Service & Maintenance

Tetra Centri® Self-cleaning Separators

		Product No.:
A	614HGV-14C	881208-01-01
C	614HGV-74C	881208-01-01
H	614HGV-74C	881208-01-01
W	614HGV-74C	881208-01-01
A	714HGV-14C	881208-02-01
BM	714HGV-14C	881208-02-01
C	714HGV-74C	881208-02-01
H	714 HGV-74C	881208-02-01
W	714HGV-74C	881208-02-01
BB	714HGV-34C	881208-02-01
D	714HGV-34C	881208-02-01
C	518HGV-74C	881209-01-01
H	518HGV-74C	881209-01-01
W	518HGV-74C	881209-01-01
WD	518HGV-74C	881209-01-01
BM	618HGV-14C	881209-02-02
C	618HGV-74C	881209-02-02
F	618HGV-74C	881209-02-02
H	618HGV-74C	881209-02-02
W	618HGV-74C	881209-02-02
BB	618HGV-34C	881209-02-02
D	618HGV-34C	881209-02-02
WD	618HGV-34C	881209-02-02
D	718HGV-74C	881209-03-01
C	718HGV-74C	881209-03-01
H	718HGV-74C	881209-03-01
W	718HGV-74C	881209-03-01
BM	818HGV-14C	881210-01-04
BB	818HGV-34C	881210-01-04
H	818HGV-74C	881210-01-04
W	818HGV-74C	881210-01-04
C	818HGV-74C	881210-01-04

Product No.:	Multiple
Book No.:	575874-02 Rev. 1

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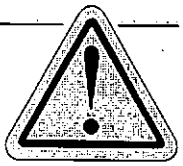
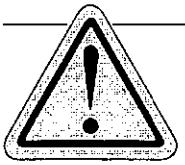
Contents



Study instruction manuals and observe the warnings before installation, operation, service and maintenance.

Not following the instructions can result in serious accidents.

In order to make the information clear only foreseeable conditions have been considered. No warnings are given, therefore, for situations arising from the unintended usage of the machine and its tools.



1 Safety Instructions

The centrifuge includes parts that rotate at high speed. This means that:

- Kinetic energy is high
- Great forces are generated
- Stopping time is long

G0010421

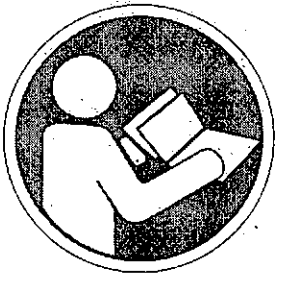
Manufacturing tolerances are extremely fine. Rotating parts are carefully balanced to reduce undesired vibrations that can cause a breakdown. Material properties have been considered carefully during design to withstand stress and fatigue.

The separator is designed and supplied for a specific separation duty (type of liquid, rotational speed, temperature, density etc.) and must not be used for any other purpose.

Incorrect operation and maintenance can result in unbalance due to build-up of sediment, reduction of material strength, etc., that subsequently could lead to serious damage and/or injury.

The following basic safety instructions therefore apply:

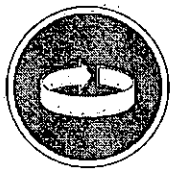
- **Use the separator only for the purpose and parameter range specified by Alfa Laval.**
- **Strictly follow the instructions for installation, operation and maintenance.**
- **Ensure that personnel are competent and have sufficient knowledge of maintenance and operation, especially concerning emergency stopping procedures.**
- **Use only Alfa Laval genuine spare parts and the special tools supplied.**



S0151211

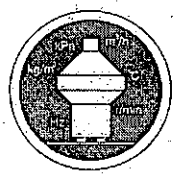
Disintegration hazards

- When power cables are connected, always check direction of motor rotation. If incorrect, vital rotating parts could unscrew.

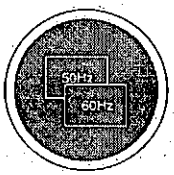


- If excessive vibration occurs, **stop** separator and **keep bowl filled** with liquid during rundown.

- Use the separator only for the purpose and parameter range specified by Alfa Laval.



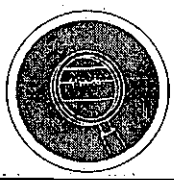
- Check that the gear ratio is correct for power frequency used. If incorrect, subsequent overspeed may result in a serious break down.
- Since the separator is equipped with a frequency controlled motor, it is extremely important to ensure that the motor speed does not exceed the allowed maximum speed. A serious break down may be the consequence.

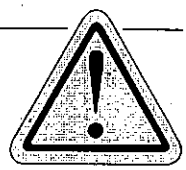


- Welding or heating of parts that rotate can seriously affect material strength.

- Wear on the large lock ring thread must not exceed safety limit. ϕ-mark on lock ring must not pass opposite ϕ-mark by more than specified distance.

- Inspect regularly for **corrosion** and **erosion** damage. Inspect frequently if process liquid is corrosive or erosive.





Entrapment hazards

- Make sure that rotating parts have come to a **complete standstill** before starting **any** dismantling work.

- To avoid accidental start, switch off and lock power supply before starting **any** dismantling work.

  Assemble the machine **completely** before start. **All** covers and guards must be in place.

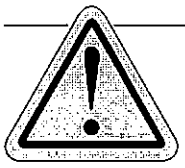
Electrical hazard

- Follow local regulations for electrical installation and earthing (grounding).
- To avoid accidental start, switch off and lock power supply before starting **any** dismantling work.

Crush hazards

- Use correct lifting tools and follow lifting instructions.

Do **not** work under a hanging load.



Noise hazards

- Use ear protection in noisy environments.

S0151201

Burn hazards

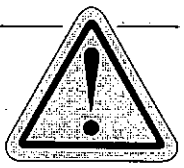
- Lubrication oil and various machine surfaces can be hot and cause burns.

S0151241

Skin irritation hazards

- When using chemical cleaning agents, make sure you follow the general rules and suppliers recommendation regarding ventilation, personell protection etc.
- Use of lubrications in various situations.

S0151261



Cut hazards

- Sharp edges on bowl discs and threads can cause cuts.

S01512B1

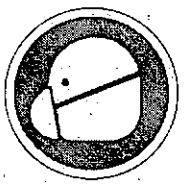
Flying objects

- Risk for accidental release of snap rings and springs when dismantling and assemby.

S01512C1

Health hazard

- Risk for unhealthy dust when handling friction blocks/pads. Use a dust mask to make sure not to inhalate any dust



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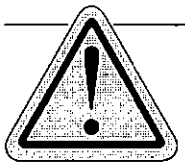


1.1 Warning signs in text

Pay attention to the safety instructions in this manual. Below are definitions of the three grades of warning signs used in the text where there is a risk for injury to personnel.

DANGER

Type of hazard

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Type of hazard

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

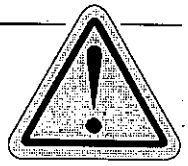
CAUTION

Type of hazard

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTE

NOTE indicates a potentially hazardous situation which, if not avoided, may result in property damage.



1.2 Environmental issues

Unpacking

Packing material consists of wood, plastics, cardboard boxes and in some cases metal straps.

Wood and cardboard boxes can be reused, recycled or used for energy recovery.

Plastics should be recycled or burnt at a licensed waste incineration plant.

Metal straps should be sent for material recycling.

Maintenance

During maintenance oil and wear parts in the machine are replaced.

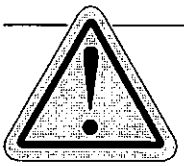
Oil must be taken care of in agreement with local regulations.

Rubber and plastics should be burnt at a licensed waste incineration plant. If not available they should be disposed to a suitable licensed land fill site.

Bearings and other metal parts should be sent to a licensed handler for material recycling.

Seal rings and friction linings should be disposed to a licensed land fill site. Check your local regulations.

Worn out or defected electronic parts should be sent to a licensed handler for material recycling.



1.3 Requirements of personnel

Only **skilled** or **instructed** persons are allowed to operate the machine, e.g. operating and maintenance staff.

- **Skilled person**: A person with technical knowledge or sufficient experience to enable him or her to perceive risks and to avoid hazards which electricity/mechanics can create.
- **Instructed person**: A person adequately advised or supervised by a skilled person to enable him or her to perceive risks and to avoid hazards which electricity/mechanics can create.

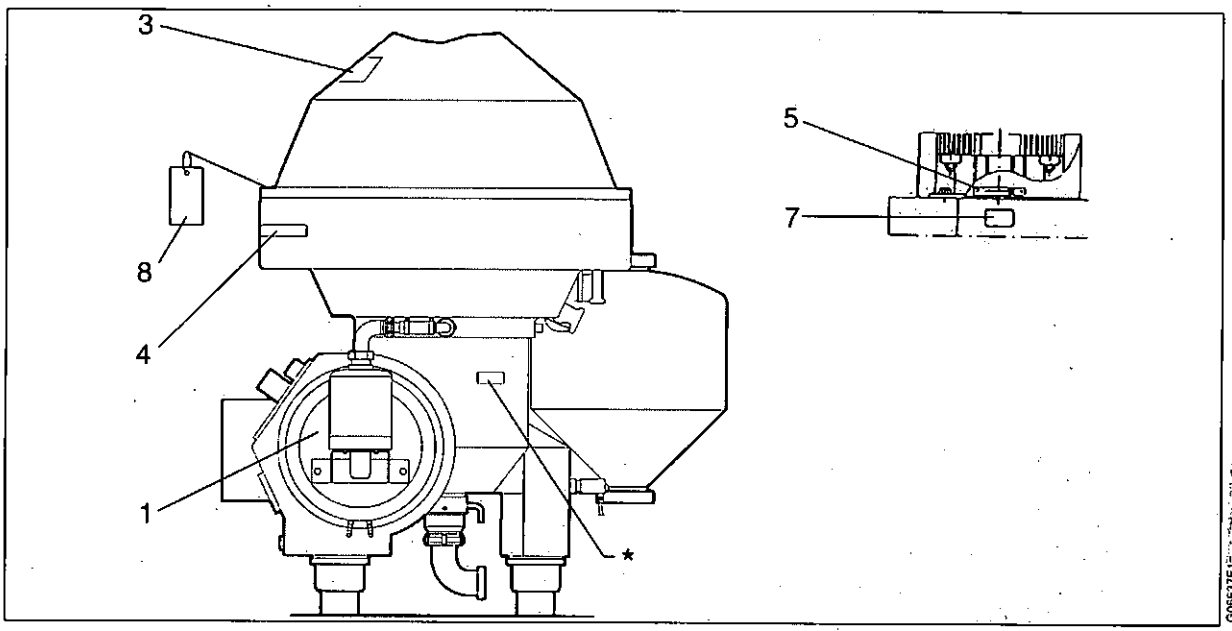
In some cases special skilled personnel may need to be hired, like electricians and others. In some of these cases the personnel has to be certified according to local regulations with experience of similar types of work.

2 General advice

Contents

2.1 Identification and safety signs on the machine

Alfa Laval ref. 553766, rev. 2



1. Machine plate

Separator

Manufacturing serial No / Year

Product No

Machine top part

Outlet

Bowl

Machine bottom part

Max. speed (bowl)

Direction of rotation (bowl)

Speed motor shaft

El. current frequency

Recommended motor power

Max. density of feed

Max. density of sediment

Max. density of operating liquid

Process temperature min./max.

3. Safety label

S0059ON1

Text on label:

WARNING

Read the instruction manuals **before** installation, operation and maintenance. Consider inspection intervals.

Failure to strictly follow instructions can lead to fatal injury.

If excessive vibration occurs, **stop** separator and **keep bowl filled** with liquid during rundown.

Out of balance vibration will become worse if bowl is not full.

Separator must **stop rotating** before **any** dismantling work is started.

4. Name plate

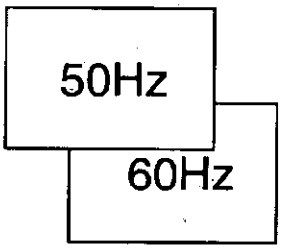
S0063221

5. Arrow

Indicating direction of rotation.

S0063811

7. Power supply frequency, all separators except BM/BB/C/H/W/818



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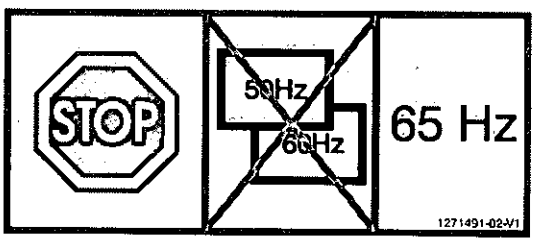
Power supply frequency, BM/BB/C/H/W/818 (spec. 881210-01-03)



S0145721

Power supply frequency BM/BB/C/H/W/818

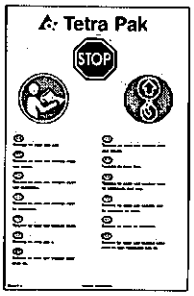
WARNING

Disintegration hazard

This machine must never be operated with high bowl speed that is greater than 4607 r/min.

8. Stop, follow the lifting instruction.

This transport label is not permanently fixed to the separator.



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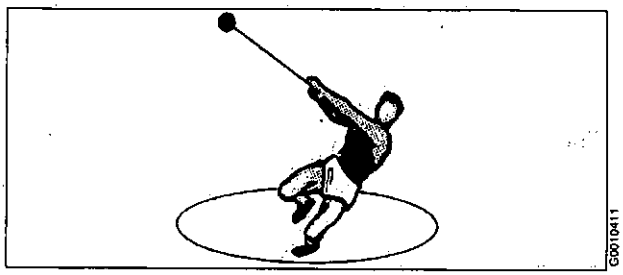
* **Space reserved for plate indicating representative**

2.2 The maintenance concept



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

The separator, like any other machine is subject to wear. Corrosion, erosion and just ordinary wear due to normal operation, all take their toll.

To ensure safe and efficient operation over a long period, certain parts will by and by have to be replaced. Proper care and maintenance will prolong the life of the separator and ensure good performance.

WARNING

Disintegration hazards

Worn, eroded or improperly assembled machine parts may cause severe damage. Follow maintenance instructions and check for possible damage.

2.2.1 Forms of maintenance

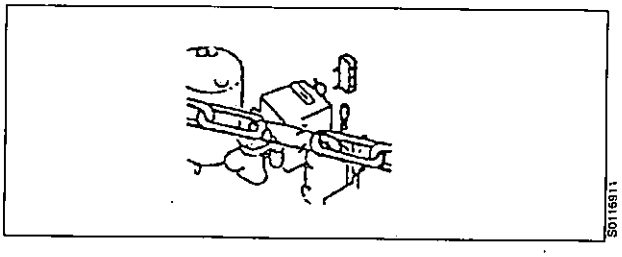
Two forms of maintenance exist: **Preventive maintenance** and **Corrective maintenance**. Preventive maintenance can be defined and planned, corrective maintenance cannot. This instruction book takes primarily preventive maintenance into consideration, but it also covers the normal requirements for corrective maintenance.

2.2.2 Maintenance strategy

The customer decides what form of maintenance or combination of forms shall be put into practice, depending on local conditions. The following specification shows the different forms of maintenance in relation to the **System effectiveness**.

System effectiveness	**Preventive maintenance Predictable**	**Corrective maintenance Uncertain**
Economy	High availability/production. Maintenance costs according to budget.	Uncertain availability / production. Maintenance costs unknown.
Production availability	Service according to plan.	Unexpected production break.
Reliability	Maintenance at known intervals.	Maintenance at unforeseeable intervals.
Maintainability	Easy to disassemble.	Disassembly made difficult by dirt and lack of lubrication
Service preparedness	Personnel and spares available (either at customer or by service-agreement with the supplier).	Preparedness uncertain
Performance	Known. Performance checked periodically.	Deterioration of performance identified too late.
Safety	Periodically checked safety by properly trained personnel.	Checking of safety must be carried out according to a separate programme for inspections to be found in the Directions for Maintenance.

Preventive maintenance reduces the risk of unexpected stoppages to a minimum. The different forms of maintenance are often used in combinations to give the best **System effectiveness** for the customer.



2.2.3 Direction for maintenance / maintenance log

With preventive maintenance the directions for maintenance state what is to be checked and replaced at recommended intervals.

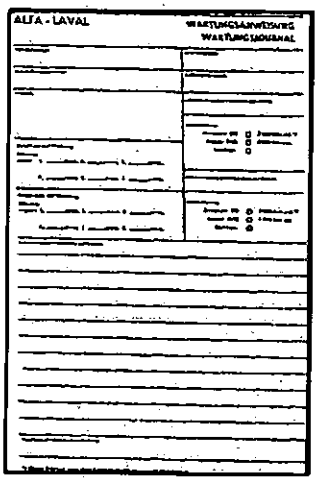
The directions also state what is to be checked from a safety point of view. The directions serve as a check list for different sub-actions when used for corrective maintenance. The directions for maintenance can be used as a maintenance log and a work sheet for performing the actions recommended by the supplier.

IS Intermediate service.

Includes inlet, outlet, bowl and friction linings.

MS Major service

Includes the actions taken for intermediate service (IS) as well as the driving device.



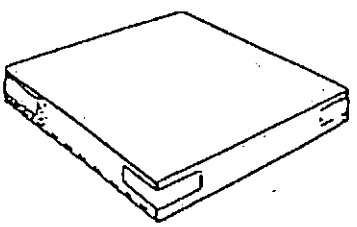
S0117011

2.2.4 Kits of spares

The kits of spares available for intermediate service (IS) and major service (MS) include the spares that are to replace the corresponding existing parts in the separator with preventive service (periodically).

Note that the parts for IS are **not** included in the MS kit.

The contents of the service kits are described in the *Spare Parts Catalogue.*



S0117111

IS-kit contains:
- Seals, gaskets, O-rings
- Valve plugs, wear rings
- Lubricants

MS-kit contains:
- Seals, gaskets, O-rings
- Ball bearings
- Rubber buffers
- Elastic plates
- Friction pad
- Height adjusting rings
- USIT-rings

In addition there is a service kit (rubber cushions) for foundation feet to be used every third year.

The kits of spares can also be used at corrective maintenance from a preparedness point of view. With preventive service the parts included in the kits are to replace corresponding existing parts in the separator to safeguard an operation free of problems till next overhaul.

2.2.5 Stock of spares at the customer

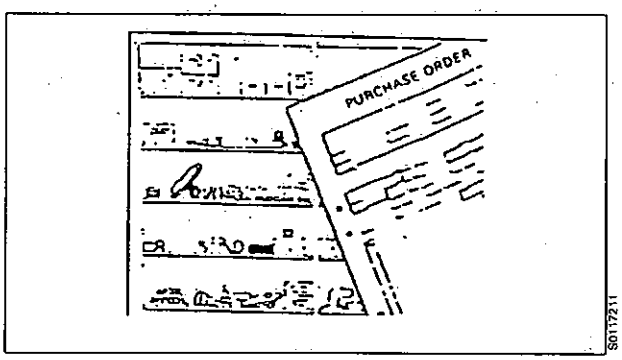
IS-kit shall always be available at the operation place.

MS-kit should always be available at the operation place.

If special difficulties exist, such as

- a long distance to the service unit
- commercial problems
- demands for a high production availability

both kits should be available.



NOTE

Always use Alfa Laval genuine parts as otherwise the warranty will become invalid.

Alfa Laval takes no responsibility for the safe operation of the equipment if non-genuine spare parts are used.

WARNING

Disintegration hazards

Use of imitation parts may cause severe damage.

2.2.6 Safety inspections

Preventive maintenance

The directions for maintenance prescribe the safety inspections which, with preventive maintenance, are periodically followed up by the user. In doing so he will discover any defects before safety is jeopardized.

Corrective maintenance

With corrective maintenance the safety inspections according to the directions for maintenance must be carried out specially from a separate program by the user.

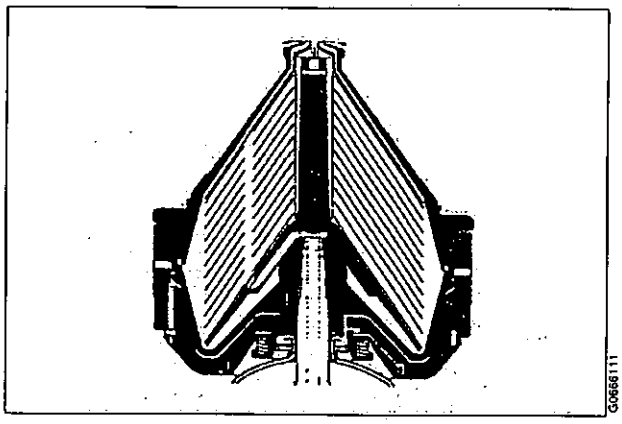
2.3 Major bowl parts

2.3.1 Balancing

Alfa Laval separator bowls are statically and dynamically factory balanced as **complete** bowl assemblies.

- Therefore, major bowl parts cannot be replaced without rebalancing the **entire** bowl.

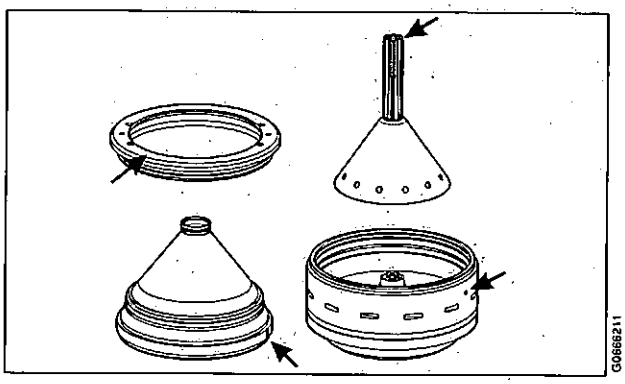
Bowl parts must never be interchanged from one machine to an other. This is just as imperative where machines of the same or a similar type are concerned. The bowl parts of each machine are stamped with the machine manufacturing number or the last three digits of that number.



2.3.2 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.

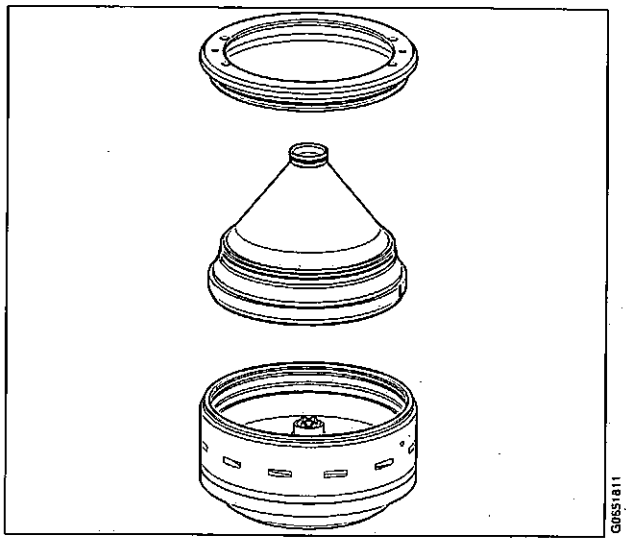
- Never operate the machine when these locating means are not in the proper relative position, or are illegible.



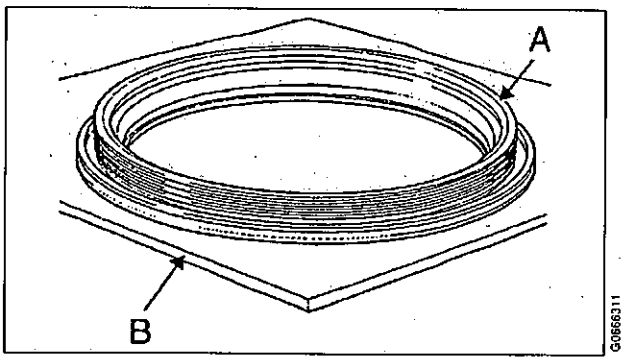
2.3.3 Handling

Great forces are generated when a separator bowl rotates. Its parts must, therefore, be high-precision- made to ensure perfect relative fit. The size of the bowl parts may easily give the impression that they need not be handled with the care that is, in fact, essential where precision-made articles are concerned. Any carelessness in this respect will very likely result in seizure damage.

Besides, the risk of seizure will increase when two or more parts in contact with each other are made of stainless steel and not properly lubricated.



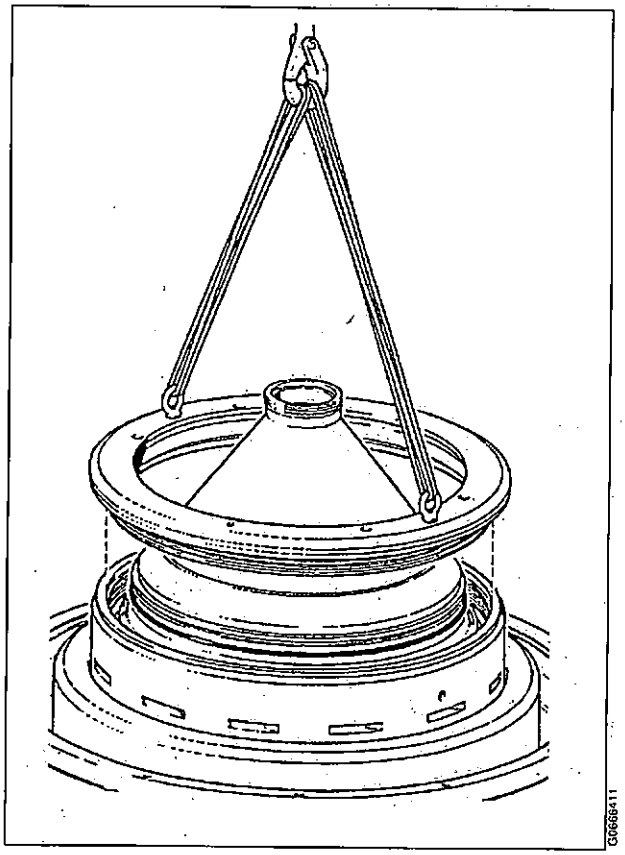
Handle all bowl parts very gently. Always put them on a **clean** and **soft** base. By way of example, the contact surface (A) of a lock ring provided with external thread should never rest on a dirty base. Scratches and dirt particles on contact and guiding surfaces as well as on threads must be avoided.



A. Contact surface
B. Clean and soft base (e.g. a rubber mat)

Use the lock ring lifting tools, if any. Even when the ring can be lifted by hand it may be difficult to put it gently on the bowl body. Denting may be the result if the ring thuds against the bowl body.

Align the hoisting device very exactly when assembling and disassembling. **Never** use a hoist that works jerkily. Use a lifting hook with catch.



2.4 Vibration

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

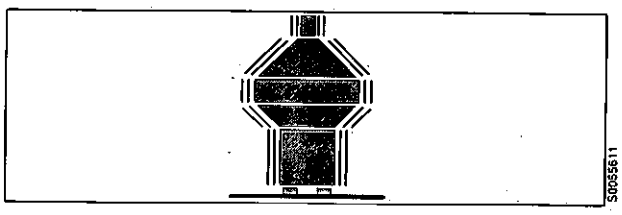
Vibration may occur, for shorter period, during the start. This is normal and pass without danger.

WARNING

Disintegration hazard

When excessive vibration occurs, **stop** separator and **keep bowl filled** with liquid during rundown.

The cause of the vibrations must be identified and corrected before the separator is restarted. Excessive vibrations may be due to incorrect assembly or poor cleaning of the bowl.



2.5 Cleaning

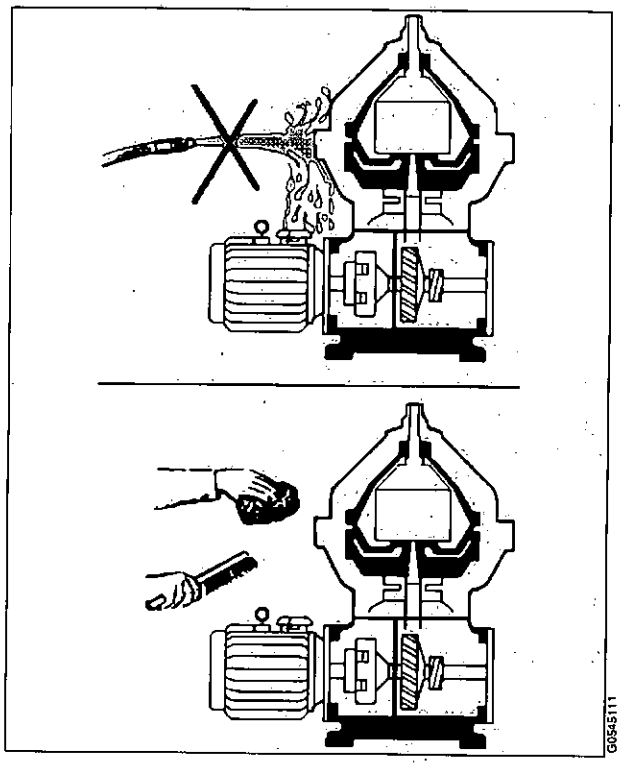
When using chemical cleaning agents, observe general rules and the supplier's recommendations as to ventilation, personal protection etc.

