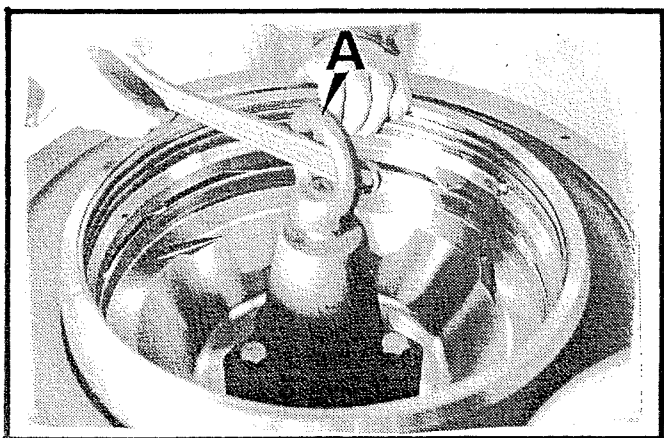


- 4 Turn the bowl body the other way round.

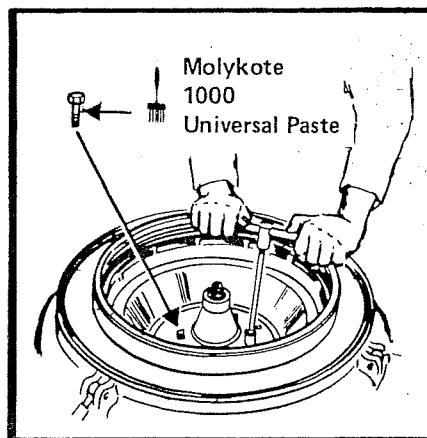


- 5 Wipe off spindle top and nave bore in bowl body. Apply oil onto the tapered end of the spindle to prevent the bowl seizing on the spindle. Use a few drops of oil only, smear it over the surface and wipe it off with a clean cloth. Check that the movable unit of the paring disc device for operating water is correctly centred. Check height position of paring disc.  page 3:9. Make sure that the three small O-rings are intact and correctly located.

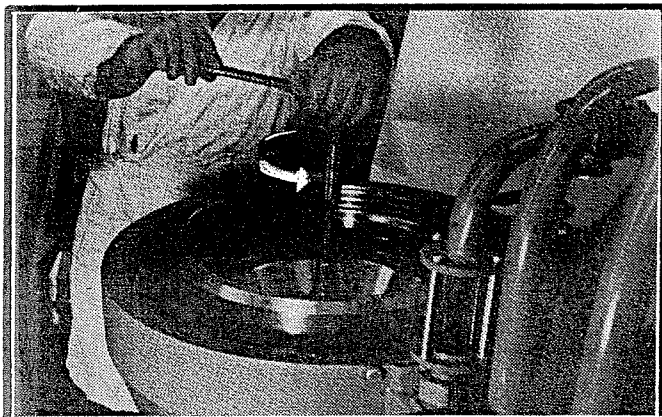




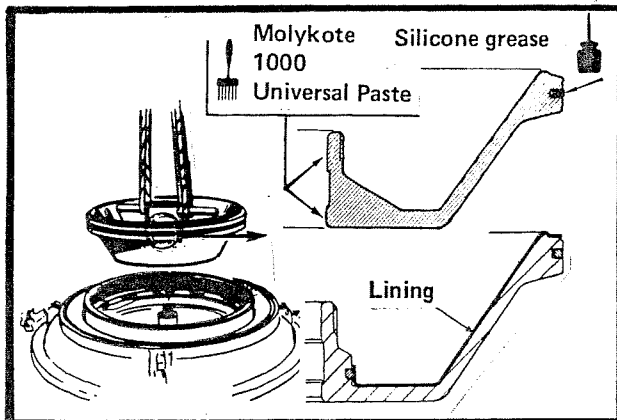
6 Starting position: Central screw (A) screwed home. Lower bowl body until central screw supports on spindle top. Now screw up the screw so that bowl body sinks down on the spindle cone.



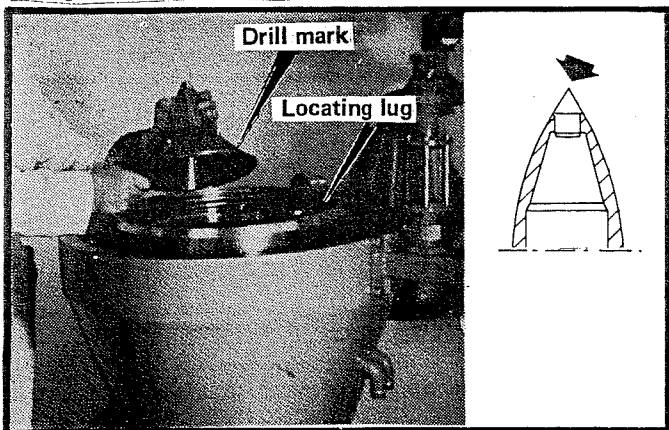
7 Rotate the bowl body slowly and align it so that the screw holes in its bottom are exactly above the holes in the operating device. Tighten the bowl body screws firmly.



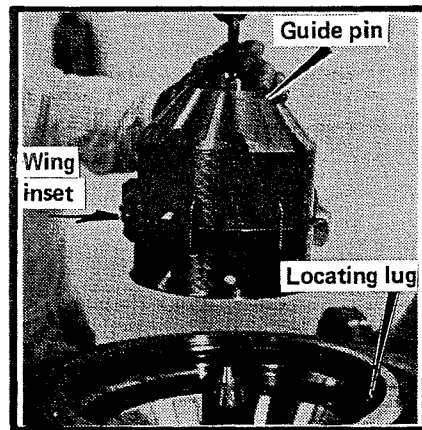
8 Check the cap nut O ring and lubricate with silicone grease. Lubricate the cap nut threads with Molykote 1000 Universal Paste. Screw on the cap nut anticlockwise (left hand thread). Tighten the nut firmly.



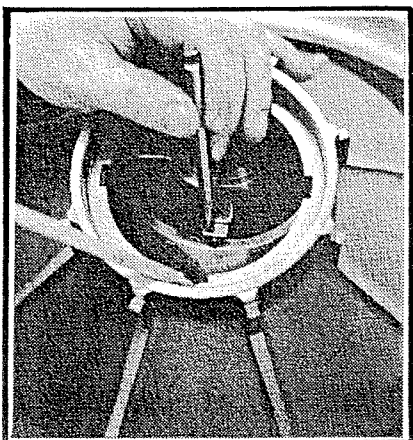
9 Fit the sliding bowl bottom. For machines with a lining in the sliding bowl bottom: Before fitting a lining the contact surfaces lining/sliding bowl bottom must be well cleaned.



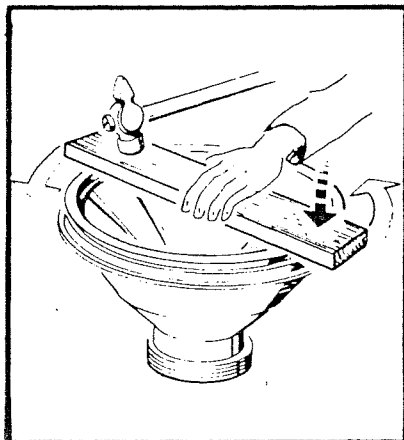
10 Check that the distributing cone is provided with an intact plastic plug. The holes in the bottom of the cone must fit over guide pins in the bowl body.



11 Lower the distributor with disc set. The recesses in the bottom of the distributor must fit over guide pins in the cone. Number of bowl discs **under** the wing inset:  
 WHPX 507: 37  
 WHPX 508: 50.

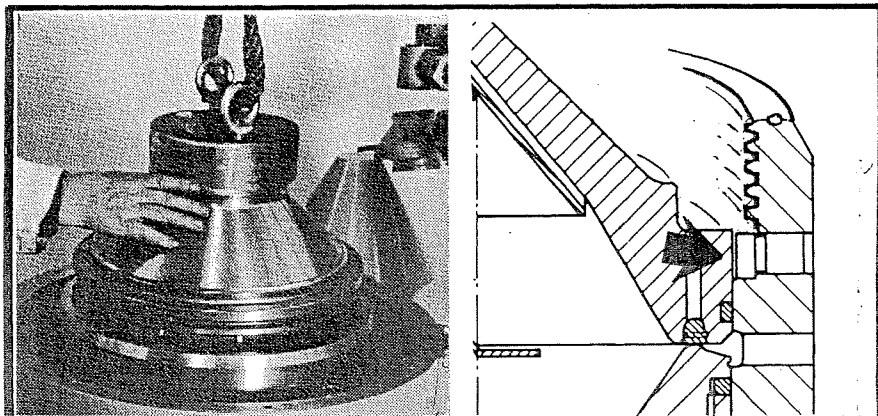


12 Fit the top disc.

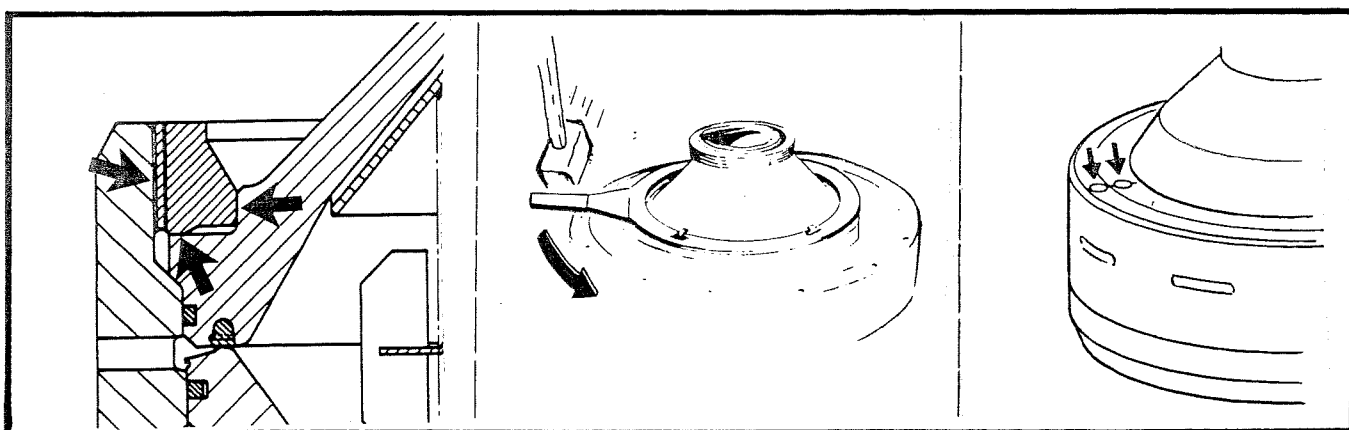


13 If the seal ring in bowl hood needs replacement, fit the new ring as follows:  
Press the ring into groove in lower edge of bowl hood with a straight board (1" x 5"), which is placed across the ring. Hammer carefully the board right above the ring, first on one side and then on the other. Turn board around successively and drive ring into groove as evenly as possible

13 **Note.** If a new seal ring of nylon (polyamide) is too wide when mounted, this is due to absorption of moisture. It will recover correct dimensions after drying for about 24 hours at a temperature of 80 ° - 90 °C. (175 ° - 195 °F).  
If the ring is too narrow, put it in hot water, 70 ° - 80 °C (160 ° - 175 °F) for 5 minutes (approx.)

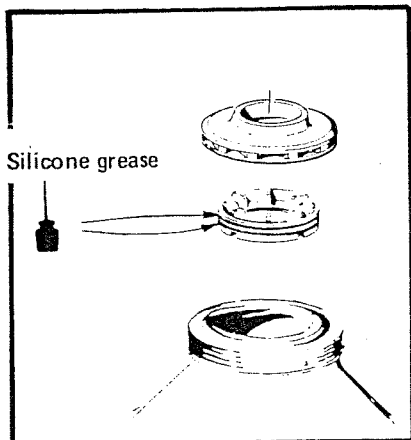


14 Put bowl hood in place. The guide lug on bowl body must enter the recess in hood.



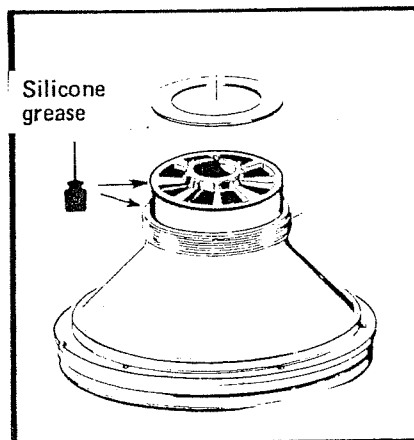
15 Degrease lock ring threads, contact and locating faces (see arrows above). Apply Molycote 1000 Universal Paste to the threads and faces stated. Brush on the paste according to the manufacturer's directions.  
Tighten ring counter-clockwise (left-hand thread) until bowl hood lies tightly against bowl body (in a new bowl marks Ø will now be in line with each other — see arrows above.)

👁 Disc set pressure — page 3:5

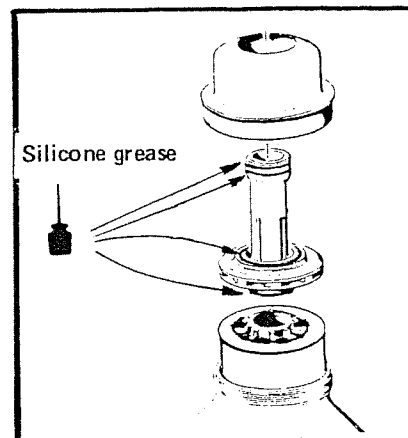


16 Fit level ring (the grooves must fit over the distributor ribs) and bottom paring disc (threads facing downwards).

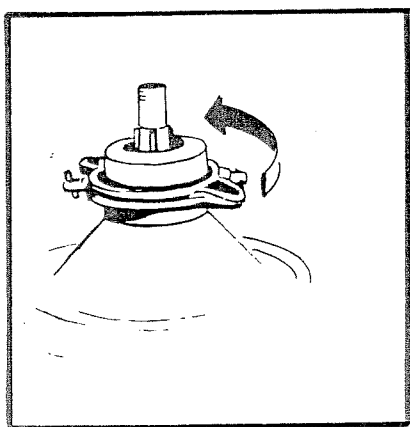
Ⓞ Height adj. of paring disc—p.3:2.



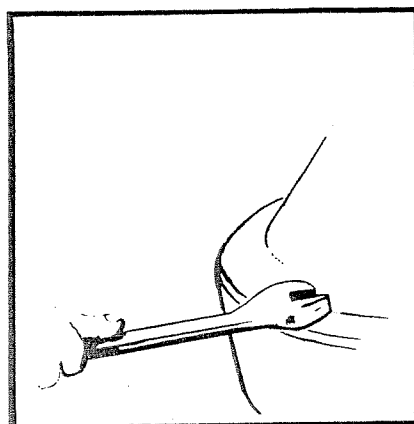
17 Fit cover (the grooves must fit over the top disc ribs), O rings on hood and cover and gravity disc.



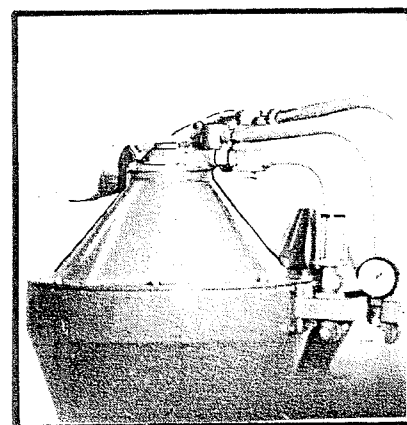
18 Lower top paring disc and paring chamber cover. Notice that the top paring disc grooves must fit over the bottom paring disc pins.



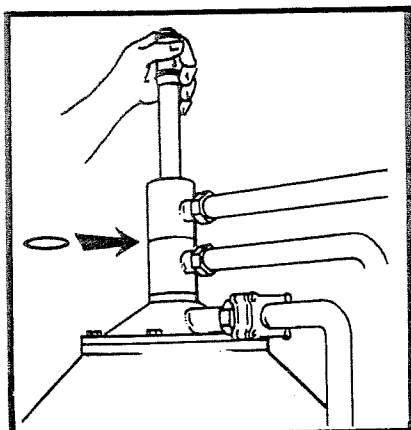
19 Lubricate the threads of paring chamber cover with Molycote 1000 Universal Paste and tighten the cover **anticlockwise** (left hand thread).



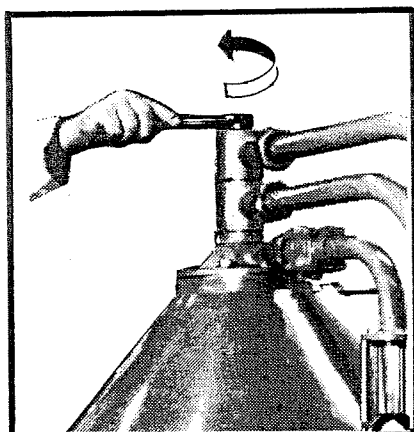
20 Fit frame hood and screw it up.



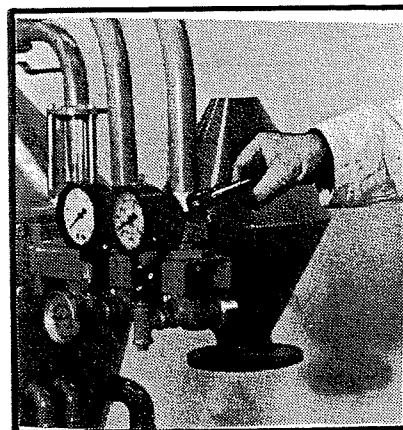
21 Fit the connecting housing, swing forward the inner pipe and fit the latter and the connecting housing to each other. Tighten the coupling nut and screw up the connecting housing.



22 Swing forward the two outer pipes. Place the packing between pipe attachments. Lubricate the inlet pipe threads with Molycote 1000 Universal Paste. Lower the pipe.



23 Ascertain that the pipe stands vertically and that the attachments are well centred. Screw the pipe cautiously anticlockwise (left hand thread) by hand until you feel that the threads engage. Then tighten the pipe with a screw spanner.

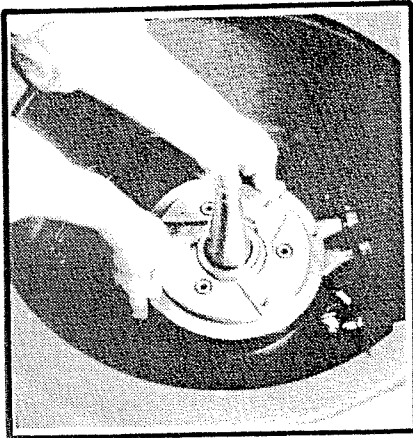


24 Tighten the coupling nuts at the pipe support.

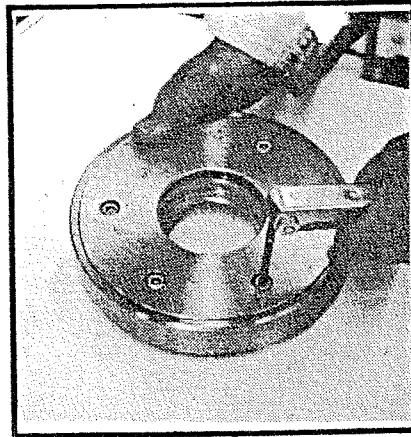
## PARING DISC DEVICE FOR OPERATING WATER

The device is accessible after the bowl has been removed from the machine.

### DISASSEMBLY



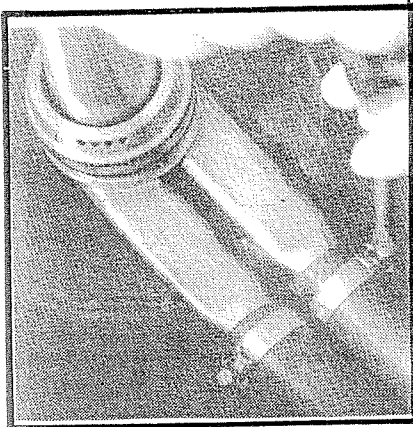
1 Lift out the movable unit of the device.



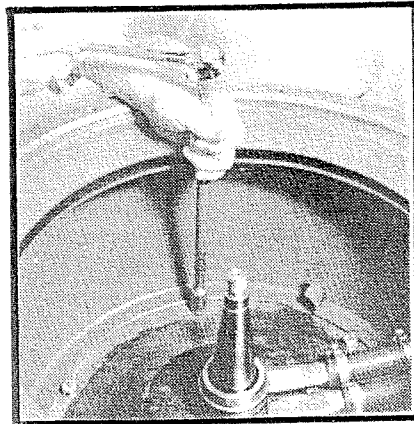
2 Turn the unit upside down and undo the screws. Dismantle the unit.



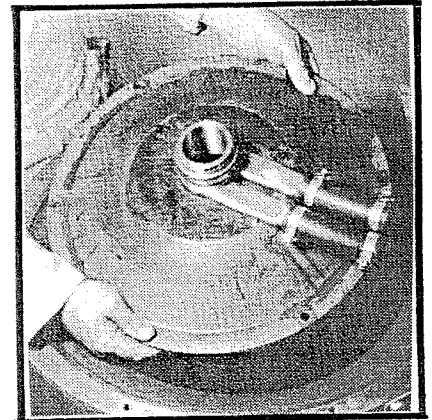
3 If the distributing ring cannot be forced out of the piston by hand, use a lead hammer to tap it out gently.



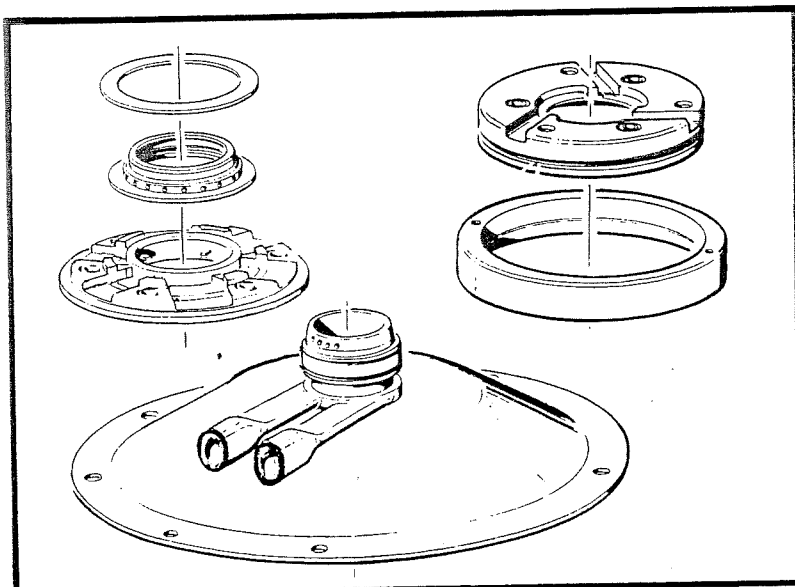
4 Undo all the four hose clips. Push the hoses inwards.



5 Undo the cover screws.



6 Remove the distributing cover. If the cover is firmly secured, insert cover screws in the two M 10 tapped holes and force it off.

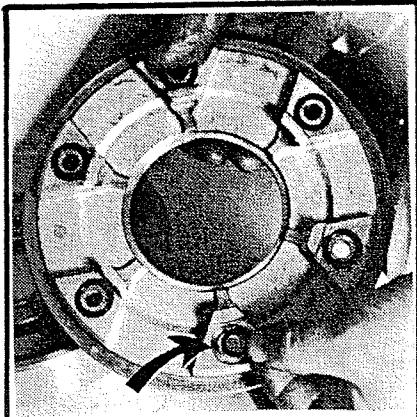


7 Cleaning the paring disc device



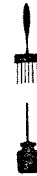
— page 3:7.

ASSEMBLY





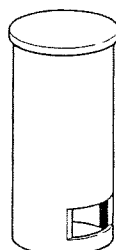
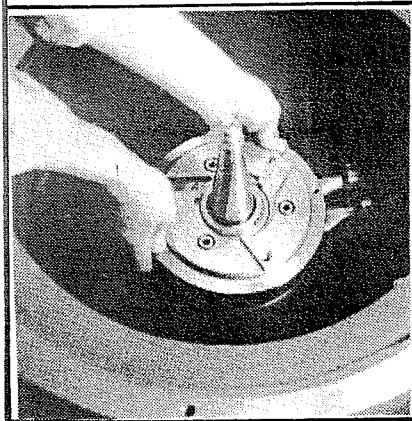
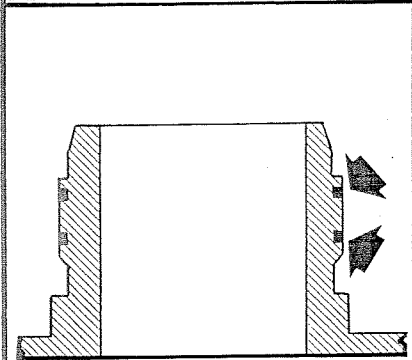
Before assembling:

- o Inspect sealing ring and O rings.
- o Lubricate surfaces marked with Molycote 1000 paste.
- o Lubricate surfaces marked with silicone grease.
- o Check that the nine small O rings are correctly located in their grooves in cover and distributing ring.