2.5.1 Frame / Motor

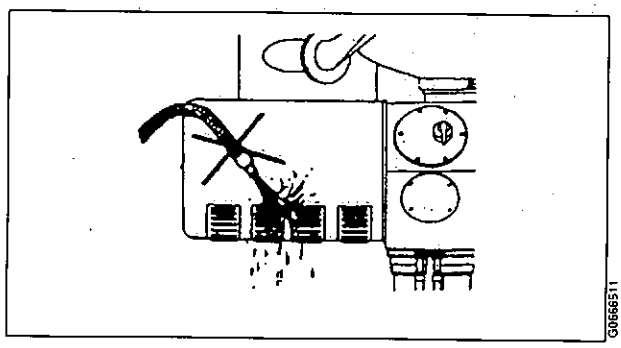
Never wash down a separator with a direct water stream. Totally enclosed motors can be damaged by direct hosing to the same extent as open motors and even more than those, because:

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.



Be careful even when the motor is equipped with a protecting hood. Never play a water jet on the ventilation grill of the hood.



2.5.2 Brake lining

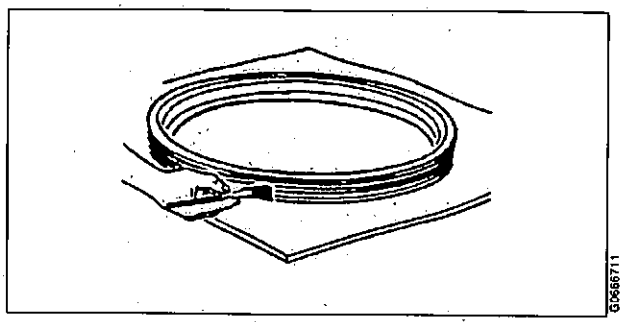
To degrease the lining and the corresponding friction surface use a suitable degreasing agent.

2.5.3 Other parts

Use white spirit, cleaning kerosene or any other solvent with equivalent properties.

2.6 Lubrication

Wipe and oil all parts after cleaning. Protect the parts against dust and dirt when not to be mounted at once. Follow strictly the lubrication instructions given for the bowl lock ring joint.



2.7 Shut-downs

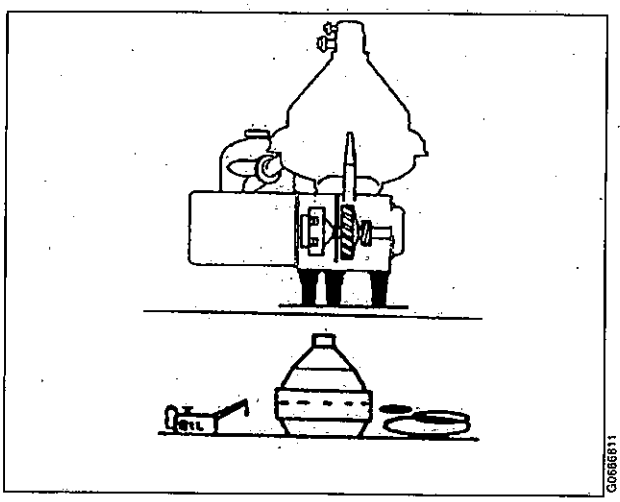
If the machine is shut down for some time, the bowl should not be left on the spindle, and its O-rings should be removed. Apply some oil on the bowl spindle taper for rust protection.
When the machine is to be set in operation again:

After some weeks

- Lubricate top bearing with some drops of oil
- Wipe the bowl spindle taper clean. Apply a few drops of oil (absolutely not Molykote) to the spindle taper. Wipe off with a clean cloth.
- Fit and lubricate the O-rings in the bowl. Reinstall the bowl.
- Check electric insulation in motor. If necessary, dry up the motor to obtain correct insulation value.
- Flush the pipings clean.

After some months, further actions

- Fit and lubricate new O-rings in the bowl.
- Check the rubber discs between motor shaft and worm wheel shaft with respect to cracks. Replace if necessary.



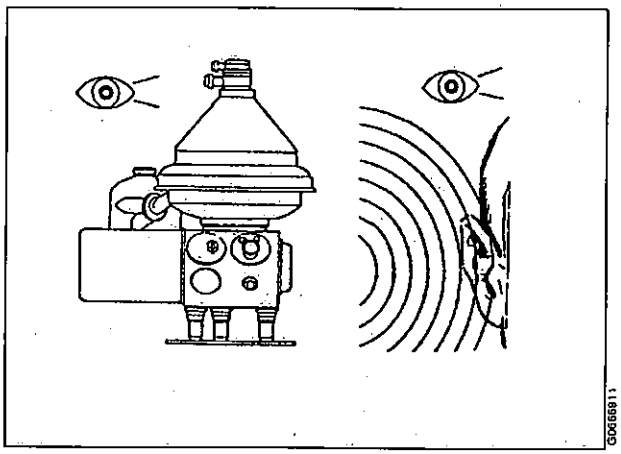
2.8 Before starting the overhaul

Try to form a conception of the machine action. The observations may be very useful when you have to decide whether a part should be replaced.

- Note visible leakage.
- Initiate some ejections and check the ejecting function.
- Note symptoms which you regard as differing from normal machine running.

The trouble tracing schedules may be of some help, see *Operator's Manual.*

However, the working experience gained from similar estimations will be the best aid.



2.9 Ball and roller bearings

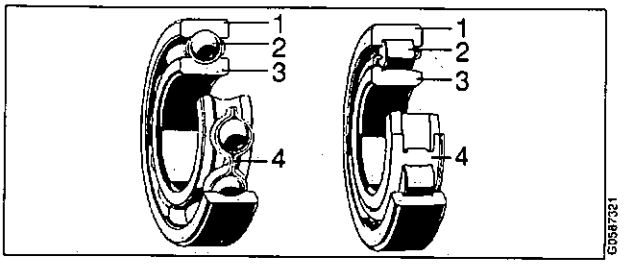
Use the greatest cleanliness when handling rolling bearings. Avoid unnecessary dismounting of bearings. **Do not refit a used bearing. Always replace it with a new one.**

Important: 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*.

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.**



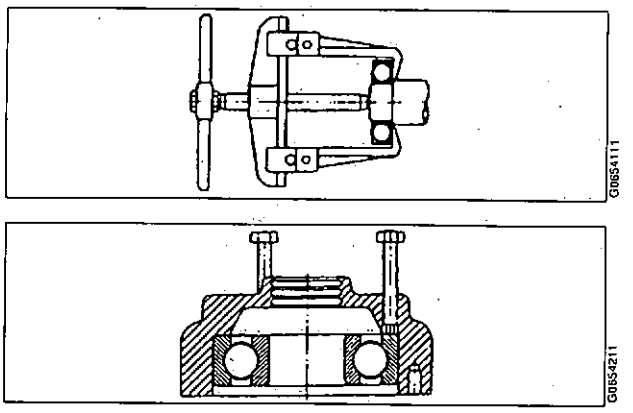
1. *Outer race*
2. *Ball/roller*
3. *Inner race*
4. *Cage*

2.9.1 Dismounting

Detach the bearing from its seat by pressing against the race having the tightest fit. Use a puller or a special tool. Thus, apply the pressure to the inner race when the bearing sits tightly on the shaft, and to the outer race when the bearing is tightly fitted in the housing respectively.

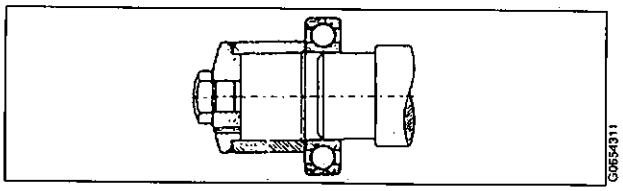
Arrange dismounted bearings and other parts in assembling order to avoid confusion.

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.



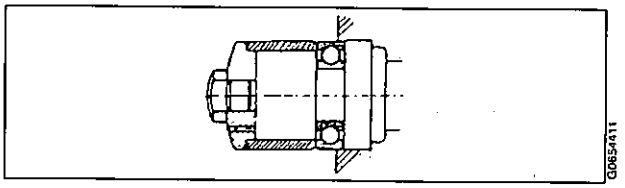
2.9.2 Fitting

Leave new bearings in original wrapping until ready to fit. The antirust agent protecting a new bearing need not to 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.

When mounting ball bearings on the spindle and worm as described below, the bearings must be heated in oil to max 125 °C.



NOTE

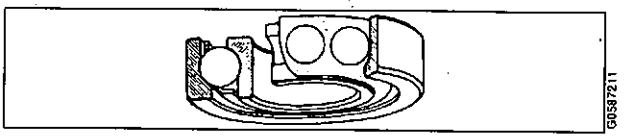
Heat the bearing in a clean container with cover.

Use only clean oil with a flash point above 250 °C.

The bearing must be well covered by the oil and must not be in direct contact with the sides or bottom of the container. Place the bearing on some kind of support or suspend it in the oil bath.

2.9.3 Angular contact ball bearings

Always fit single-row angular contact ball bearings with the **wide** shoulder of the **inner** race facing **upwards**.



NOTE

Observe that it is extremely important that this bearing is positioned correct.

A bearing of this kind turned upside down cannot carry any load. It collapses when loaded resulting in serious breakdown of the machine.

2.10 Tightening of screws

When tightening screws, use the torques stated in the table below unless otherwise stated. The figures apply to lubricated screws tightened with a torque wrench.

METRIC THREAD		
Thread	Torque in Nm	
	Stainless steel	Carbon steel
M6	7	8
M8	17	20
M10	33	39
M12	57	68
M16	140	155
M20	275	325
M24	470	570

3 Directions for maintenance

Contents

3.1 Intermediate service (every 3rd month *) IS

To be carried out by customer or supplier.

The IS-kit spares are to be used.

Main parts and operations	Remarks	Done
Inlet/ outlet		
Renew rubber rings / packings included in the IS-kit		
Check parts for wear / erosion / corrosion / damage. Rectify any surface damage		
Check height adjustments		
Check wobble and eccentricity		
Separator bowl		
Renew rubber rings / packings included in the IS-kit		
Renew valve plugs for operating slide and bowl hood seal ring		
Clean and inspect all bowl parts for erosion / corrosion / damage. Rectify any surface damage		
Clean and inspect nave of bowl body		
Clean and treat lock ring threads. See		
Check disc stack pressure		
Check bowl spindle taper for run-out. Rectify any surface damage		
Paring disc device/operating water		
Renew rubber rings / packings included in the IS-kit		
Clean channels		
Check water flow		
Check height adjustment		

*/ or 2000 hours

Main parts and operations	Remarks	Done
Frame		
Renew brake lining		
Renew oil in worm gear housing, if necessary. See "5.2 Lubricants" on page 181		
Renew oil drain plug packing		
Renew safety label if damaged or not legible		
Check play in speed transmitter (if any)		
Monitoring equipment		
Verify function of monitoring equipment		

3.2 Major service * (once a year **) MS

To be carried out by supplier or customer.

The MS-kit spares are to be used.

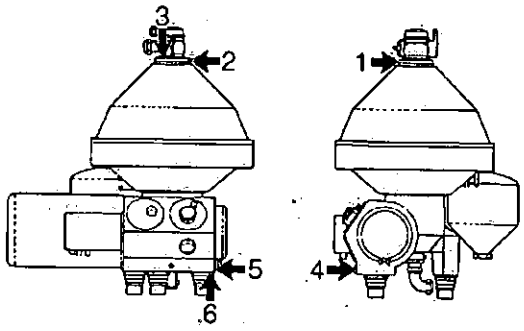
Main parts and operations	Remarks	Done
Vertical driving device		
Renew rubber rings / packings included in the MS-kit		
Renew ball bearings included in the MS-kit		
Renew buffers (rubber buffers or buffers with springs)		
Check worm gear for abnormal wear		
Check bottom bearing housing for any signs of rotating outer ring		
Horizontal driving device		
Renew rubber rings / packings included in the MS-kit		
Renew ball bearings included in the MS-kit		
Renew elastic plates of coupling		
Renew the corrugated shim and O-ring in end shield		
Check worm wheel shaft for wobbling and eccentricities		
Check bearing seats for any signs of damage		
Frame		
Renew rubber dampers (at least every third year. Use the service kit for foundation feet)		
Check foundation		
Check vibrations		
Motor		
Lubricate according to manufacturer's recommendations (see plate on motor and motor cover)		

*/ includes "Intermediate service"

**/ or 8000 hours

3.3 Vibration report (separator)

Separator Type:	**Measuring points - example**
Manufacturing No:	
Vibration measurement procedure and instrumentation according to SS-iSO 2372 and SS-ISO 2954 standards.	
Instrument Type:	
Manufacturing No:	



Vibration velocity RMS, mm/s

(RMS stands for Root-Mean-Square Value)

Running conditions	**Measuring position**						Vibration severity: (max. value from 1-6*)	Date: Signature:
	1	**2**	**3**	**4**	**5**	**6**		
1.								
2.								
3.								
4.								
5.								
6.								
7.								

* Vibration limit, see "Technical data" in *Installation Manual*. If higher, contact the supplier.

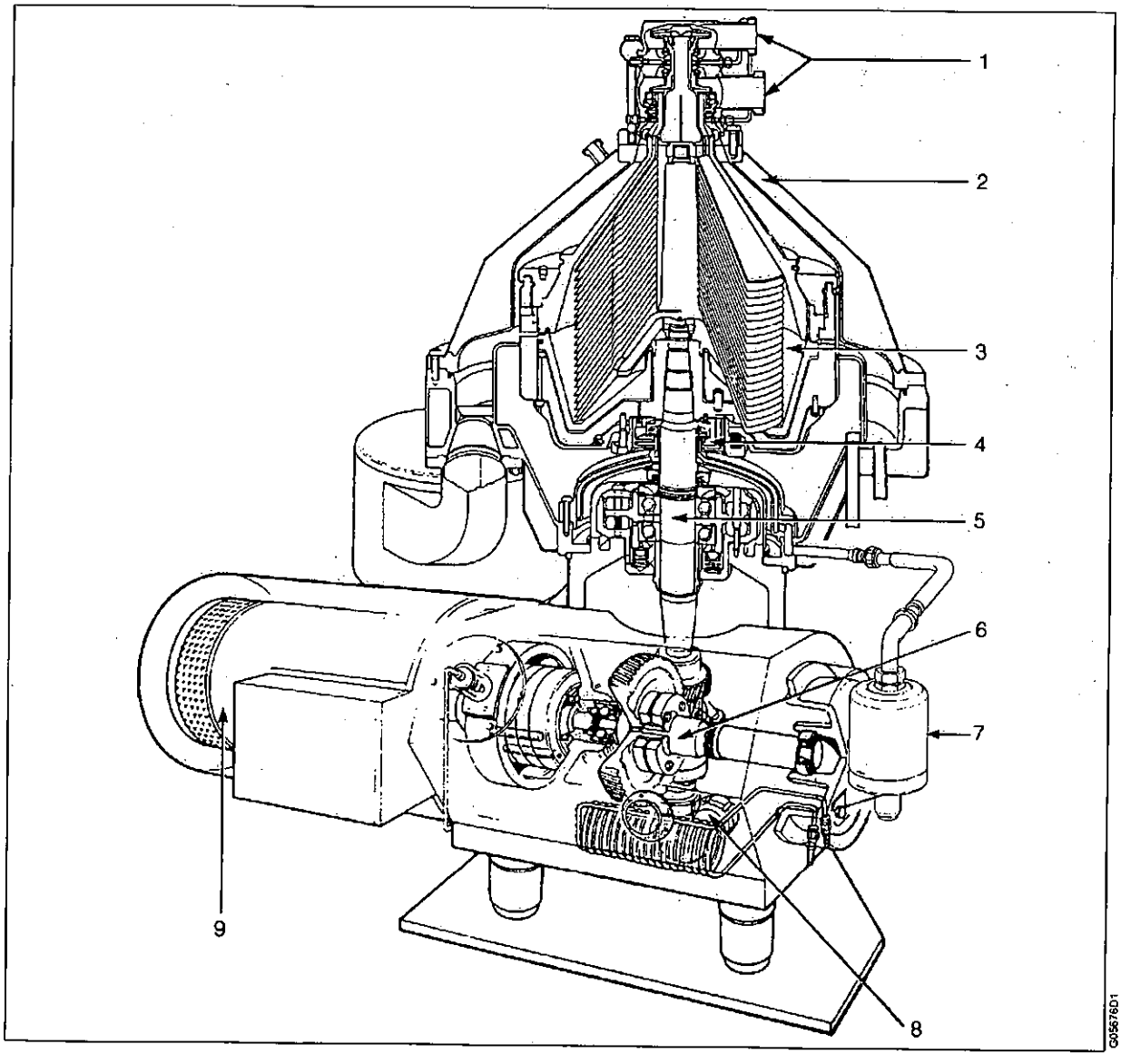
4 Dismantling/Assembly

Contents

4.1 Main parts

NOTE

If **inlet** or **worm wheel** is going to be disassembled it's recommended to do this while the bowl still remains in the machine.



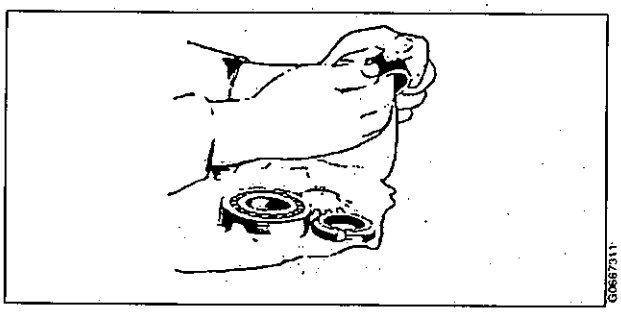
1. *Outlets*
2. *Machine top part*
3. *Bowl*
4. *Operating paring disc device*
5. *Vertical driving device*
6. *Horizontal driving device*
7. *OWMC*
8. *Inlet*
9. *Motor*

In the following chapters it is described how to disassemble and assemble the separator in the correct order by means of the proper tools. The symbol ✔ appears here and there in the text and illustrations. It refers to the heading Checkpoints in the chapter in question (or in another chapter stated) where description of the checking method / recommendation is to be found.

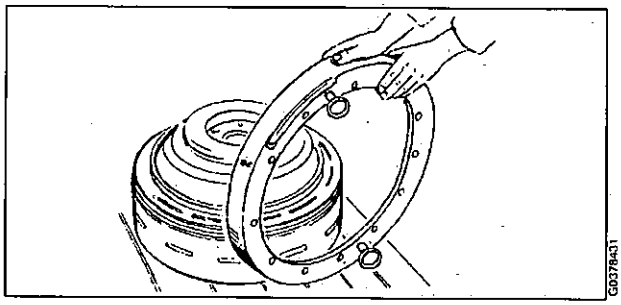
Part number for each part is stated in the *Spare parts catalogue (SPC)*.

4.1.1 Remember

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



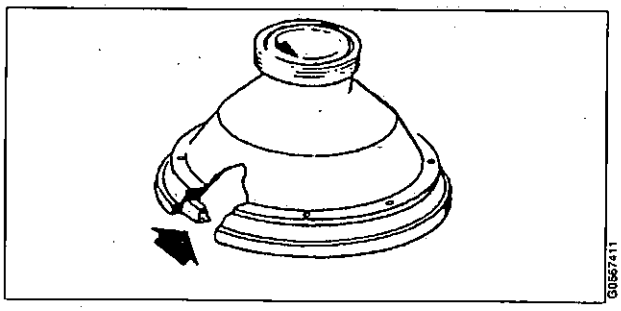
2. Never place parts directly on the floor. Use a clean rubber mat, fibreboard or a suitable pallet as base.



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

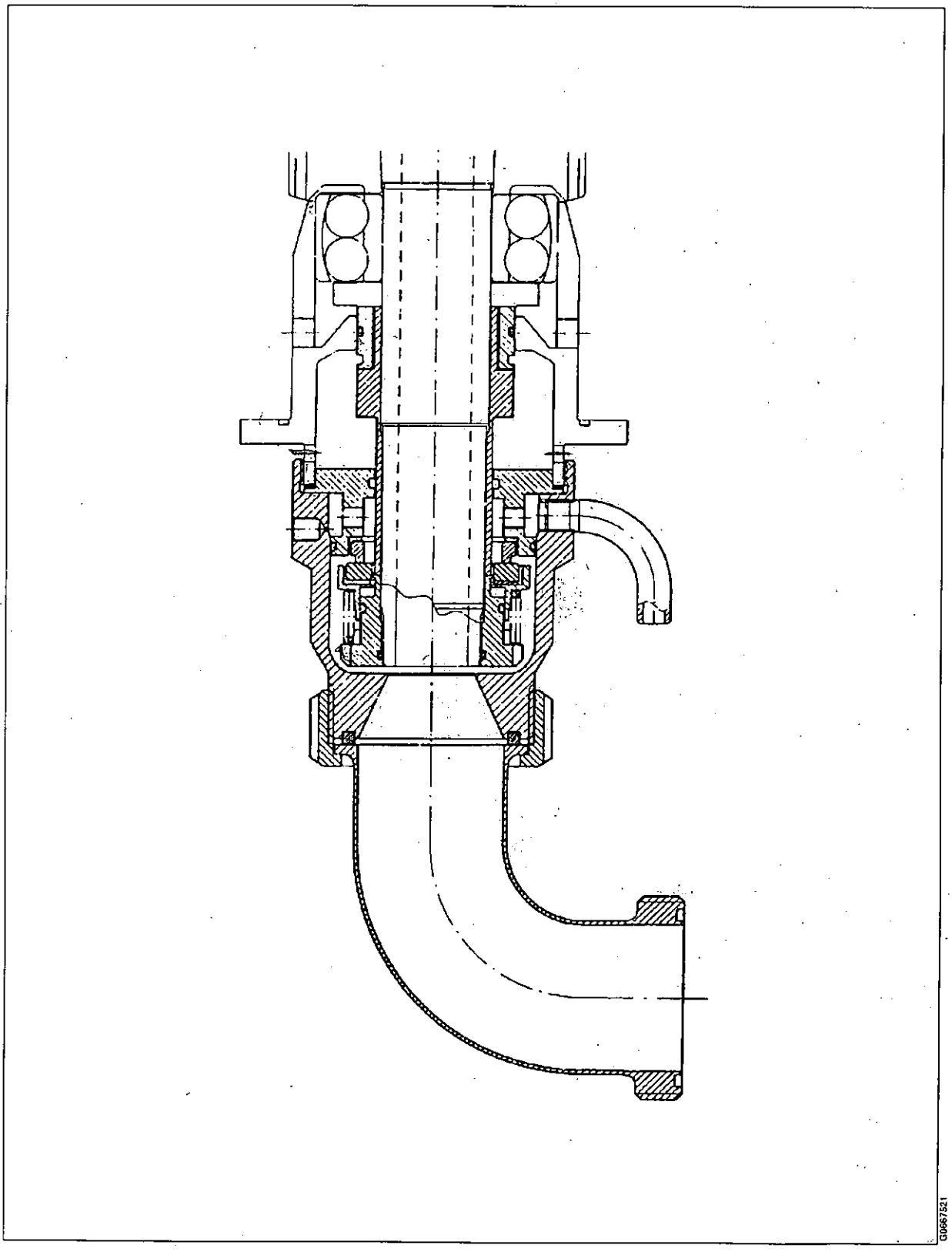
4. Position the hoisting device very exactly when assembling and disassembling. **Never** use a hoisting device that works jerkily Use a lifting hook with catch.

   An electrically operated hoist should have two speeds: 1,5 m/min and 6 m/min, approx. The lower speed is used when lifting parts out of and into the machine.



5. Use a lifting sling certified for 500 kg load when lifting separator parts without specified weight.

4.2 Inlet

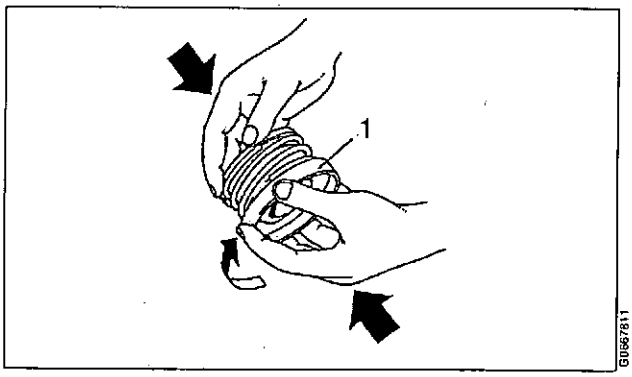


4.2.1 Dismantling

Never undo any part of the machine until the bowl is at a standstill.

1. Undo the ring nut and remove the elbow 20.
2. Unscrew the inlet housing 18 with a hook spanner (right hand thread).
3. Unscrew the guide sleeve 15 with a hook spanner (right hand thread). The following parts will accompany the sleeve as one unit:
   - O-ring 14
   - O-ring 13
   - Spring 12 NOTE! right hand winding.
   - Wear ring holder 11
   - Gasket 10
   - Wear ring 9

   all joined together by a bayonet holder between guide sleeve and wear ring.



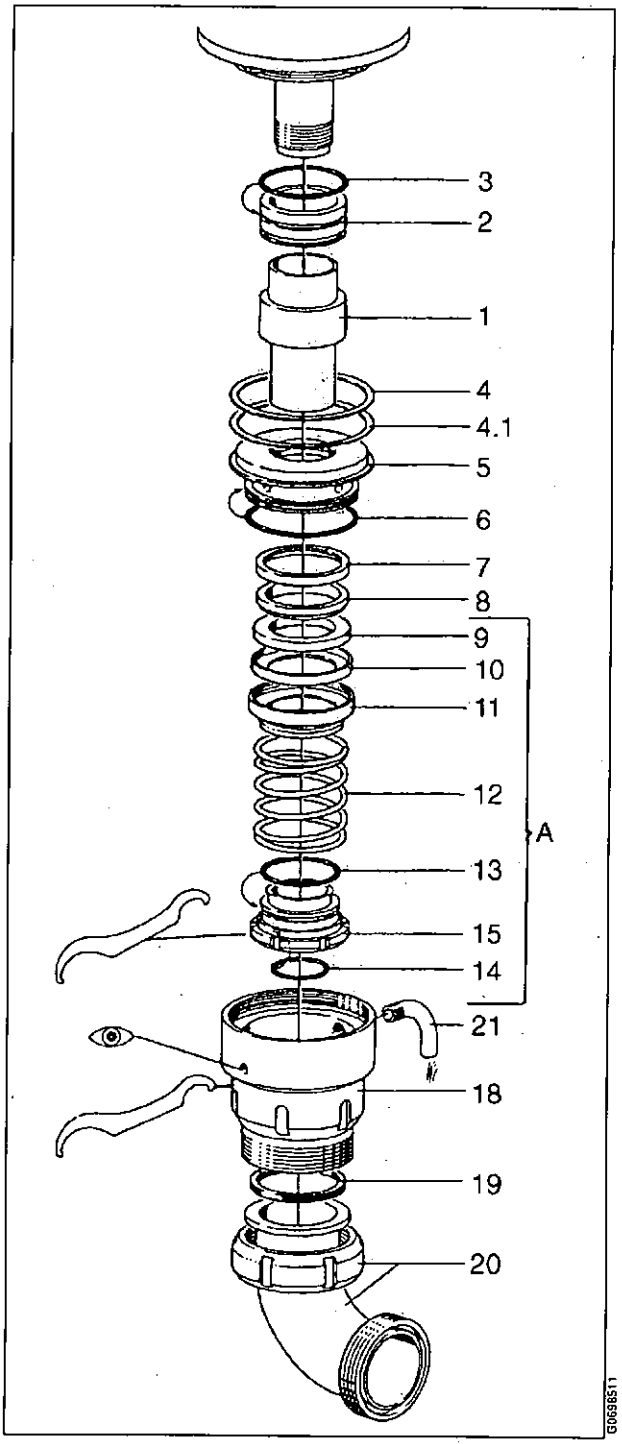
1. Holder

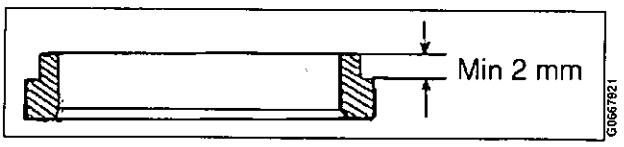
4. Seal ring 8, gasket 7 and intermediate part 5 with O-ring 6 and height adjusting rings 4 can now be brought straight down, also the sleeve 1.
5. Finally, remove the throttling ring 2 (carbon ring) and O-ring 3 straight downwards. A machined groove at the bottom of the ring provides a grip

✔ Check point

Check especially:

- Cooling water inlet hole (1,2 mm)
- O-rings, seal ring, wear ring

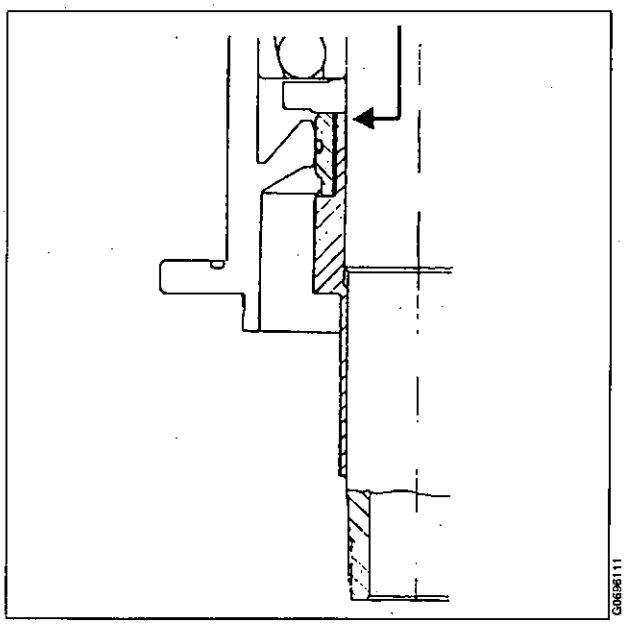




Checking the seal surface of a seal ring

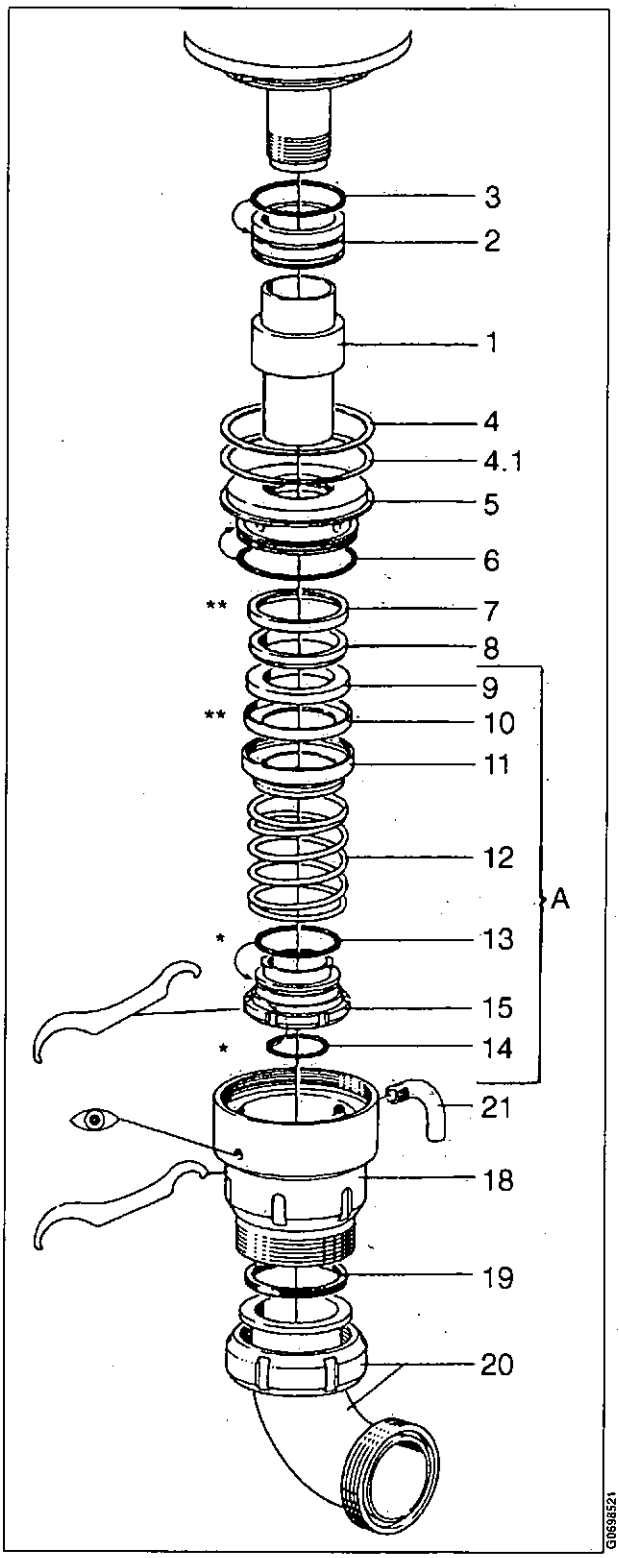
4.2.2 Assembly/ Height adjustment

1. Assemble the unit A, i.e. the guide sleeve 15 and the wear ring holder 11 (bayonet holder) with other parts:
   - Wear ring 9
   - Gasket 10
   - Spring 12 NOTE! right hand winding.
   - O-ring 13
   - O-ring 14.
2. Place the throttling ring 2 (carbon ring) with O-ring 3 on the sleeve 1. Push the sleeve 1 up the spindle until it is hard up against the stop – see arrow.



3. Push up intermediate part 5 with height ring 4 (possibly also height adjusting ring 4.1), O-ring 6, gasket 7 and seal ring 8 on to the sleeve 1.
4. Screw on the unit A, pre-assembled according to paragraph 1 above, using a hook spanner.

   Height adjustment: Next page.

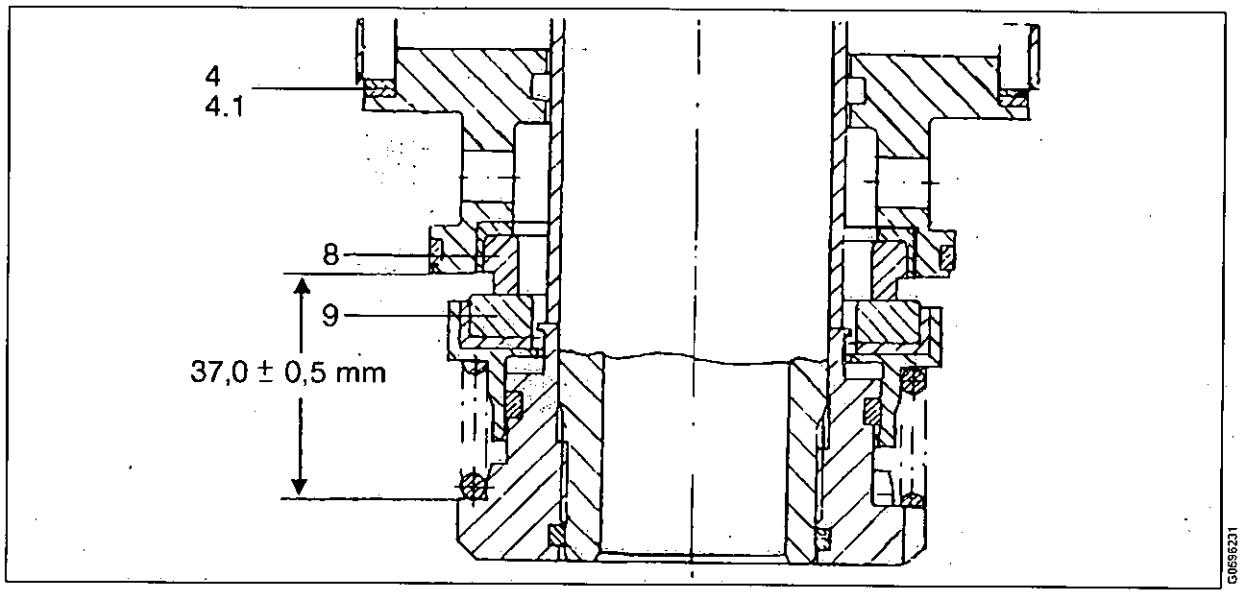


Lubricate with:

* Silicone grease

** Soapy water

5. Height adjustment



Correct height setting will provide the correct clamping force between seal ring 8 and wear ring 9. A clamping force that is too low will cause leakage of process liquid into the cooling water side. If the clamping force is too high, the seal ring will be rapidly worn out.

Check the height setting after every assembly.
The bowl must be mounted on the spindle when this check is made.

Measure the height dimension given as 36,5 - 37,5 mm in the figure. If necessary, obtain the correct dimension with the aid of the height adjusting rings 4 (thickness 1,0 mm).

If measured dimension is less than 36,5 mm: Remove one height adjusting ring.

If measured dimension is greater than 37,5 mm: Insert one height adjusting ring.

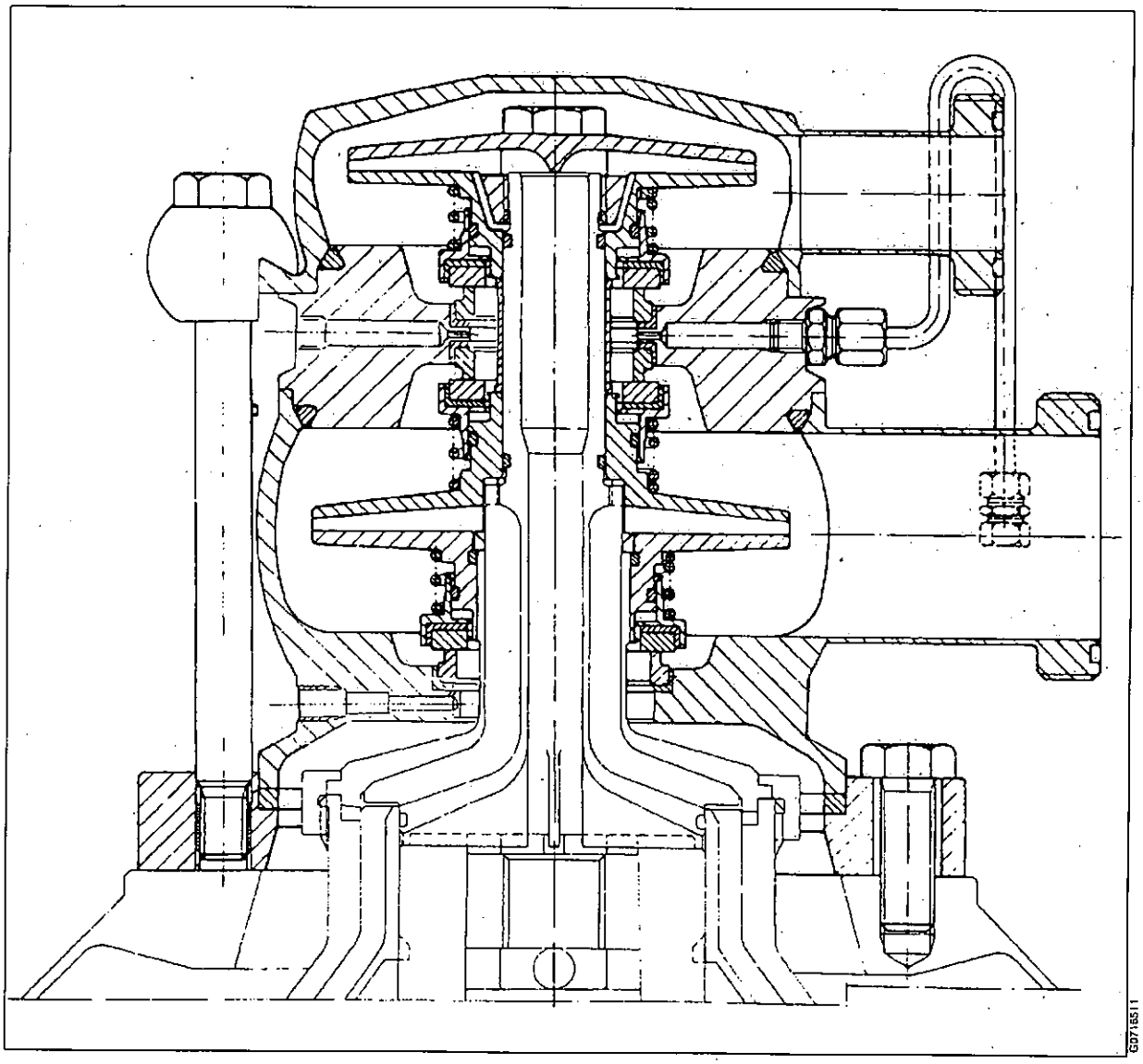
Rotate the bowl by hand and check that it can turn freely.

6. Screw on inlet housing 18 with a hook spanner. The diametrical positions of cooling water inlet and outlet can be adjusted, if necessary, with height adjusting ring 4.1 (thickness 0,5 mm).

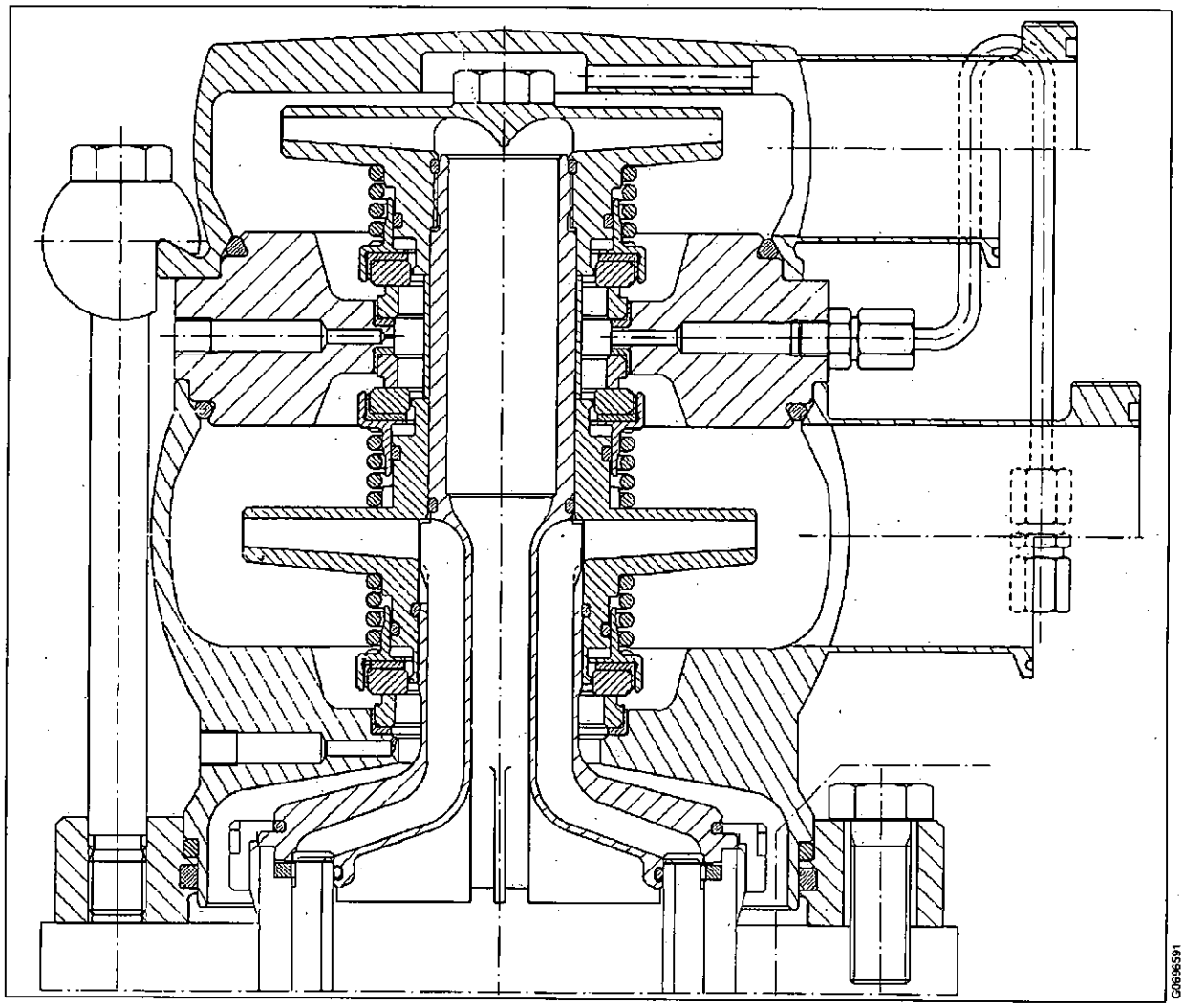
7. Connect the elbow 20 to the inlet housing.

4.3 Outlets (twin phase separators)

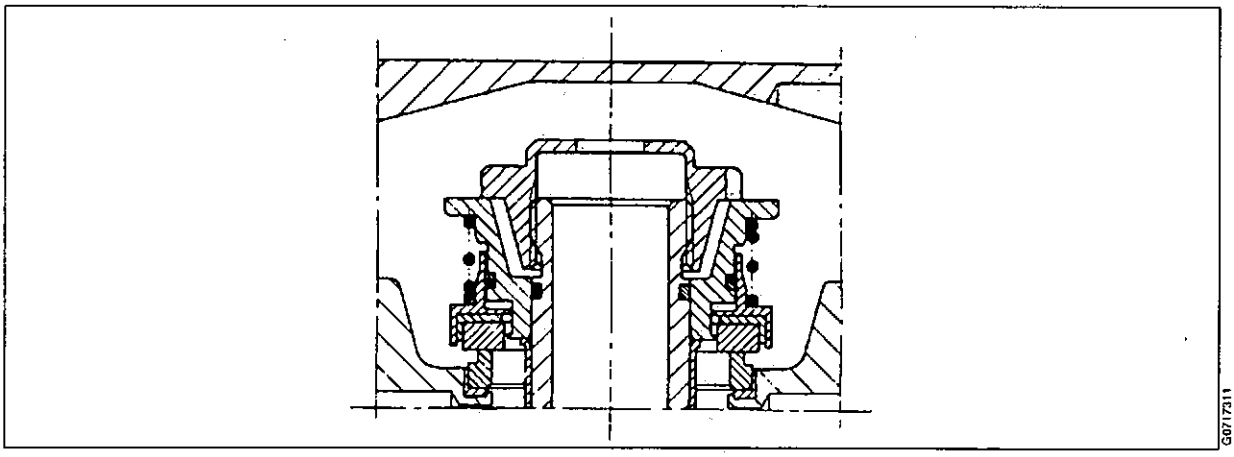
4.3.1 C / H / W / WD except C / H / W / 718 and C / H / W 818



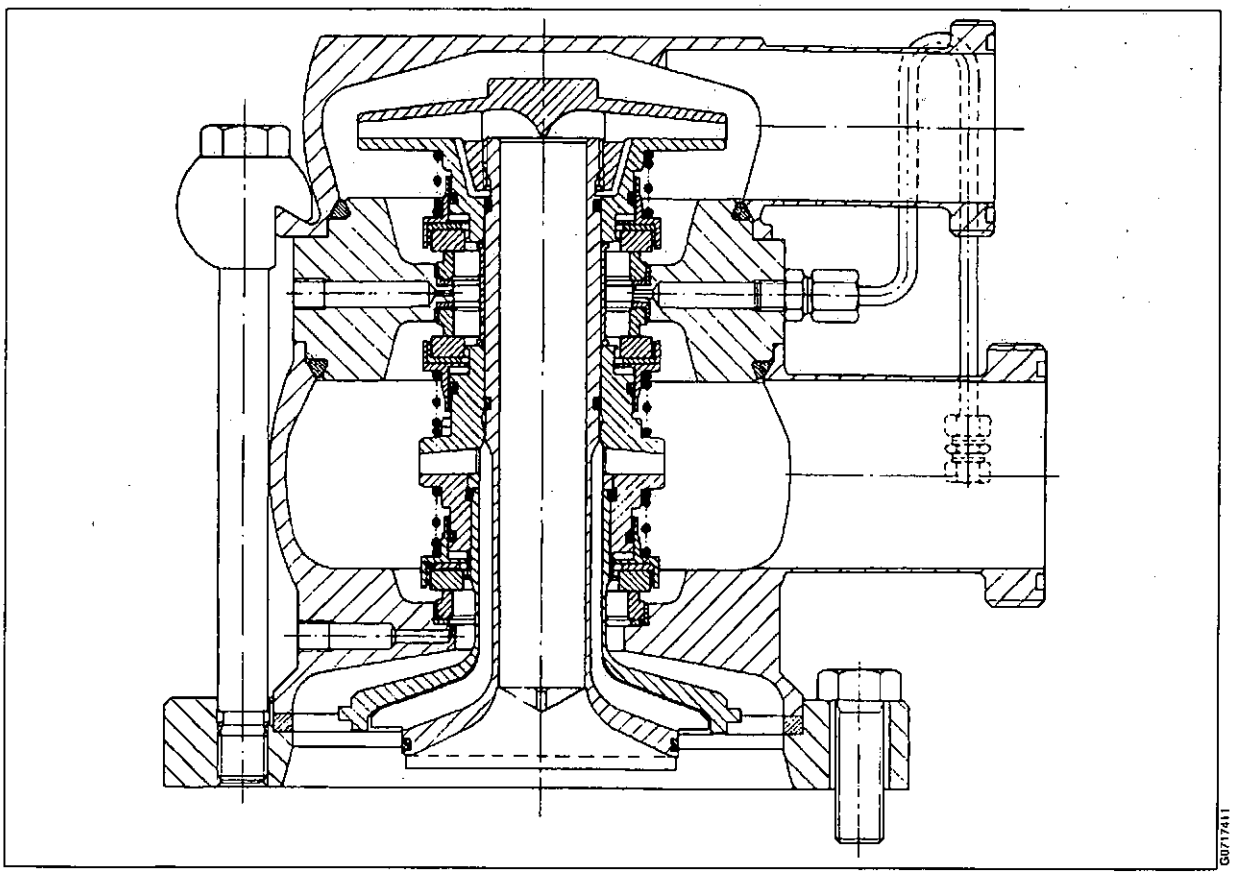
4.3.2 C / H / W 718 and C / H / W 818



4.3.3 A, B, F



A

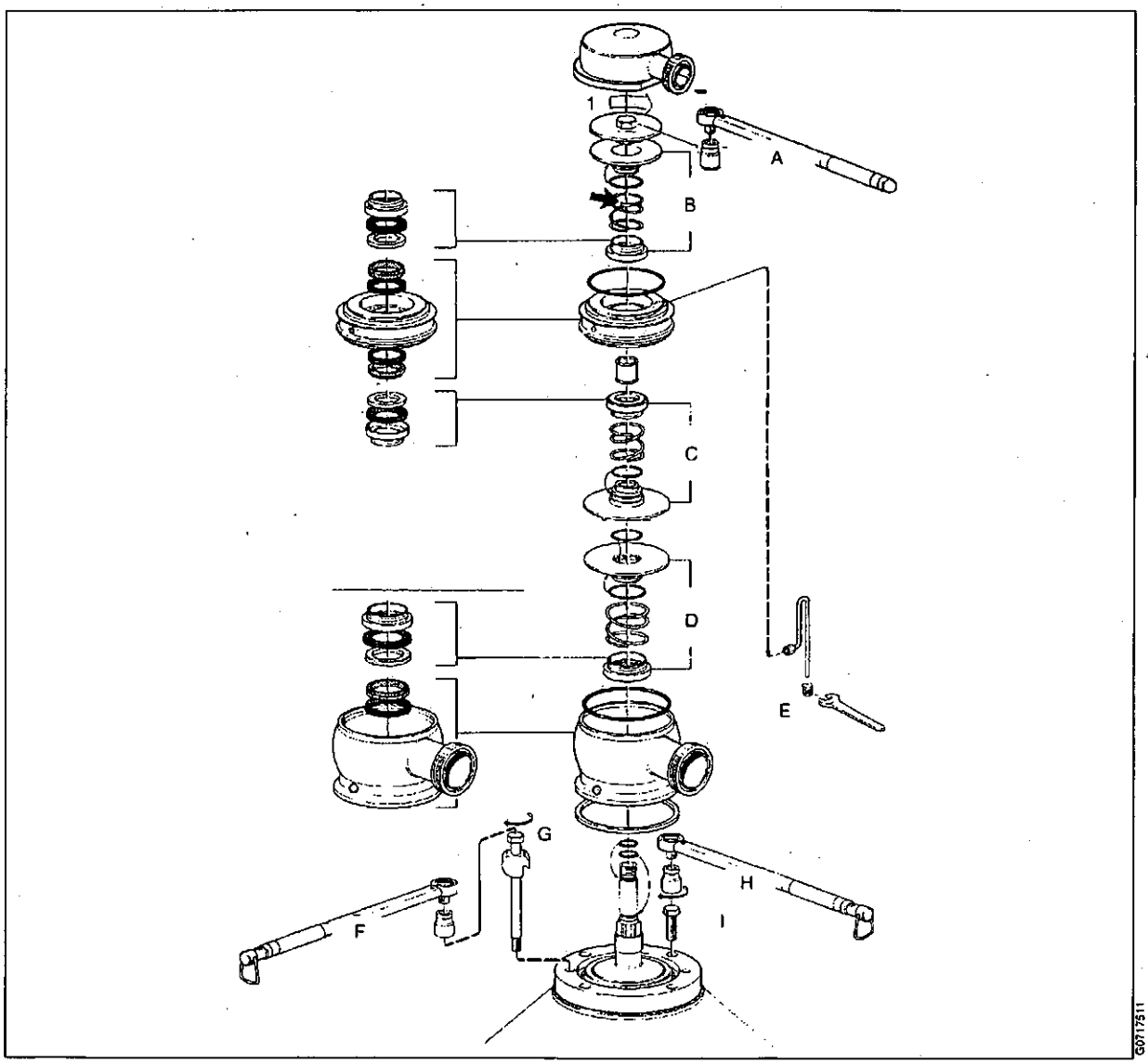


B, F

WARNING

Entrapment hazard

Make sure that rotating parts have come to a **complete standstill** before starting **any** dismantling work. The revolution counter indicates separator rotation.

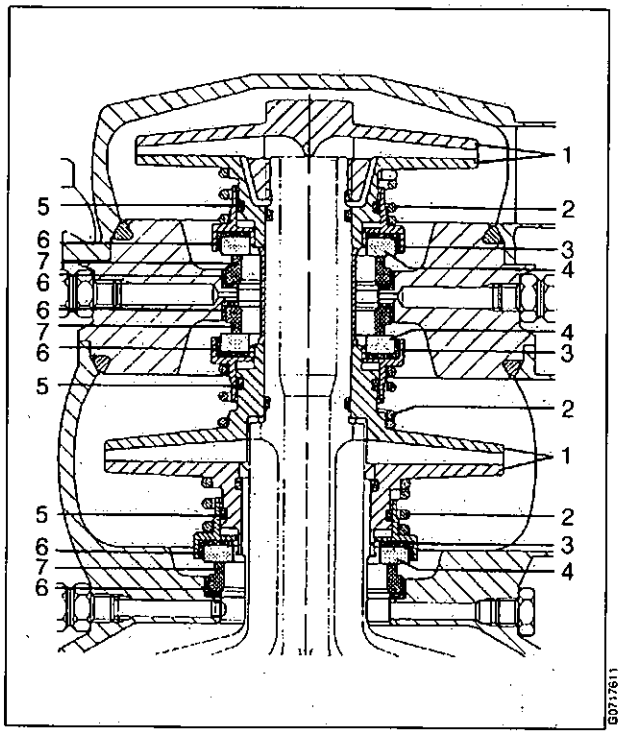


A. Width over flats 24 mm
B. Bayonet fitting (left-hand wound compression spring)
C. Bayonet fitting (right-hand wound compression spring)
D. Bayonet fitting (left-hand wound compression spring)
E. Width over flats 14 mm
F. Width over flats 24 mm
G. 50 Nm
H. Width over flats 24 mm
I. 100–120 Nm

4.3.4 Dismantling

The axial seals consist of:

1. *Pump impeller, top / bottom part*
2. *Compression spring*
3. *Support*
4. *Wear ring*
5. *O-ring*
6. *Rubber packing*
7. *Seal ring*



Remove the pipings for process liquid and cooling water.