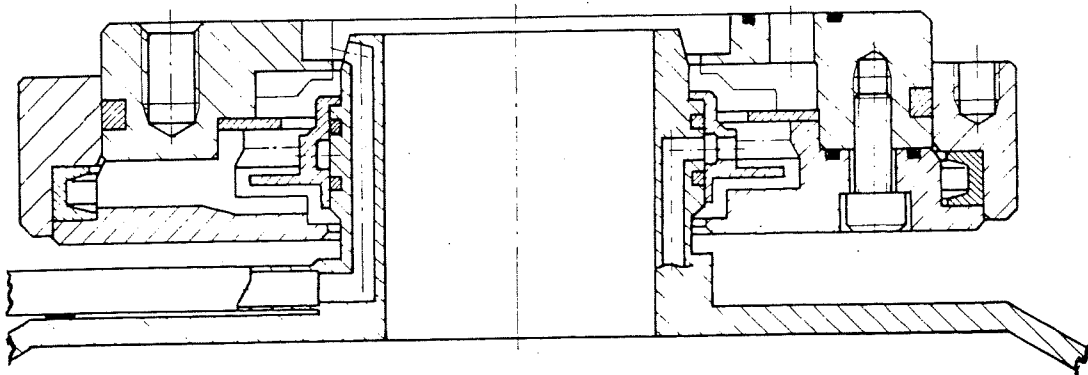
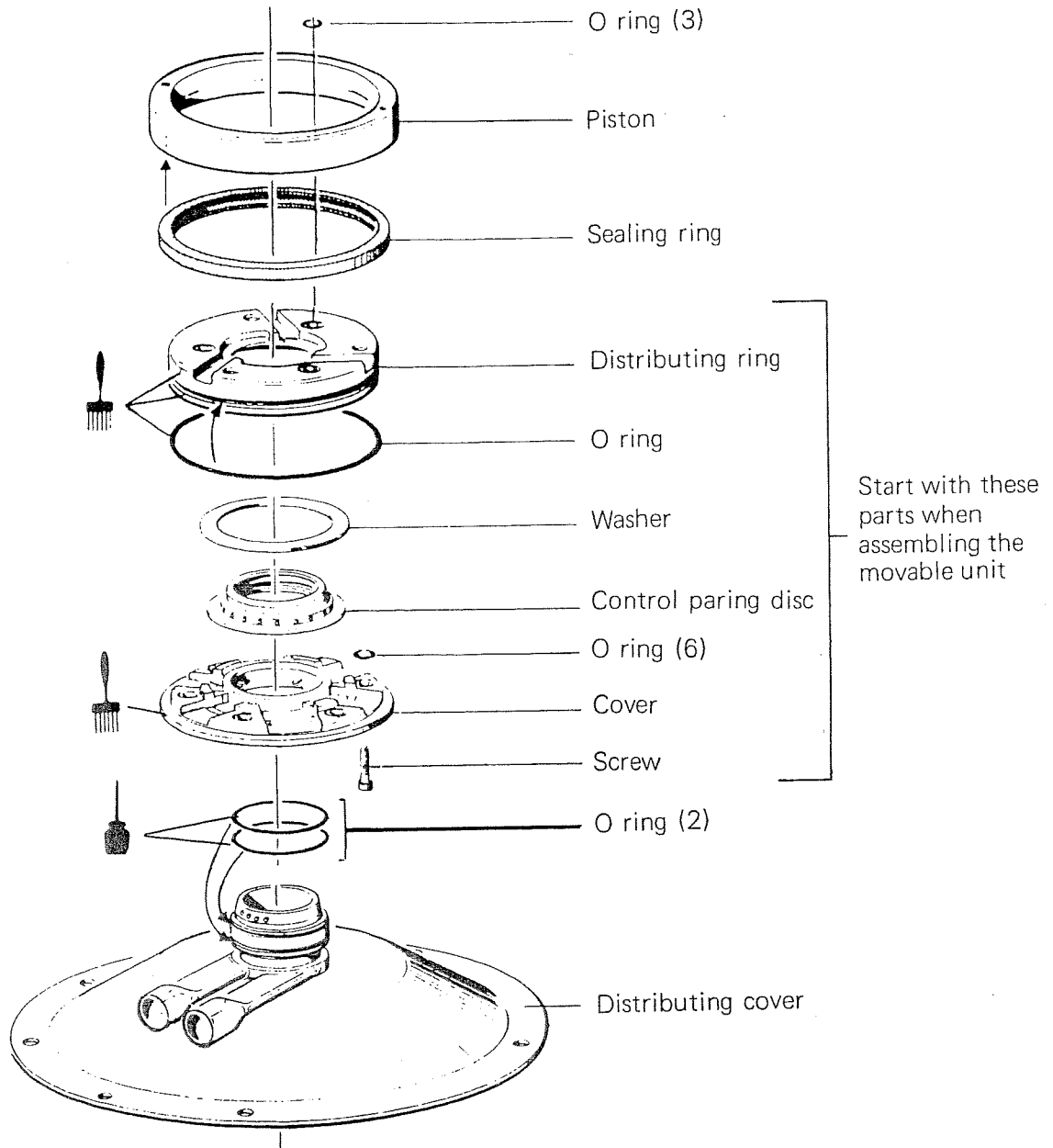
Assembly

- o Fit the O rings on the cover neck. Make sure that they are correctly located in the grooves and are not twisted. These O rings retain the control paring disc in position and it is essential that they are in good condition and correctly fitted.
- o Fit the distributing cover in the frame and tighten the hose clips.
- o Check the height position of distributing cover  p. 3:9.
- o Assemble the movable unit of the device in the order indicated in the exploded view.
- o Check that the inside of the disc and the outside of the cover neck are free from burrs, then fit the unit. The control paring disc is movable inside the unit and must be pressed down until stopped by the shoulder on the cover neck. This is done most suitably with Alfa-Laval mounting tool, article No. 546244-80, or with a thin-walled pipe (72 mm bore, 1.5 to 2 mm wall thickness). On page 3:9 is described how to use the Alfa-Laval mounting tool.
- o Check that the disc is in contact with the shoulder by measuring the distance between top faces of disc and neck.  Height Position of Control Paring Disc – p. 3:9.

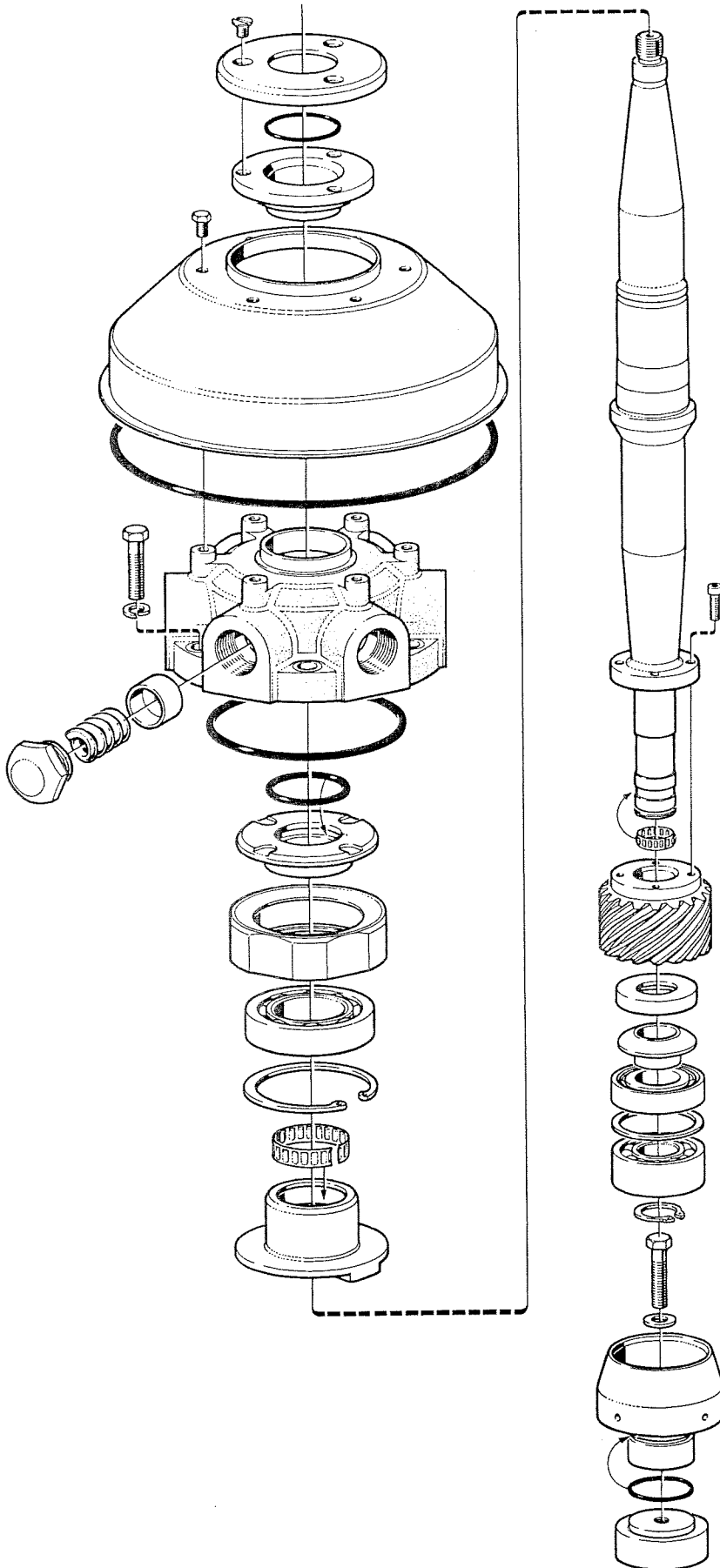


Alfa-Laval mounting tool, article No. 546244-80.

# PARING DISC DEVICE FOR OPERATING WATER



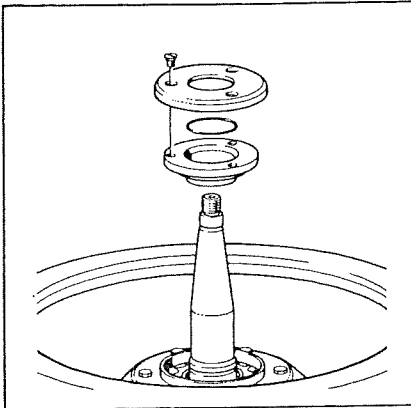
BOWL SPINDLE  
-Single top bearing design



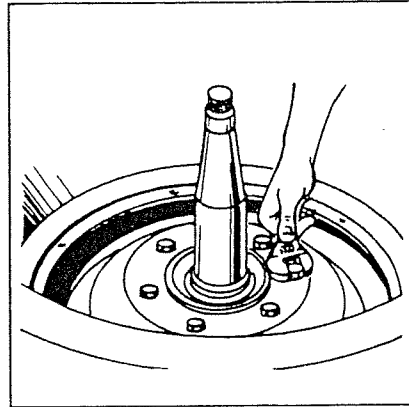
## BOWL SPINDLE - Single top bearing design

The bowl spindle is accessible after bowl and paring disc have been removed from the separator.

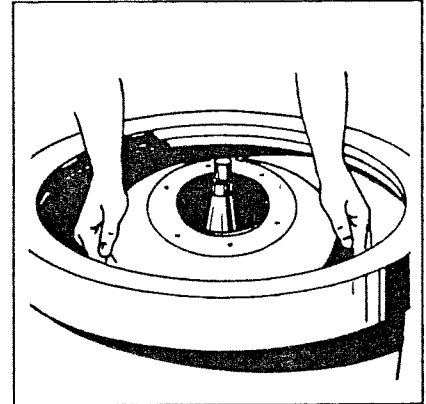
### DISASSEMBLY



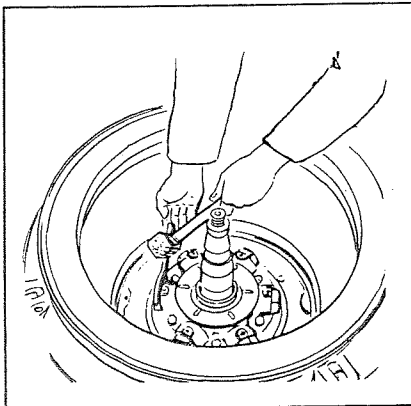
- 1 Remove the protecting plate, the O-ring and the protecting collar.



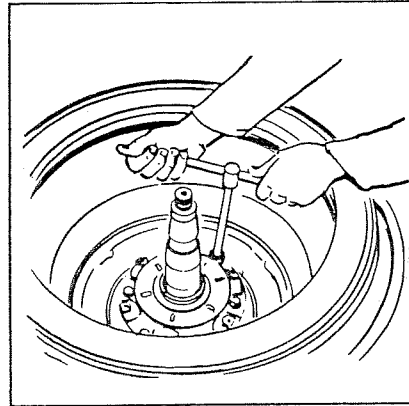
- 2 Undo the screws for the protecting cap.



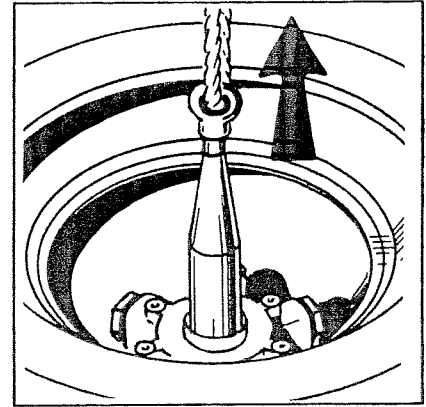
- 3 Remove the protecting cap.



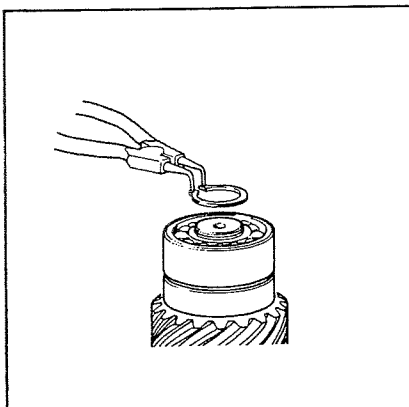
- 4 Slacken the screw plugs slightly.



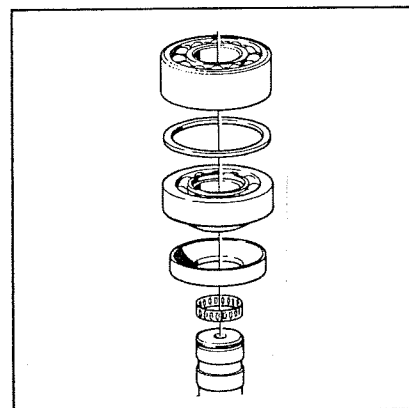
- 5 Remove the spring casing screws.



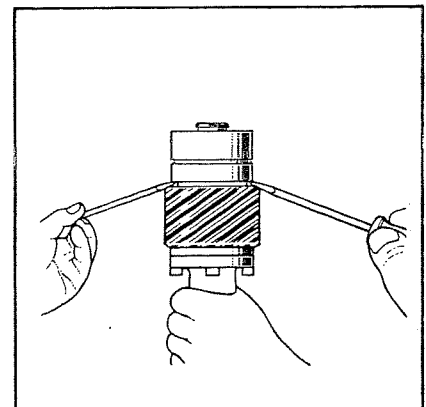
- 6 Lift out the bowl spindle. Be careful not to damage the worm or worm wheel. Disengage the brake.



- 7 Remove the snap ring locking the bottom bearing assembly.



- 8 Remove the parts.

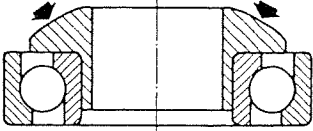


- 9 If the parts cannot be pulled off by hand, carefully prize them loose by means of two screwdrivers inserted between the worm and the ball-bearing.

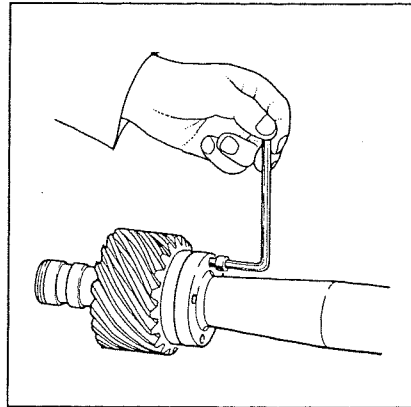


## BOWL SPINDLE - Single top bearing design

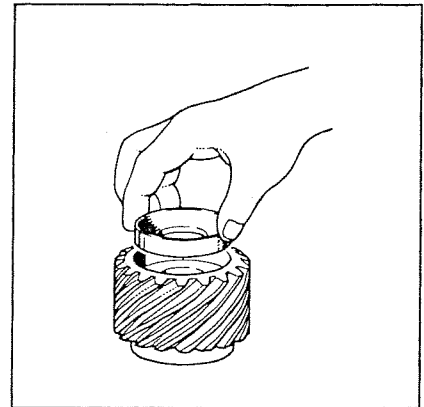
Be careful not to damage the spherical surface.



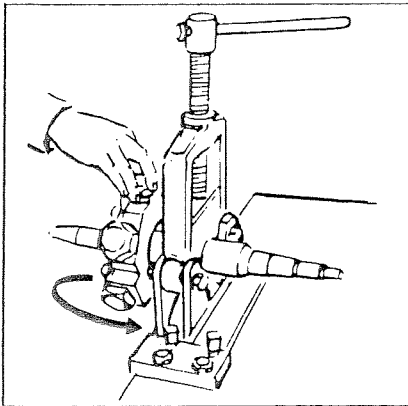
10 The lower support ring is an assembly consisting of an angular contact ball-bearing and a support ring. THIS UNIT MUST NOT BE DISASSEMBLED.



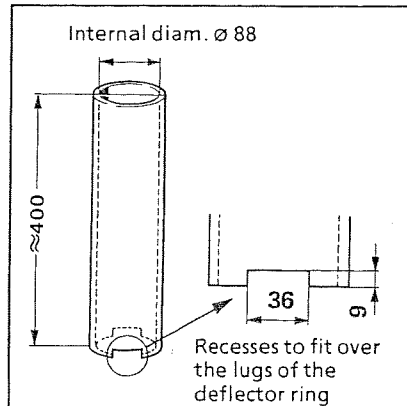
11 Remove the screws for the worm and pull off by hand.



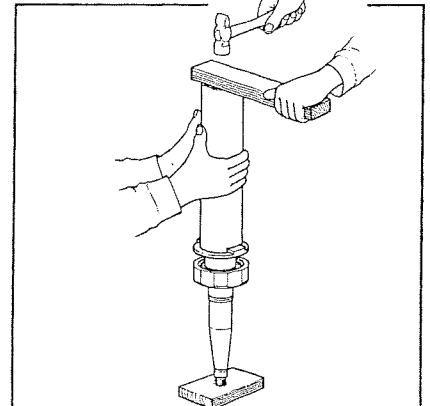
12 If the upper support ring needs to be removed always replace it with a new one.



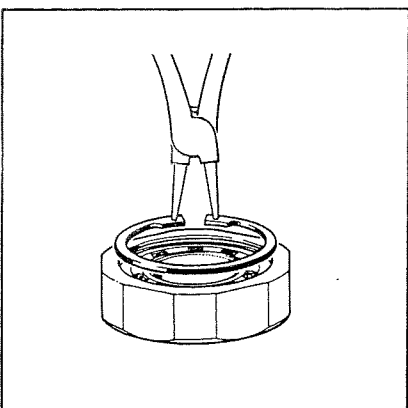
13 Remove the screw plugs, springs and buffers. Pull off the spring casing and the fan.



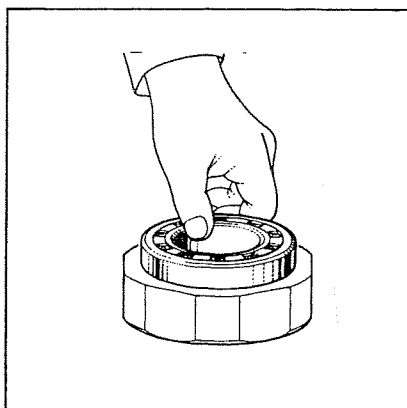
14 Use a tube to disassemble the deflector ring and the ball-bearing.



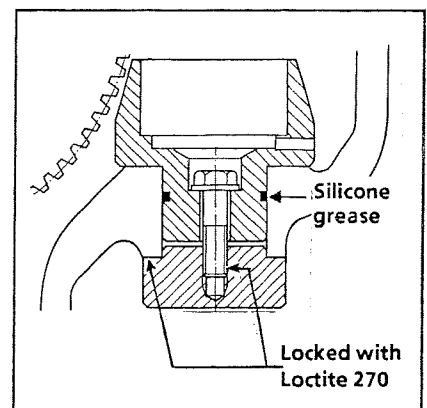
15 Disassembly of deflector ring and ball bearing (with housing). Place the spindle on a block of hard wood, place another piece above the tube and hammer off.



16 Remove the snap ring in the housing.



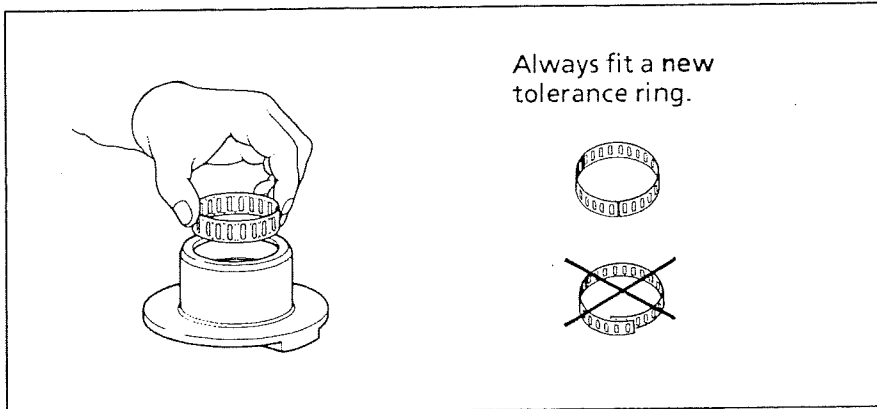
17 Pull out the ball bearing by hand.



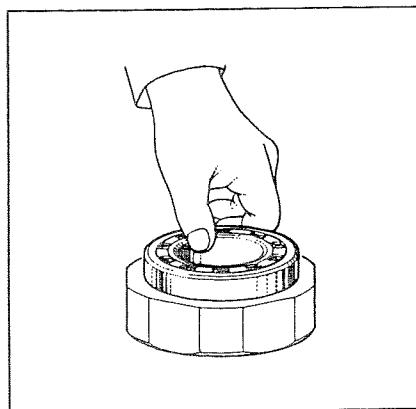
If the bottom bushing is to be removed, push the worm wheel aside, unscrew the screw of the bottom bushing and lift out the latter. Before applying Loctite clean the threads and the plane surfaces frame/bottom washer.

## BOWL SPINDLE - Single top bearing design

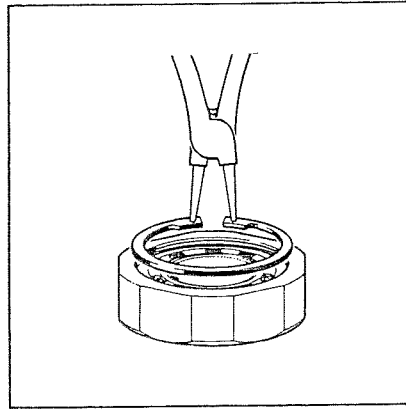
### ASSEMBLY - Top bearing



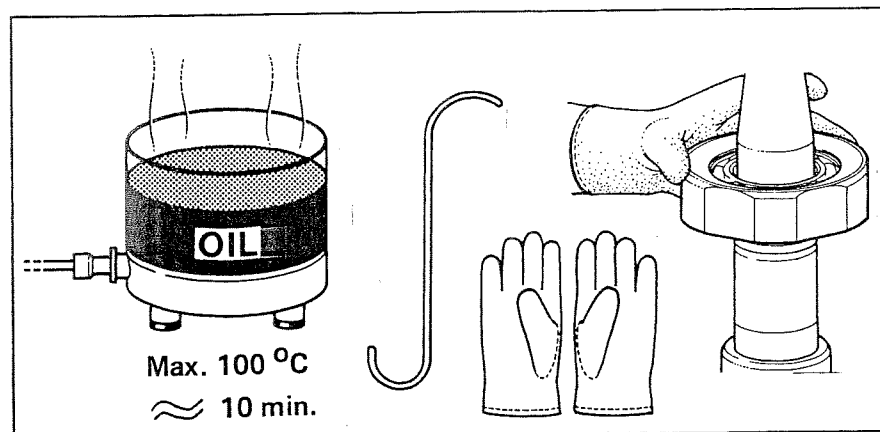
- 1 Fit the tolerance ring inside the deflector ring. The ends of the tolerance ring must be positioned end-to-end and not overlapping. Check that the tolerance ring lies properly in its groove and that it can be moved easily by hand.



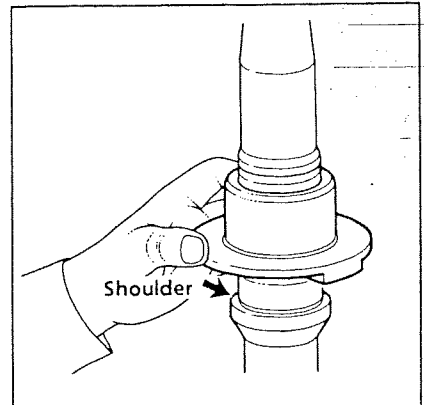
- 3 Push the ball bearing into its housing.



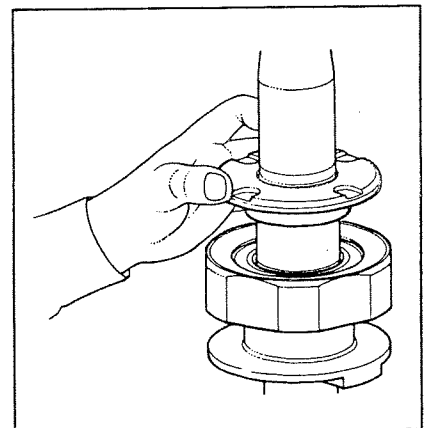
- 4 Lock the bearing with the snap ring.



- 5 Heat the assembled ball bearing and housing in oil and fit it on to the spindle.