The relative order of the parts appears from the adjoining figure. Use the tools shown. The following points should be observed:

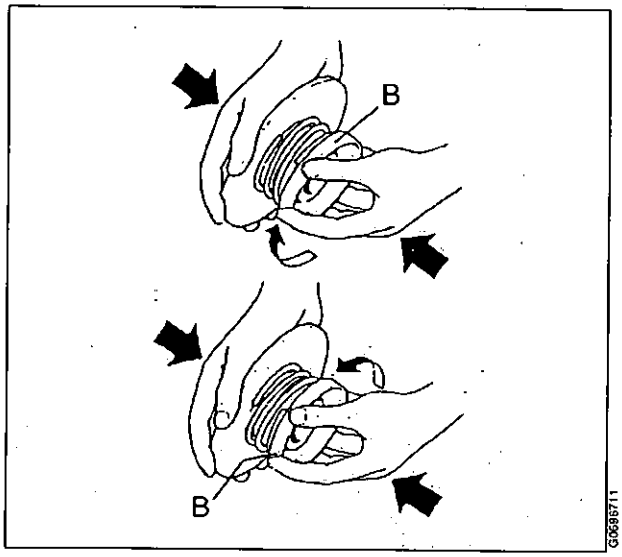
- Start by removing the hook screws.

  The top part of the upper pump impeller is left-hand threaded.

  The axial seals are connected by bayonet fitting to
  - the bottom part of the upper pump impeller
  - the top and the bottom part of the lower pump impeller and will therefore be brought with these impeller parts when disassembling.

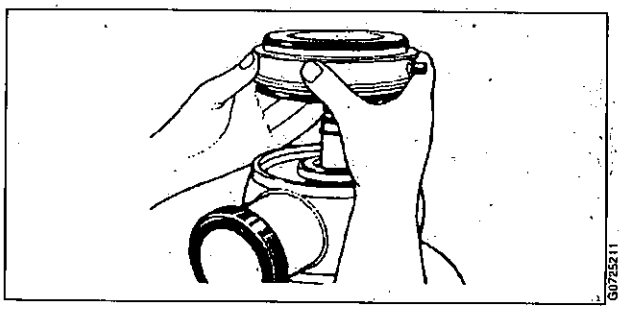
1. Dismantling a bayonet fitting: Press the parcel and turn at the same time the support against the bent end of the spring (it cannot be turned in the other direction). Be careful that the parts do not fly out when fitting is disengaged.

   The coil spring of the intermediate seal is right-hand wound. The springs of the two other seals are left-hand wound.

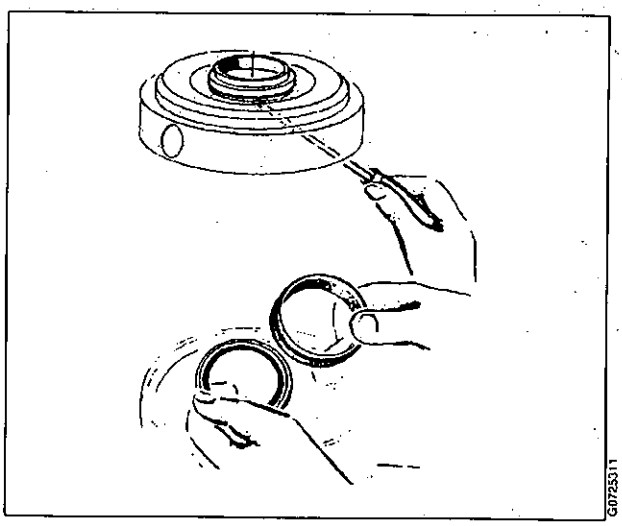


B. Support

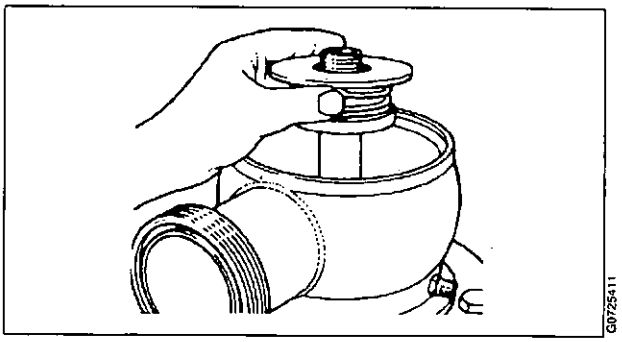
2. Lift off the intermediate part **carefully straight upwards** so as to avoid damaging its carbon seal rings.



3. If a seal ring or a wear ring is to be removed: Cautiously prize the part loose by means of a screw driver. Then remove the rubber packing.

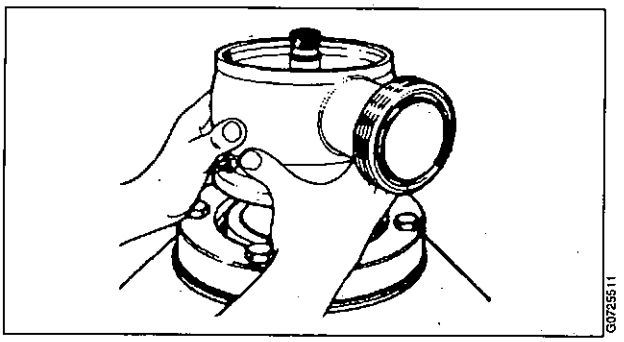


4. Dismount the axial seal together with the bottom part of the pump impeller. When using the larger pump impellers it is not possible to grasp the bottom part, and the latter must therefore be lifted off together with the outlet housing.



5. Prize out the housing with two screwdrivers on each side. Lift off the outlet housing.

   Note that a carbon seal ring is placed in the bottom of the housing and that this ring may easily be damaged. Therefore lift the housing **carefully straight upwards** until the outlet pipe is passed.



✔ **Check point**
" Axial seals" on page 56.

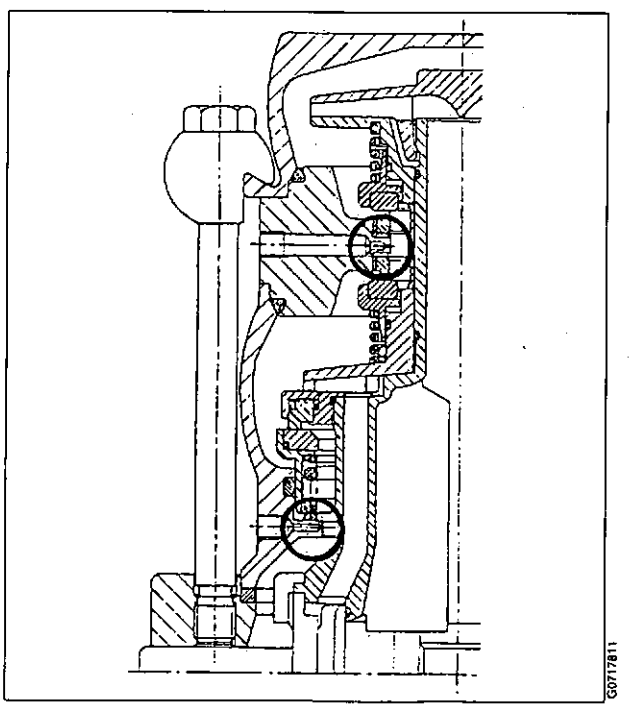
6. Carefully note where the parts of the axial seals belong if they are to be reused after dismantling. Do not confuse carbon rings of identical dimension, as they have been bedded in against their "old" wear rings.

4.3.5 Check points

Cooling water nozzles

1. Cooling water must be fed to the seals during the starting and stopping periods as well as during operation. CIP-liquid must be fed during cleaning. See *Operator's Manual*. It is important, therefore, that the cooling water nozzles are not obstructed. Hole diameter of the nozzles: 1,2 mm.

   Clean the nozzles with an iron wire or the like.



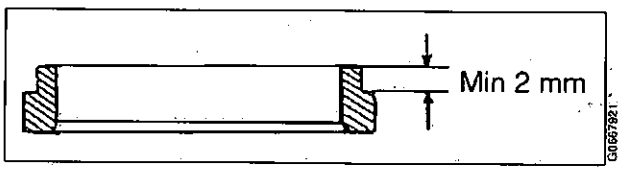
Axial seals

1. Defective axial seals will cause a leakage of process liquid from the machine.

   The sealing surfaces of wear ring and seal ring must be free of deposits and defects which can give rise to leakage and exceptionally rapid wear. In certain cases damaged sealing surface of the seal rings can be remedied see below. However, for practical reasons it is best to have new or reconditioned seal rings available when inspecting the seals, so that defective seal rings can be replaced at once when required. The old seal rings may then be repaired when convenient and put to use again at a later inspection. The **wear rings** can not be remedied.

2. If the damage is not excessive the sealing surface can be reconditioned by turning in a lathe and subsequent polishing on an abrasive cloth (grain size 600) placed on a face plate. In certain cases polishing alone will be sufficient.

   After repair, the sealing surface should have a polished, bright finish perfectly free from perceptible marks.



Repairing the sealing surface of a seal ring

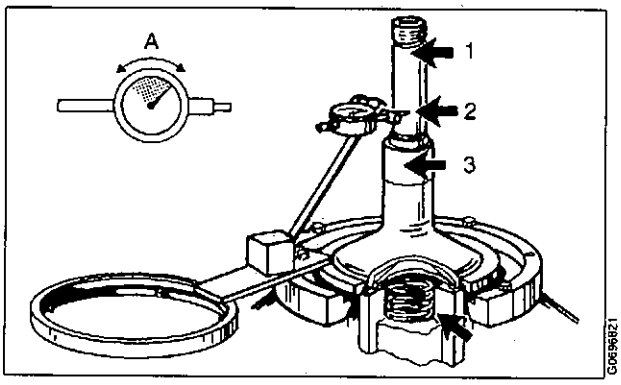
4.3.6 Assembly

Assembly takes place by reversing the sequence of operations for dismantling. Observe the following:

Wobble of outlet pipe

Excessive radial wobble of the outlet pipe will cause wear on the seals.

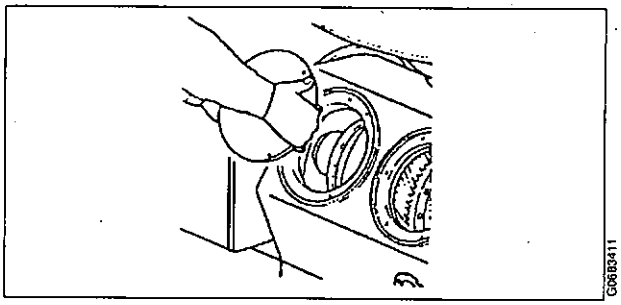
Fit a spring between distributor and outlet pipe, as shown in the figure. This spring is included in the tool kit.



Checking the wobble of outlet pipe
A: *Max 0,3 mm*

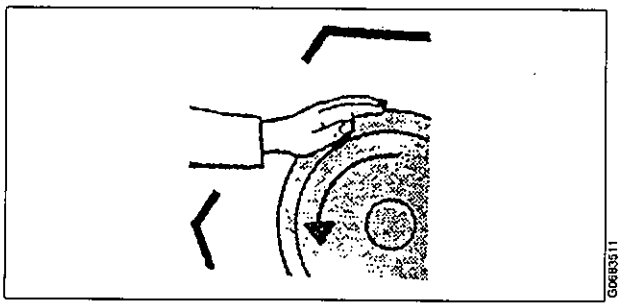
Tighten the spanner for the small lock ring in the ring situated on the top of the frame hood with one of the hexagon screws see figure. Place the support of the dial indicator on the handle of the spanner and measure the wobble at 1, 2 and 3. Remove the brake cover and revolve the outlet pipe by turning the coupling drum by hand.

Max. permissible wobble is **0,3 mm**.



If the wobble is excessive, turn the pipe in the distributor, check that it is not riding on distributor or bowl hood, thus being forced into an incorrect position.

Outlet pipe, guide sleeve and distributor are marked with alignment marks. They shall be assembled with these marks exactly aligned. If the max. permissible wobble is exceeded, try in a new position. If a position is found where the wobble is acceptable, make new punch marks in the new position.



Remove the spring, refit the outlet pipe and the guide sleeve and clamp the small lock ring.

If an unacceptable wobble cannot be remedied in this way, the bowl spindle cone must be checked with respect to defects, even the bowl body nave may be defective. See "4.6 Separator bowl" on page 75.

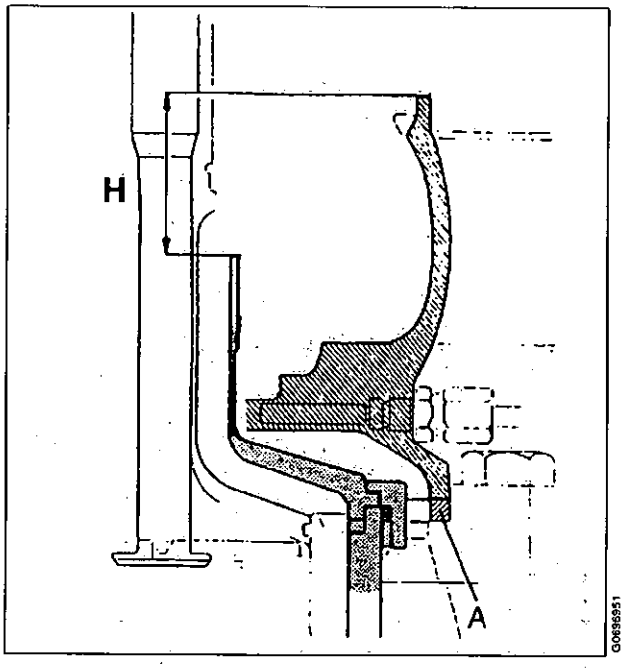
4.3.7 Height adjustment (outlet device)

Check the height position after each assembly.

Use two steel rules or a depth gauge.

If the height measure does not correspond with the measure stated in the figure: Replace the inserted height adjusting ring A by a ring with more suitable thickness.

Check the height position by removing the brake cap and rotating the coupling drum by hand. The bowl should then move freely and easily.



614 / 714 / 518 / 618 (excluding A 614 / 714)

H = 47 ±0,5 mm

A 614 / 714

H = 44 ±0,5 mm

718 / 818

H = 61 ±0,5 mm

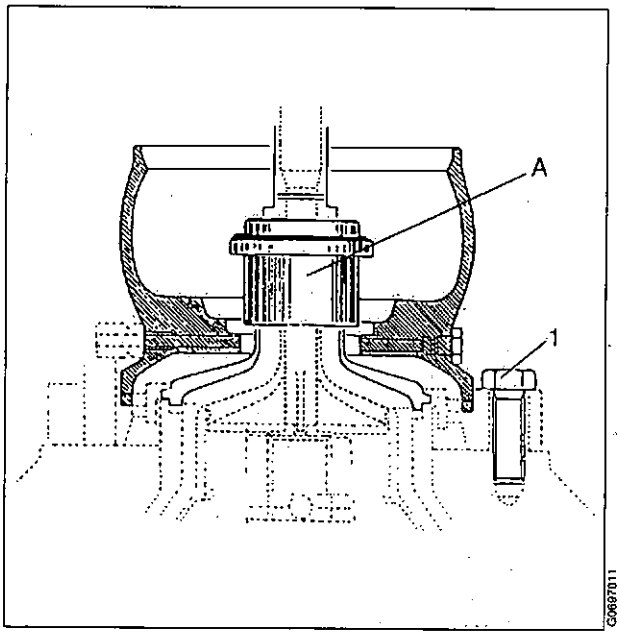
Checking eccentricity of outlet pipe / outlet housing

Excessive eccentricity between the outlet housing and the outlet pipe will cause increased wear on the axial seals. The eccentricity must always be checked when mounting the outlet device.

- Undo the four screws (**1**) of the centering ring (if not already done).
- Fit the outlet housing (its height position should already have been checked). The seal ring and rubber packing must not be fitted when mounting the outlet housing.
- Pass the gauge (**A**) for checking centering over the outlet pipe and press down the gauge in the bottom hole of the outlet housing.
- Tighten the four screws (**1**) with a torque of **100 - 120 Nm** (10 - 12 kpm).
- Lift out the gauge. Notice that it should be easy to lift out.
- Remove the outlet housing and fit seal ring and rubber packing of the axial seal.
- Fit the outlet housing on the frame hood.

  The checking could also be done with the seal ring and rubber packing fitted. The gauge (A) should then be turned upside down relative the figure above.

  Be careful not to cause any damage.

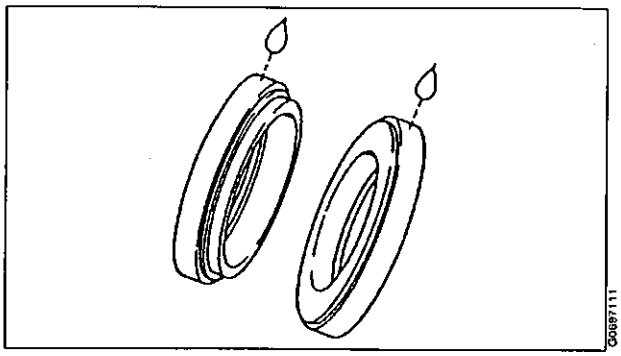


Setting outlet housing and outlet pipe

Axial seals

1. Clean the parts and ascertain that they are undamaged. Press down the seal rings and the wear rings in their rubber packings. Lubricate the packings on their external surface with soapy water (not oil) and press them down (with rings) in the parts to which they belong, i.e. in the supports, the intermediate part and the lower outlet housing respectively.*

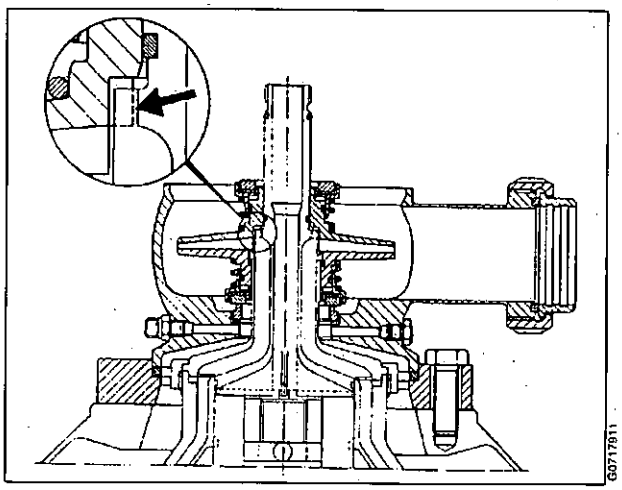
   Lubricate the O-rings of the impellers with silicone grease.** Assemble the parts to be locked by bayonet fitting. Note: The compression spring of the uppermost seal has a small hook at one end which must fit into the bottom part of the upper impeller.



2. Press the parcel and turn at the same time the support against the bent end of the spring until the parts are engaged. Finally check that the support slides easily on the O-ring.

   Ascertain that the grooves of the top part of the lower impeller fit over the ribs of the outlet pipe.

   Do not forget the spacing sleeve.



NOTE

Connections for cooling water to intermediate part.

Inlet: **Small** hole in bottom
Outlet: **Somewhat** larger hole in the bottom.

* The wear ring and the seal ring must be handled with care. When the parts are to be pressed down in their seats together with the rubber packings, the power must be uniformly distributed around the periphery. It is likewise important not to damage the sealing surface on which power is applied. Preferably use a plastic tube with a smooth end surface.

** Quality requirements – see "5.2 Lubricants" on page 181.

Outlet housings

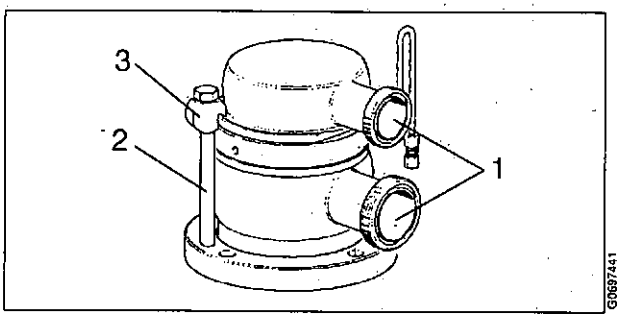
It is important that the long fixing screws are placed straight. Tightening the screws in a skew position will create excessive forces when tightened. This might damage the threads and as a consequence be a potential risk.

WARNING

Skin irritation hazards

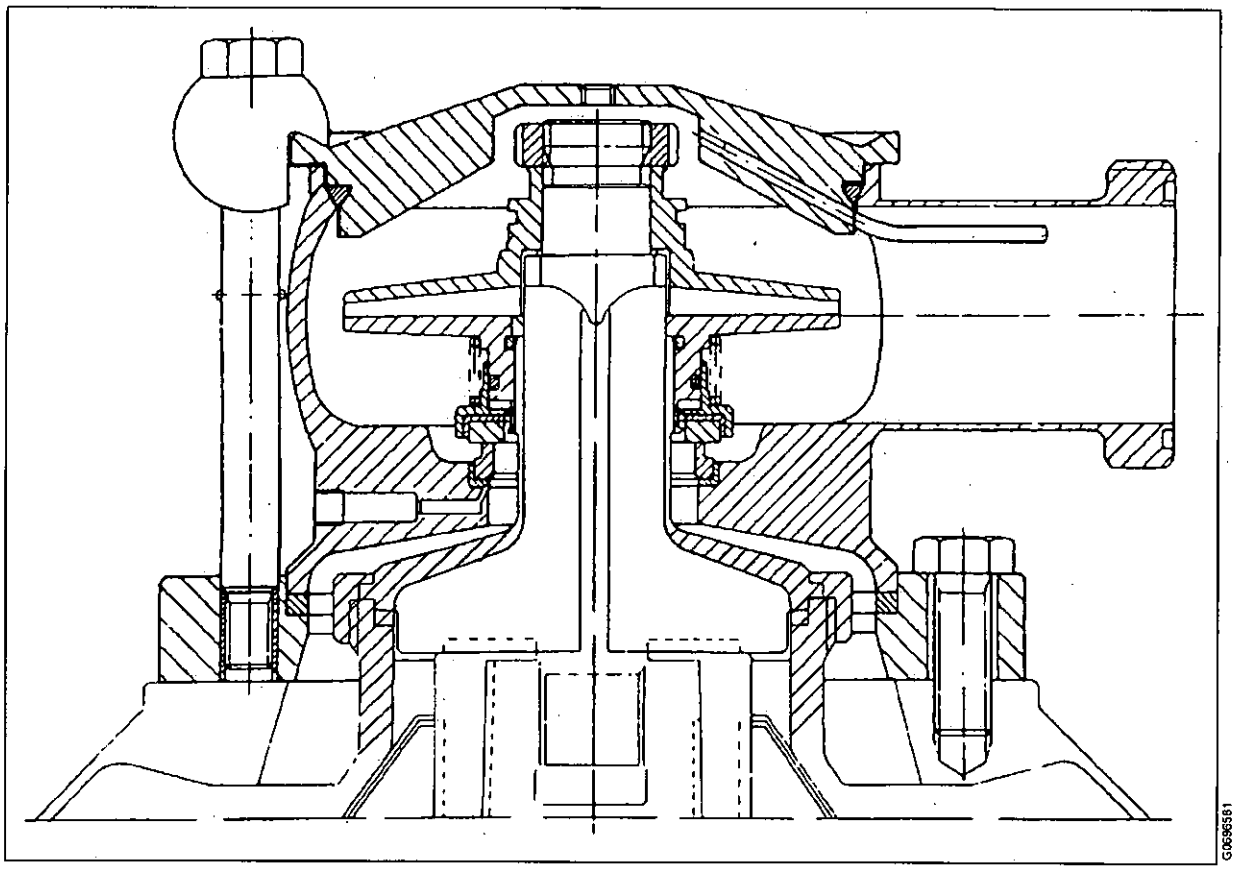
Ensure that the outlet housing fixing screws are properly fitted and tightened to avoid leakage / splash of dangerous liquids.

1. Make sure that the outlet pipes (1) are in correct position before the fixing screws (2) are tightened. Never turn the outlet housings unless the fixing screws are fully loose.
2. Make sure that the screw hooks (3) are properly seated in the outlet housing groove.
3. Make sure that the fixing screws are centred in their holes. Tighten with a torque of **50 Nm**.

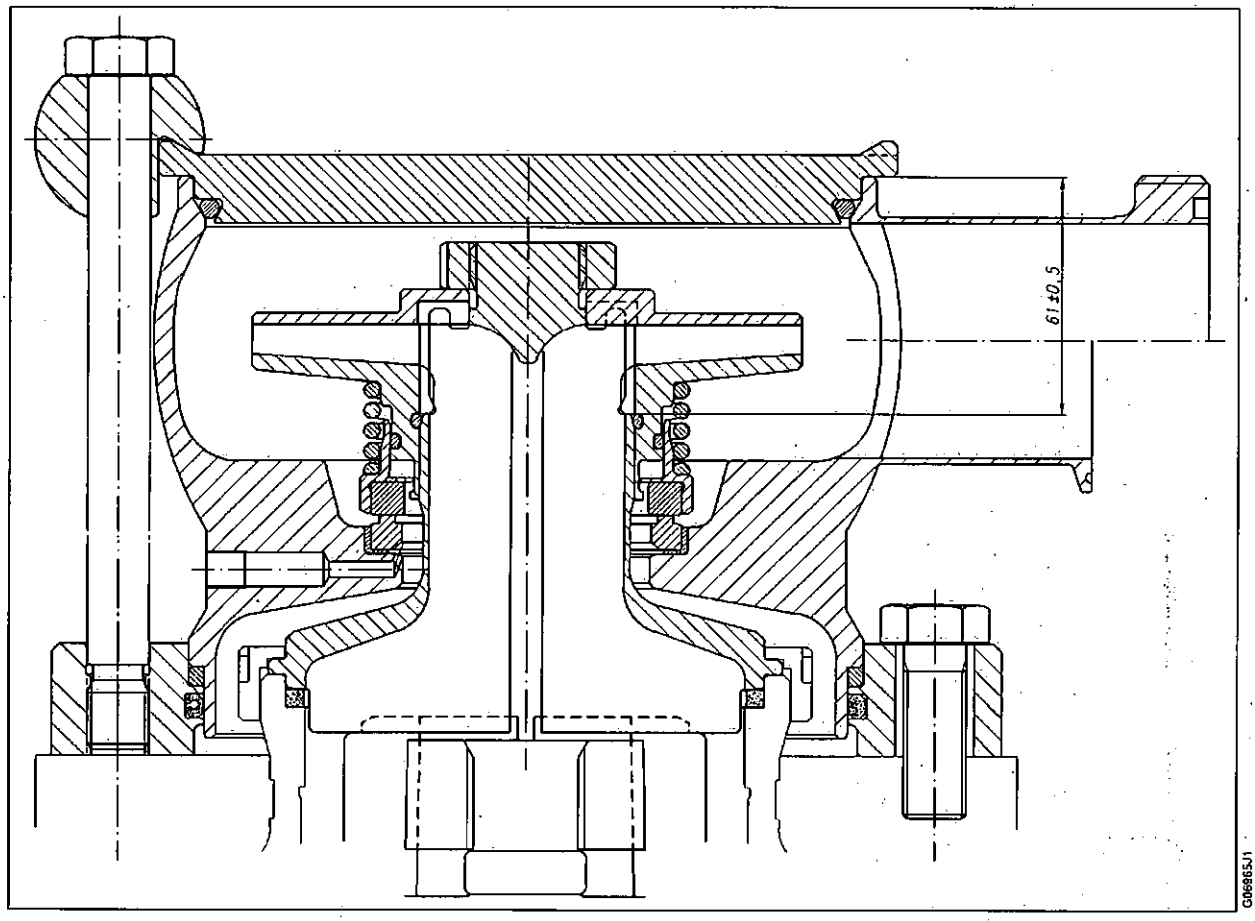


4.4 Outlet (single phase separators)

4.4.1 BB / D 714, 818 / 618



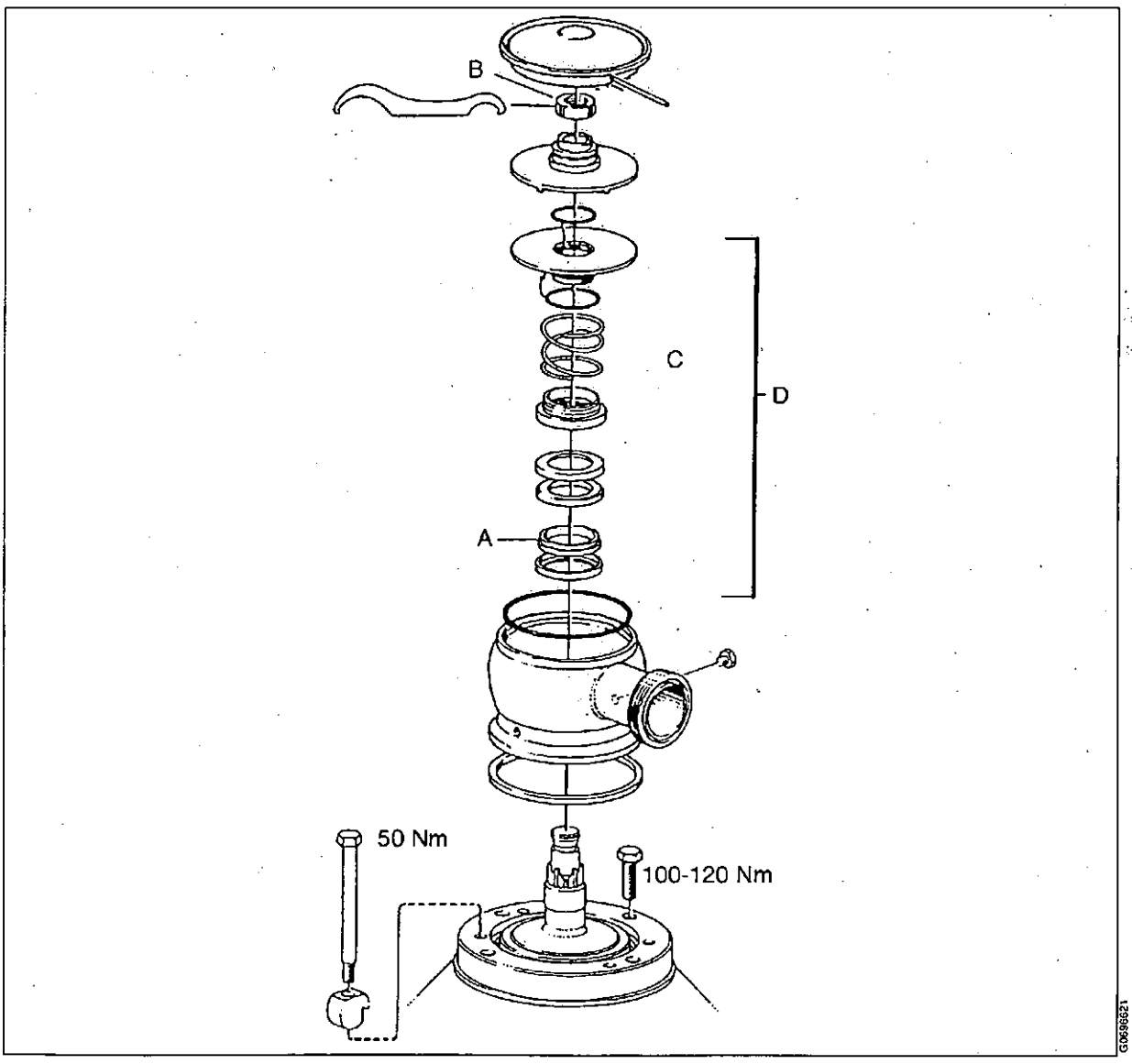
4.4.2 BM / BB 818, D 718, high flow



WARNING

Entrapment hazard

Make sure that rotating parts have come to a **complete standstill** before starting **any** dismantling work. The revolution counter indicates separator rotation.

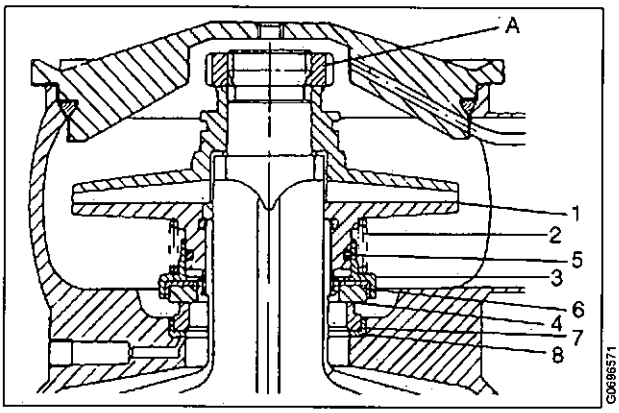


A. Seal ring, left-hand thread
B. Nut, Note! Left-hand thread
C. Bayonet fitting (left-hand wound compression spring)
D. To be removed as a complete unit. Note! Lift straight up, otherwise the seal ring (A) can be damaged

4.4.3 Dismantling

The axial seals consist of:

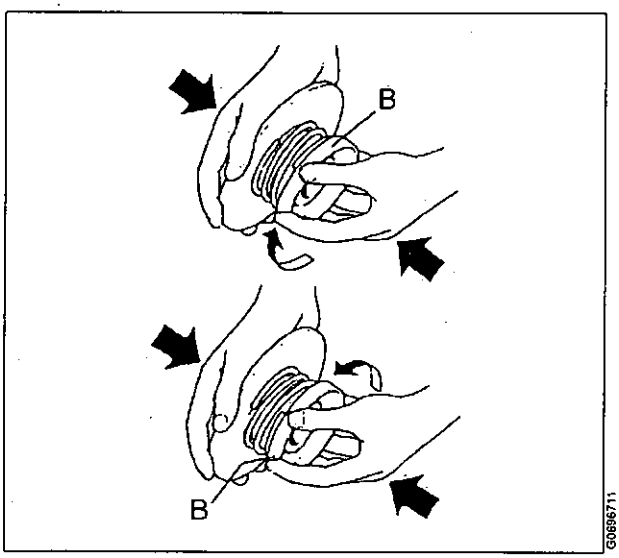
A. Nut
1. Pump impeller, top / bottom part
2. Compression spring
3. Support
4. Wear ring
5. O-ring
6. Rubber packing
7. Seal ring
8. Rubber packing



Remove the pipings for process liquid and cooling water.

When dismantling, note that the nut (A) which secures the impeller has left-hand thread.

1. Dismantling a bayonet fitting: Press the parcel and turn at the same time the support (B) against the bent end of the spring (it cannot be turned in the other direction). Be careful that the parts do not fly out when fitting is disengaged.

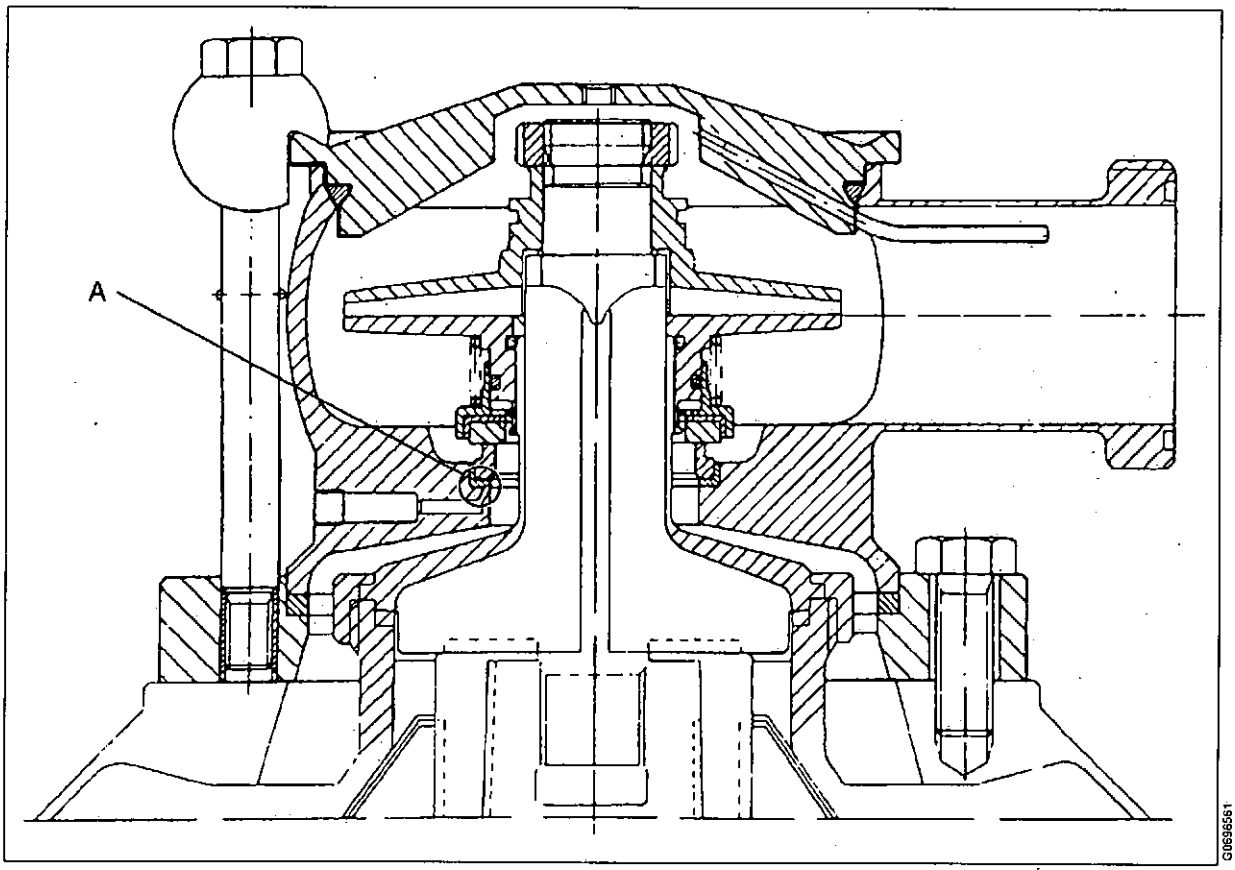


B. Support

(Assembly takes place by reversing the sequence of operation for dismantling).

4.4.4 Check points

Cooling water nozzle



1. Cooling water must be fed to the seals during the starting and stopping periods as well as during operation. CIP-liquid must be fed during cleaning. See *Operator's Manual*. It is important that the cooling water nozzle (**A**) is not obstructed. The hole diameter of the nozzle: **1,2 mm**.

   Clean the nozzle with an iron wire or the likely.

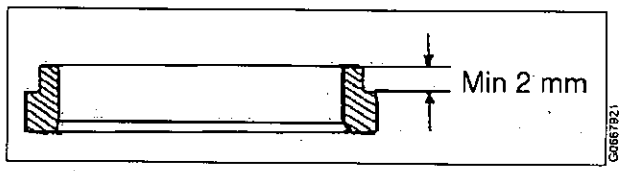
Axial seals

1. Defective axial seals will cause a leakage of process liquid from the machine.

   The sealing surfaces of wear ring and seal ring must be free of deposits and defects which can give rise to leakage and exceptionally rapid wear. In certain cases damaged sealing surface of the seal rings can be remedied see below. However, for practical reasons it is best to have new or reconditioned seal rings available when inspecting the seals, so that defective seal rings can be replaced at once when required. The old seal rings may then be repaired when convenient and put to use again at a later inspection. The **wear rings** can not be remedied.

2. If the damage is not excessive the sealing surface can be reconditioned by turning in a lathe and subsequent polishing on an abrasive cloth (grain size 600) placed on a face plate. In certain cases polishing alone will be sufficient.

   After repair, the sealing surface should have a polished, bright finish perfectly free from perceptible marks.



Repairing the sealing surface of a seal ring

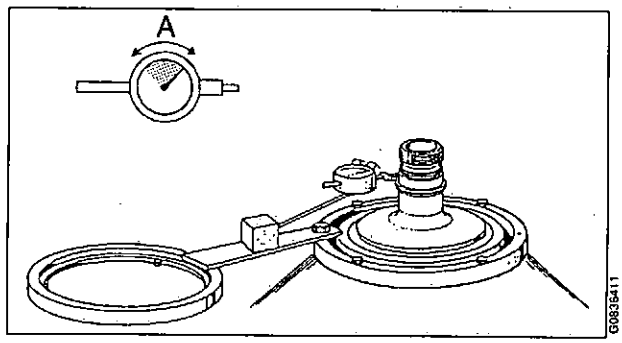
4.4.5 Assembly

Assembly takes place by reversing the sequence of operations for dismantling. Observe the following:

Wobble of outlet pipe

Excessive radial wobble of the outlet pipe will cause wear on the seals.

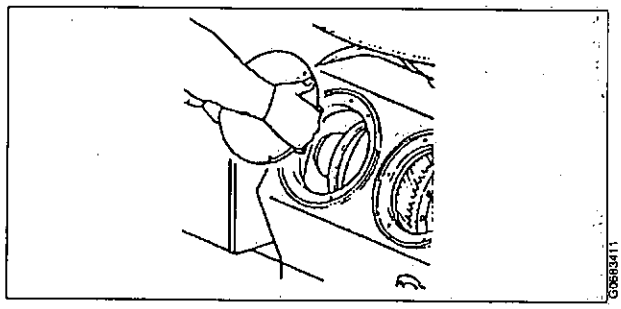
Fit a spring between distributor and outlet pipe, as shown in the figure. This spring is included in the tool kit.



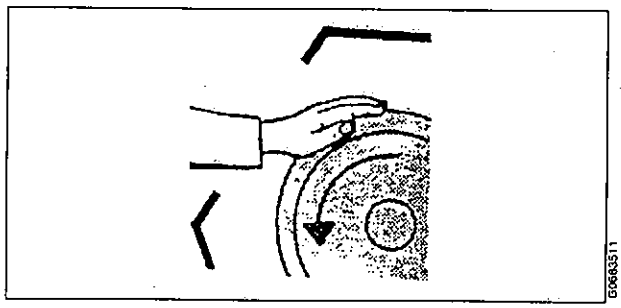
Checking the wobble of outlet pipe
A: *Max 0,3 mm*

Tighten the spanner for the small lock ring in the ring situated on the top of the frame hood with one of the hexagon screws see figure. Place the support of the dial indicator on the handle of the spanner and measure the wobble at 1, 2 and 3. Remove the brake cover and revolve the outlet pipe by turning the coupling drum by hand.

Max. permissible wobble is **0,3 mm**.



If the wobble is excessive, turn the pipe in the distributor, check that it is not riding on distributor or bowl hood, thus being forced into an incorrect position.



Outlet pipe, guide sleeve and distributor are marked with punch marks. They shall be assembled with these marks exactly aligned with each other. If the max. permissible wobble is exceeded, try in a new position. If a position is found where the wobble is acceptable, make new punch marks in the new position.

Remove the spring, refit the outlet pipe and the guide sleeve and clamp the small lock ring.

If an unacceptable wobble cannot be remedied in this way, the bowl spindle cone must be checked with respect to defects, even the bowl body nave may be defective. See "4.6 Separator bowl" on page 75.

Height adjustment,

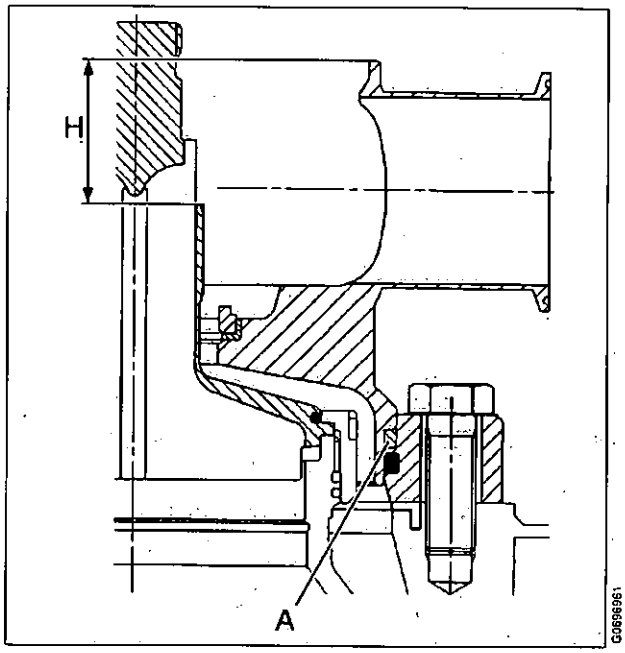
Check the height position after each assembly.

Use two steel rules or a depth gauge.

If the height measure does not correspond with the measure stated in the figure: Replace the inserted height adjusting ring (A) by a ring with more suitable thickness.

Check the height position by removing the brake cap and rotating the coupling drum by hand. The bowl should then move freely and easily.

For the (H) dimension, see "4.3.7 Height adjustment (outlet device)" on page 58



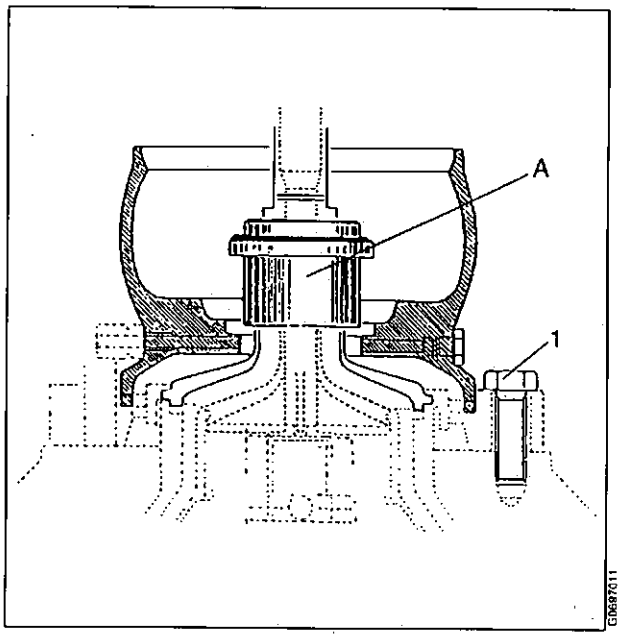
Checking eccentricity of outlet pipe / outlet housing

Excessive eccentricity between the outlet housing and the outlet pipe will cause increased wear on the axial seals. The eccentricity must always be checked when mounting the outlet device.

- Undo the four screws (**1**) of the centring ring (if not already done).
- Fit the outlet housing (its height position should already have been checked). The seal ring and rubber packing must not be fitted when mounting the outlet housing.
- Pass the gauge (**A**) for checking centring over the outlet pipe and press down the gauge in the bottom hole of the outlet housing.
- Tighten the four screws (**1**) with a torque of **100 - 120 Nm** (10 - 12 kpm).
- Lift out the gauge. Notice that it should be easy to lift out.
- Remove the outlet housing and fit seal ring and rubber packing of the axial seal.
- Fit the outlet housing on the frame hood.

  The checking could also be done with the seal ring and rubber packing fitted. The gauge (A) should then be turned upside down relative the figure above.

  Be careful not to cause any damage.



Setting outlet housing and outlet pipe

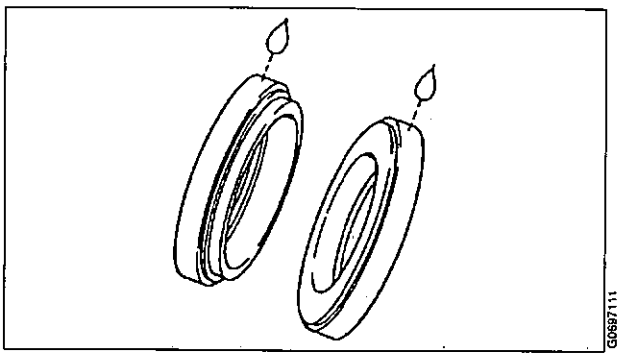
Axial seals

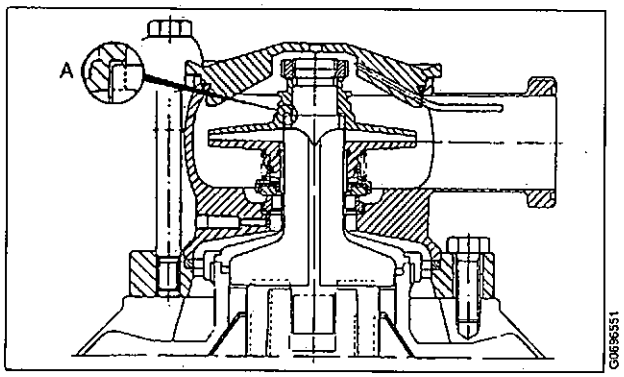
1. Clean the parts and ascertain that they are undamaged. Press down the seal rings and the wear rings in their rubber packings. Lubricate the packings on their external surface with soapy water (not oil) and press them down (with rings) in the parts to which they belong, i.e. in the support and the outlet housing respectively.*

   Lubricate the O-rings of the impellers with silicone grease.** Assemble the parts to be locked by bayonet fitting.

2. Press the parcel and turn at the same time the support against the bent end of the spring until the parts are engaged. Finally check that the support slides easily on the O-ring.

   Ascertain that the grooves of the top part of the impeller fit over the ribs of the outlet pipe (**A**).





* The wear ring and the seal ring must be handled with care. When the parts are to be pressed down in their seats together with the rubber packings, the power must be uniformly distributed around the periphery. It is likewise important not to damage the sealing surface on which power is applied. Preferably use a plastic tube with a smooth end surface.

** Quality requirements – see "5.2 Lubricants" on page 181.

Outlet housing

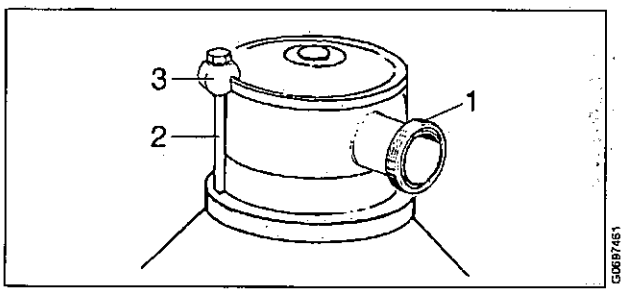
It is important that the long fixing screw are placed straight. Tightening the screws in a skew position will create excessive forces when tightened. This might damage the threads and as a consequence be a potential risk.

WARNING

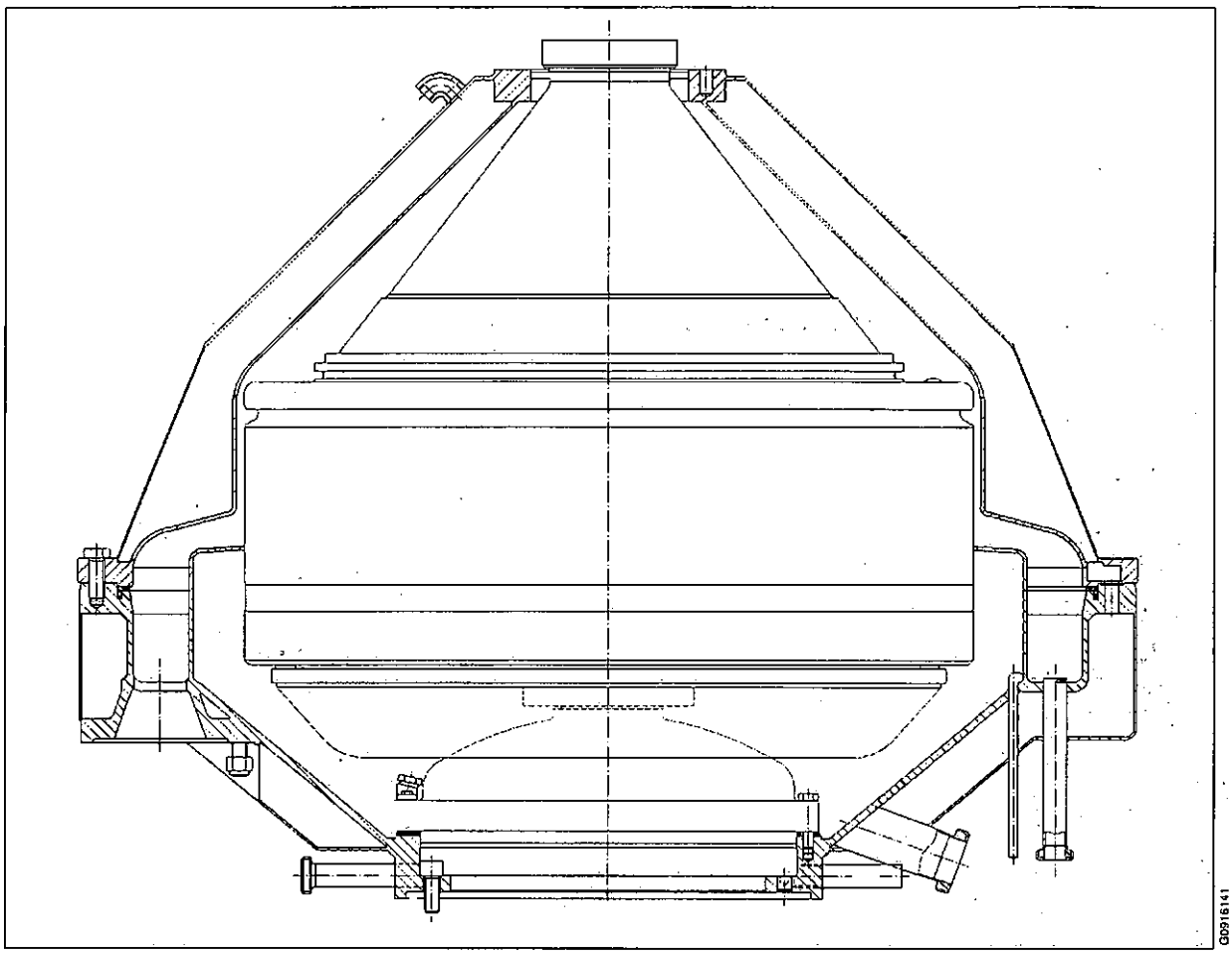
Skin irritation hazards

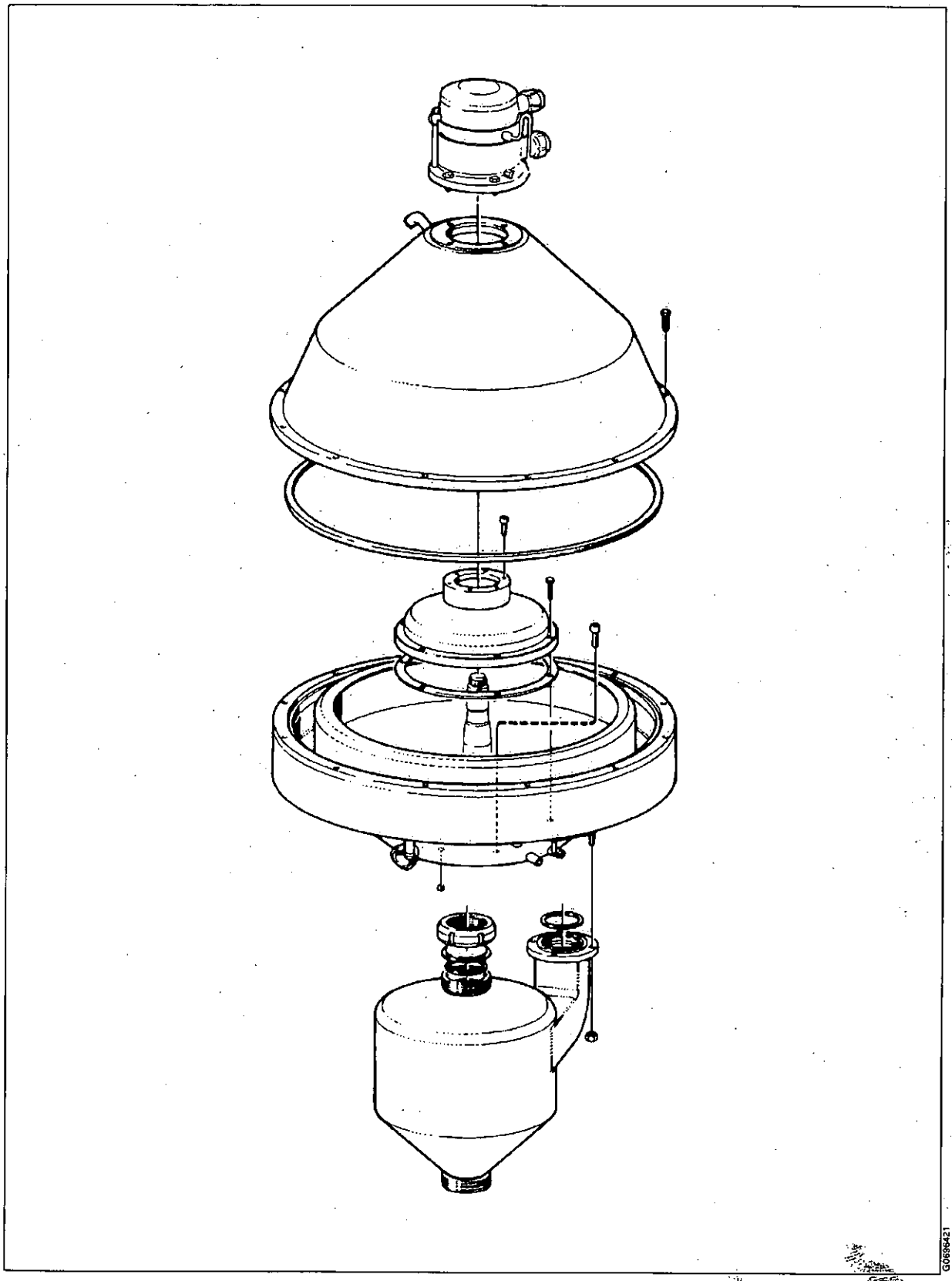
Ensure that the outlet housing fixing screws are properly fitted and tightened to avoid leakage / splash of dangerous liquids.