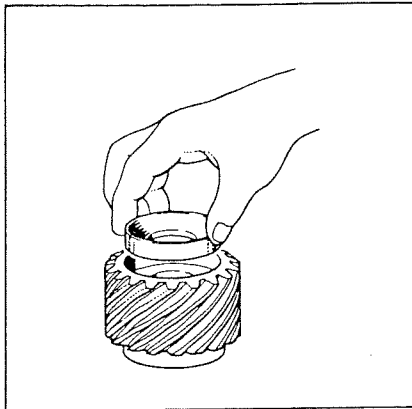
- 2 Fit the deflector ring onto the spindle. Pull it down until it rests on the shoulder of the spindle. It is advisable to use the same tube when fitting as recommended for disassembling.



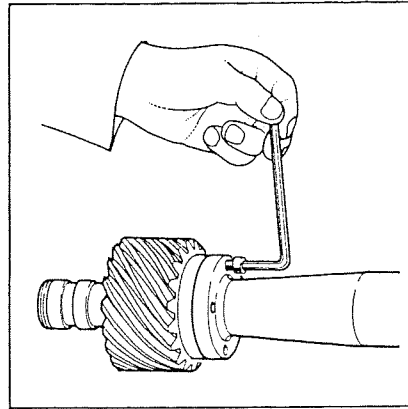
- 6 Fit the O-ring for the fan in its groove, apply silicone grease to the O-ring and slide the fan down the spindle to its stop.

## BOWL SPINDLE - Single top bearing design

### ASSEMBLY - Bottom bearing

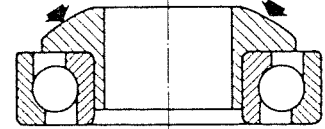


- 1 Place the upper support ring in the worm. Be careful not to damage the spherical surface.



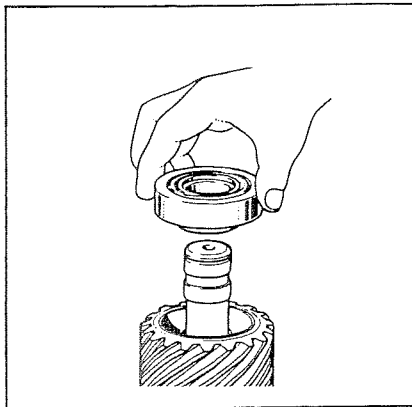
- 2 Fit the worm onto the spindle. Apply Loctite 242 to the screws and tighten.

Be careful not to damage the spherical surface.



When fitting the support ring and the angular contact ball bearing into an assembly the support ring must rest against the wide shoulder of the inner race of the bearing.

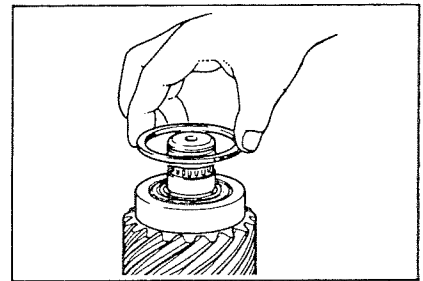
- 3 The support ring and the ball bearing are not assembled when delivered as spares. When assembling it is as a rule necessary first to heat the bearing for approx. 10 min. in oil of a temperature of 100°C.



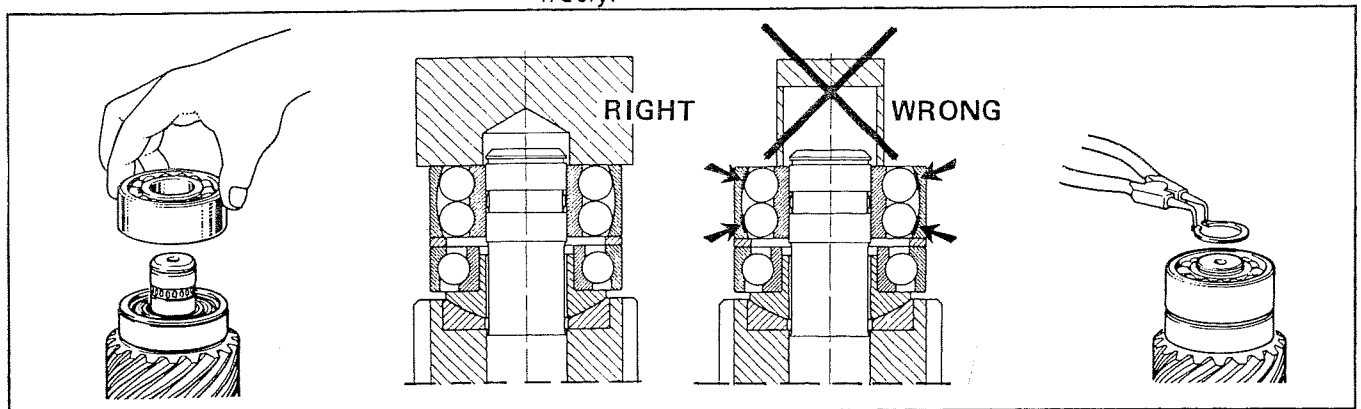
- 4 Fit the lower support ring.



- 5 Fit the tolerance ring. Its ends must be positioned end-to-end and not overlapping. Check that the ring lies correctly in its groove and that it moves freely.



- 6 Fit the washer

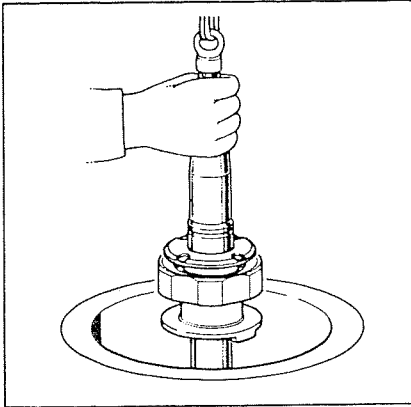


- 7 and the self-aligning ball bearing. If the bearing cannot be pushed down by hand, examine the condition of the spindle journal. Make a test assembly with the tolerance ring not fitted. It should then be possible to push down the bearing by hand. If this is not the case, adjust the spindle journal. Do not forget to fit the tolerance ring at the final assembly. If the bearing cannot be pushed down by hand onto the tolerance ring, use a tool\* which acts on BOTH the inner and outer races. Do not use force when fitting!
- Note!** Using a tool on the inner race only will damage the spherical surface of the outer race causing a drastic shortening of the bearing's life. Finally lock the bearing with the snap ring.

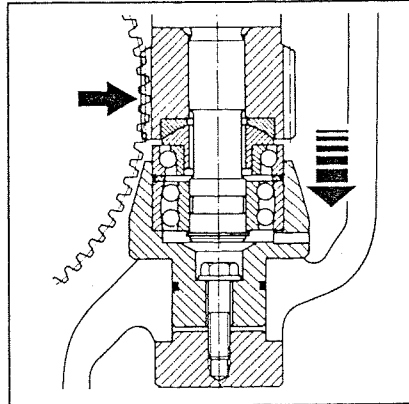
\* Alfa-Laval can supply such a tool. State article No. 546634-01 when ordering. The tool was included in the kit for conversion into single top bearing from the year-end 1986 onwards.

## BOWL SPINDLE - Single top bearing design

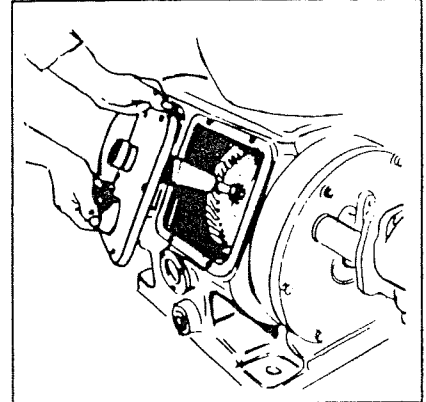
### ASSEMBLY - Fitting the spindle in the frame



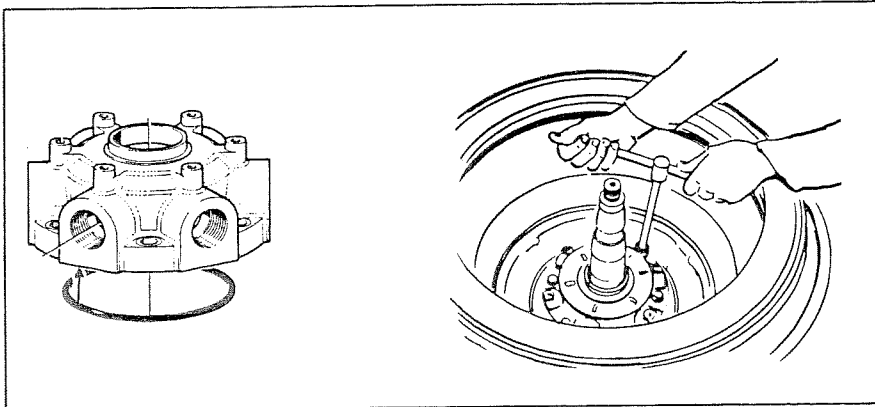
1 Lower the spindle carefully into the frame.



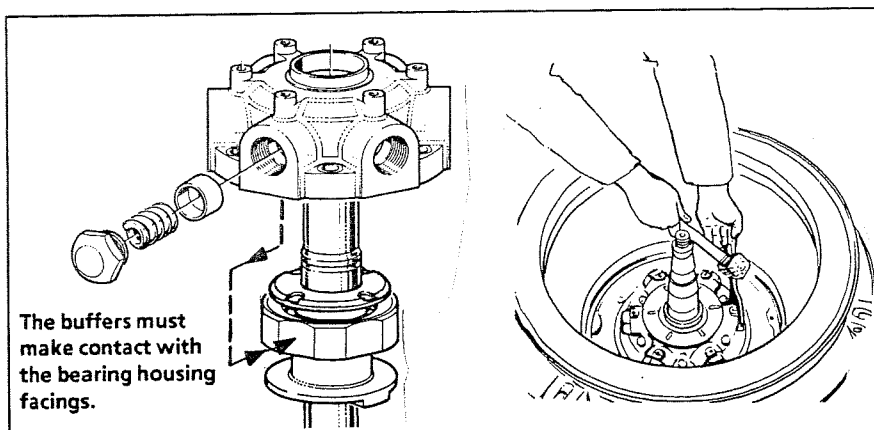
2 Guide the bearing carefully into the bottom bushing. The worm must mesh with the worm wheel.



3 Worm engagement can be checked after removing the revolution counter cover.



4 Fit the O-ring in the spring casing. Replace and tighten the screws firmly. Do not forget the spring washers!

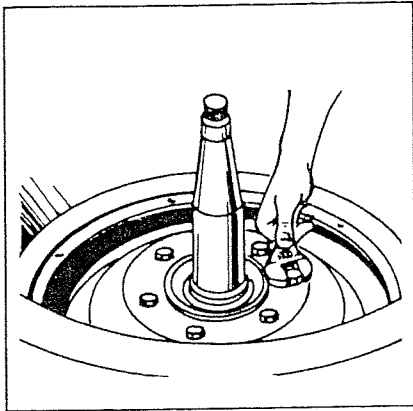


5 The buffers, springs and bores must be cleaned carefully. Lubricate the buffers and the springs with the same oil as is used in the worm gear housing. Fit the buffers, springs and screw plugs and tighten.

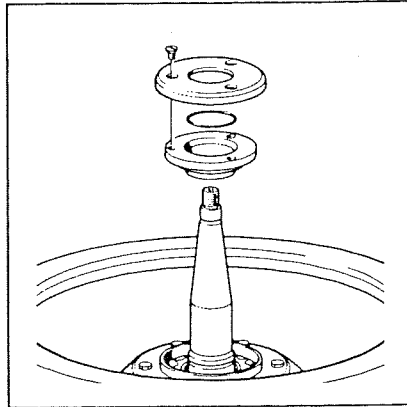
👁 Radial wobble of bowl spindle - page 3:11.

**BOWL SPINDLE**  
- Single top bearing design

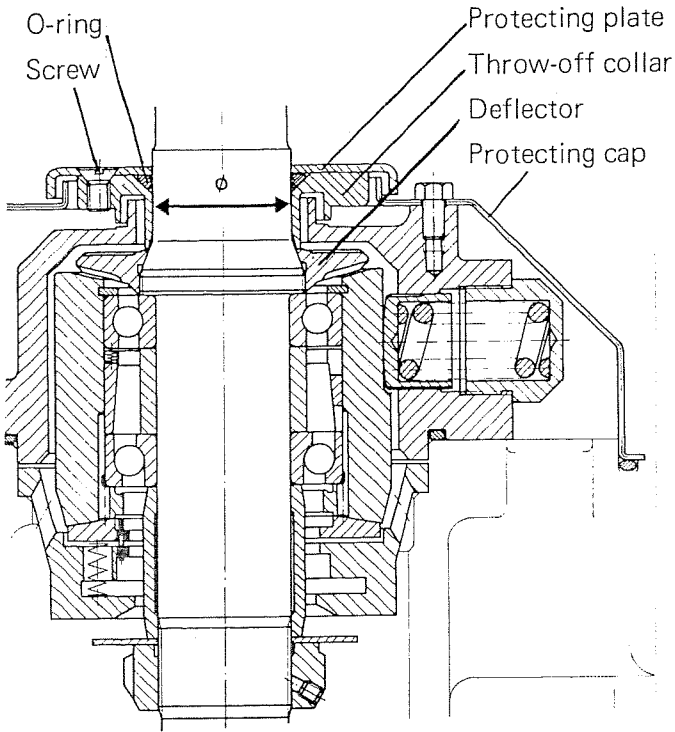
**ASSEMBLY - Fitting the spindle in the frame**



- 6 Put the O-ring of the protecting cap in its groove. Fit the protecting cap.

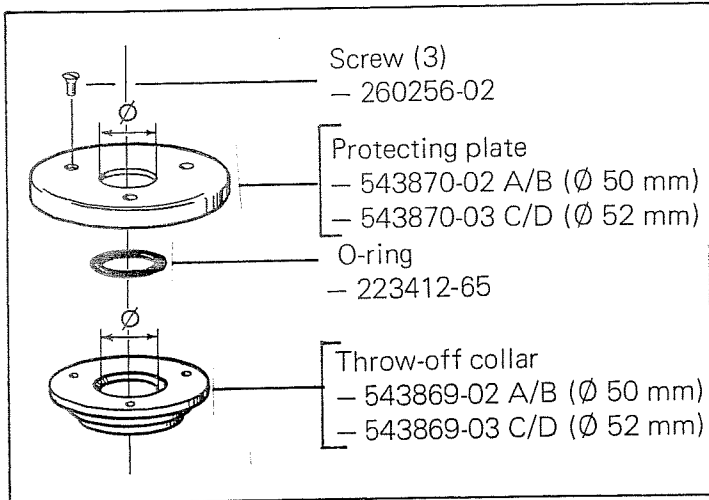


- 7 Fit the protecting collar, the O-ring and the protecting plate. Tighten the screws.



The top bearing of the bowl spindle has been provided with a new throw-off collar, a new O-ring as well as a protecting plate, which is fitted to the throw-off collar with three screws thereby pressing the O-ring. Revised parts and parts to be added will appear from the table. **NOTE**, that there are two different designs of the spindle as regards diam.  $\varnothing$ .

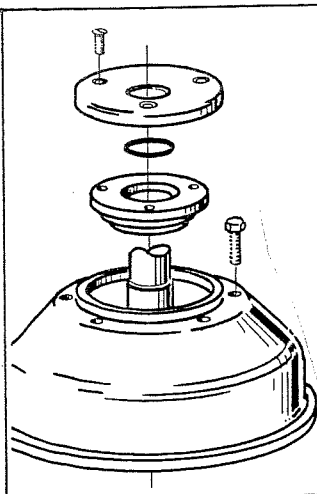
Article, name	Old article No.	Replaced by article No./ part to be added
Throw-off collar, $\varnothing$ 50 mm	539062-01	543869-02
O-ring	2234121-38	223412-65
Protecting plate, $\varnothing$ 50 mm	--	543870-02
Screw, 3 in number	--	260256-02
Throw-off collar, $\varnothing$ 52 mm	543017-01	543869-03
O-ring	2234121-38	223412-65
Protecting plate, $\varnothing$ 52 mm	--	543870-03
Screw, 3 in number	--	260256-02



**Revisions in Spare Parts Catalogue – SPC Page 301.1**

Driving device, vertical  
543032-80/81/82/83

	Machine Unit No.	Hz
A	543048-01/03	50
B	543048-02/04	60
C	543048-05/07	50
D	543048-06/08	60



When **DISASSEMBLING** the bowl spindle the following is applicable on page 4:27 for steps 1,2 and 3:

Remove the screws of the protecting plate, the plate itself, the screws of the protecting cap, the cap itself, the O-ring and the throw-off collar.

**Revisions in book for Maintenance. Repair – MR**

When **ASSEMBLING** the bowl spindle the following is applicable on page 4:32 for step 11:

Bring the throw-off collar down to the stop. Bring down the O-ring and the protecting plate. Tighten the protecting plate firmly with the three screws.



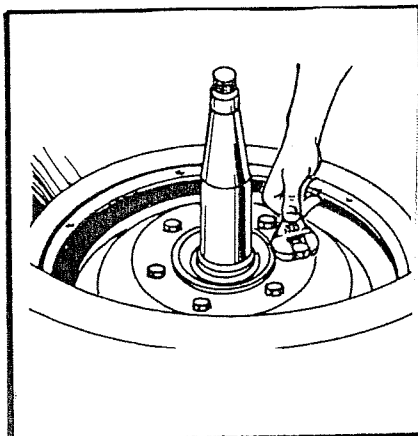
**BOWL SPINDLE**  
 – Double top bearing design

The bowl spindle is accessible after bowl and paring disc device have been removed from the machine.

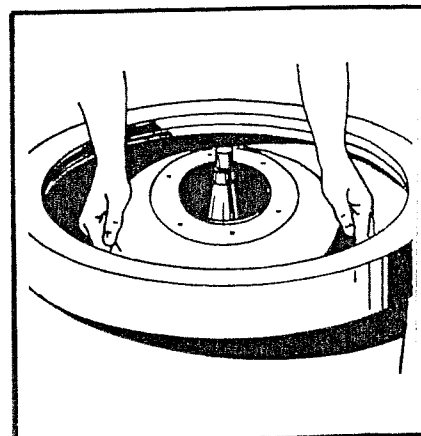
**DISASSEMBLY**



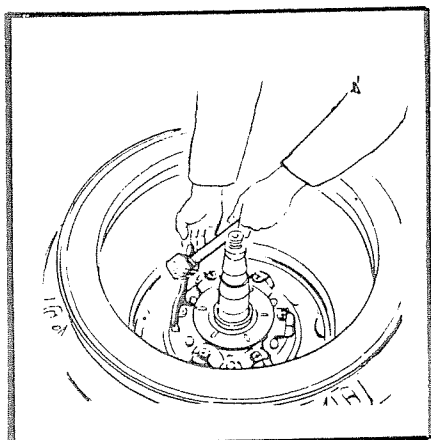
1 Remove the throw-off collar.  
 ⦿ Radial run-out  
 – page 3:11.



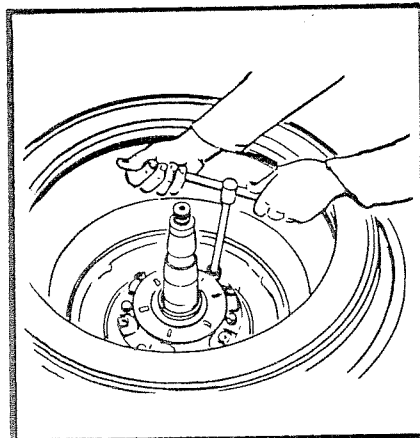
2 Undo the screws of the protecting cap.



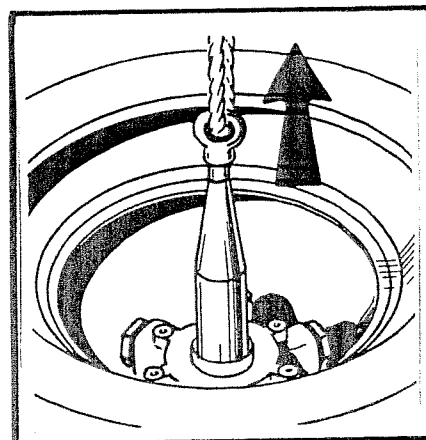
3 Remove the protecting cap.



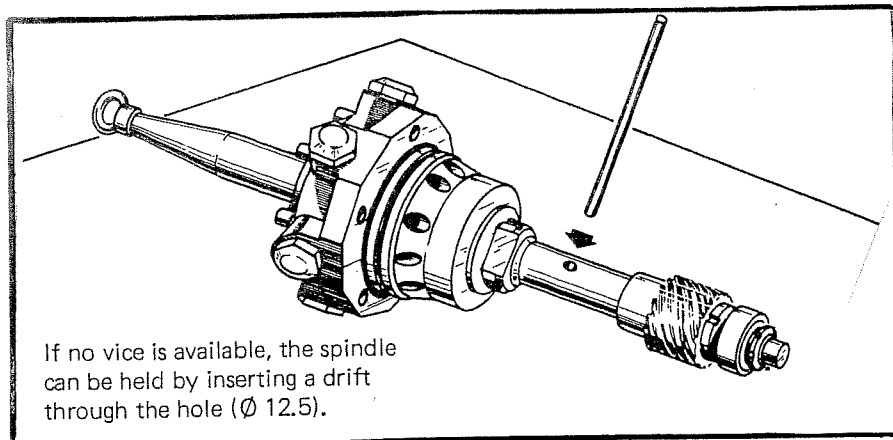
4 Slacken the screw plugs slightly.



5 Remove the spring casing screws.

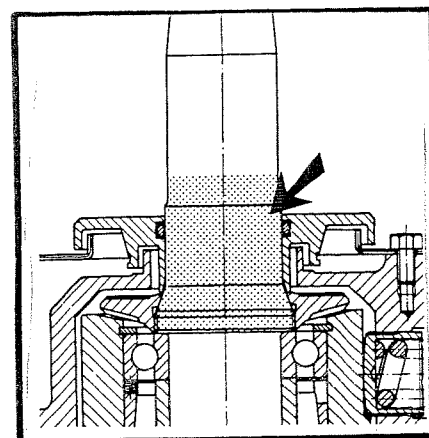


6 Lift out the bowl spindle. Be careful not to damage worm or wormwheel. The brake must be disengaged.



If no vice is available, the spindle can be held by inserting a drift through the hole ( $\varnothing 12.5$ ).

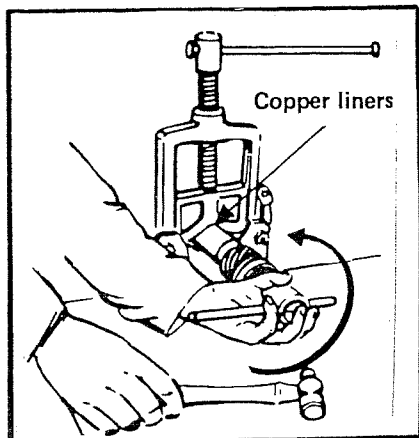
7 ⦿ Worm, wormwheel – page 3:15.  
 ⦿ Ball bearings – page 1:12.



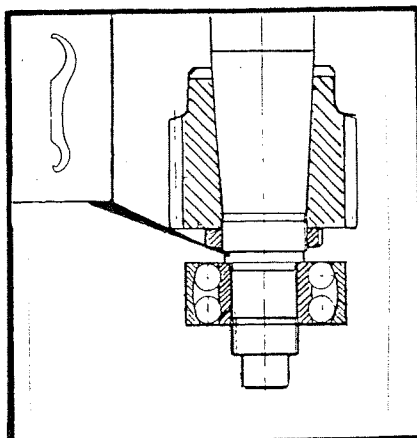
8 The indicated part of the bowl spindle must be free from scratches and other marks. Never clamp this part in a vice.



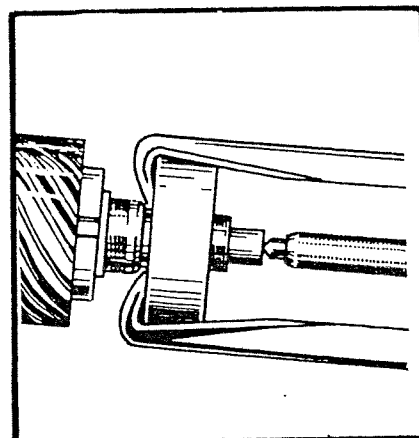
BOWL SPINDLE  
 – Double top bearing design



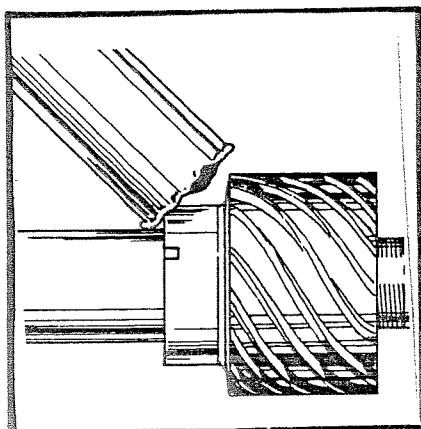
9 Remove round nut, lock washer and spacer washer.



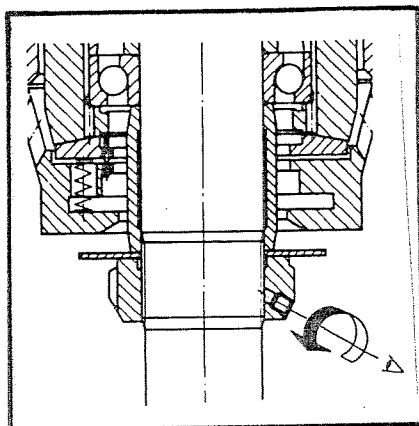
10 Screw down the round nut of the worm to press the bearing loose slightly and make room for a puller.



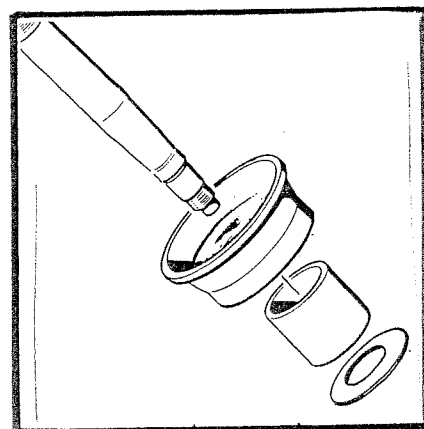
11 Pull off the bearing.



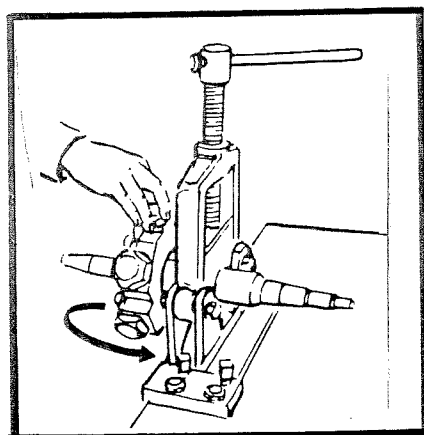
12 Tap off the worm with a hammer and soft drift.



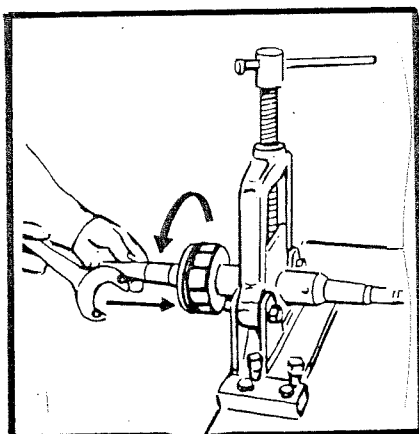
13 Undo the three set screws of the lock nut a few turns and screw off the nut.  
**Note!** The set screws must be seated in the lock nut.



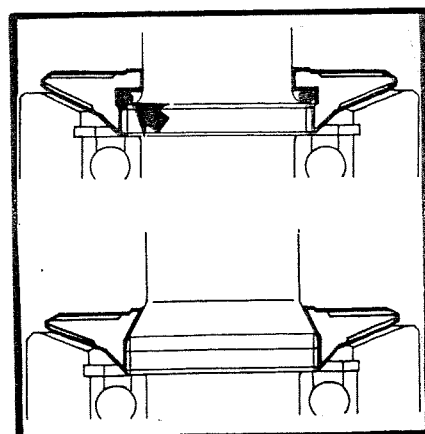
14 Remove collar, spacing sleeve and axial buffer.  
 👁 Axial buffer springs  
 – page 3:12.



15 Remove screw plugs, springs and buffers. Pull off the spring casing.  
 👁 Springs, bearing housing and buffers – pages 3:12 and 3:14.

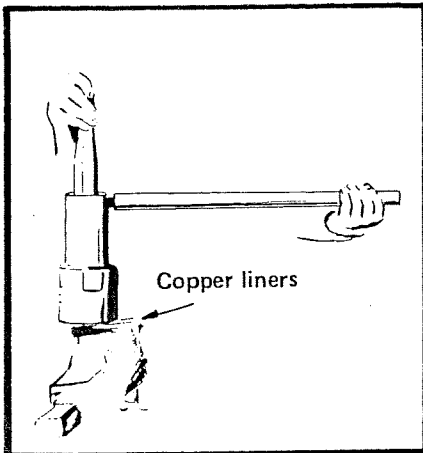


16 Screw off the deflector **clockwise** (left hand thread) with a pin spanner or soft drift.

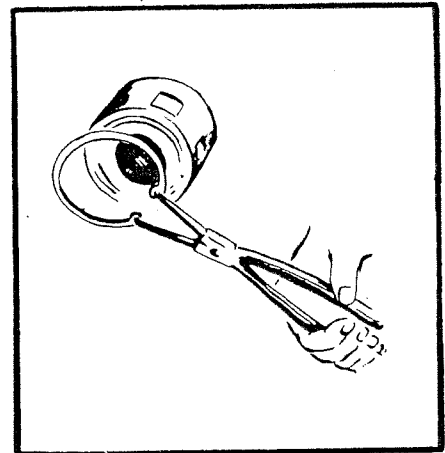


16a There are two designs of the deflector, the bowl spindle and the throw-off collar. In machines of one design there is an elastic ring between the deflector and the bowl spindle.  
**Note!** - this ring should **not** be removed.

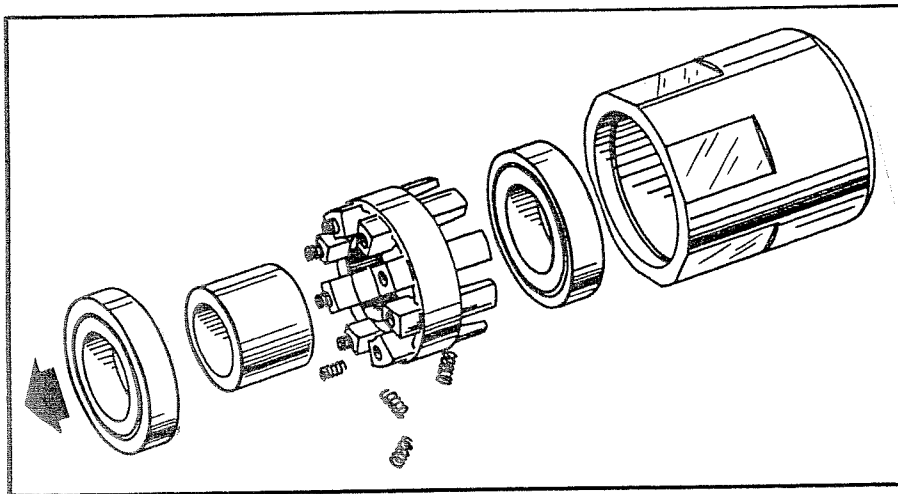
**BOWL SPINDLE**  
 – Double top bearing design



**17** Press off the bearing unit, which includes ball bearings and housing. Lubricate the threads of the tool (left hand thread). Use a handle extension.

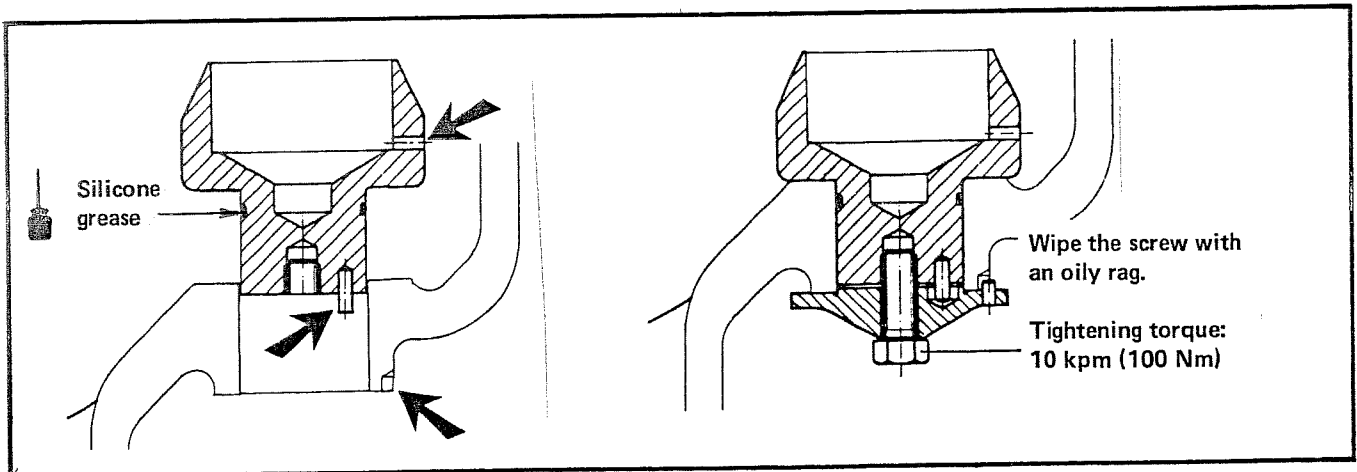


**18** Remove the retaining ring that keeps the bearing unit together.



**19** Remove the parts from the bearing housing. Be careful not to lose the preloading springs.  
 👁 Preloading springs – page 3:12.

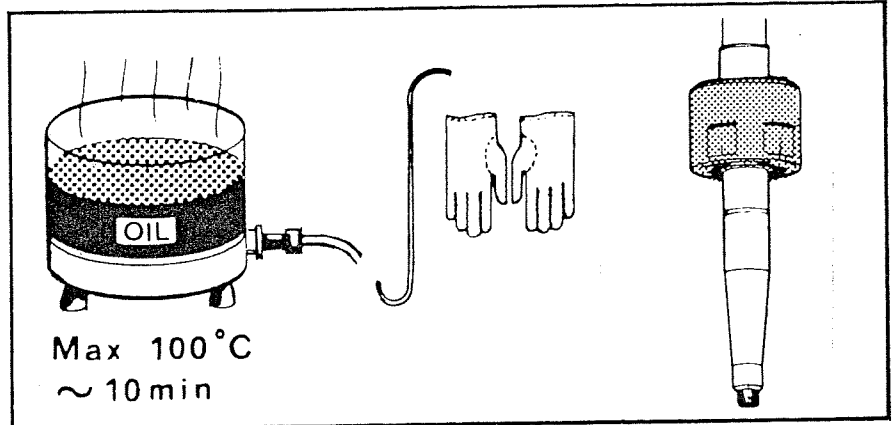
**BOTTOM BUSHING**



Check the bearing seat in the bottom bushing after the bowl spindle has been lifted out of the frame. If the bushing must be exchanged: remove the screw and the bottom washer and lift out the bushing. Clean the guiding surface in the frame. Mounting: put a faultless O-ring in the groove and turn the bushing so that its draining hole and guiding pin are in the same plane as the recess in the frame – see arrows in the figure. Mount the bushing, the bottom washer and the screw.

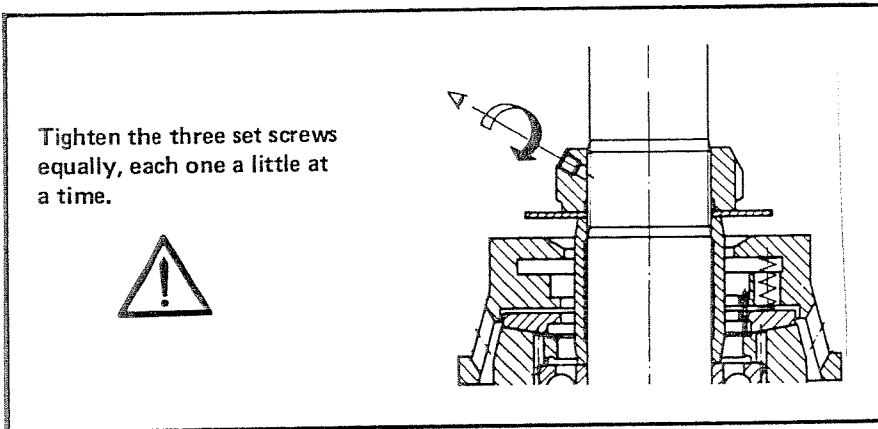
**ASSEMBLY**

See figure and number of stage on next page.

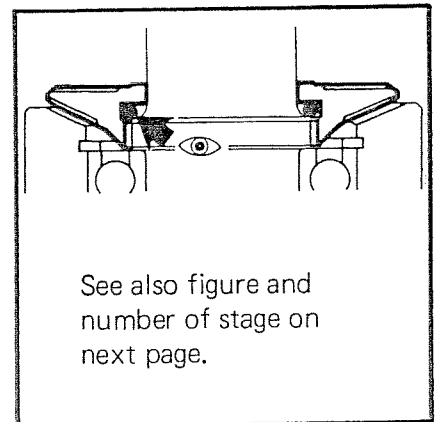


**1** Assemble the parts of bearing unit and axial buffer separately into complete units.

**2** Heat the complete bearing unit in oil and fit it on to the spindle.

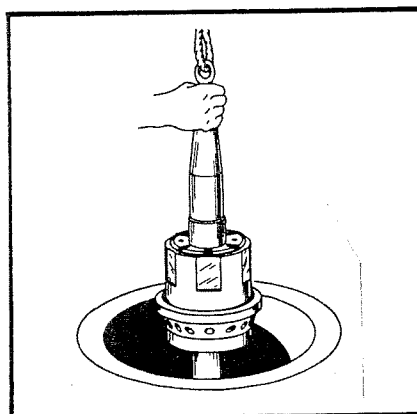


**3** Immediately afterwards fit axial buffer, spacing sleeve and collar. Tighten the lock nut whilst the bearing unit is still hot. The inner race of the upper ball bearing must rest rigidly against the shoulder of the spindle. Tighten the three set screws of the lock nut according to instructions in figure.

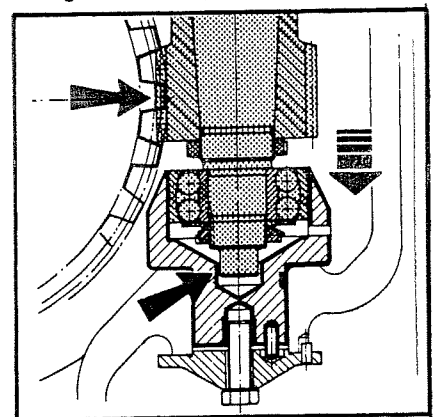


**4** If the deflector is equipped with an elastic ring: check that this ring is placed in its seating. Screw on the deflector anticlockwise (left hand thread) until it rests rigidly against the spindle.

See figure and number of stage on next page.



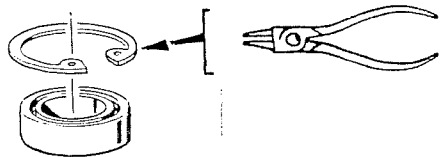
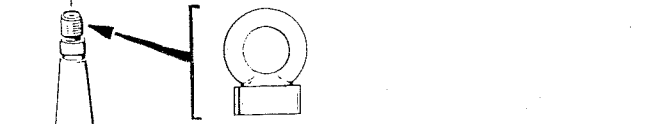
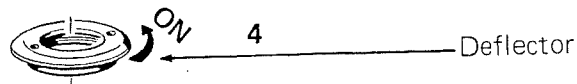
**5** Lower the spindle carefully into the frame.



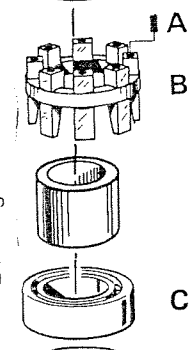
**6** Guide the bearing into the bottom bushing. The worm teeth must mesh with those of the worm wheel.

**4** Fit the worm. Heat the bottom bearing in oil to max. 100°C and fit it on to the spindle. The inner race must rest rigidly against the shoulder of the spindle.

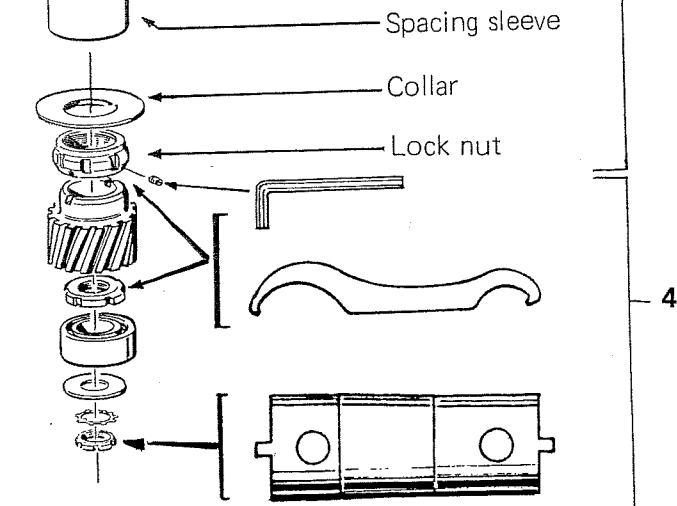
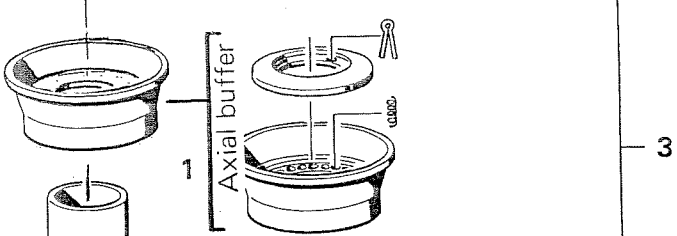
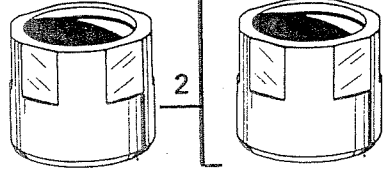
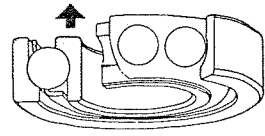
BOWL SPINDLE  
- Double top bearing design



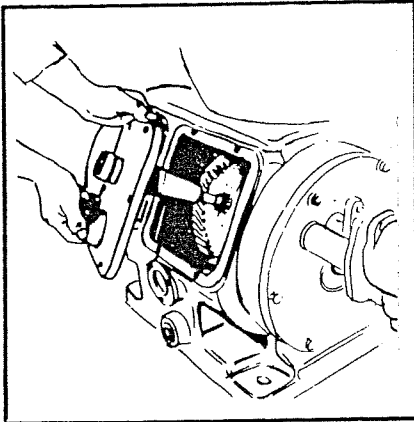
Check that the preloading springs **A** are in the correct positions in spring support **B**.



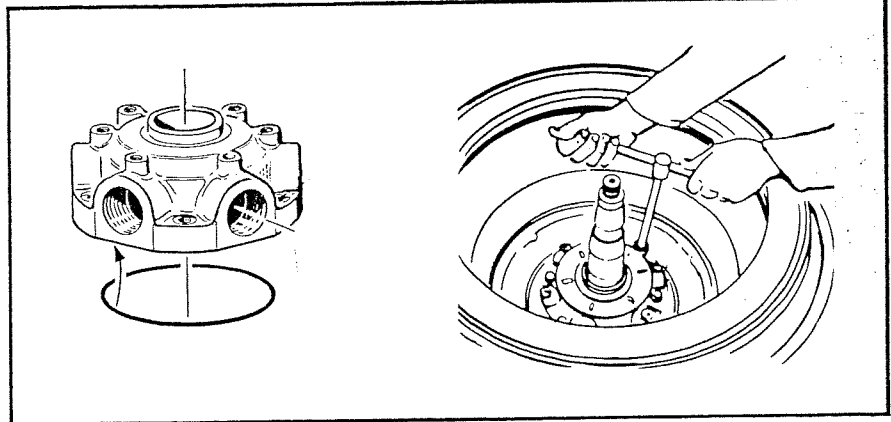
**Note.** Angular contact bearing **C** must be fitted with the wide shoulder of the inner race facing upwards.



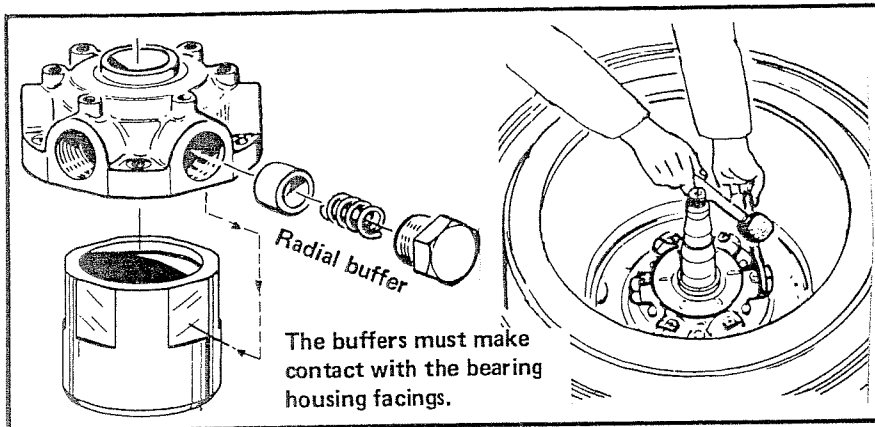
**BOWL SPINDLE**  
 – Double top bearing design



7 Worm engagement can be checked after removing the revolution counter cover.

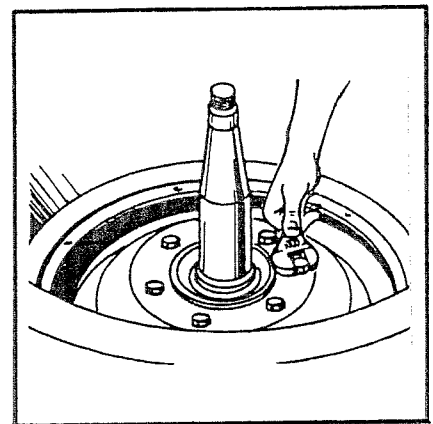


8 Fit the spring casing with O-ring. Tighten the spring casing screws firmly. Remember spring washers.

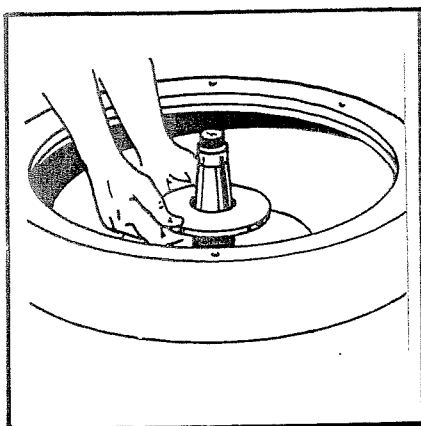


9 The buffers, the springs and the bores for the said parts must be carefully cleaned. Lubricate the buffers and the springs with the same oil as is used in the worm gear housing. Fit the buffers, springs and screw plugs. Tighten the screw plugs.

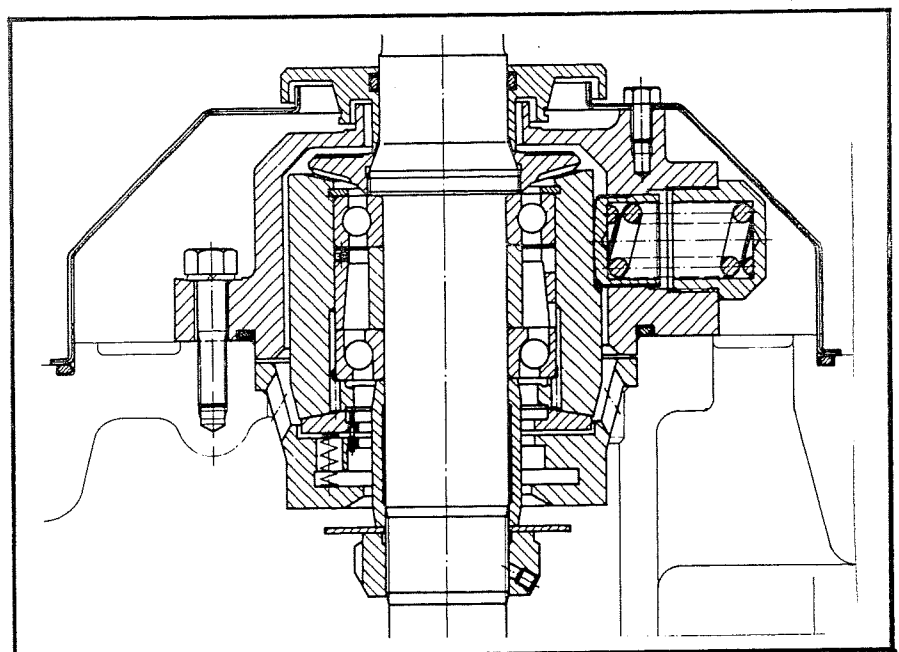
👁 Radial run-out — page 3:11.



10 Put the O ring of the protecting cap in its groove. Fit the protecting cap.




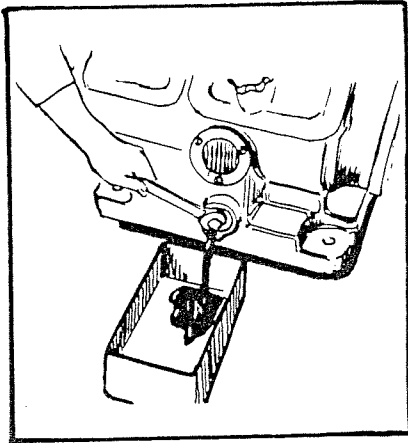
11 Smear silicone grease on the throw-off collar O ring. Bring the collar down to the stop.



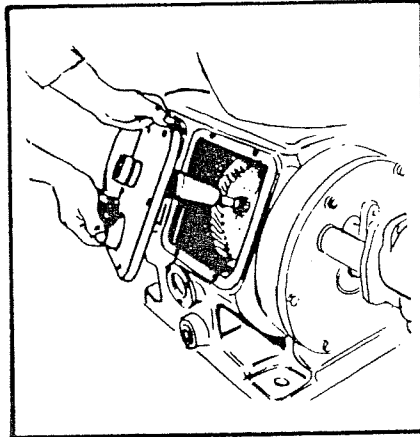
Top bearing in assembled state.

DISASSEMBLY

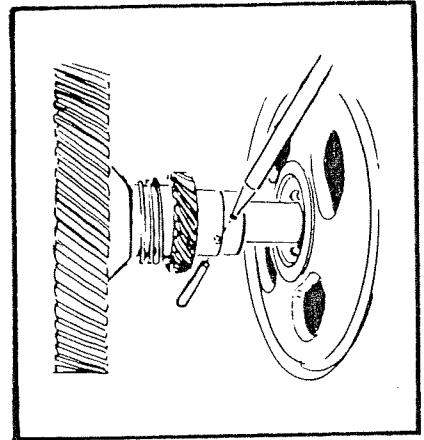
 Pump — see special instruction book



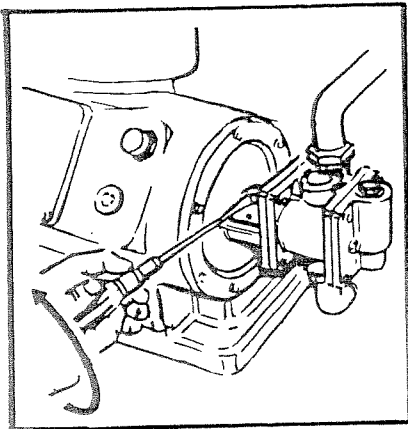
1 Drain oil from worm gear housing.