1. Make sure that the outlet pipe (1) is in correct position before the fixing screws (2) are tightened. Never turn the outlet housing unless the fixing screws are fully loose.
2. Make sure that the screw hooks (3) are properly seated in the outlet housing groove.
3. Make sure that the fixing screws are centred in their holes. Tighten with a torque of **50 Nm**.



4.5 Machine top part

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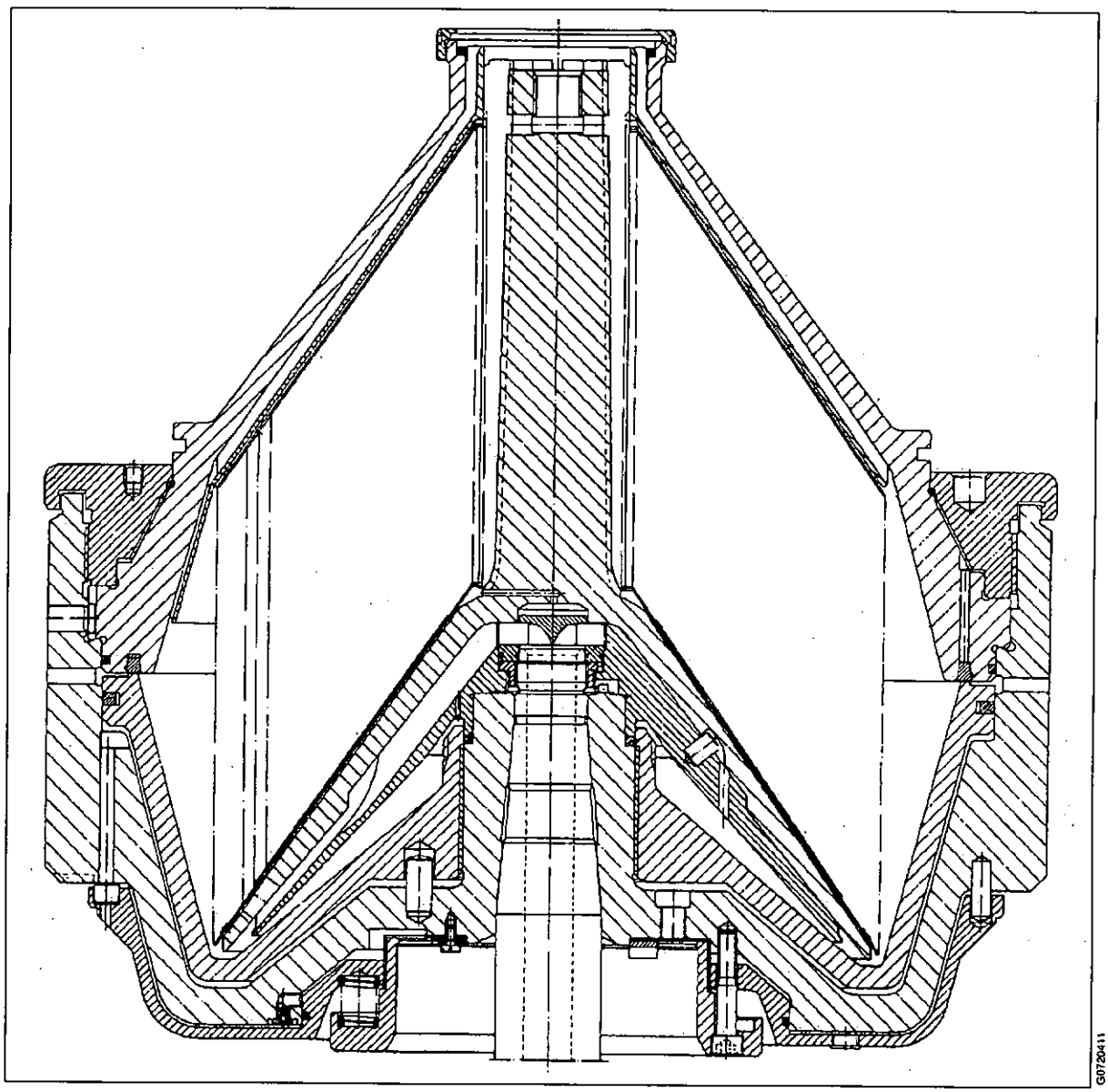
4.6 Separator bowl



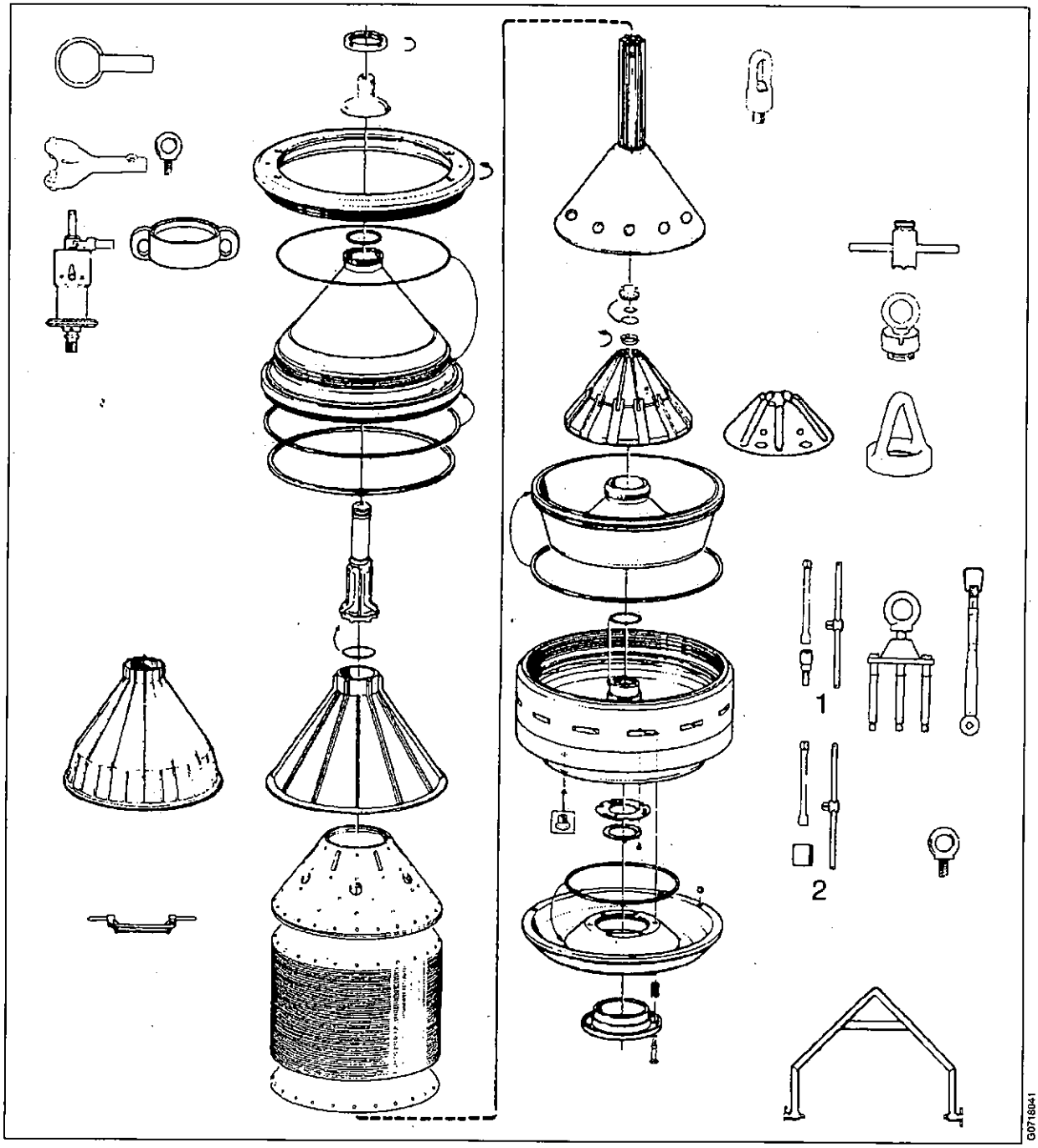
B

WARNING

Entrapment hazard

Make sure that rotating parts have come to a **complete standstill** before starting **any** dismantling work. The revolution counter indicates separator rotation.

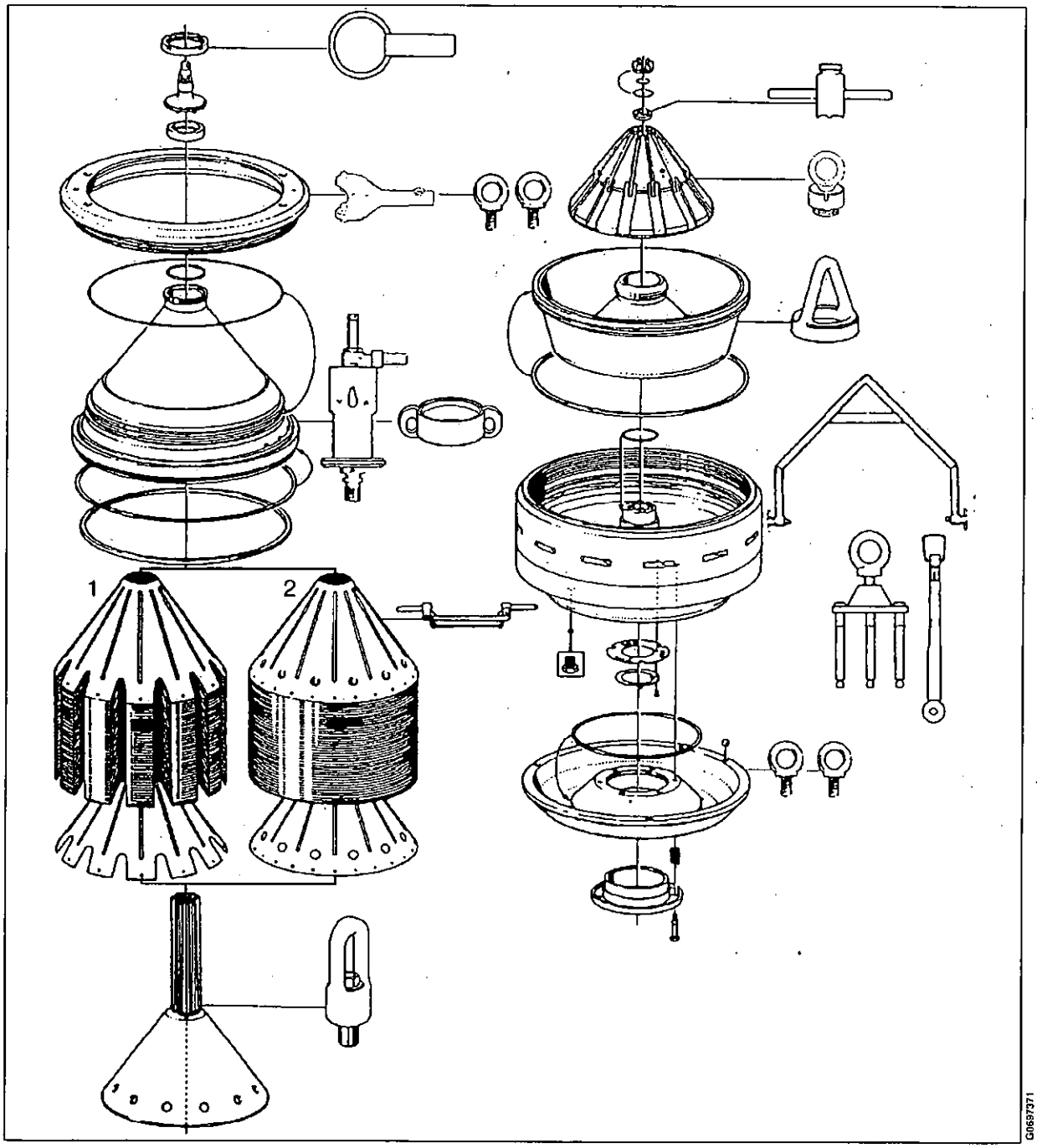
Twin phase separators



1. Width over flats 10 mm
2. Width over flats 24 mm

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.

Single phase separators



1. *D 714 / 618 / 718*
2. *BB 714 / 618 / 818*

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.

4.6.1 Dismantling

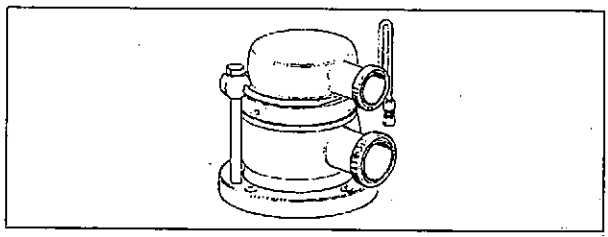
WARNING

Entrapment hazard

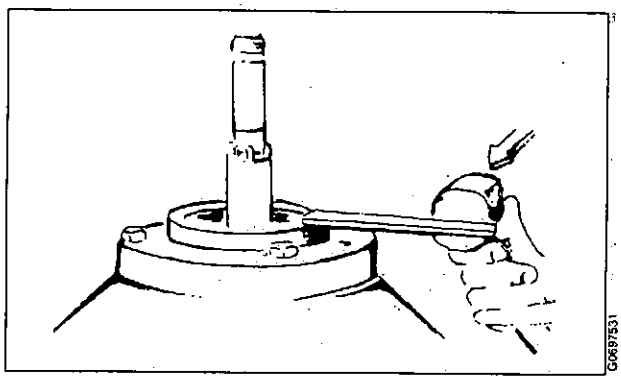
Make sure that rotating parts have come to a **complete standstill** before starting **any** dismantling work. The revolution counter indicates separator rotation.

Uncovering the bowl

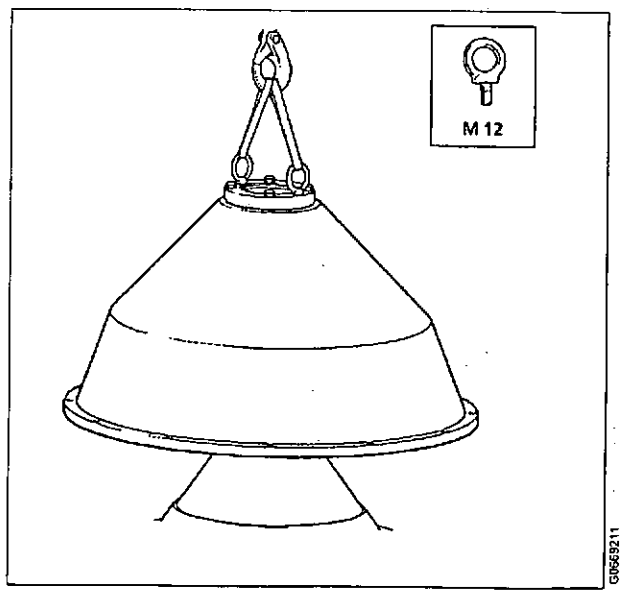
1. Dismantle outlet parts as advised in "4.3 Outlets (twin phase separators)" on page 49 or "4.4 Outlet (single phase separators)" on page 62.



2. Unscrew small lock ring clockwise (**left-hand thread**). Remove outlet pipe and guide sleeve.



3. Remove the screws for the frame hood. Drain off the cooling jacket before lifting. Screw the lifting eyes into the threaded holes for the hook screws in the centring ring. Lift off the frame hood with the aid of the eyes.

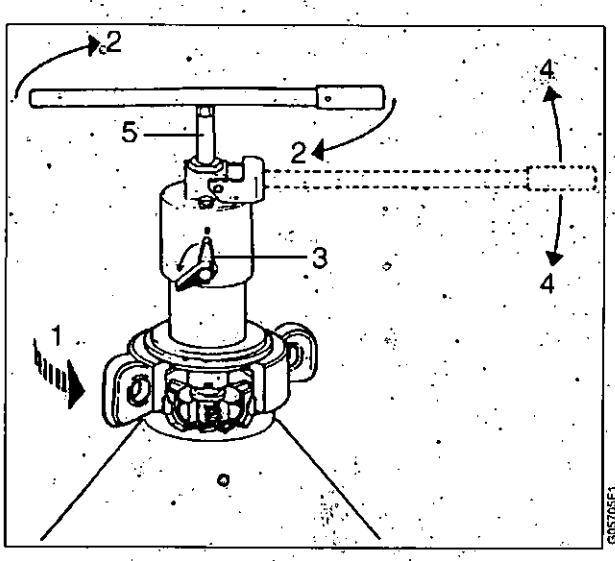


Large lock ring

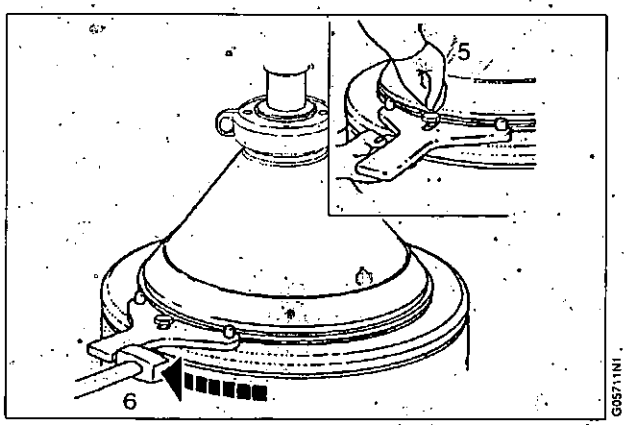
1. Before loosening the large lock ring, the disc set pressure must be neutralized by means of a compressing tool. The latter is used together with a lifting ring, which is to be screwed on to the bowl hood. (See also directions in the instruction book for the compressing tool.)

   Note! To avoid damage on the threads in the distributor, the tool must be well tightened, operation 2.

   Carry out operations (1– 3). Note: Pump (4) **until full pressure** is obtained (automatic release at correct disc stack compression).Centre rod moves upwards.

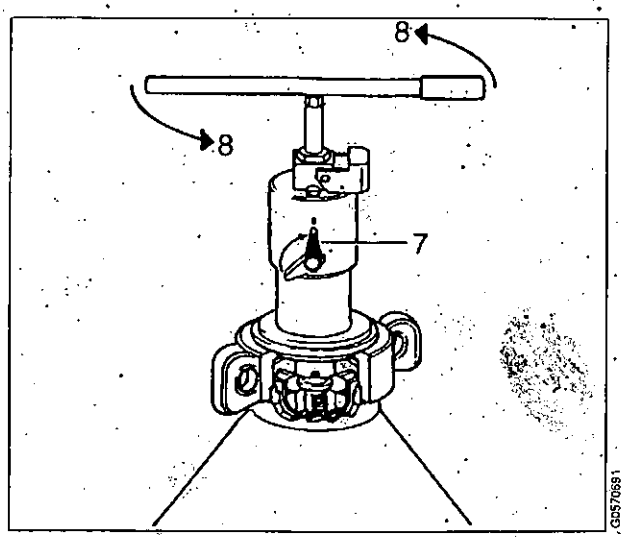


2. Fit large lock ring spanner (5). Unscrew large lock ring clockwise (**left-hand thread**) (6).



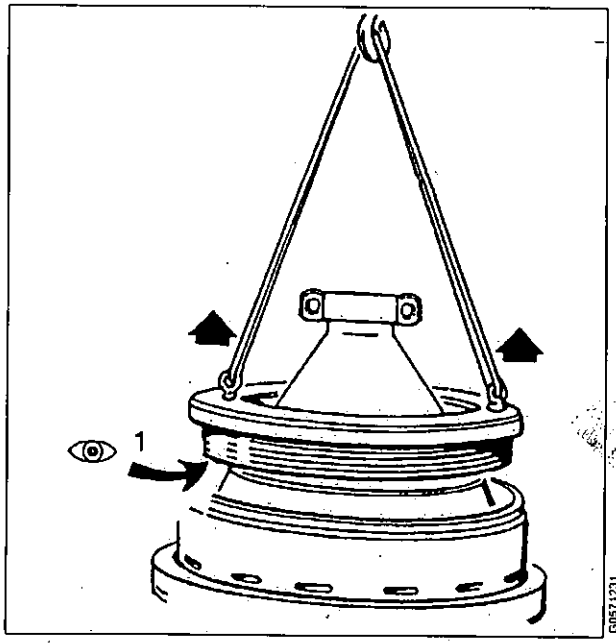
3. Undo and remove the compressing tool. Operations (7 – 8).

   Remove the large lock ring spanner.

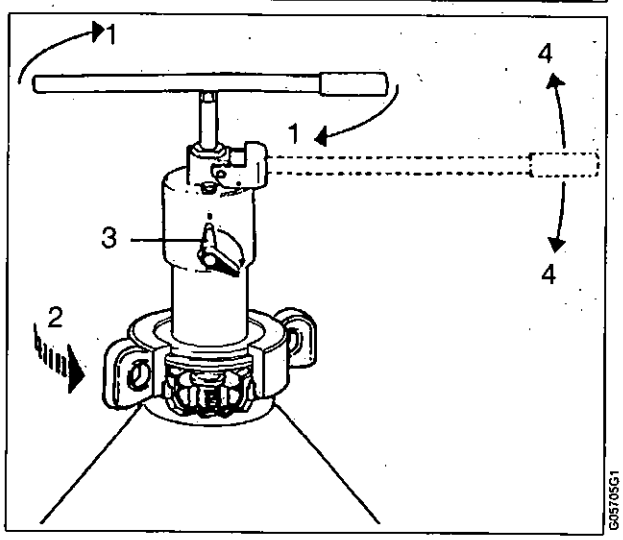


4. Check that the lock ring is entirely screwed off before lifting it. Take care not to damage the contact surface (1).

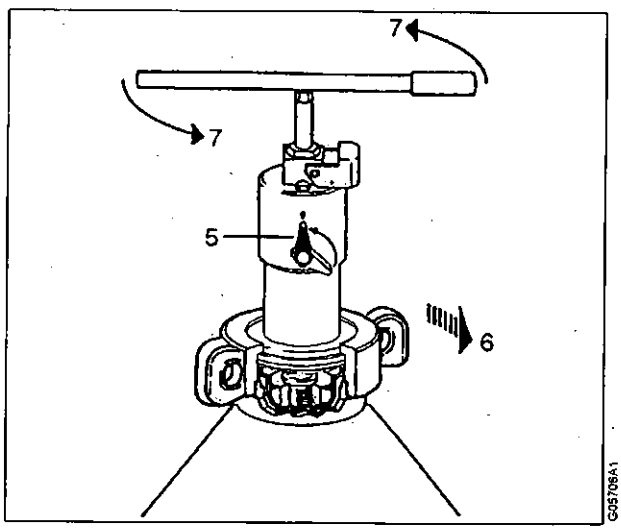
✔ **Check point**



5. If the bowl hood sticks in the bowl body, use the compressing tool to ease off the hood. Carry out operations (1 - 3). Note: Fit the compressing tool before fitting lifting ring. Pump. Centre rod moves downwards (4).

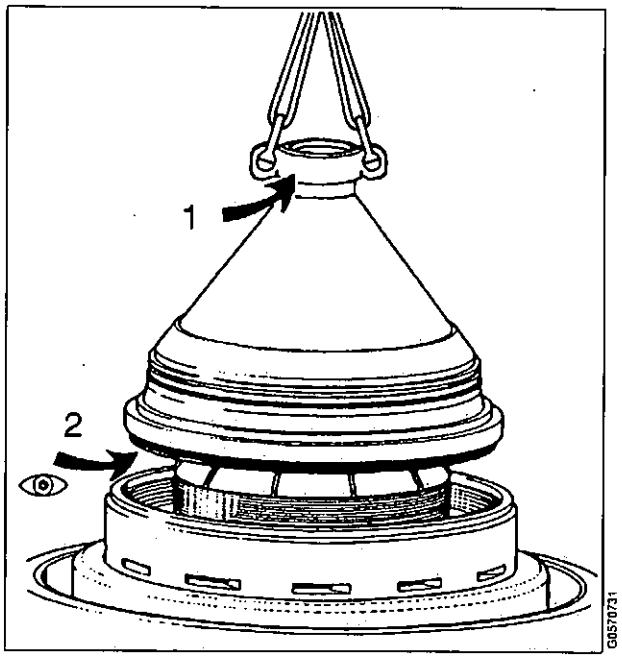


6. Undo and remove the tools.
   Operations (5 - 7).

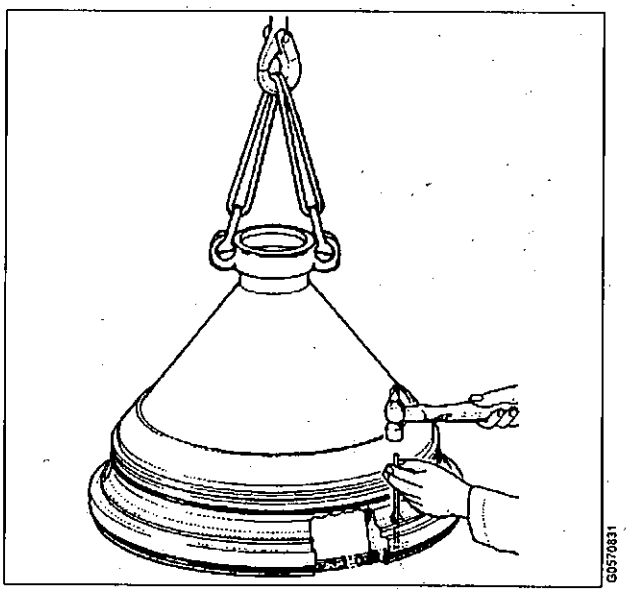


7. Lift the bowl hood by means of lifting ring (1). Never with compressing tool fitted. Check if the top disc (this top disc does not exist in the B BRPX and D MRPX separators) has got stuck in the hood. If so, knock loose the top disc with some easy blows from a soft hammer or put a drift through holes in the lifting tool and knock directly on the top disc. Take care to prevent that the top disc falls down uncontrolled. Take care not to damage the seal ring (2).

✔ **Check point**



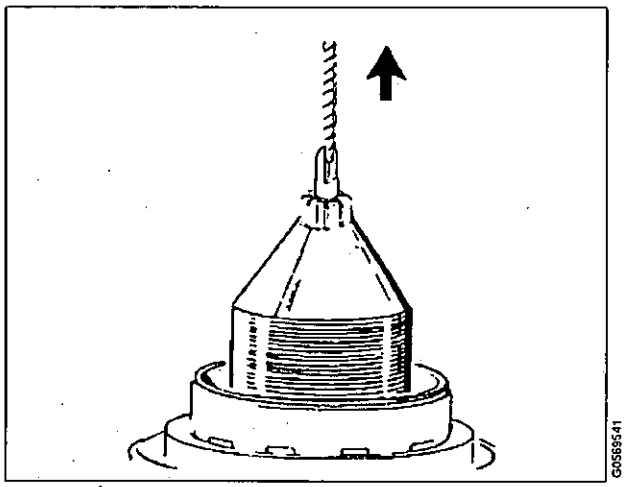
8. When seal ring in lower edge of bowl hood needs replacement, force out the ring by means of a drift, inserting it alternately in the holes intended for this purpose. When the seal ring has been forced out of that part of the groove which is situated under the holes, pull it off by hand.



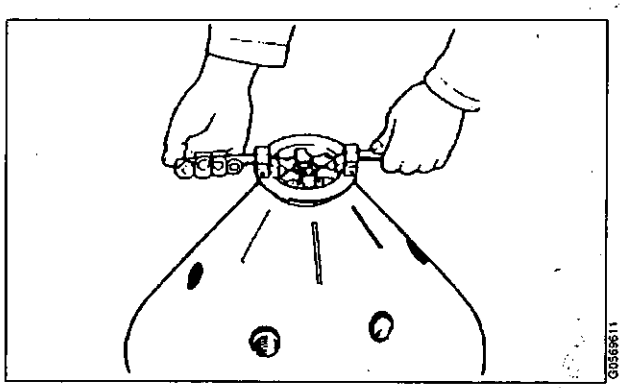
Distributor with disc stack, Sleeve with wings, Cap nut and Distributing cone.