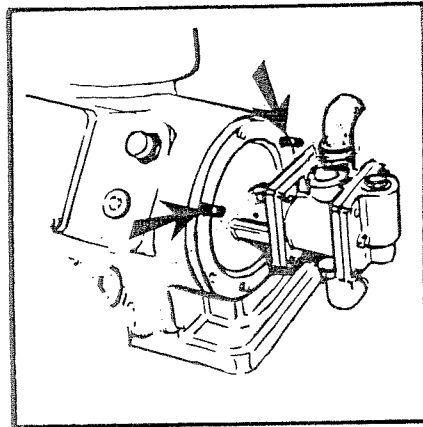
2 Remove revolution counter cap.



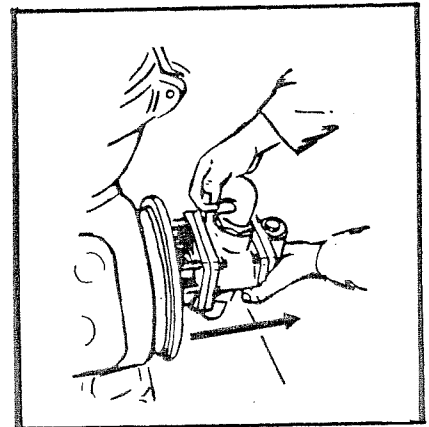
3 Force out taper pin of worm wheel.



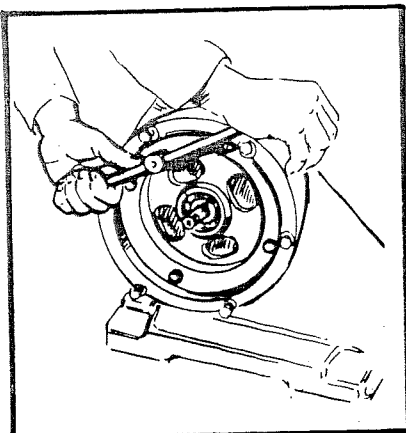
4 Remove pump pipe connections and half-sleeves over the coupling. Undo the coupling stop screw.



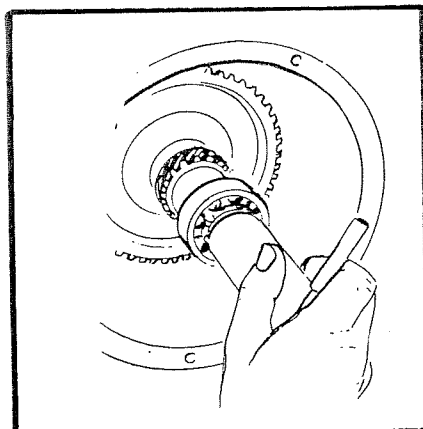
5 Remove two of the pump adapter screws and replace by M12 studs.



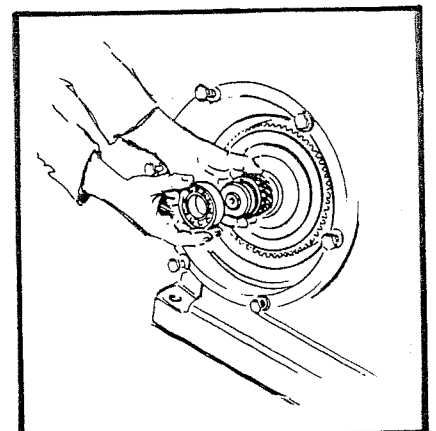
6 Remove the remaining pump adapter screws and withdraw the pump carefully. The studs must act as guides.



7 Remove: screws of bearing shield

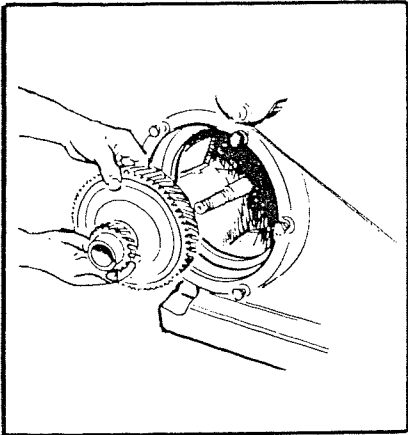


8 round nut and its lock washer

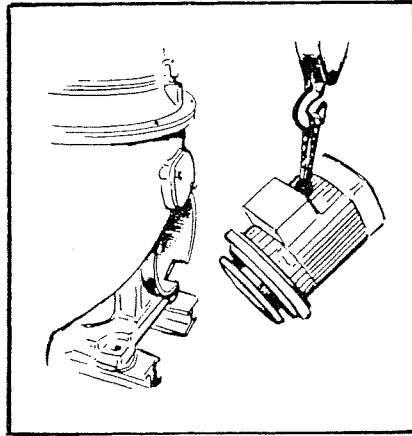


9 ball bearing.

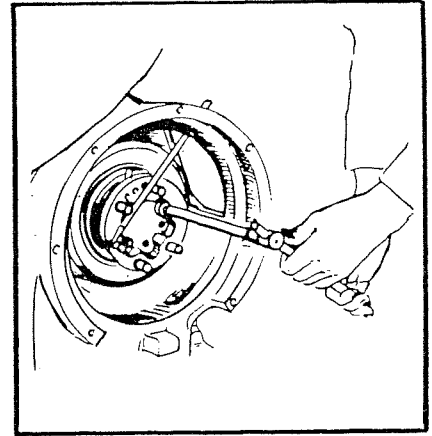
WORMWHEEL SHAFT  
HUB/COUPLING



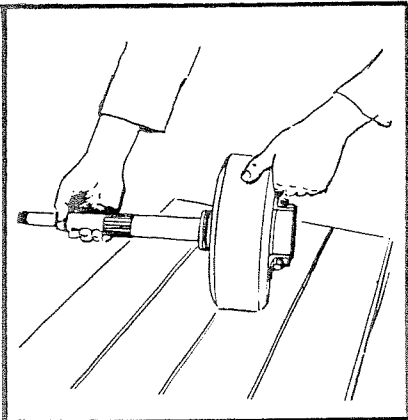
10 Remove worm wheel with ball bearing.



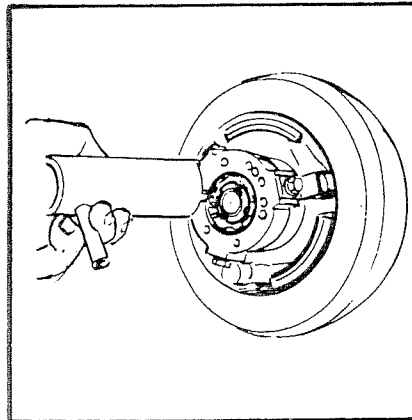
11 motor,



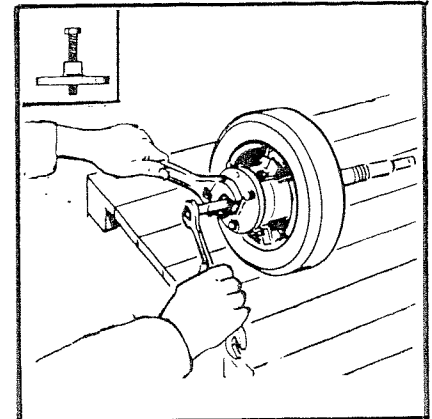
12 coupling disc.



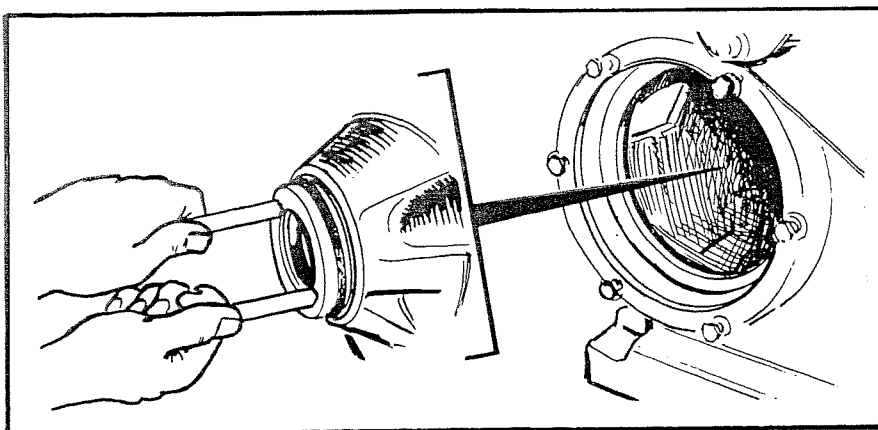
13 Lift out worm wheel  
👁 Hub—page 3:19.



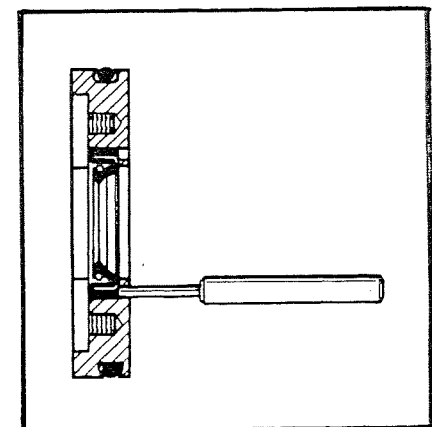
14 To dismantle the hub:  
remove round nut and lock washer.



15 Ease off the hub: remove friction blocks.

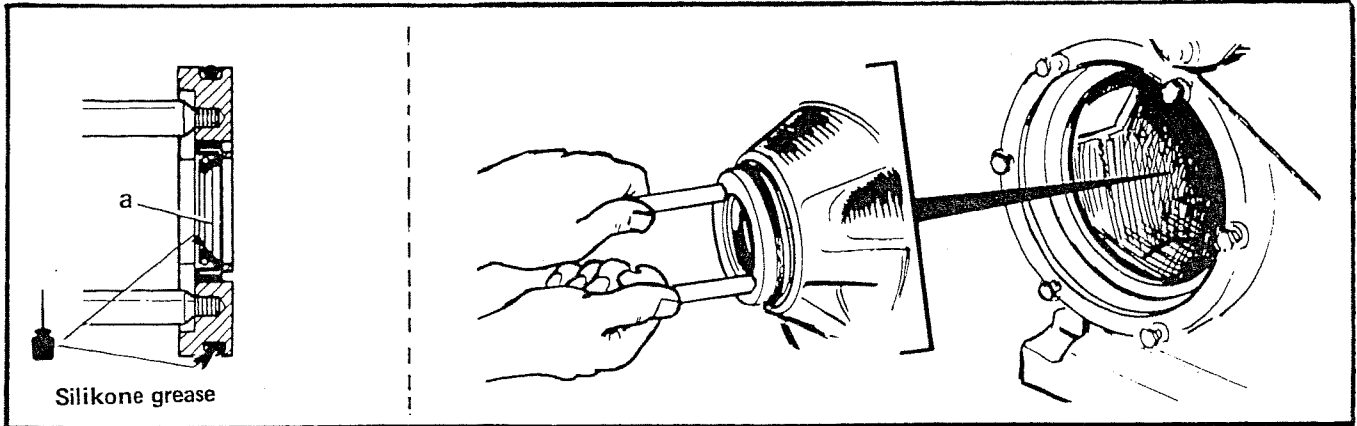


16 Remove sealing washer using two 20 UNC screws 1/4".



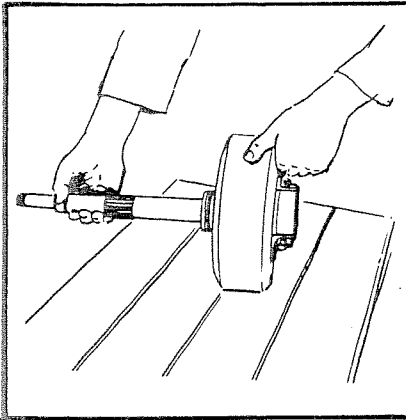
17 Removal of lip seal ring.

ASSEMBLY

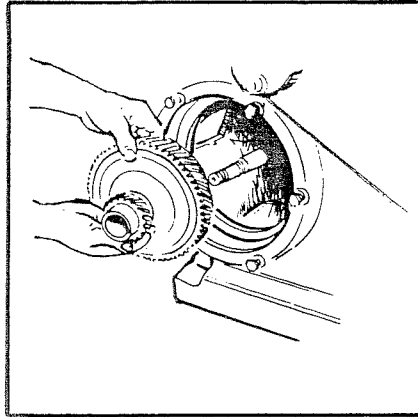


1 Check that lipseal ring (a) is correctly fitted.

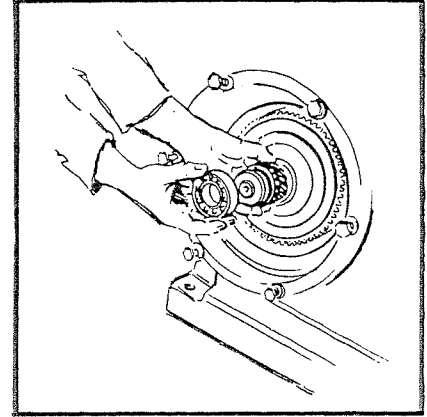
Fit sealing washer in the frame.



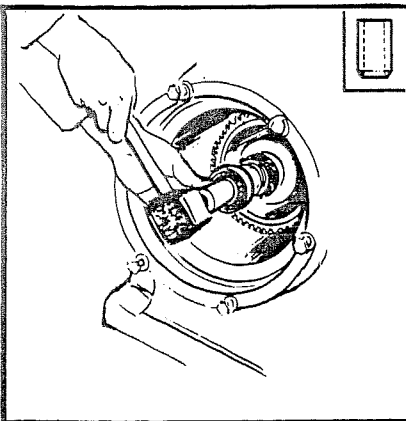
2 Fit wormwheel shaft,



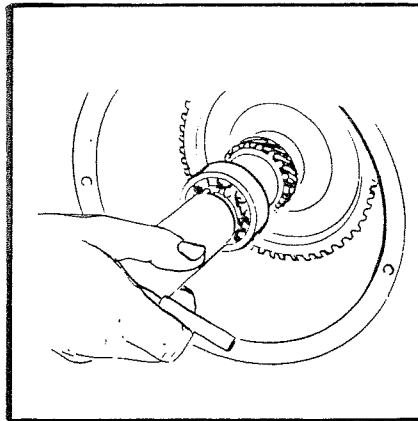
3 wormwheel with ball bearing and stop ring,



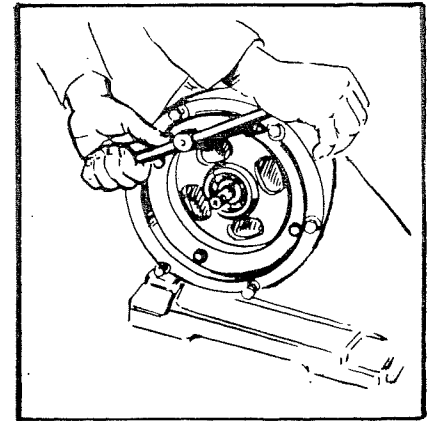
4 ball bearing.



5 Use the drive-on sleeve of the tool kit when fitting the bearing.



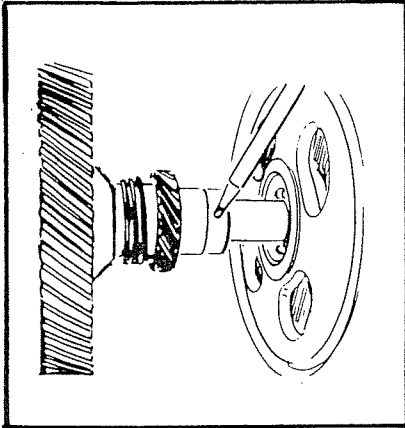
6 Screw on the round nut and secure with lock washer.



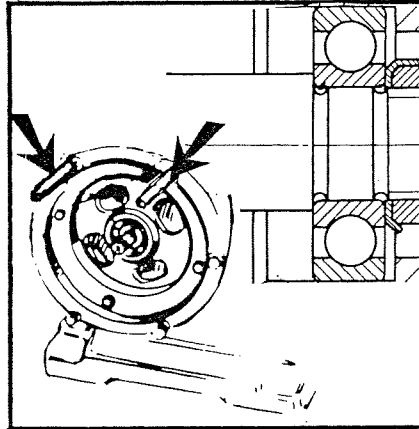
7 Screw in the screws of bearing shield.



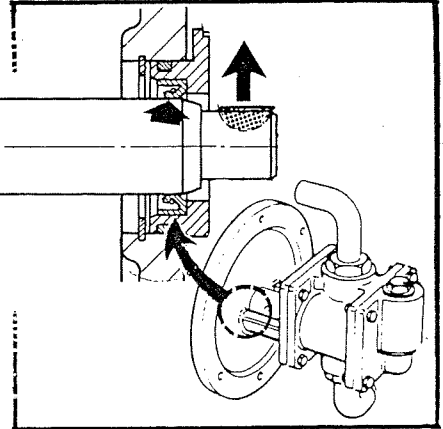
WORMWHEEL SHAFT  
HUB/COUPLING



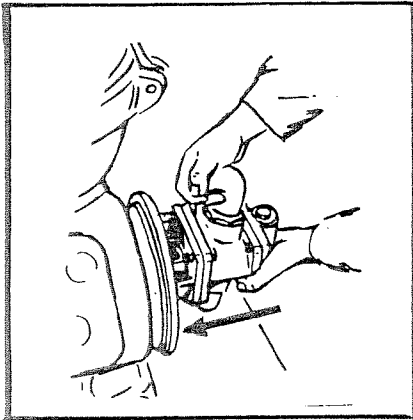
8 Force the taper pin of worm wheel in place.



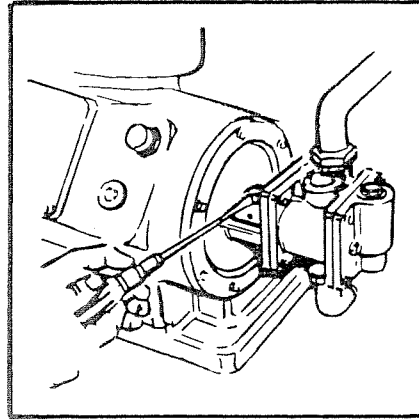
9 Fit two M12 studs in the frame flange to guide the pump adapter. Rotate the wormwheel shaft until the Woodruff key faces upwards.



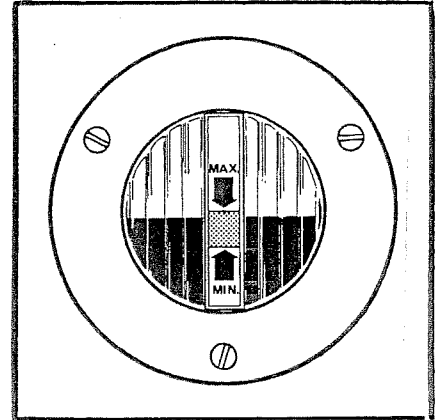
10 Inspect the lip sealing ring in pump adapter. Change if defective in any way. Make sure to fit correctly. Smear silicone grease on the sealing lip.



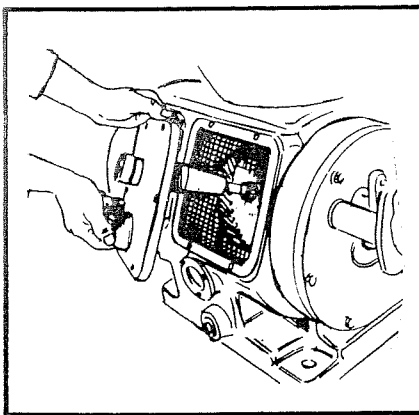
11 Fit the pump. Be very careful that the sealing ring is not damaged by the key.



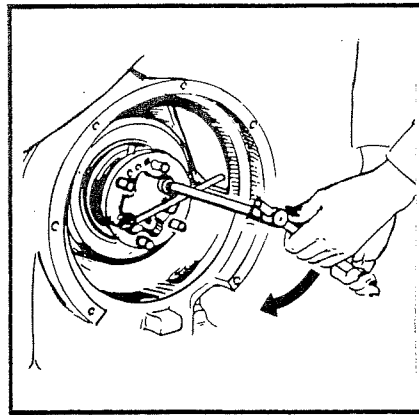
12 Tighten the coupling stop screw. Fit the half-sleeves over the coupling. Refit the pipe connection.




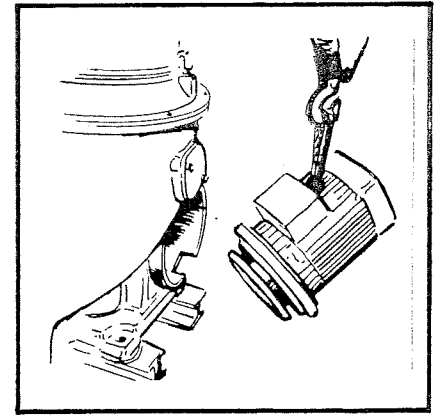
13 Pour oil into worm gear housing. It is important that the oil level is situated between readings MAX. and MIN. (The bowl must always be at a standstill when oil is supplied and when oil level is checked.)



14 Fit the revolution counter.



15 Fit the friction coupling. Fasten the coupling disc. Fit the brake.  
 Axial play of elastic plate — page 3:18.



16 Fasten the motor. Connect motor to mains supply so that the bowl will rotate **clockwise**, as seen from above.

Spec. No. 881032-01

### Throughput capacities

Rated capacity <sup>1)</sup>	8300
<b>Recommended max. troughput</b>	
Diesel oil	6500
Viscosity 13 cSt/40 °C	
Heavy fuel oil	
Viscosity cSt/50 °C	
30– 40	5000
40– 80	3400
80–180	2500
180–380	2100
380–460	1700
460–600	1300
Lubricating oil, by-pass treatment, optimum	
Straight	2500–3000
Detergent	1500–1850
Turbine	5400

Note! Max. density of oil 0.990/15°C

1) Separator with standard bowl treating a light gas oil without tendency to emulsify and having a viscosity of <12 cSt at separation temperature.

### Sludge and water space

5.0 litres

### Built-on inlet pump

Capacity in l/h for	50Hz	60Hz
	2420	2900
	3630	4350
	4350	5220
	5760	6920
	8540	10250

Suction lift: max 4 m wg (manometric)  
Delivery head: max 15 m wg (manometric)

Note! Separate feed pump. See special sheet

### Built-in oil outlet paring-disk pump

Delivery head: 50 m

### Electric motor

Size 10 kW

### Speed

The prescribed speed of the worm-wheel shaft, which must not be exceeded, is stamped on the name plate of the machine

The table below indicates rpm.

Drive motor	1420–1500 (50 Hz)	1700–1800 (60 Hz)
Bowl spindle	6745–7125	6800–7200
Revolution counter	118–125	142–150

### Running-up time

Approx. 6 min

### Stopping time

Approx. 8 min. (Running-out with brake applied)

### Materials

Frame, lower part  
cast iron («Centriblue» finish\*)

Frame, upper part, frame hood  
fabricated steel («Centriblue» finish\*)

Bowl body and hood, sliding bowl bottom, disk stack,  
gravity disks, operating slide, and dosing ring  
stainless steel

Other bowl parts  
tinned steel, bronze, and brass

Paring-disk pumps  
brass

Other inlet and outlet parts  
bronze, brass, aluminium, and stainless steel

\* An epoxy enamel

### Operating liquid

Volume of tank for make-up, closing, opening, sealing  
and displacement water:

Min. 50 litres. (One tank for max. 3 machines).

Height from operating liquid connection of the separator  
to the max. liquid level in the tank 3 m ± 0.2 m.