1. Remove top disc (twin phase separators only) before fitting the tool. Lift out the distributor with disc stack. If the discs are to be removed, use gloves for finger protection.

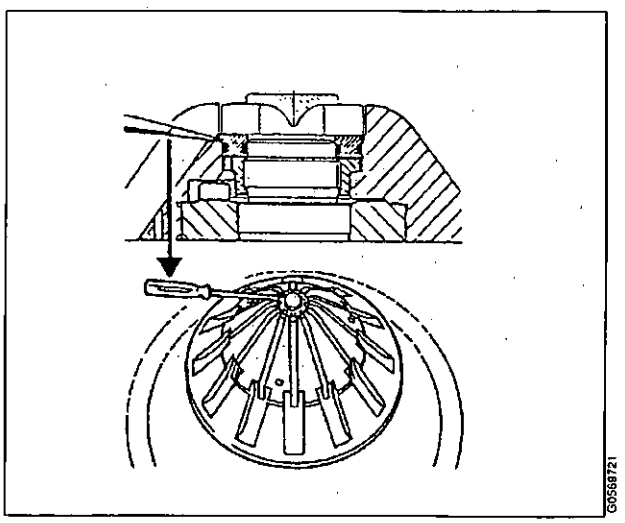
   Check the cleaning efficiency, see *Operator's Manual.*



2. If the discs are to be removed, use the special tool.

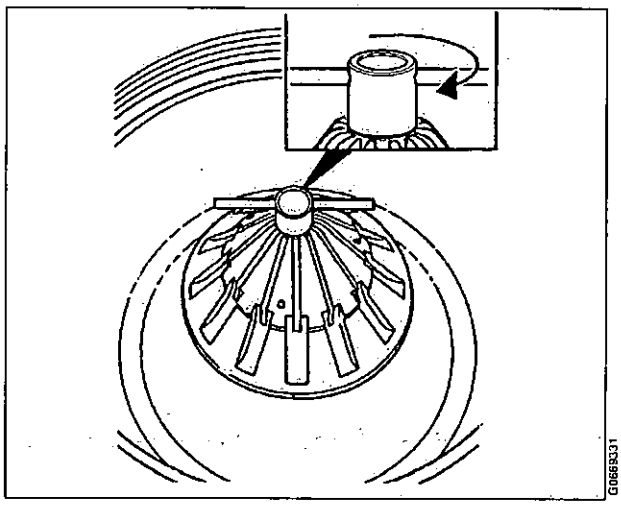


3. Carefully remove the wing crown by means of a screw driver. Note, that there is one internal and one external O-ring in the sleeve with wings.

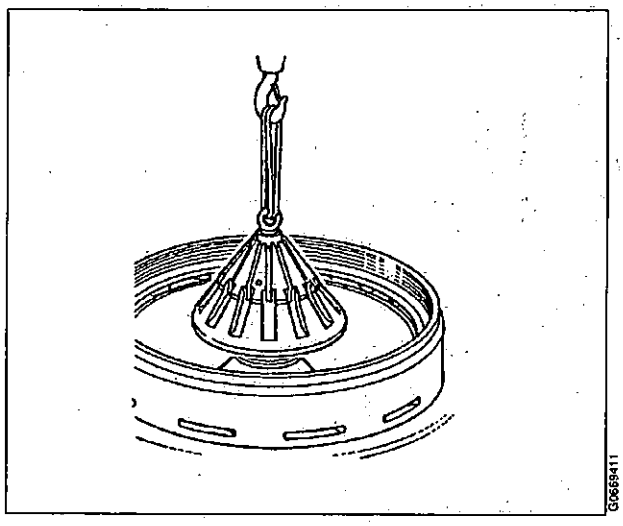


4. Unscrew and remove the cap nut.

   Left-hand thread!

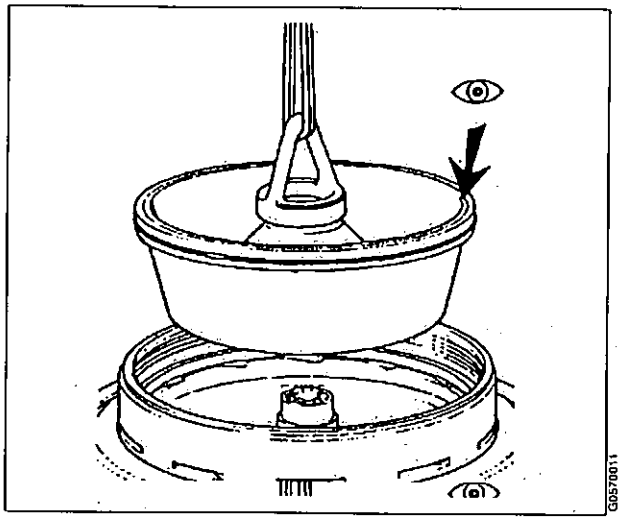


5. Fit the lifting tool into the distributing cone and lift it out.



Sliding bowl bottom - Bowl body - Ejection mechanism

1. The sliding bowl bottom edge sealing against the bowl hood ✔. Look out for erosion!

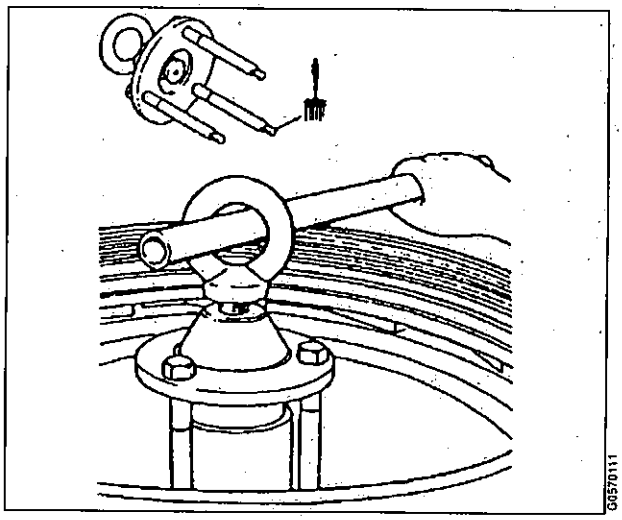


2. Remove the screws for the bowl body. Mount lifting tool.

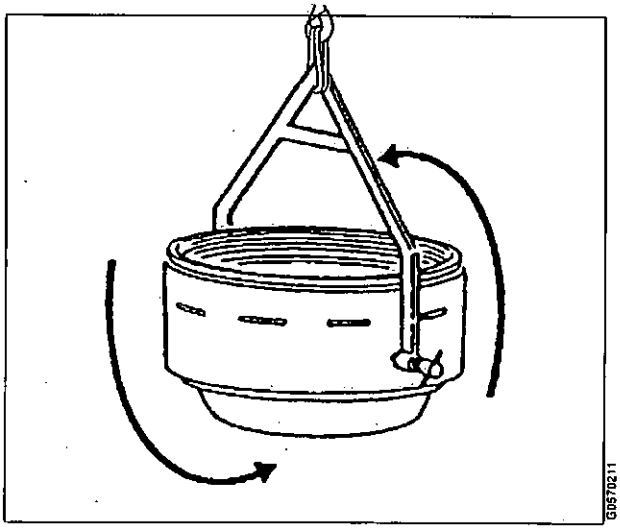
NOTE

Screw back the lifting eye to allow the three screws to be properly screwed down.

Tighten the three screws to the bowl. Ease off the bowl body from the spindle top by tightening the central screw (lifting eye). Use a hoist to lift the bowl.



3. Remove the two plugs in the bowl body wall and fit the turning tool. Ensure that the screw on the turning tool is properly tightened.



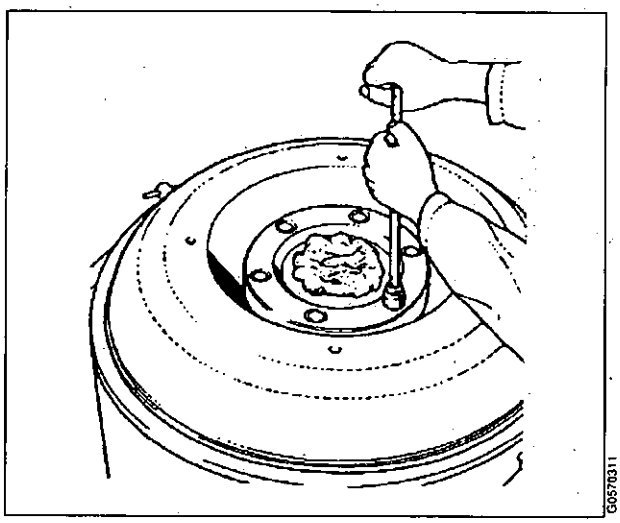
WARNING

Crush hazard

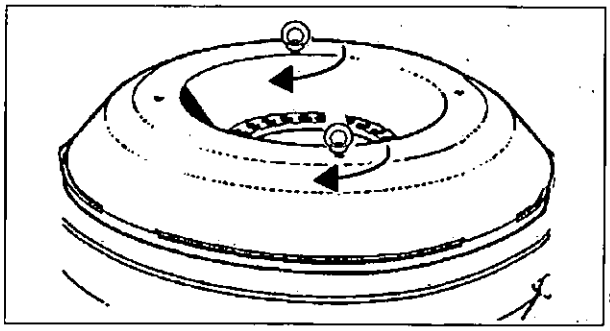
Risk for jamming injury when turning the bowl body.

Turn the bowl body upside down.

4. Protect the nave bore in bowl body with a rag. Loosen the screws of the spring support alternately and a little at a time.



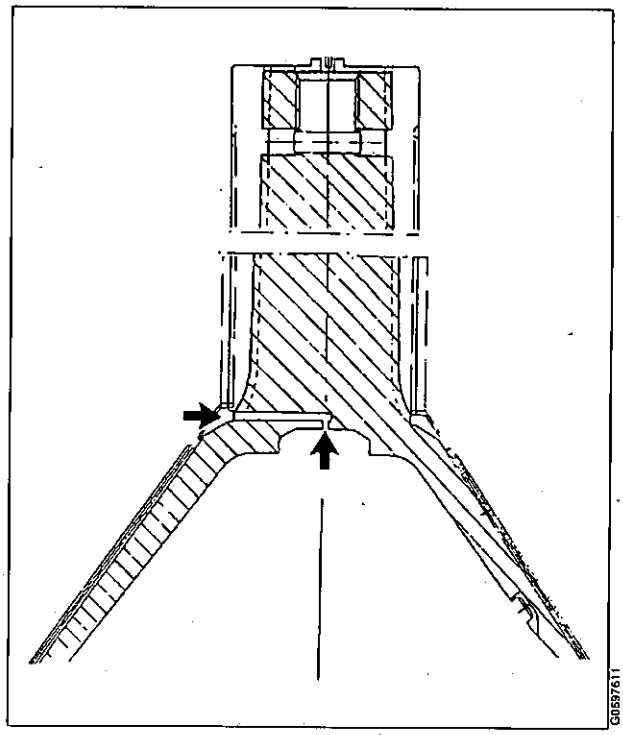
5. Remove the two threaded plugs in the operating slide and fit the two lifting eyes from the tool set in the plug holes. Ease off the operating slide with the aid of two lifting eyes. These are also used for lifting the operating slide.



4.6.2 Check point - Duct in distributor

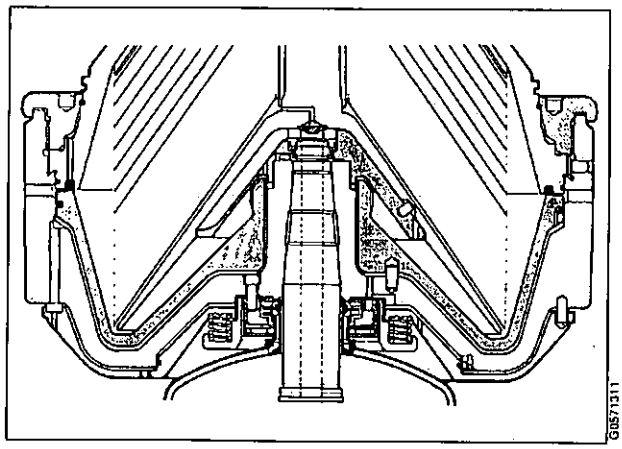
A clogged duct may cause difficulties in getting the liquid flowing when starting the process and after large discharges.

It is therefore important to clean this duct when tendency towards rising inlet pressure is observed.



4.6.3 Check points - Parts of ejection mechanism on bowl

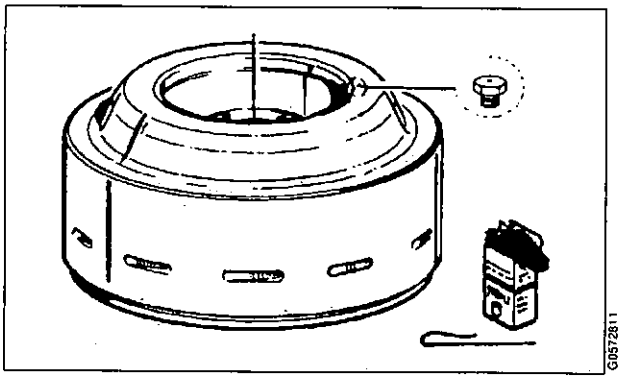
Dirt and lime deposits in the ejection mechanism may cause bad ejecting function or none at all.



Nozzle, ducts

Clean the nozzle (Ø 5,0 mm) and the ducts with a soft iron wire or the like. If necessary unscrew the nozzle.

Remove deposits on other surfaces with steel wool.



Guiding surfaces etc

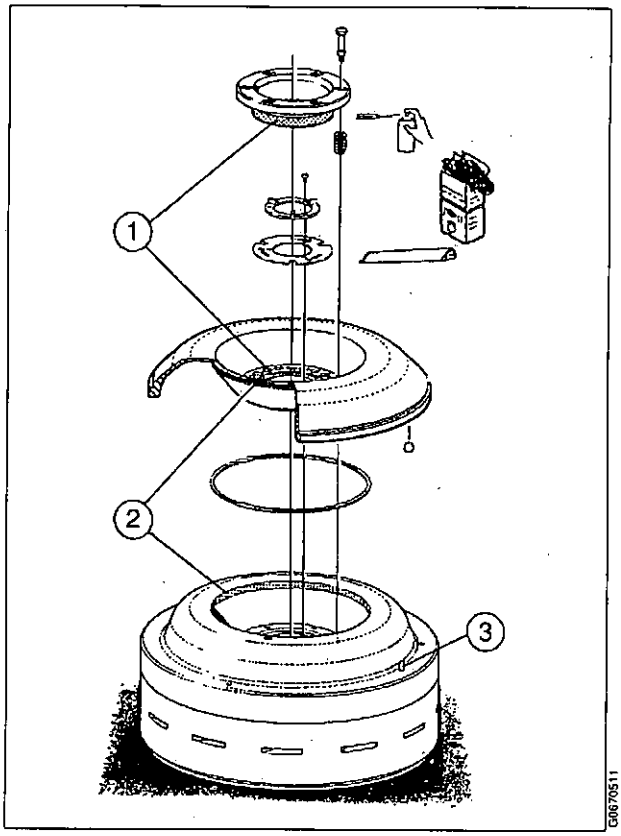
Examine the guiding surfaces (1) of spring support and operating slide. Clean the surfaces, remove any marks and lubricate the surfaces. Proceed in the same way as for repair of seizure damage in lock ring joint, see later in this chapter.

Polish sealing surfaces (2) of operating slide and bowl body with steel wool.

Inspect guide pin (3) for the operating slide. If worn (eroded) so much as to jeopardize the polar location of the slide, replace it.

NOTE

There must be clearance between operating slide and guide pin.



Springs, valve plugs

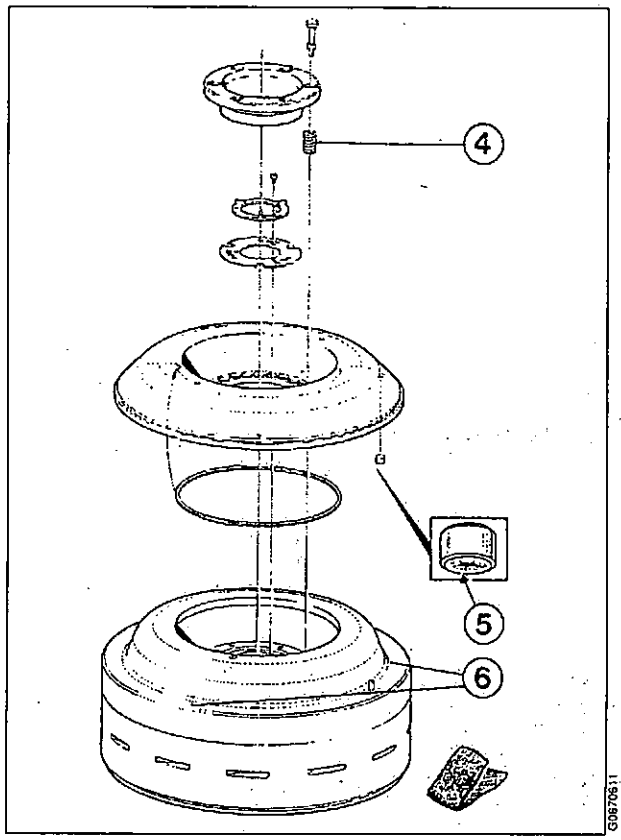
Defective or broken springs, as well as poor sealing between the valve plugs of operating slide and the bowl body, may prevent complete closing of the bowl.

If one or more springs (4) differ appreciably from the other ones in regard to length or which seem to be defective in other respects, replace all springs.

Check the sealing surface (5) of the three valve plugs. Preferably replace all plugs even if only one of them is defective (scratches, pores).

Remove the plugs according to one of the following instructions

- If there is a hole opposite each valve plug, turn the operating slide upside down and use a drift in the hole to tap out the plugs.
- If there is a groove next to the plug, use a chisel in the groove to press out the plug.



WARNING

Risk for eye injury

Wear safety goggles.

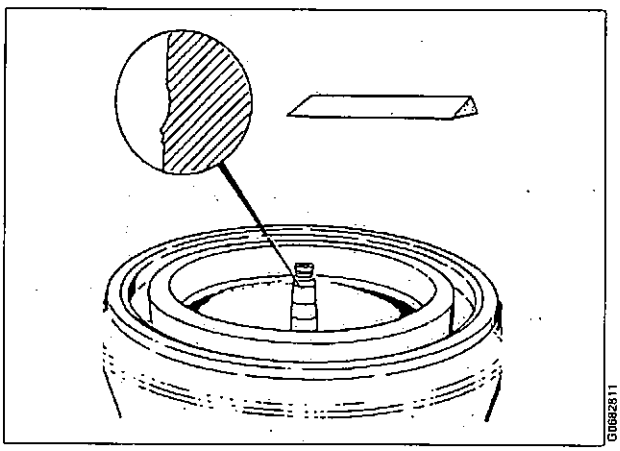
Examine the three sealing surfaces (6) of the bowl body in contact with the valve plugs. Remove any marks and lime deposits with a very fine-grain emery cloth.

4.6.4 Check points - Wear, impact marks, seizure damage

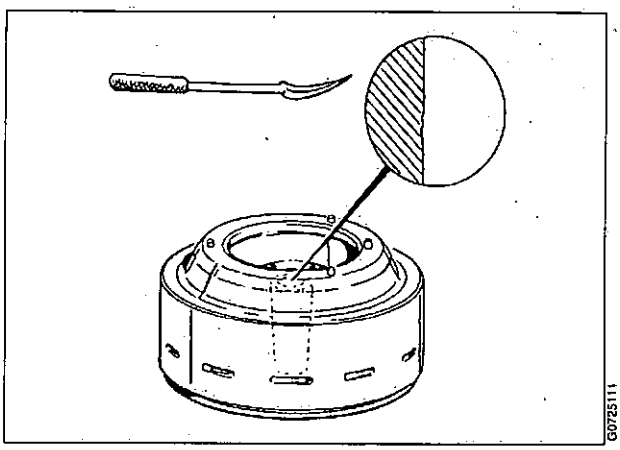
Bowl body nave - Bowl spindle cone

Impact marks and similar on the spindle cone and / or in the nave may cause bad bowl run.

Clean spindle cone with a suitable defatting agent. Remove any impact marks on cone with an oil-stone.



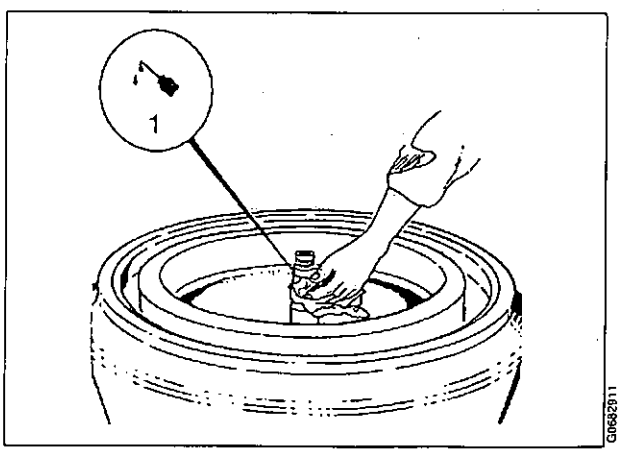
Clean bowl body nave with a suitable defatting agent. Remove any impact marks on nave with a scraper.



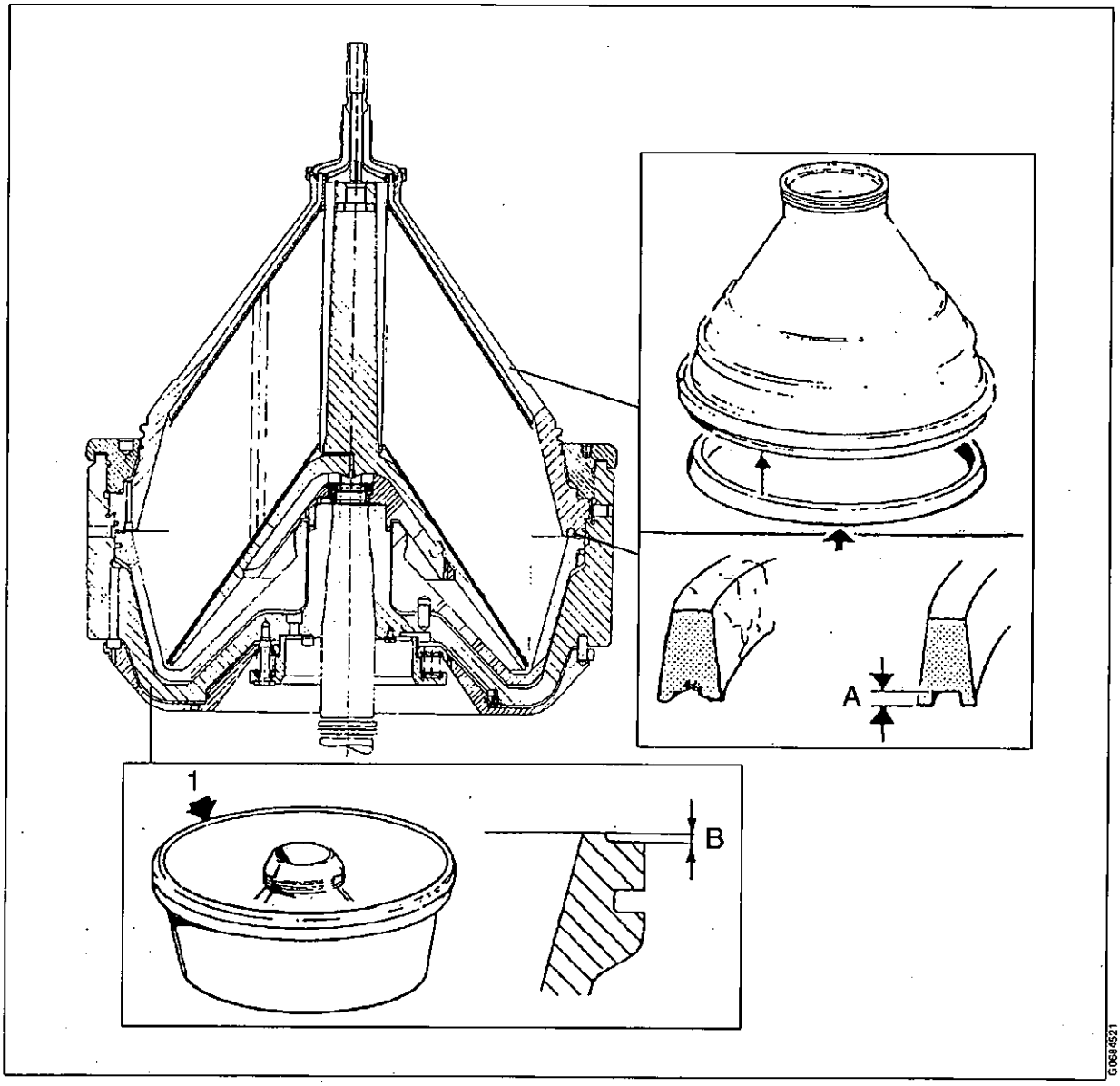
NOTE

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

Whenever fitting the bowl body on the spindle first apply a few drops of oil (1) to the spindle cone for corrosion protection reasons and then wipe it with a clean cloth.



Bowl hood / Sliding bowl bottom



A. *Max. **1 mm***
B. *Original profile height: **2,0 mm** (models 614 / 714), **2,5 mm** (models 518 / 618 / 718 / 818)*

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 course solid particles.

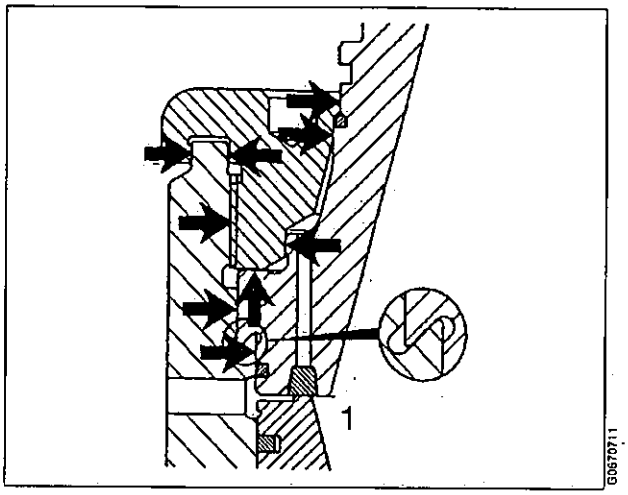
The ring should be replaced also when its sealing surface is depressed by more than 1 mm, even though acceptable in other respects.

Also check the sealing edge (1) of the sliding bowl bottom. If damaged through corrosion or erosion or in other ways it can be rectified by turning in a lathe, provided that suitable equipment is available. Maximum permissible reduction of the original profile height: **0,5 mm**.

Lock ring joint - Seizure damage

1. Impact marks and similar scores on lock ring, bowl hood or body can cause seizure damage.

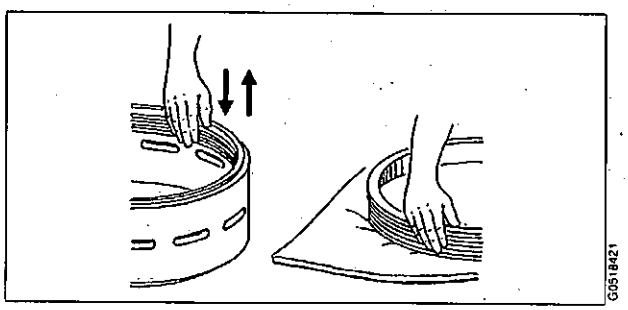
   Check threads as well as contact- and guiding surfaces see arrows.



1. *Dovetail slot*

2. Check the parts for seizure damages by letting your fingers lightly slide over the area to be inspected. Note, however, that these damages are very sharp and easily cut your fingers. Therefore, always use a piece of cloth or gloves when making this inspection.

   An obvious sign of seizure damage is when the lock ring does not fit with the main guide.