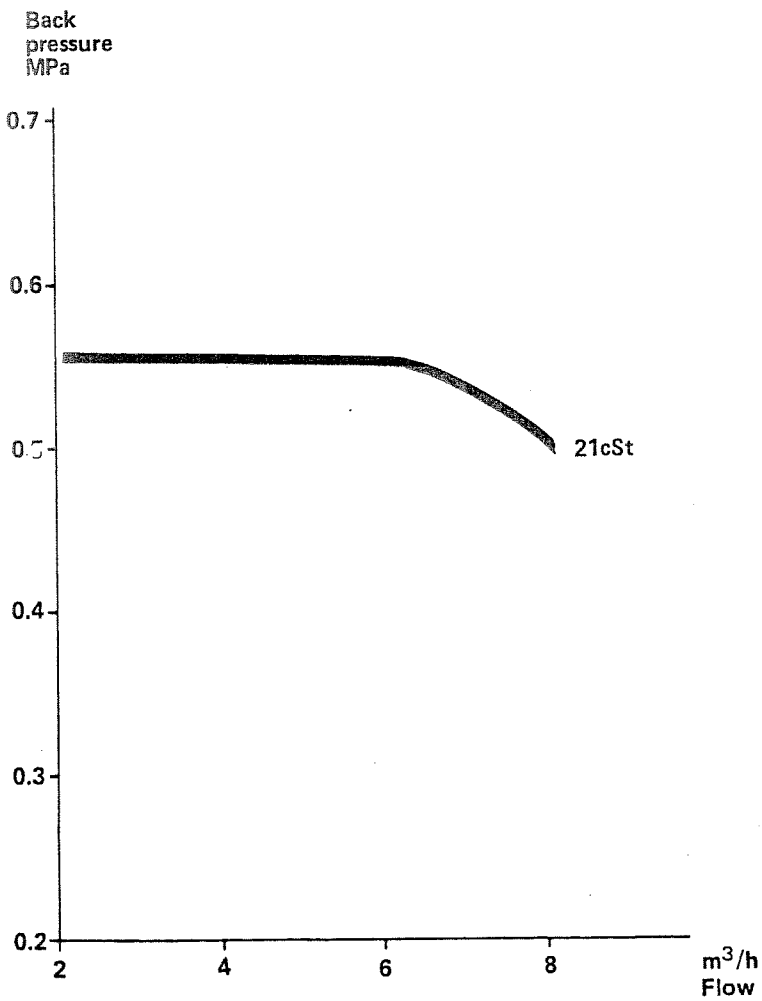
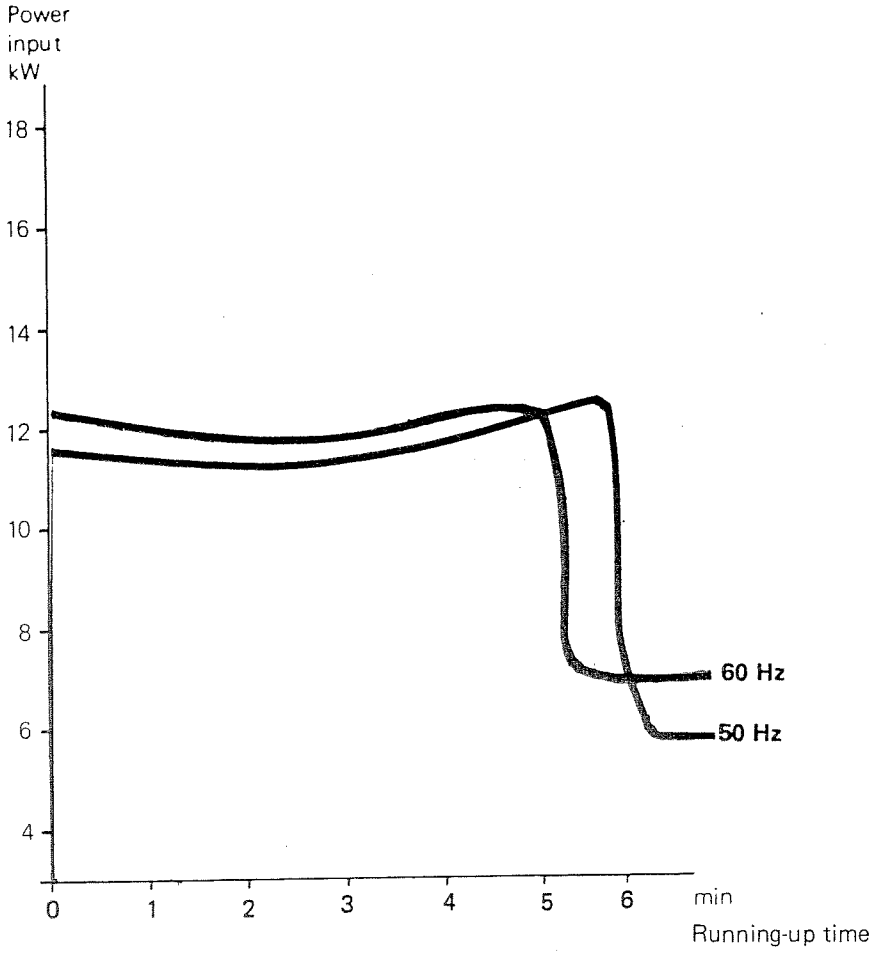
Hardness of operating water to be max. 10 d<sup>0</sup>H. (German  
degree of hardness).

### Shipping data

WHPX507TGD, complete with set of tools, excluding  
motor

Net weight:	750 kg
Gross weight	870 kg
Volume:	2.55 m <sup>3</sup>

# WHPX 507TGD



No. PC 30950 E3
Reg. 33436
8005

### Capacity

Recommended max throughput		l/h
Lubricating oil, detergent type	40 °C	1800-2700
	60 °C	2100-3000
	70 °C	3000-4500
Cutting oil	40-60 °C	1500-2400
Grinding oil	40-60 °C	1500-2400
Hydraulic oil	70-80 °C	2750-3500
Airfilter oil	20-30 °C	1500-3000
Testbed oil	60-80 °C	1800-3000
Waste oil	80-95 °C	600-3000

### Sludge and water space

5.0 litres

### Built-on inlet pump

Capacity in l/h for	50Hz	60Hz
	2420	2900
	3630	4350
	4350	5220
	5760	6920
	8540	10250

Suction lift: max 4 m wg (manometric)  
 Delivery head: max 15 m wg (manometric)

Note! Separate feed pump. See special sheet

### Built-in oil outlet paring-disk pump

Delivery head: 50 m

### Electric motor

Size 10 kW

### Speed

The prescribed speed of the worm-wheel shaft, which must not be exceeded, is stamped on the name plate of the machine

The table below indicates rpm.

Drive motor	1420–1500 (50 Hz)	1700–1800 (60 Hz)
Bowl spindle	6745–7125	6800–7200
Revolution counter	118–125	142–150

### Running-up time

Approx. 6 min

### Stopping time

Approx. 8 min. (Running-out with brake applied)

### Materials

Frame, lower part  
 cast iron (»Centriblue» finish\* )

Frame, upper part, frame hood  
 fabricated steel (»Centriblue» finish\* )

Bowl body and hood, sliding bowl bottom, disk stack, gravity disks, operating slide, and dosing ring  
 stainless steel

Other bowl parts  
 tinned steel, bronze, and brass

Paring-disk pumps  
 brass

Other inlet and outlet parts  
 bronze, brass, aluminium, and stainless steel

\* An epoxy enamel

### Operating liquid

Volume of tank for make-up, closing, opening, sealing and displacement water:

Min. 50 litres. (One tank for max. 3 machines).

Height from operating liquid connection of the separator to the max. liquid level in the tank  $3\text{ m} \pm 0.2\text{ m}$ .

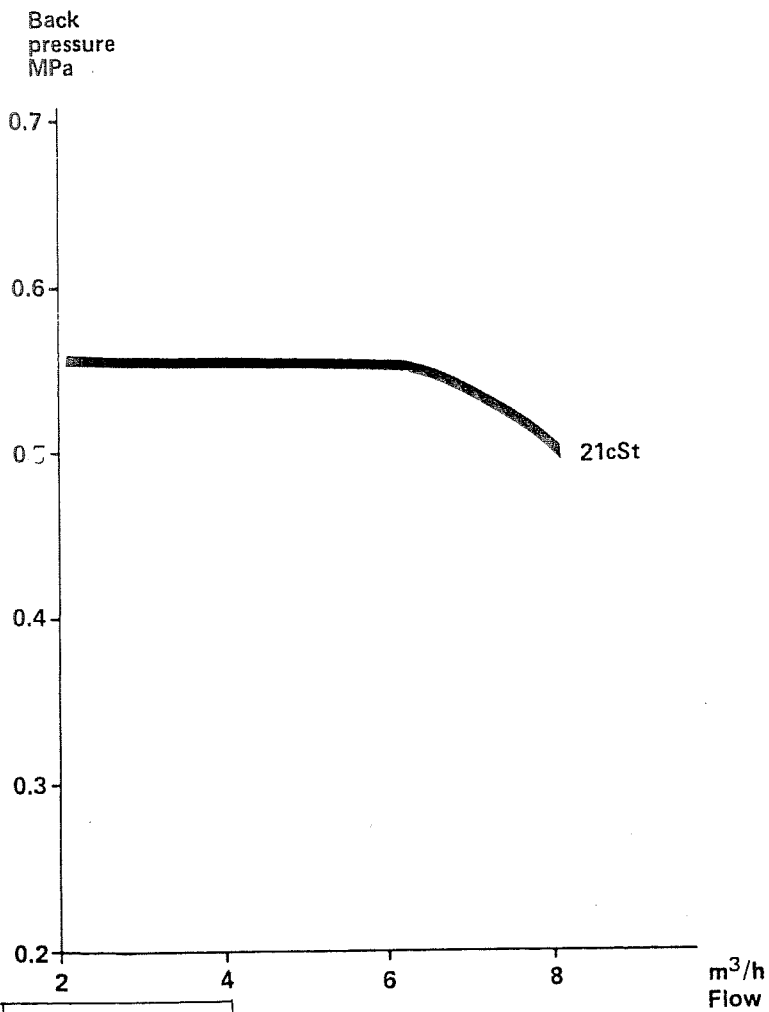
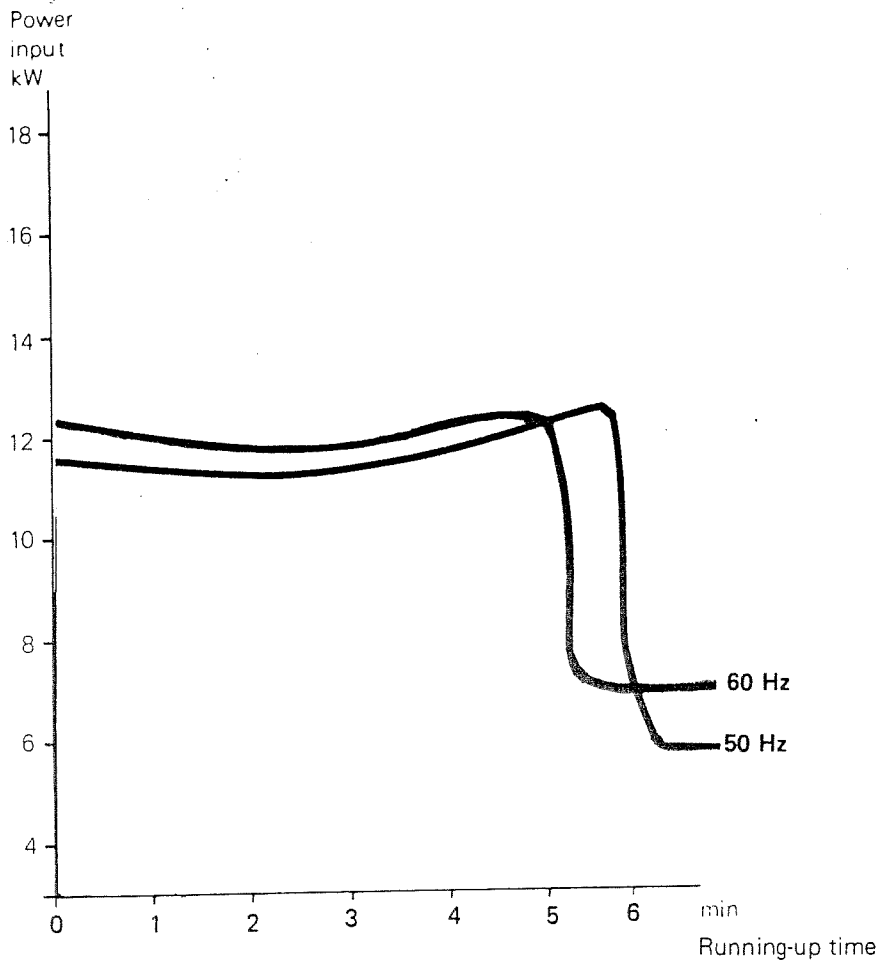
Hardness of operating water to be max. 10 d<sup>o</sup>H. (German degree of hardness).

### Shipping data

WHPX 507TGD, complete with set of tools, excluding motor

Net weight:	750 kg
Gross weight	870 kg
Volume:	2.55 m <sup>3</sup>

# WHPX 507TGD



No. PC 31474 E
Reg. 33436
8012

Spec. No. 881028-01

<b>Throughput capacities</b>	l/h
Rated capacity <sup>1)</sup>	11250
<b>Recommended max. throughput</b>	
Diesel oil	
Viscosity 13 cSt/40 °C	8850
Heavy fuel oil	
Viscosity cSt/50 °C	
30– 40	6800
40– 80	4500
80–180	3400
180–380	2900
380–460	2300
460–600	1700
Lubricating oil, by-pass treatment, optimum	
Straight	3400–4000
Detergent	2000–2500
Turbine	7300

Note! Max. density of oil 0.990/15°C

1) Separator with standard bowl treating a light gas oil without tendency to emulsify and having a viscosity of <12 cSt at separation temperature.

### Sludge and water space

5.0 litres

### Built-on inlet pump

Capacity in l/h for	50Hz	60Hz
	2420	2900
	3630	4350
	4350	5220
	5760	6920
	8540	10250

Suction lift: max. 4 m wg (manometric)  
Delivery head: max. 15 m wg (manometric)

Note! Separate feed pump. See special sheet.

### Built-in oil outlet paring-disk pump

Delivery head: 20–50 m, depending on flow

### Electric motor

Size 10 kW

### Speed

The prescribed speed of the worm-wheel shaft, which must not be exceeded, is stamped on the name plate of the machine

The table below indicates rpm.

Drive motor	1420–1500 (50 Hz)	1700–1800 (60 Hz)
Bowl spindle	6745–7125	6800–7200
Revolution counter	118–125	142–150

### Running-up time

Approx. 6 min.

### Stopping time

Approx. 8 min. (Running-out with brake applied)

### Materials

Frame, lower part  
cast iron («Centriblue» finish\*)

Frame, upper part, frame hood  
fabricated steel («Centriblue» finish\*)

Bowl body and hood, sliding bowl bottom, disk stack, gravity disks, operating slide, and dosing ring  
stainless steel

Other bowl parts  
tinned steel, bronze, and brass

Paring-disk pumps  
brass

Other inlet and outlet parts  
bronze, brass, aluminium, and stainless steel

\* An epoxy enamel

### Operating liquid

Volume of tank for make-up, closing, opening, sealing and displacement water:

Min. 50 litres (One tank for max. 3 machines).

Height from operating liquid connection of the separator to the max. liquid level in the tank  $3m \pm 0.2 m$

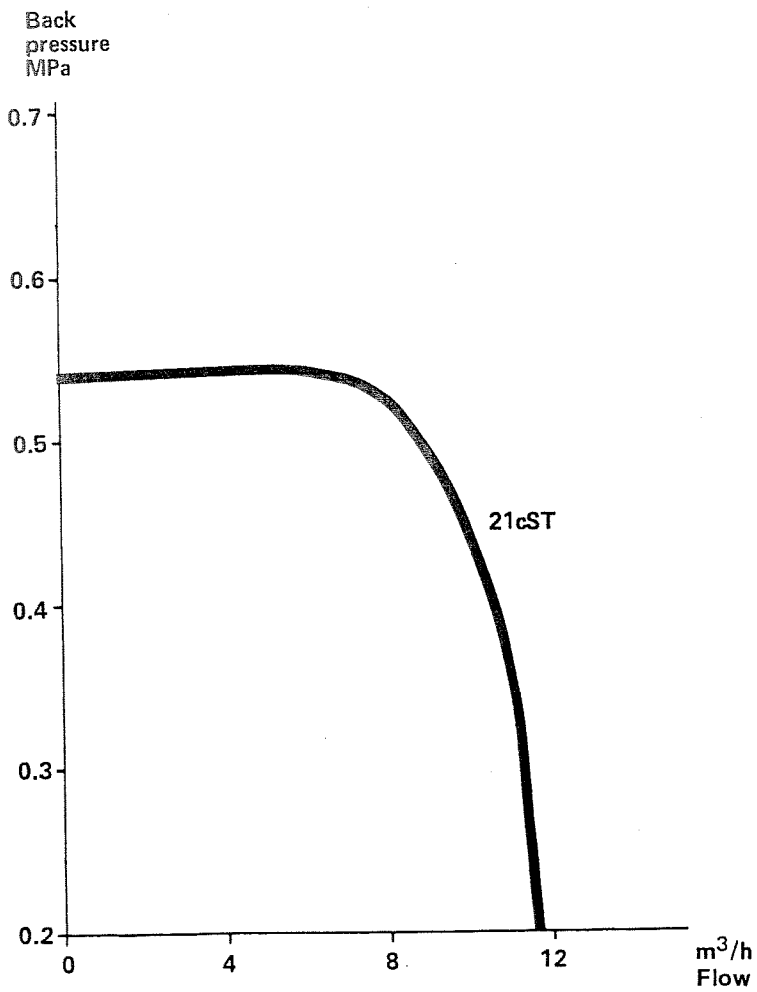
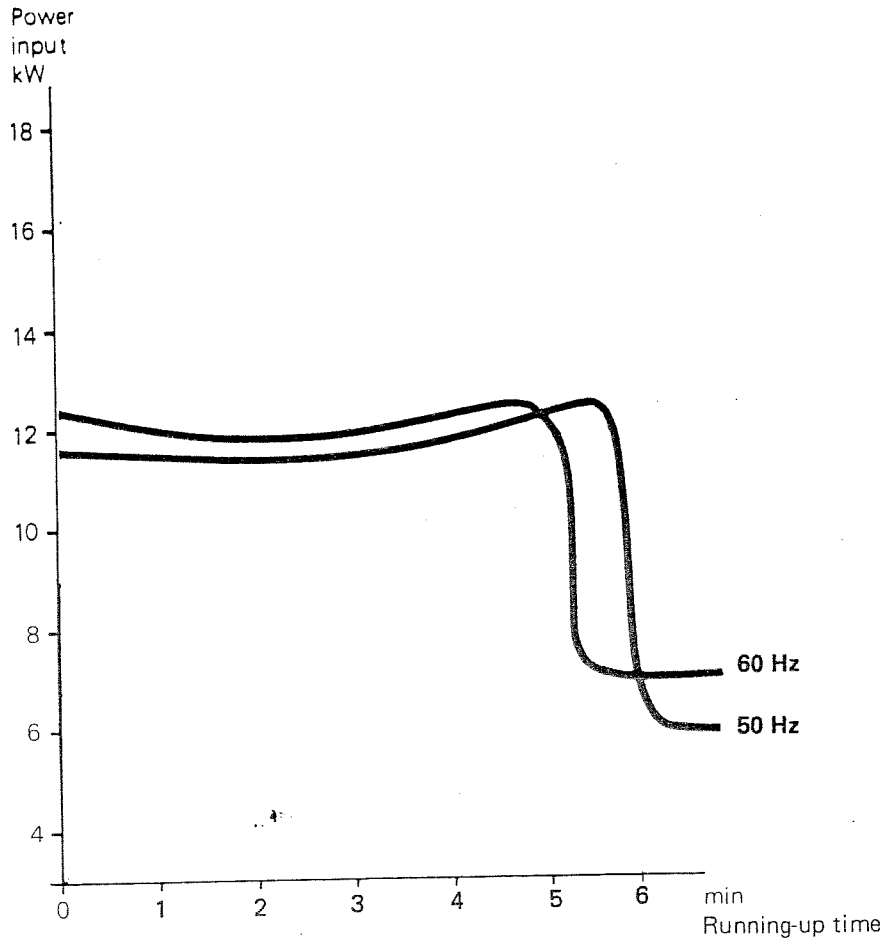
Hardness of operating water to be max. 10 d<sup>o</sup>H. (German degree of hardness)

### Shipping data

WHPX 508TGD, complete with set of tools, excluding motor

Net weight:	750 kg
Gross weight:	870 kg
Volume:	2.55 m <sup>3</sup>

# WHPX 508TGD



### Capacity

Recommended max throughput		l/h
Lubricating oil, detergent type	40 °C	2500-3750
	60 °C	2900-4150
	70 °C	4150-6250
Cutting oil	40-60 °C	2050-3300
Grinding oil	40-60 °C	2050-3300
Hydraulic oil	70-80 °C	3750-5000
Airfilter oil	20-30 °C	2000-4000
Testbed oil	60-80 °C	2500-4000
Waste oil	80-95 °C	800-4000

### Sludge and water space

5.0 litres

### Built-on inlet pump

Capacity in l/h for	50Hz	60Hz
	2420	2900
	3630	4350
	4350	5220
	5760	6920
	8540	10250

Suction lift: max. 4 m wg (manometric)  
Delivery head: max. 15 m wg (manometric)

Note! Separate feed pump. See special sheet.

### Built-in oil outlet paring-disk pump

Delivery head: 20–50 m, depending on flow

### Electric motor

Size 10 kW

### Speed

The prescribed speed of the worm-wheel shaft, which must not be exceeded, is stamped on the name plate of the machine

The table below indicates rpm.

Drive motor	1420–1500 (50 Hz)	1700–1800 (60 Hz)
Bowl spindle	6745–7125	6800–7200
Revolution counter	118–125	142–150

### Running-up time

Approx. 6 min.

### Stopping time

Approx. 8 min. (Running-out with brake applied)

### Materials

Frame, lower part  
cast iron (»Centriblue» finish\*)

Frame, upper part, frame hood  
fabricated steel (»Centriblue» finish\*)

Bowl body and hood, sliding bowl bottom, disk stack, gravity disks, operating slide, and dosing ring  
stainless steel

Other bowl parts  
tinned steel, bronze, and brass

Paring-disk pumps  
brass

Other inlet and outlet parts  
bronze, brass, aluminium, and stainless steel

\* An epoxy enamel

### Operating liquid

Volume of tank for make-up, closing, opening, sealing and displacement water:

Min. 50 litres (One tank for max. 3 machines).

Height from operating liquid connection of the separator to the max. liquid level in the tank  $3\text{m} \pm 0.2\text{m}$

Hardness of operating water to be max. 10 d<sup>o</sup>H. (German degree of hardness)

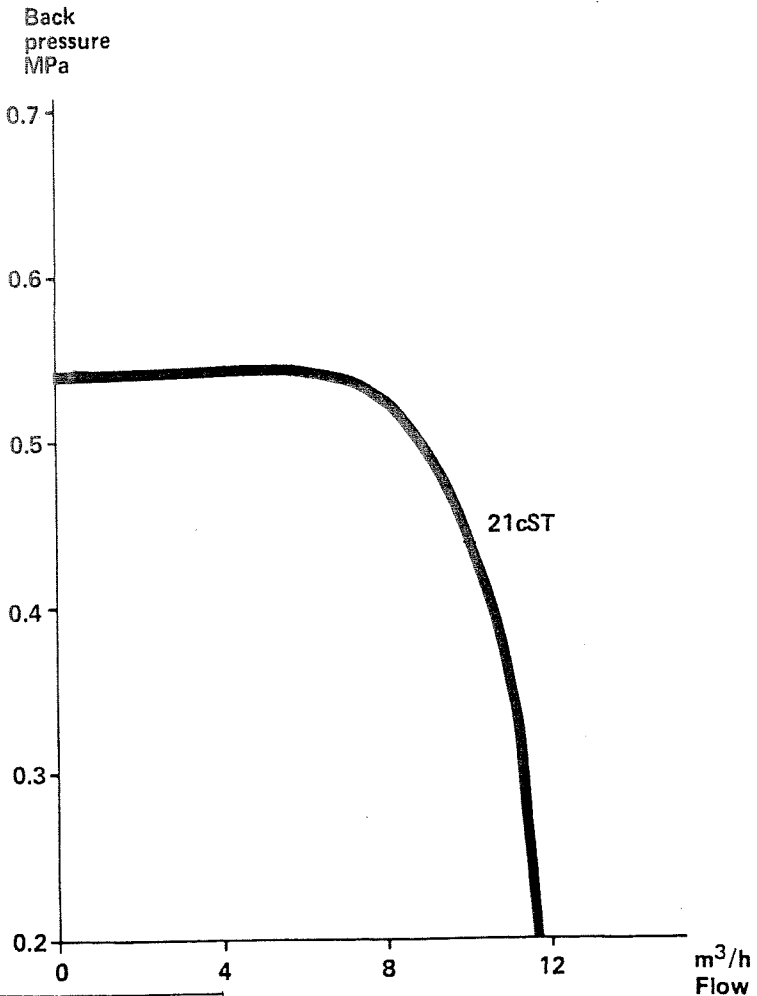
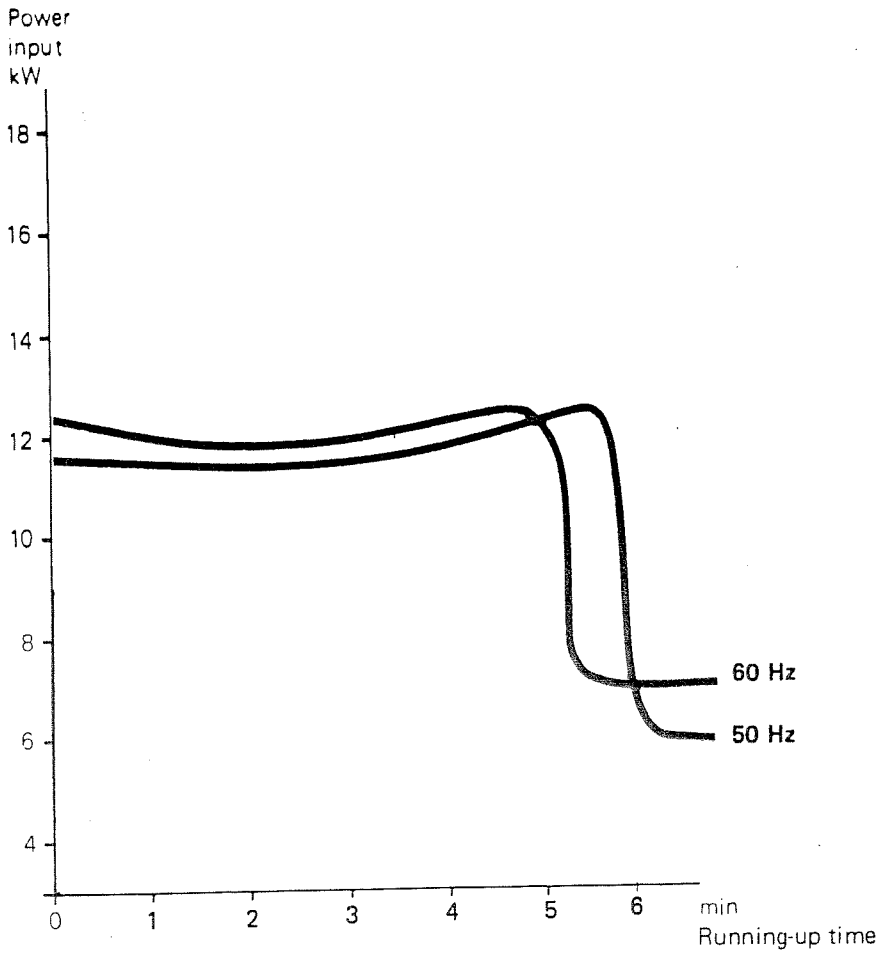
### Shipping data

WHPX 508TGD, complete with set of tools, excluding motor

Net weight:	750 kg
Gross weight:	870 kg <sup>3</sup>
Volume:	2.55 m <sup>3</sup>

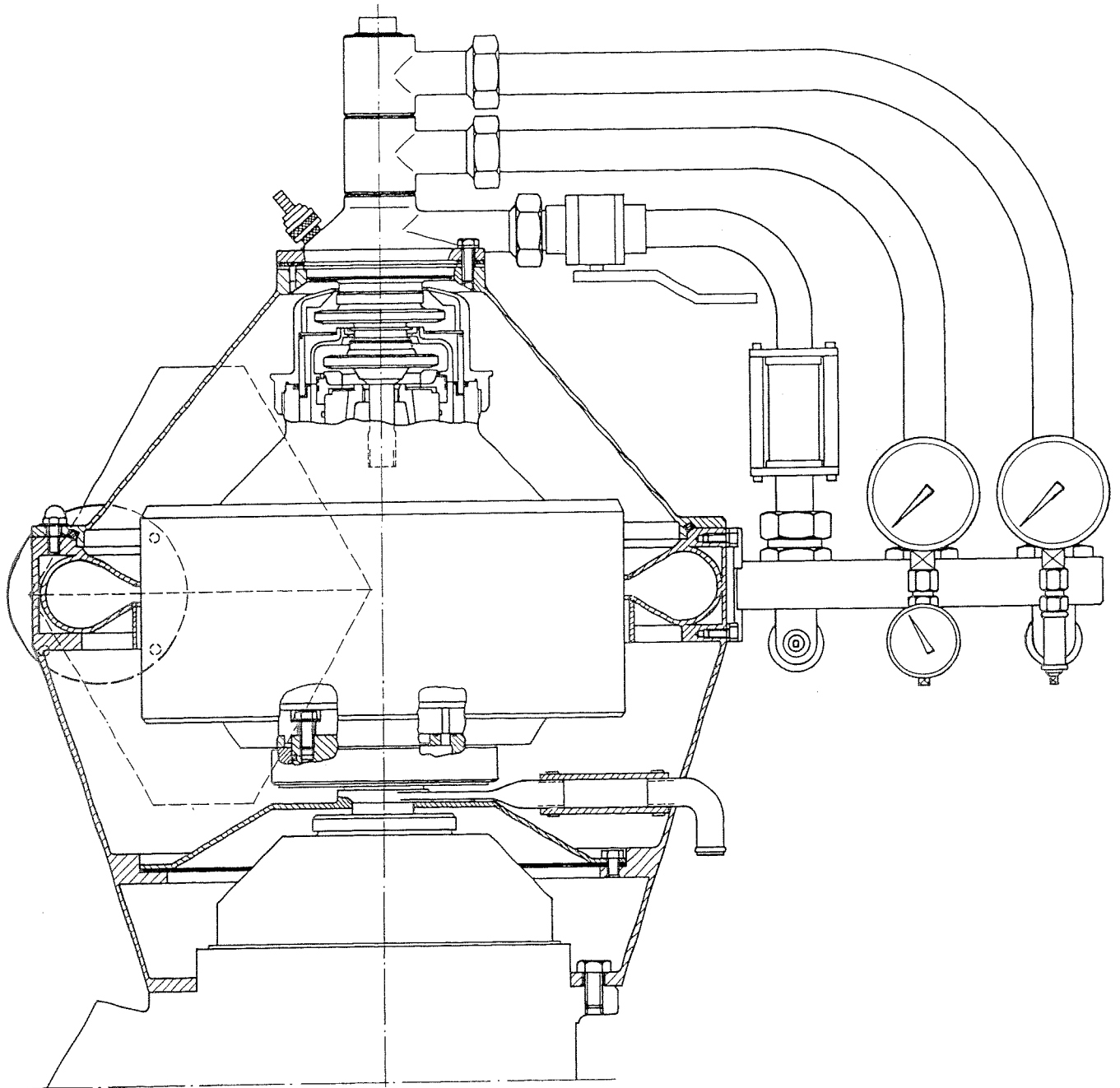


WHPX 508TGD

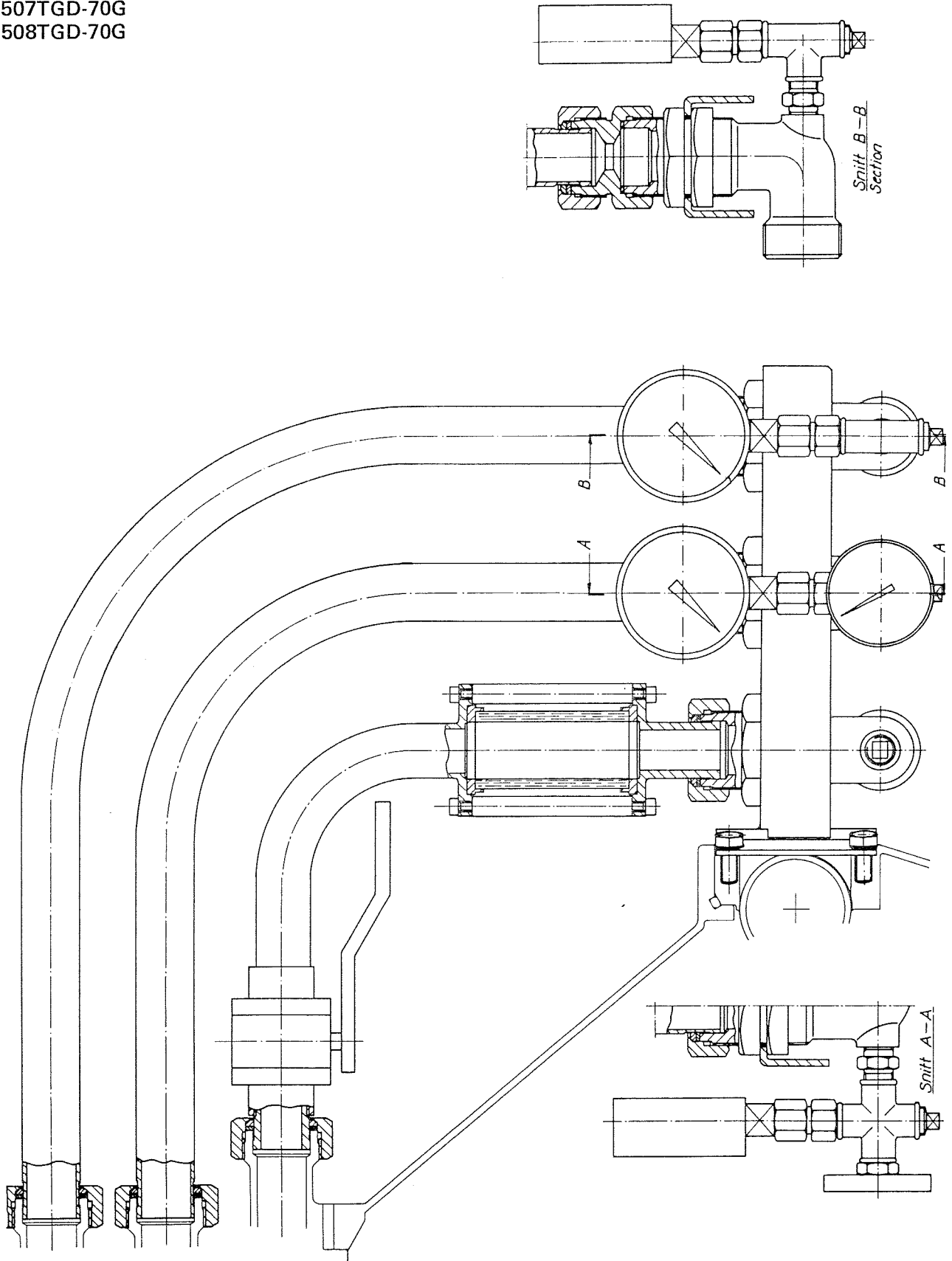


No. PC 31475 E
Reg. 33436
8012

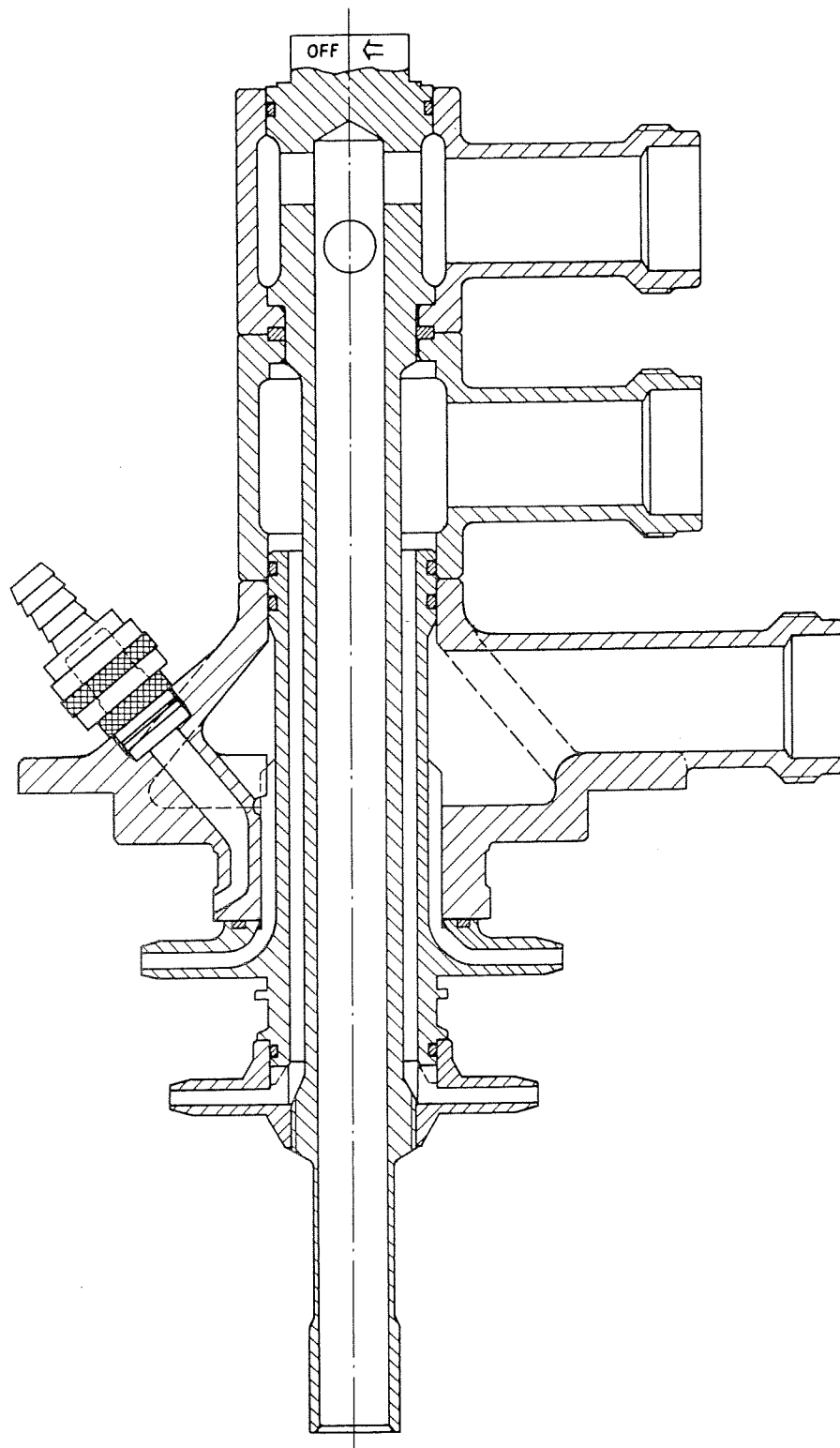
WHPX 507TGD-20  
WHPX 508TGD-20  
WHPX 507TGD-20G  
WHPX 508TGD-20G  
WHPX 507TGD-70G  
WHPX 508TGD-70G



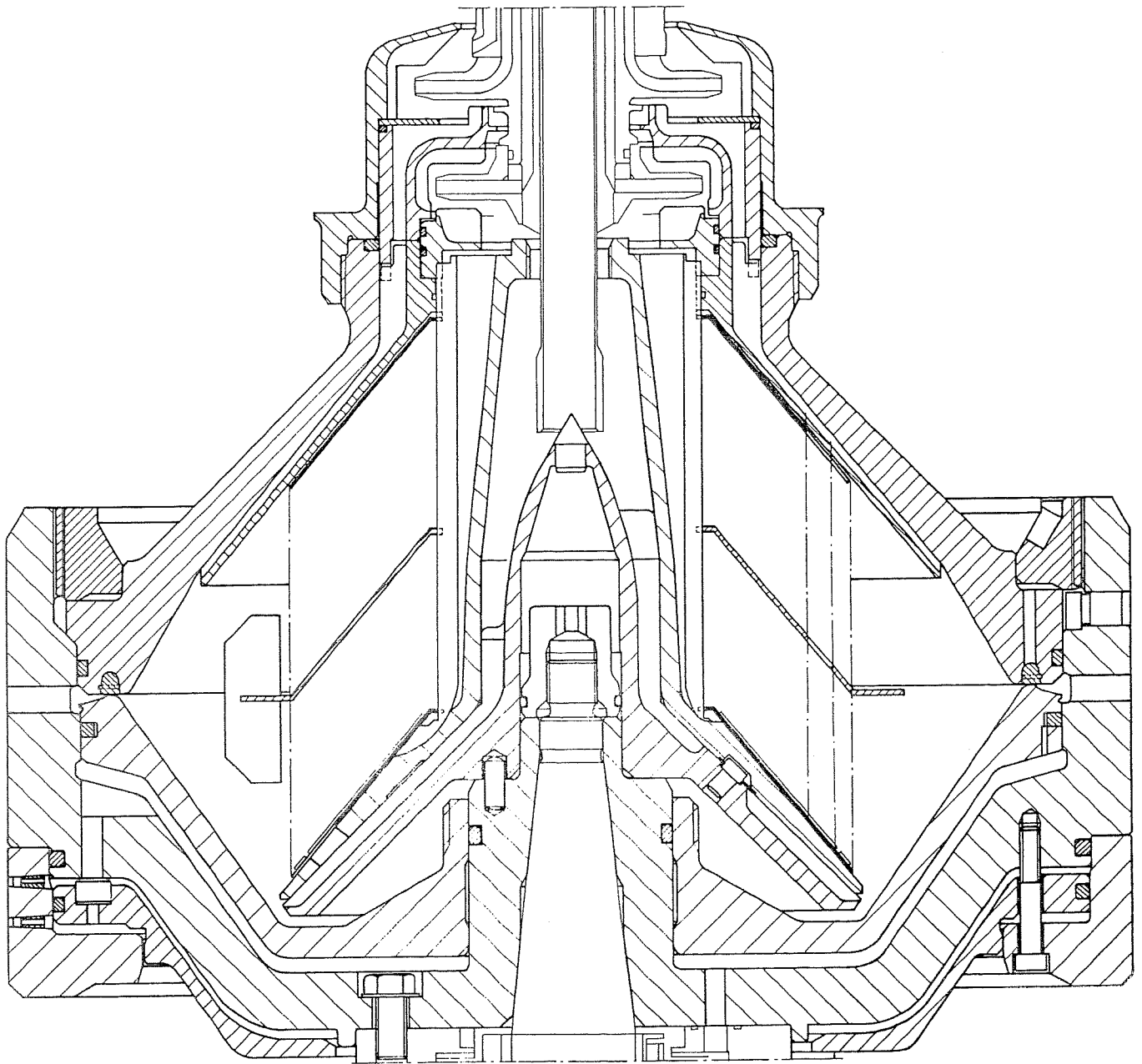
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WHPX 508TGD-70G



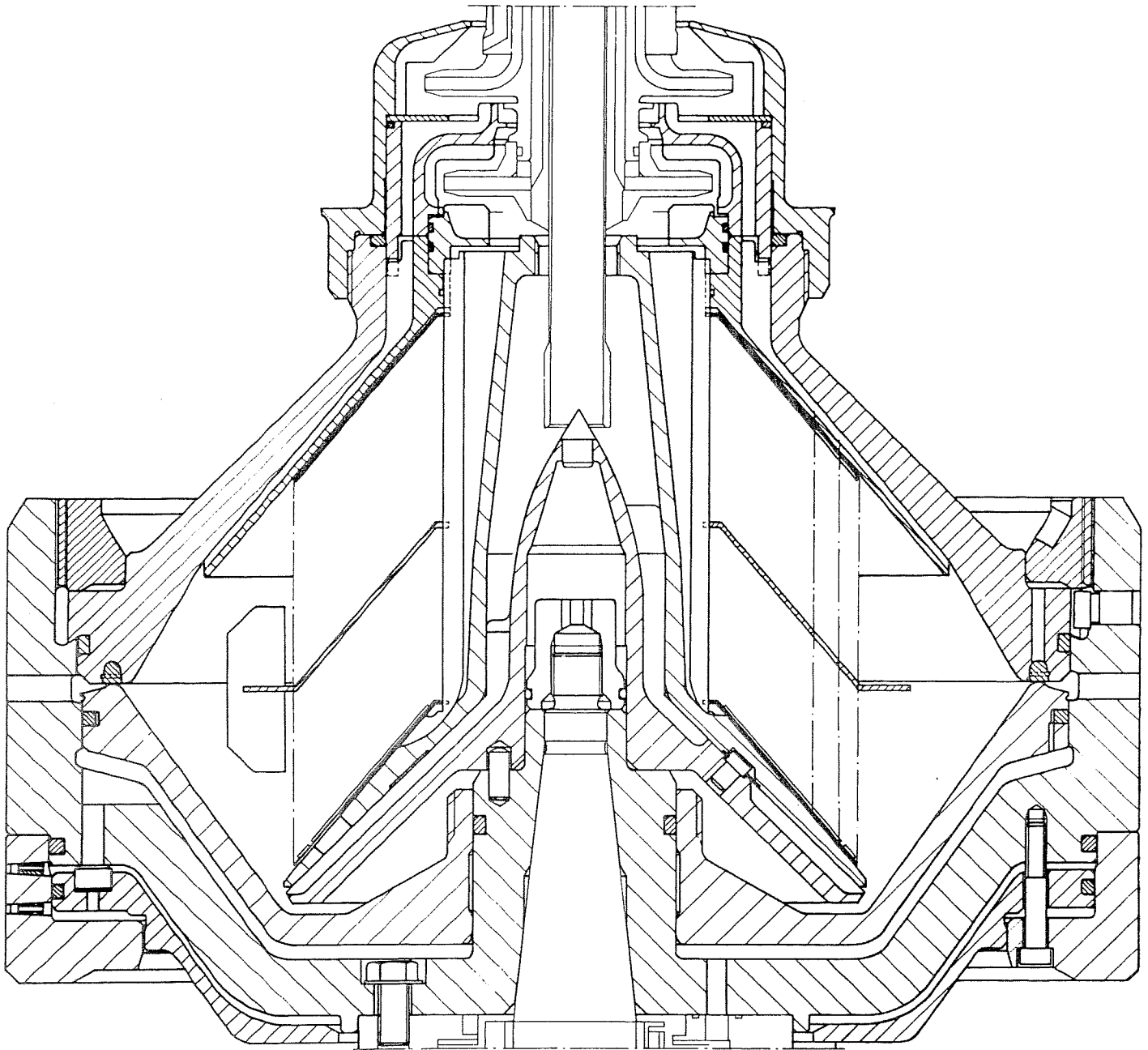
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WHPX 507TGD-20G  
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WHPX 508TGD-70G



WHPX 507TGD-20  
WHPX 508TGD-20

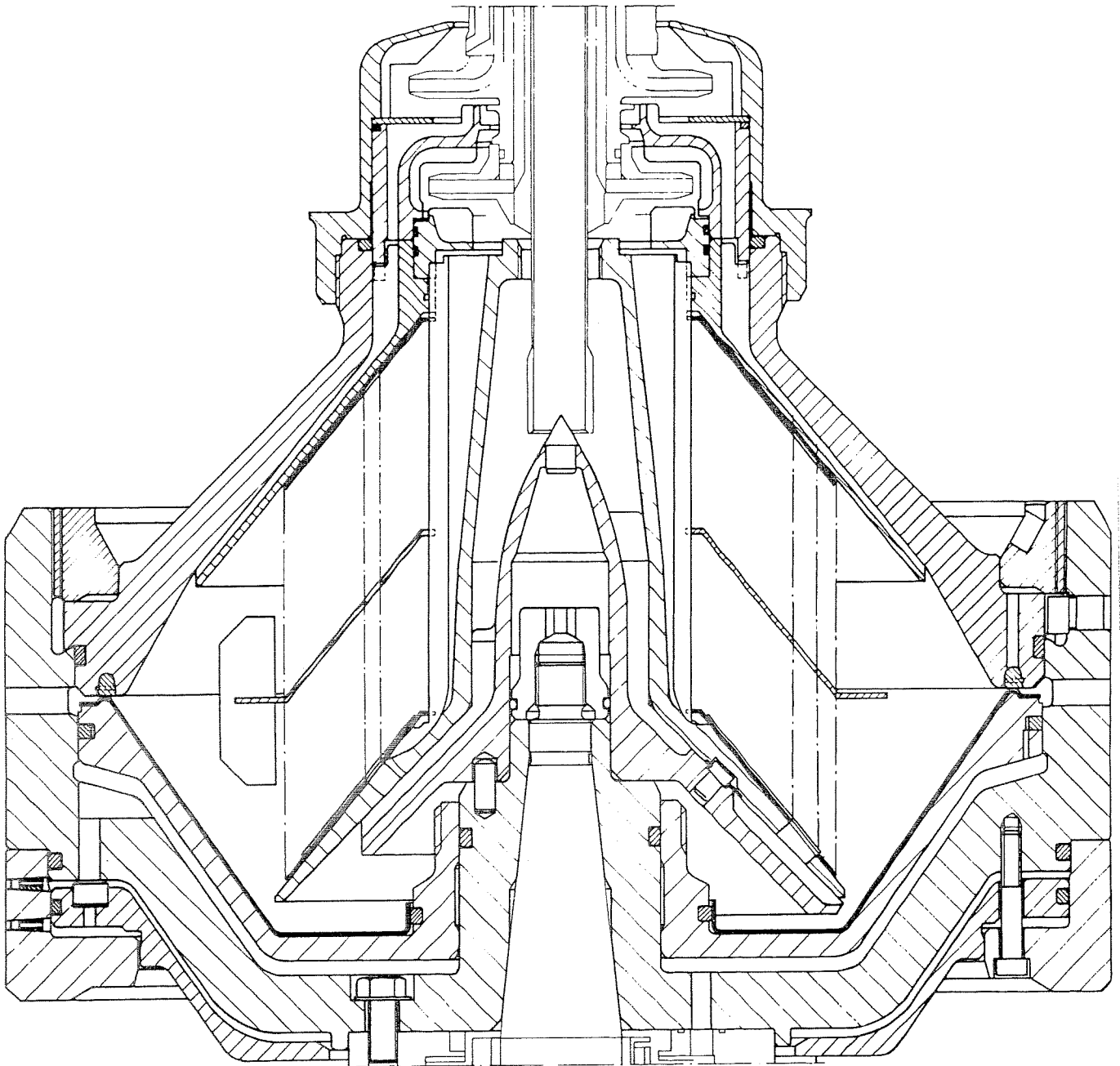


WHPX 507TGD-20  
WHPX 508TGD-20



Laxspårsstyrning kulhuv/kulkropp  
Guiding of dovetail slot bowl hood/bowl body  
Guía de cola de milano en tapa del rotor/cuerpo del rotor.  
Guidage en queue d'aronde chapeau du bol/fond du bol  
Führung der Einschwabkerbe Trommeldeckel/  
Trommelkörper

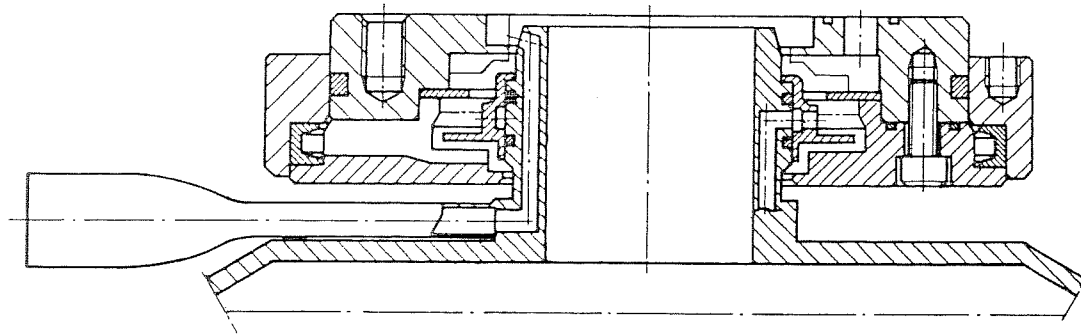
WHPX 507TGD-20G  
WHPX 508TGD-20G  
WHPX 507TGD-70G  
WHPX 508TGD-70G



Kula med foder för slidaltrik  
Bowl with lining for sliding bowl bottom  
Rotor con revestimiento en el fondo  
deslizante.  
Bol avec fond de bol à double fond.  
Trommel mit Schieberbodenbelag.

Laxspårsstyrning kulhuv/kulkropp  
Guiding of dovetail slot bowl hood/bowl body  
Guía de cola de milano en tapa del rotor/cuerpo  
del rotor.  
Guidage en queue d'aronde chapeau du bol/fond  
du bol  
Führung der Einschwalbkerbe Trommeldeckel/  
Trommelkörper.

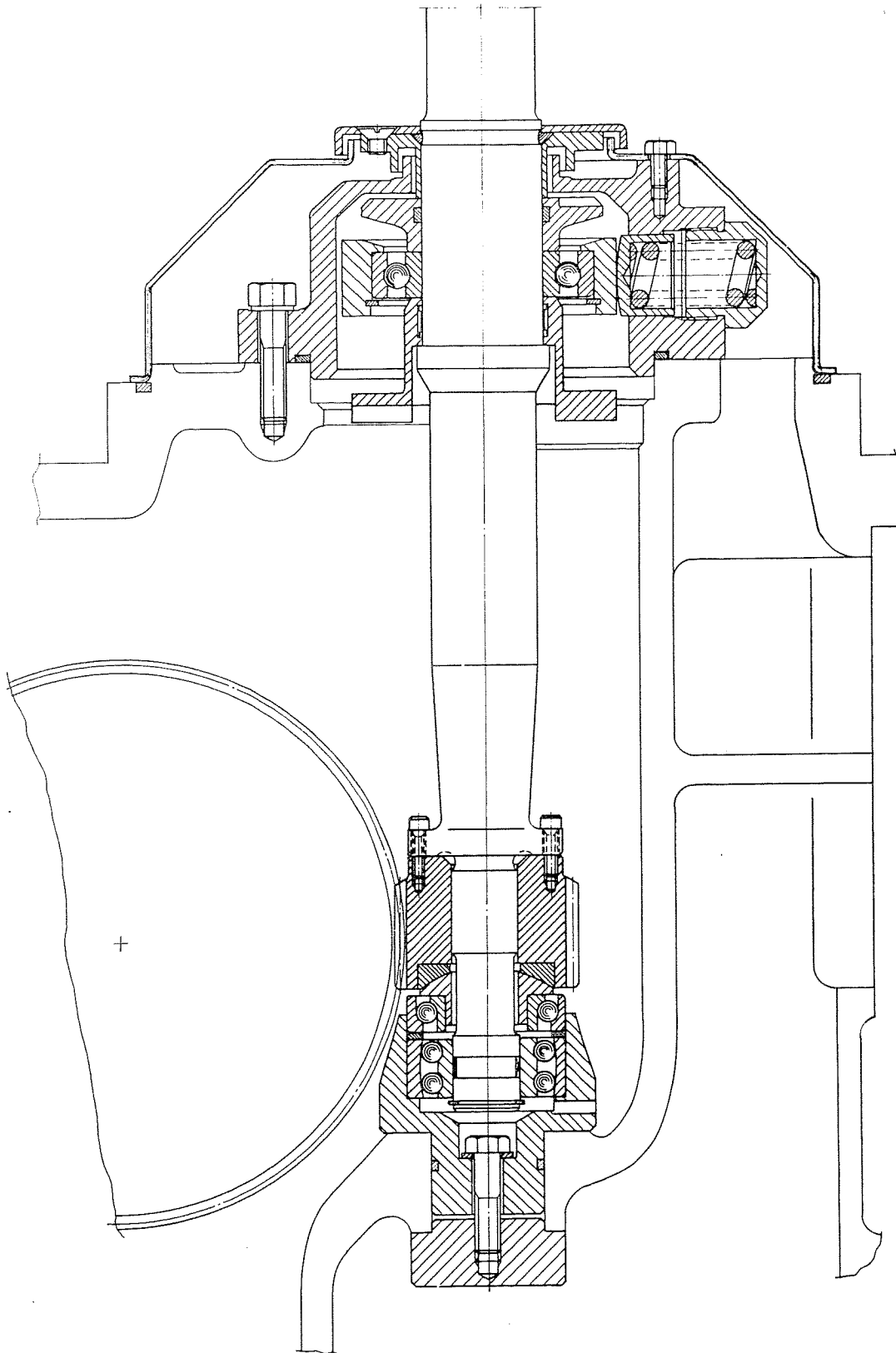
WHPX 507TGD-20  
WHPX 508TGD-20  
WHPX 507TGD-20G  
WHPX 508TGD-20G  
WHPX 507TGD-70G  
WHPX 508TGD-70G





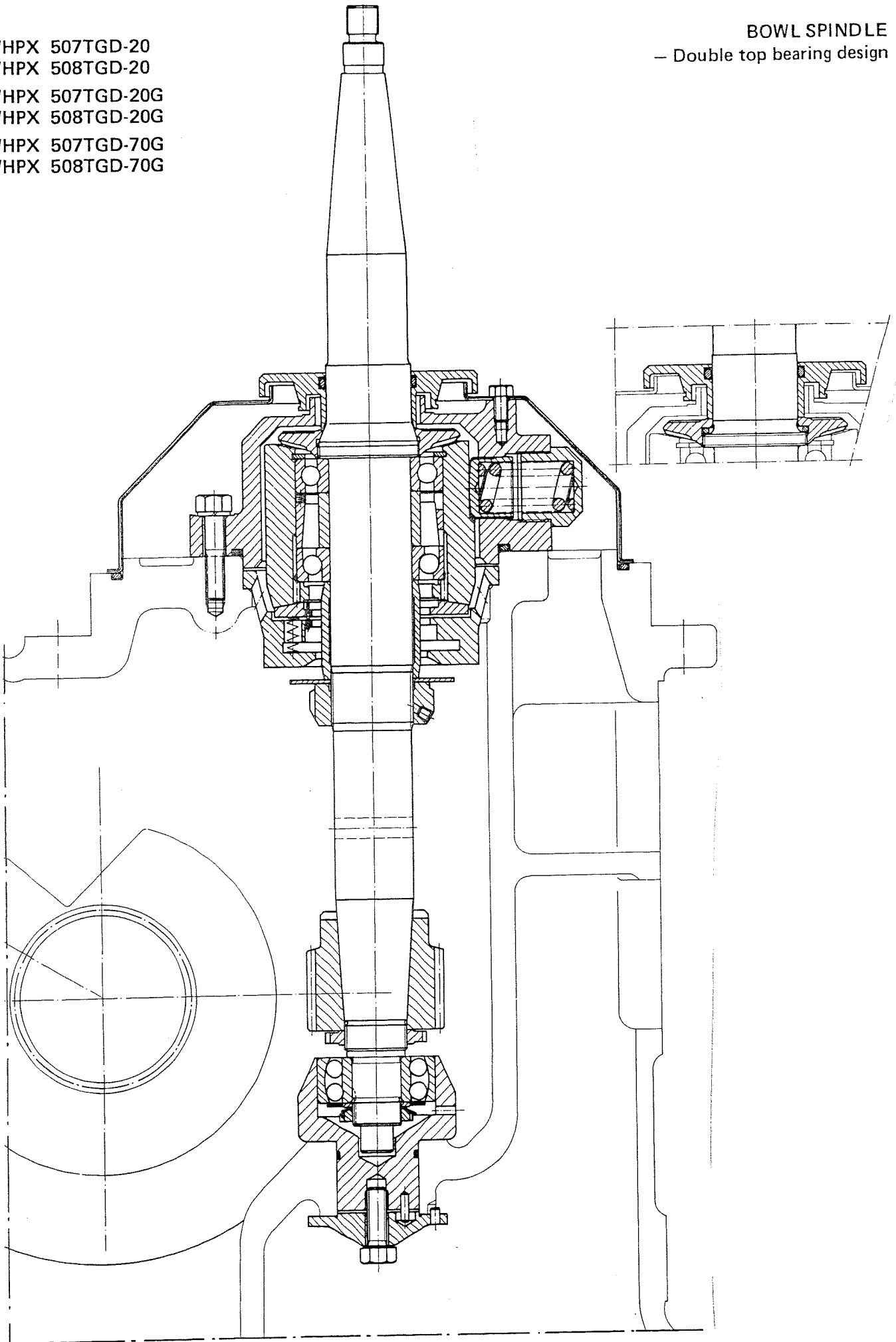
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WHPX 508TGD-20  
WHPX 507TGD-20G  
WHPX 508TGD-20G  
WHPX 507TGD-70G  
WHPX 508TGD-70G

**BOWL SPINDLE**  
- Single top bearing design



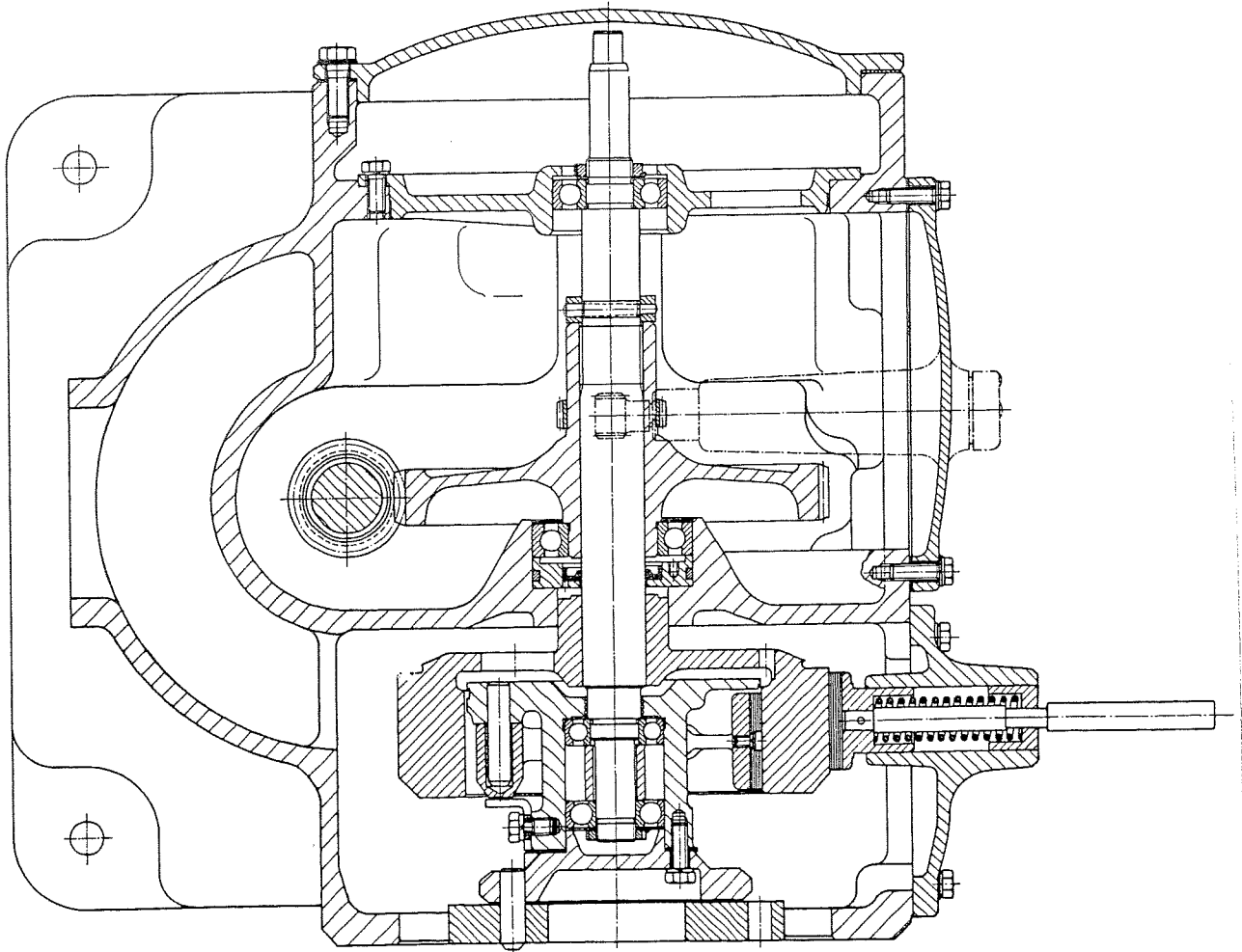
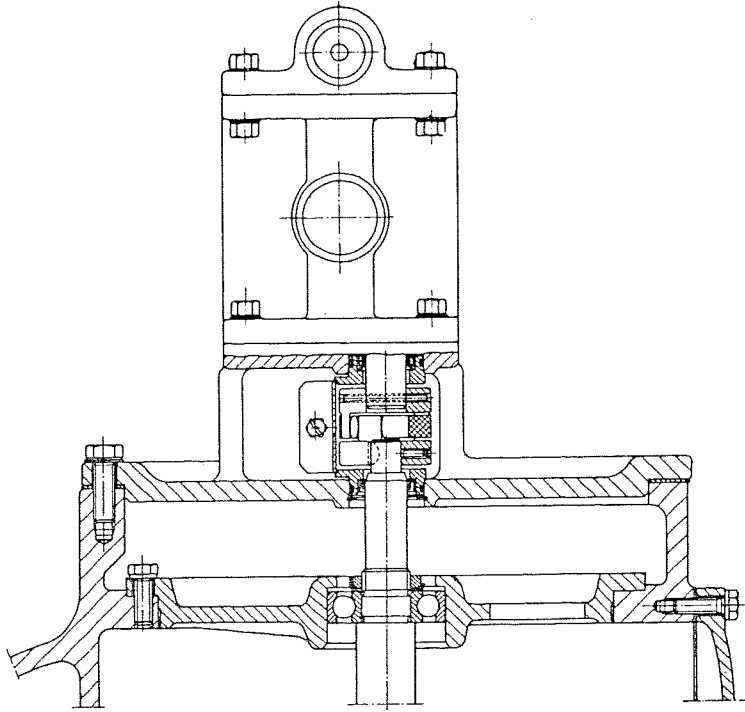
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WHPX 508TGD-20  
WHPX 507TGD-20G  
WHPX 508TGD-20G  
WHPX 507TGD-70G  
WHPX 508TGD-70G

BOWL SPINDLE  
– Double top bearing design





WHPX 507TGD-20  
WHPX 508TGD-20  
WHPX 507TGD-20G  
WHPX 508TGD-20G  
WHPX 507TGD-70G  
WHPX 508TGD-70G







Place of operation		Machine type	
Manufac. No.	Process liquid	Time for job: at a total of ..... operating hours	Job actually done after ..... operating hours
Reason for job		Other reason	
Preventive <input type="checkbox"/> 1000 h <input type="checkbox"/> 2000 h		.....	
<input type="checkbox"/> 4000 h <input type="checkbox"/> 8000 h		.....	
Job ordered by:	Date	Job done by:	Date

ACTION	EXECUTION EVERY			
	1000 h	2000 h	4000 h	8000 h
<b>1. INLET. OUTLET</b> Checking of: o the threads of inlet pipe and paring disc, and the level ring o height position ( $74 \pm 0.5$ mm) o seal rings, packings				x x x
<b>2. BOWL</b> Cleaning of bowl discs and other parts in contact with process liquid.* Cleaning of ejection mechanism. Checking of condition of valve plugs. Cleaning of nozzles ( $\varnothing 1.3$ mm). Greasing of threads as well as contact and guiding surfaces of lock ring with molybdenum disulphide paste. Checking of: o seal rings, packings o wear of lock ring threads (max. $25^\circ$ ) o disc set pressure o sealing surface bowl hood/sliding bowl bottom o corrosion, erosion (max. 1 mm)		x x x x	x x x x	x x x x
<b>3. PARING DISC DEVICE FOR OPERATING WATER</b> Checking height position of distributing cover ( $146 \pm 1$ mm). Checking height position of control paring disc (12 mm).				x
<b>4. BOWL SPINDLE</b> Applying oil onto the tapered end of spindle (a few drops only) Checking of: o radial wobble (max. 0.04 mm) o ball bearing housing (indentations max 0.5mm) and radial buffer o seal rings, packings Replacement of ball bearings. Replacement of radial buffer springs in top bearing. Preloading springs and axial buffer springs in the top bearing should be replaced after 16000 operating hours (this applies to double top bearing design only).		x x	x x	x x x x



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 \* In addition a check has to be done in case a low pressure alarm occurs without an evident external reason (incorrect flow, temperature etc.).

Keep the log in the Maintenance and Repair Manual or in a central maintenance register.

ACTION	EXECUTION EVERY			
	1000 h	2000 h	4000 h	8000 h
<b>5. WORM GEAR</b> Oil change in worm gear housing — see Lubrication Schedule in Operator's Manual Note: In a new installation, or after replacement of gear, change the oil after 300 operating hours. Checking of: o worm and worm wheel (in connection with oil change)	x	x	x	x
<b>6. WORM WHEEL SHAFT</b> Checking of coupling drum and shaft				x
<b>7. COUPLING</b> Checking of: o axial play of elastic plate (ca. 2 mm) o friction pads o ball bearings in nave Replacement of grease in nave				x x x x
<b>8. BRAKE</b> Checking of: o lining o spring and brake shoe				x x
<b>9. PUMP</b> Cleaning of pump strainer Exchange of lipseal rings Checking of: relief valve, bushings, impeller shaft, wearing seals		x	x	x x
				x
} See special instruction book				
<b>Notes:</b> ..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....				

Place of operation		Machine type	
Manufac. No.	Process liquid	Time for job: at a total of ..... operating hours	Job actually done after ..... operating hours
Reason for job		Other reason	
Preventive <input type="checkbox"/> 1000 h <input type="checkbox"/> 2000 h		.....	
<input type="checkbox"/> 4000 h <input type="checkbox"/> 8000 h		.....	
Job ordered by:	Date	Job done by:	Date

ACTION	EXECUTION EVERY			
	1000 h	2000 h	4000 h	8000 h
<p><b>1. INLET. OUTLET</b></p> <p>Checking of:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> the threads of inlet pipe and paring disc, and the level ring</li> <li><input type="checkbox"/> height position (<math>74 \pm 0.5</math> mm)</li> <li><input type="checkbox"/> seal rings, packings</li> </ul>				x x x
<p><b>2. BOWL</b></p> <p>Cleaning of bowl discs and other parts in contact with process liquid.*</p> <p>Cleaning of ejection mechanism. Checking of condition of valve plugs. Cleaning of nozzles (<math>\varnothing 1.3</math> mm). Greasing of threads as well as contact and guiding surfaces of lock ring with molybdenum disulphide paste.</p> <p>Checking of:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> seal rings, packings</li> <li><input type="checkbox"/> wear of lock ring threads (max. 25 °)</li> <li><input type="checkbox"/> disc set pressure</li> <li><input type="checkbox"/> sealing surface bowl hood/sliding bowl bottom</li> <li><input type="checkbox"/> corrosion, erosion (max. 1 mm)</li> </ul>		x x x x x	x x x x x	x x x x x
<p><b>3. PARING DISC DEVICE FOR OPERATING WATER</b></p> <p>Checking height position of distributing cover (<math>146 \pm 1</math> mm).                  Checking height position of control paring disc (12 mm).</p>				x
<p><b>4. BOWL SPINDLE</b></p> <p>Applying oil onto the tapered end of spindle (a few drops only)</p> <p>Checking of:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> radial wobble (max.0.04 mm)</li> <li><input type="checkbox"/> ball bearing housing (indentations max 0.5mm) and radial buffer</li> <li><input type="checkbox"/> seal rings, packings</li> </ul> <p>Replacement of ball bearings.                  Replacement of radial buffer springs in top bearing.                  Preloading springs and axial buffer springs in the top bearing should be replaced after 16000 operating hours (this applies to double top bearing design only).</p>		x x	x x	x x x x x



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ACTION	EXECUTION EVERY			
	1000 h	2000 h	4000 h	8000 h
<b>5. WORM GEAR</b> Oil change in worm gear housing – see Lubrication Schedule in Operator's Manual Note: In a new installation, or after replacement of gear, change the oil after 300 operating hours. Checking of: o worm and worm wheel (in connection with oil change)	x	x	x	x
<b>6. WORM WHEEL SHAFT</b> Checking of coupling drum and shaft				x
<b>7. COUPLING</b> Checking of: o axial play of elastic plate (ca. 2 mm) o friction pads o ball bearings in nave Replacement of grease in nave				x x x x
<b>8. BRAKE</b> Checking of: o lining o spring and brake shoe				x x
<b>9. PUMP</b> Cleaning of pump strainer Exchange of lipseal rings Checking of: relief valve, bushings, impeller shaft, wearing seals		x	x	x x x
} See special instruction book				
<b>Notes:</b> ..... ..... ..... ..... ..... ..... ..... ..... ..... .....				

Place of operation		Machine type	
Manufac. No.	Process liquid	Time for job: at a total of ..... operating hours	Job actually done after ..... operating hours
Reason for job		Other reason	
Preventive <input type="checkbox"/> 1000 h <input type="checkbox"/> 2000 h		.....	
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Job ordered by:	Date	Job done by:	Date

ACTION	EXECUTION EVERY			
	1000 h	2000 h	4000 h	8000 h
<b>1. INLET. OUTLET</b> Checking of: o the threads of inlet pipe and paring disc, and the level ring o height position ( $74 \pm 0.5$ mm) o seal rings, packings				x x x
<b>2. BOWL</b> Cleaning of bowl discs and other parts in contact with process liquid.* Cleaning of ejection mechanism. Checking of condition of valve plugs. Cleaning of nozzles ( $\varnothing 1.3$ mm). Greasing of threads as well as contact and guiding surfaces of lock ring with molybdenum disulphide paste. Checking of: o seal rings, packings o wear of lock ring threads (max. 25 °) o disc set pressure o sealing surface bowl hood/sliding bowl bottom o corrosion, erosion (max. 1 mm)		x x x x	x x x x	x x x x
<b>3. PARING DISC DEVICE FOR OPERATING WATER</b> Checking height position of distributing cover ( $146 \pm 1$ mm). Checking height position of control paring disc (12 mm).				x
<b>4. BOWL SPINDLE</b> Applying oil onto the tapered end of spindle (a few drops only) Checking of: o radial wobble (max. 0.04 mm) o ball bearing housing (indentations max 0.5mm) and radial buffer o seal rings, packings Replacement of ball bearings. Replacement of radial buffer springs in top bearing. Preloading springs and axial buffer springs in the top bearing should be replaced after 16000 operating hours (this applies to double top bearing design only).		x x	x x	x x x x



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ACTION	EXECUTION EVERY			
	1000 h	2000 h	4000 h	8000 h
<p><b>5. WORM GEAR</b></p> <p>Oil change in worm gear housing – see Lubrication Schedule in Operator's Manual</p> <p>Note: In a new installation, or after replacement of gear, change the oil after 300 operating hours.</p> <p>Checking of:</p> <ul style="list-style-type: none"> <li>o worm and worm wheel (in connection with oil change)</li> </ul>	x	x	x	x
<p><b>6. WORM WHEEL SHAFT</b></p> <p>Checking of coupling drum and shaft</p>				x
<p><b>7. COUPLING</b></p> <p>Checking of:</p> <ul style="list-style-type: none"> <li>o axial play of elastic plate (ca. 2 mm)</li> <li>o friction pads</li> <li>o ball bearings in nave</li> </ul> <p>Replacement of grease in nave</p>				x x x x
<p><b>8. BRAKE</b></p> <p>Checking of:</p> <ul style="list-style-type: none"> <li>o lining</li> <li>o spring and brake shoe</li> </ul>				x x
<p><b>9. PUMP</b></p> <p>Cleaning of pump strainer</p> <p>Exchange of lipseal rings</p> <p>Checking of: relief valve, bushings, impeller shaft, wearing seals</p> <div style="display: flex; align-items: center; margin-left: 20px;"> <div style="font-size: 2em; margin-right: 5px;">}</div> <div>See special instruction book</div> </div>		x	x	x x x
<p><b>Notes:</b></p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>				

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Manufac. No.	Process liquid	Time for job: at a total of ..... operating hours	Job actually done after ..... operating hours
Reason for job		Other reason	
Preventive <input type="checkbox"/> 1000 h <input type="checkbox"/> 2000 h		.....	
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ACTION	EXECUTION EVERY			
	1000 h	2000 h	4000 h	8000 h
<b>1. INLET. OUTLET</b> Checking of: o the threads of inlet pipe and paring disc, and the level ring o height position ( $74 \pm 0.5$ mm) o seal rings, packings				x x x
<b>2. BOWL</b> Cleaning of bowl discs and other parts in contact with process liquid.* Cleaning of ejection mechanism. Checking of condition of valve plugs. Cleaning of nozzles ( $\varnothing 1.3$ mm). Greasing of threads as well as contact and guiding surfaces of lock ring with molybdenum disulphide paste. Checking of: o seal rings, packings o wear of lock ring threads (max. 25 °) o disc set pressure o sealing surface bowl hood/sliding bowl bottom o corrosion, erosion (max. 1 mm)		x x x x	x x x x	x x x x
<b>3. PARING DISC DEVICE FOR OPERATING WATER</b> Checking height position of distributing cover ( $146 \pm 1$ mm). Checking height position of control paring disc (12 mm).				x
<b>4. BOWL SPINDLE</b> Applying oil onto the tapered end of spindle (a few drops only) Checking of: o radial wobble (max.0.04 mm) o ball bearing housing (indentations max 0.5mm) and radial buffer o seal rings, packings Replacement of ball bearings. Replacement of radial buffer springs in top bearing. Preloading springs and axial buffer springs in the top bearing should be replaced after 16000 operating hours (this applies to double top bearing design only).		x x	x x	x x x x



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<b>5. WORM GEAR</b> Oil change in worm gear housing – see Lubrication Schedule in Operator's Manual Note: In a new installation, or after replacement of gear, change the oil after 300 operating hours. Checking of: o worm and worm wheel (in connection with oil change)	x	x	x	x
<b>6. WORM WHEEL SHAFT</b> Checking of coupling drum and shaft				x
<b>7. COUPLING</b> Checking of: o axial play of elastic plate (ca. 2 mm) o friction pads o ball bearings in nave Replacement of grease in nave				x x x x
<b>8. BRAKE</b> Checking of: o lining o spring and brake shoe				x x
<b>9. PUMP</b> Cleaning of pump strainer Exchange of lipseal rings Checking of: relief valve, bushings, impeller shaft, wearing seals		x	x	x x x
				} See special instruction book
<b>Notes:</b> ..... ..... ..... ..... ..... ..... ..... ..... ..... .....				