NOTE

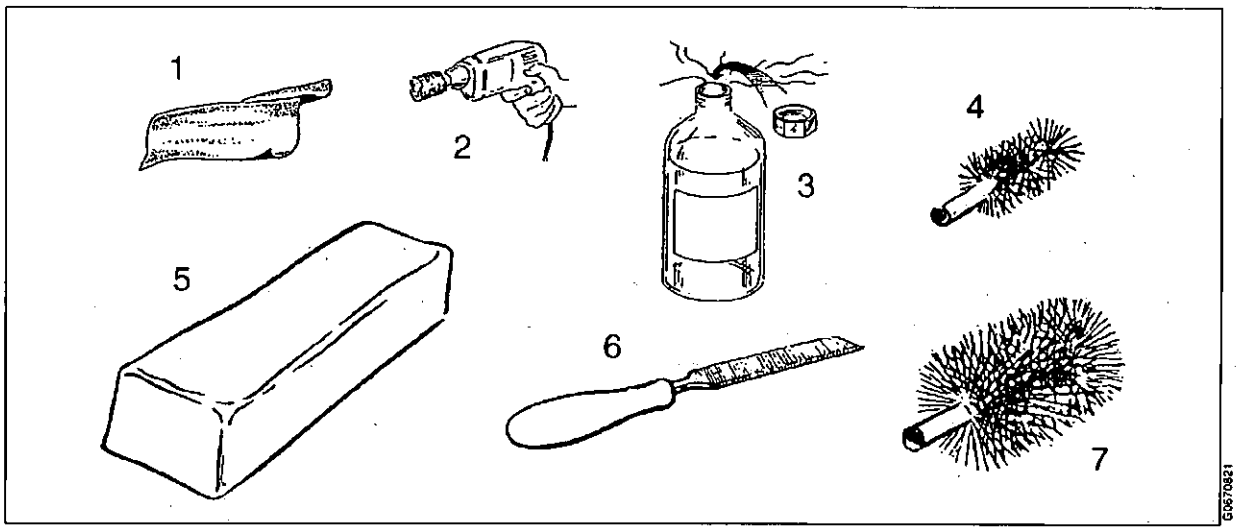
Never force any parts together. It can be very time-consuming and expensive to repair these defects. Careful handling is therefore of utmost importance.

CAUTION

Cut hazard

Lock ring threads may have sharp edges and can cause cuts.

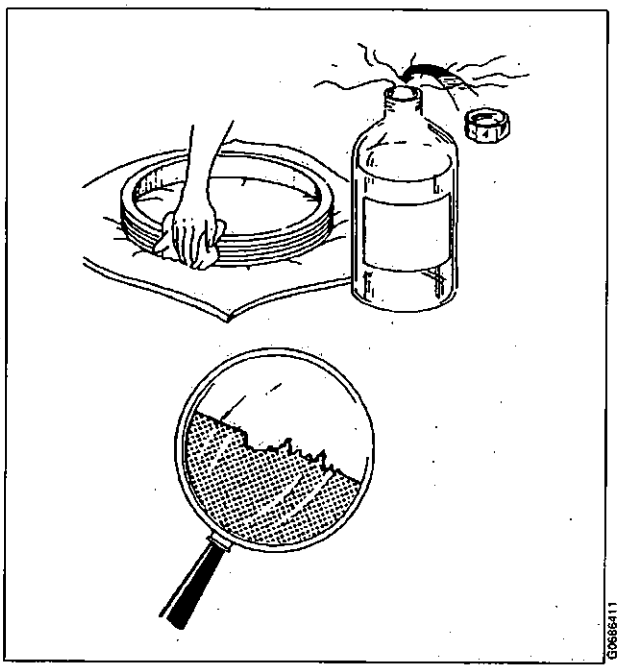
3. If damage has occurred due to seizure or other reasons, use the following to repair the damage:



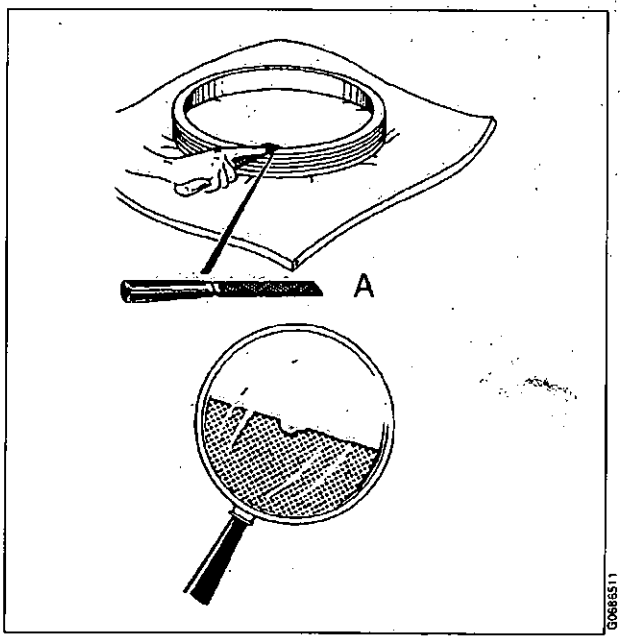
1. *Emery cloth (grain size: 240)*
2. *Hand drilling machine*
3. *Defatting agent*
4. *Fibre brush ø25 mm (1")*
5. *Brush wax (grain size: 600)*
6. *Very fine-cut file (single-cut)*
7. *Fibre brush ø50 mm (2")*

Procedure for seizure damage repair

1. Clean threads, contact and guiding surfaces with a defatting agent, HNO_3 (0,5% solution) or NaOH (1 - 2%) to absolute clean material. This is important as the following programme otherwise is of minor value.

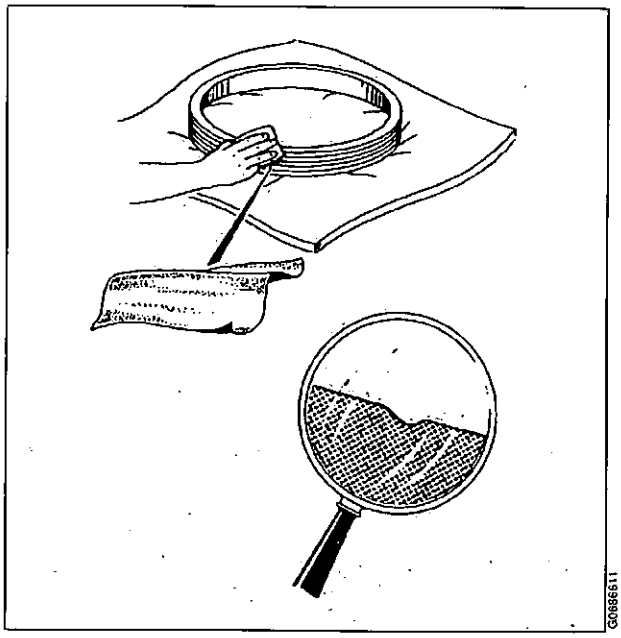


2. If the seizure damage is large, first use a fine and single-cut file, but moderately. Otherwise the damage may get worse. Remove the seizure damage material on top of the surface. Don't use rotating files etc. Just take away the damage, not the undamaged material.

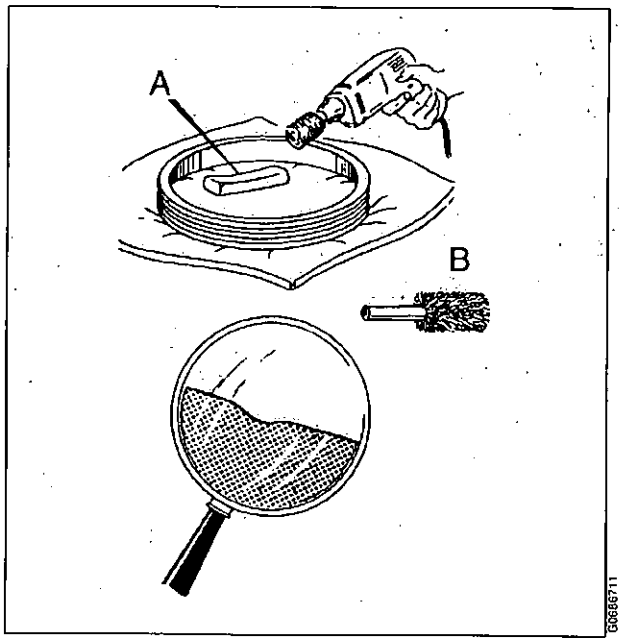


A. *Very fine-cut file (single-cut)*

3. A fine-grain emery cloth, i.e. 240 should be used to smoothen off the edges and to remove the burnt impurities.

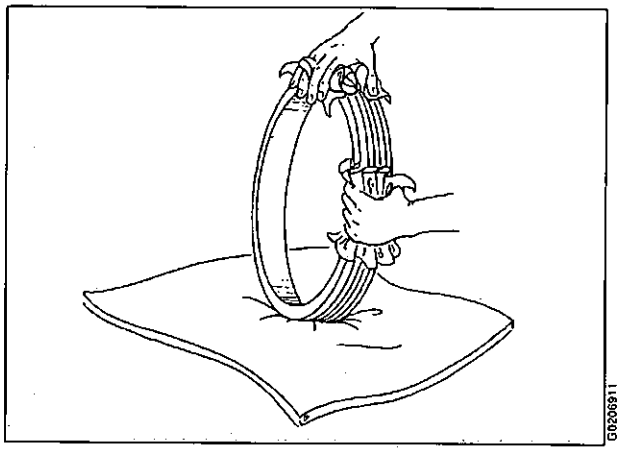


4. Accomplish the remedy by polishing the damaged spot with the fibre brushes and brush wax. It is recommended to polish the whole area where seizure damage may occur. The polishing will smoothen out the complete damage, even in the deepest parts.

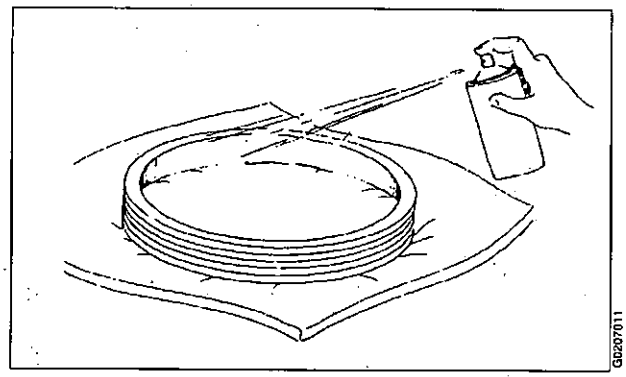


A. *Brush wax (grain size: 600)*
B. *Fibre brush: Ø 25 mm, Ø 50 mm*

5. The lock ring shall now be thoroughly cleaned, preferably with a detergent and afterwards with hot water (70-90 °C). The water temperature will warm the lock ring so that it will dry quickly. It is essential that the lock ring is perfectly polished and dry before applying any Molykote.

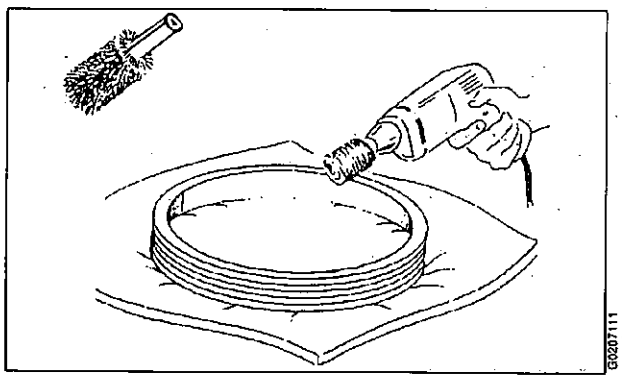


6. Spray the clean and dry surface with Molykote 321R and let it dry for 10 min.

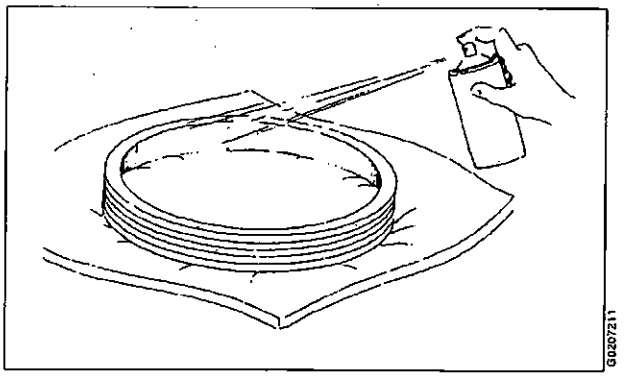


7. Use a fibre brush to polish the Molykote into the surface. The black spray will look like black shoe cream well polished when right performed.

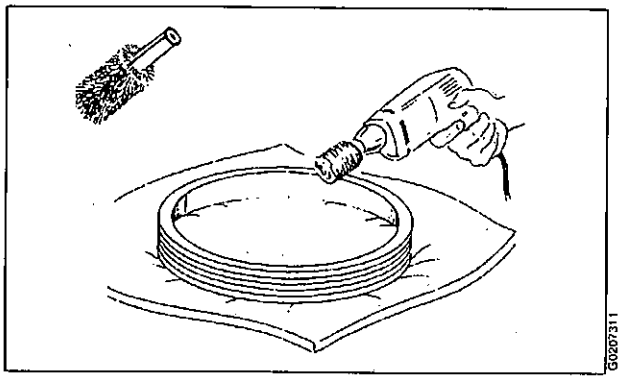
Note! Never use the same brush as in previous operation.



8. Spray the lock ring a second time and let it dry for 10 min.

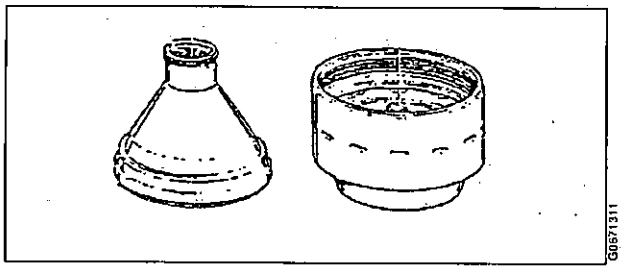


9. Polish the Molykote to a black shining surface which now can last about one year. Smaller dam - ages can be repaired locally.

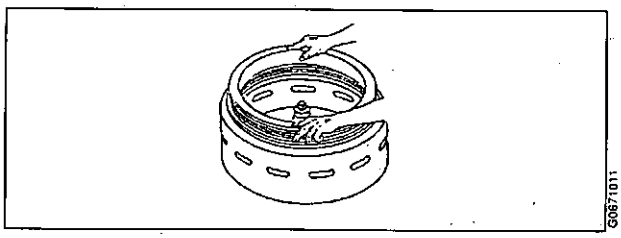


10. Proceed in the same way with the bowl hood and bowl body guides.

    Before final mounting of the bowl check as a precaution that the lock ring turns easily on the bowl body threads. To this end the ring should be screwed on by hand without using the spanner. If it turns heavily, adjust according to recommendation in this instruction.



11. Check the roundness of the lock ring, if it is still turning heavily at different positions (oval).

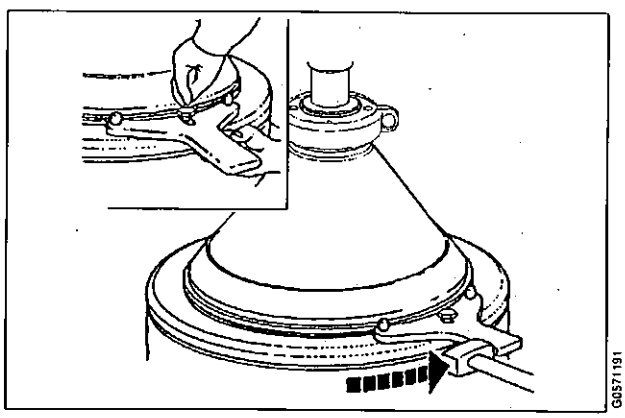


12. Final mounting of the lock ring.

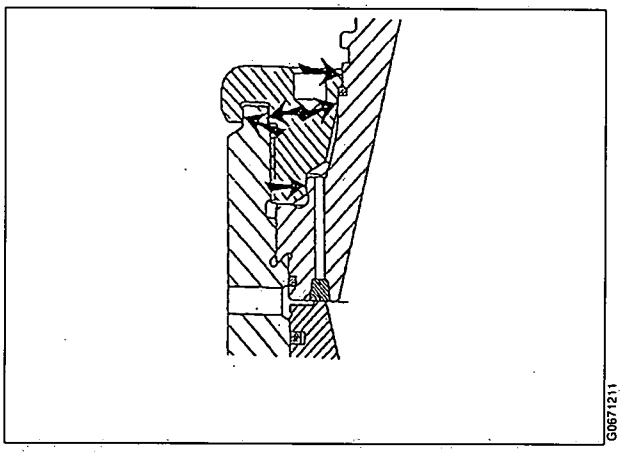
    Assemble
    - distributor with disc stack
    - top disc (twin phase separators only)
    - bowl hood

    Assemble the lock ring according to directions in this chapter.

    The following must, however, be taken into consideration:

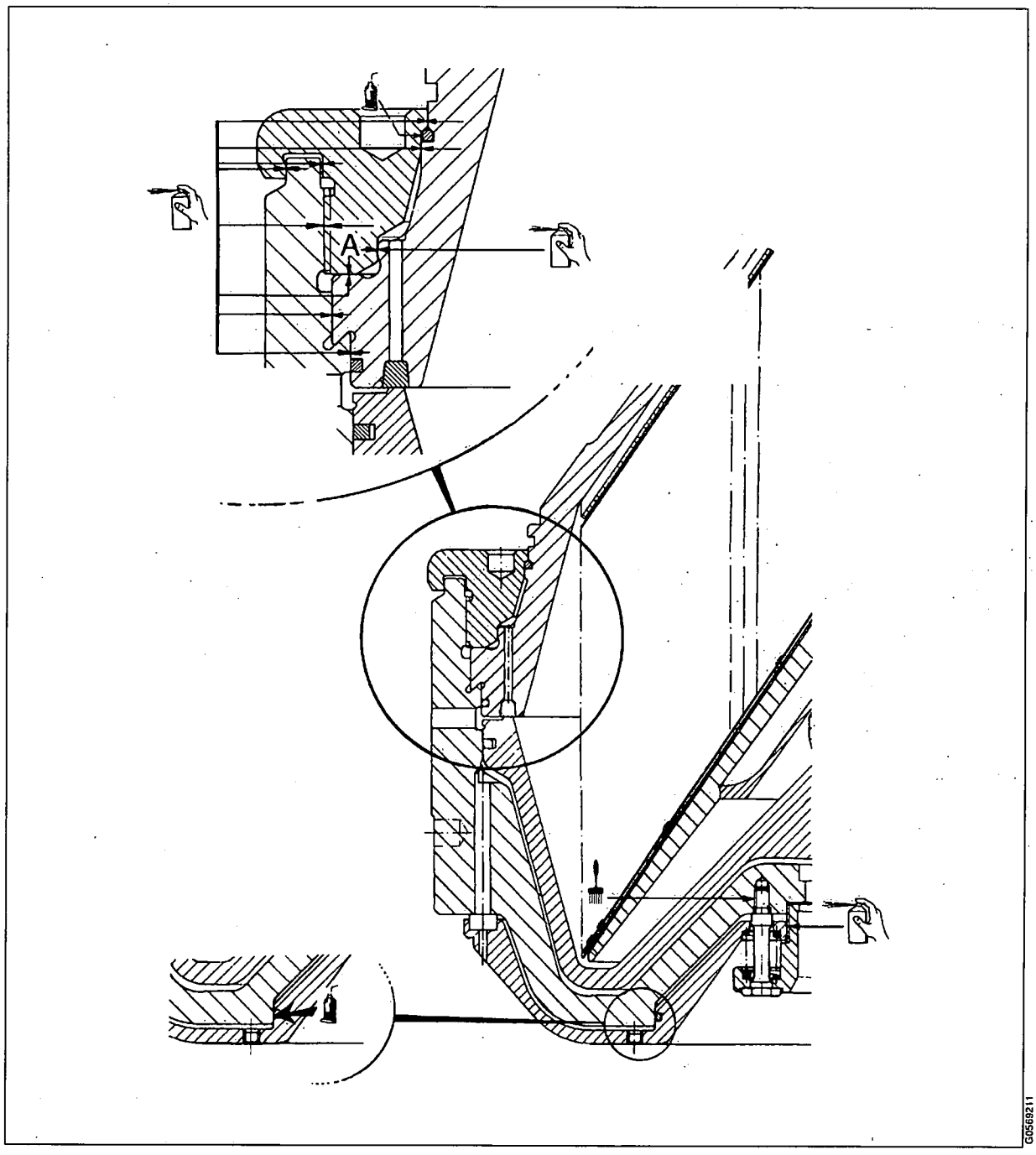


13. Screw the lock ring on by hand before pumping the compressing tool. Do this slowly and gently.
When the guiding surfaces bowl body/bowl hood are approaching each other, be extra careful. Shift the hands from the spanner handle to either side of the lock ring in order to feel, while gently continuing the screwing, that the guiding surfaces of the lock ring easily enter the corresponding surfaces of the bowl hood and bowl body.



Guiding surfaces

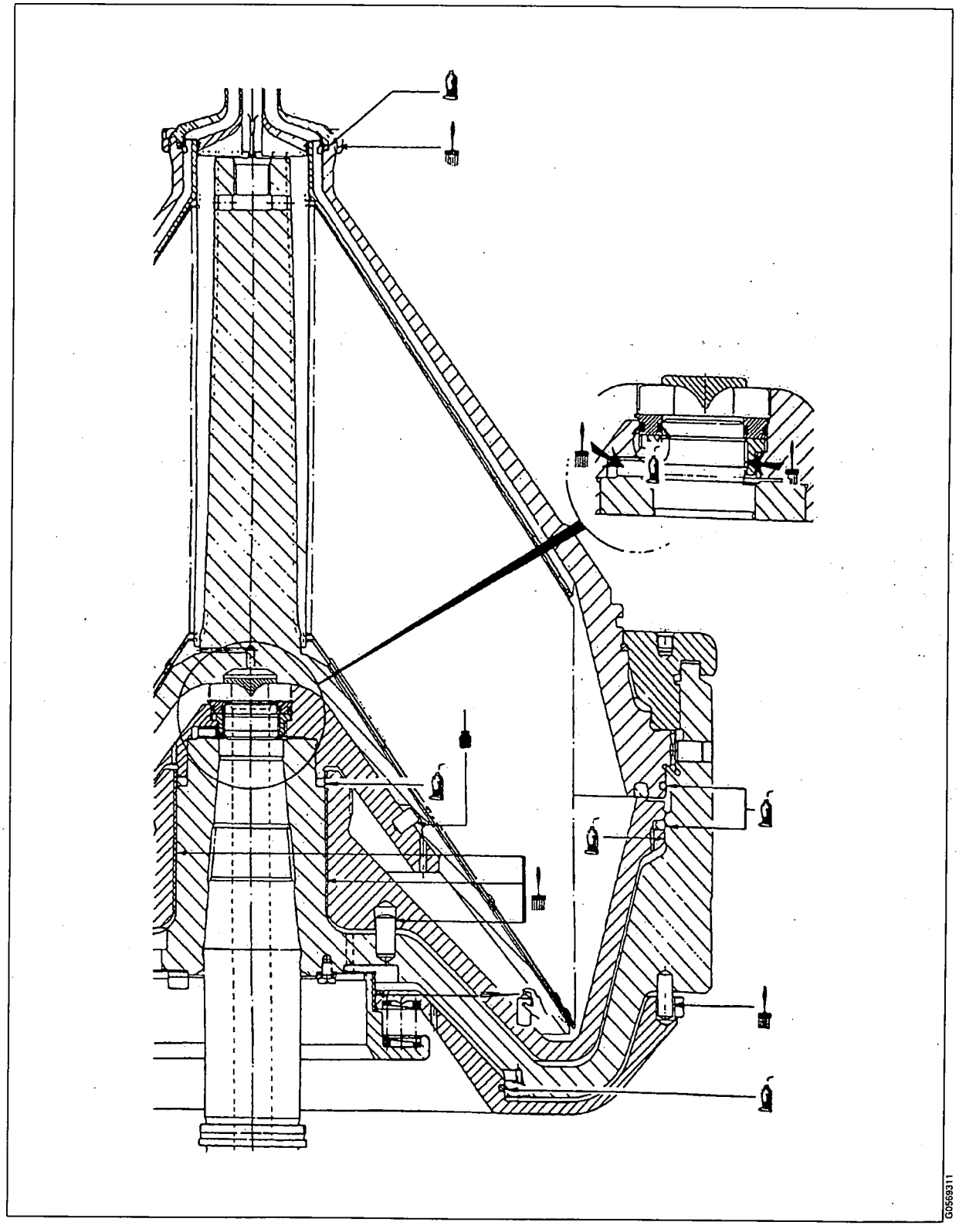
4.6.5 Check point - Lubrication



Lock ring joint

Degrease lock ring threads, contact and locating surfaces. Prime and lubricate the threads and surfaces stated according to "5.2 Lubricants" on page 181. The alternative with spray-lubrication is recommended in first place.

The surfaces at "A" must be well cleaned. When using another lubricant than spray, ascertain that only a thin layer is applied.

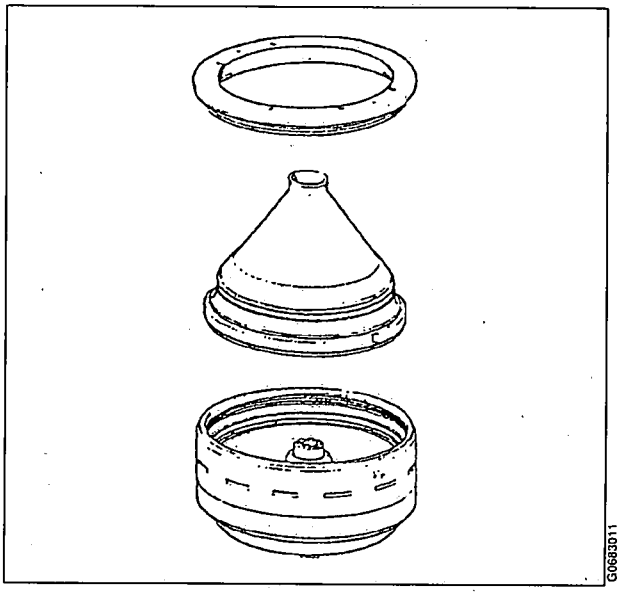


Lubricants are specified in chapter "5.2 Lubricants" on page 181.

4.6.6 Check points - Corrosion / erosion

Corrosion

Evidence of corrosion attacks should be looked for and rectified each time the separator is dismantled. Main bowl parts such as the bowl body, bowl hood and lock ring must be inspected with particular care for corrosion damage.



WARNING

Disintegration hazard

Inspect regularly for corrosion damage. Inspect frequently if process liquid is corrosive.

Always contact the supplier if you suspect that the largest depth of the corrosion damage exceeds 1,0 mm or if cracks have been found. Do not continue to use the separator until it has been inspected and given clearance for operation by the supplier.

Cracks or damage forming a line should be considered as being particularly hazardous.

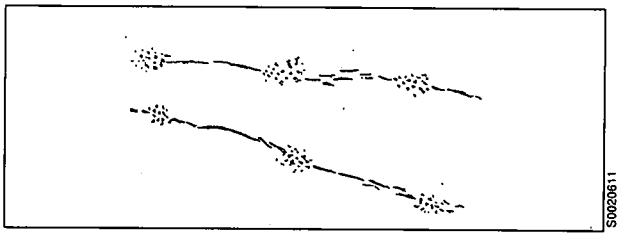
Non-stainless steel and cast iron parts

Corrosion (rusting) can occur on unprotected surfaces of non-stainless steel and cast iron. Frame parts can corrode when exposed to an aggressive environment.

Stainless steel

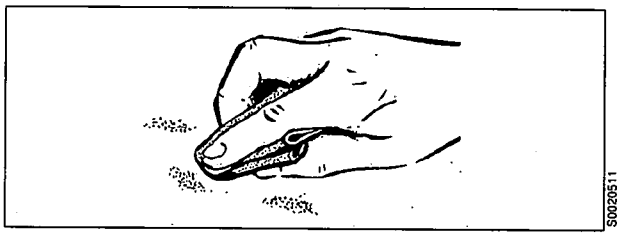
Stainless steel parts corrode when in contact with either chlorides or acidic solutions. Acidic solutions causes a general corrosion. The chloride corrosion is characterised by local damage such as pitting, grooves or cracks. The risk of chloride corrosion is higher if the surface is:

- Exposed to a stationary solution.
- In a crevice.
- Covered by deposits.
- Exposed to a solution that has a low pH value.



Corrosion damage caused by chlorides on stainless steel begins as small dark spots that can be difficult to detect.

- Inspect closely for all types of damage by corrosion and record these observations carefully.
- Polish dark-coloured spots and other corrosion marks with a fine grain emery cloth. This may prevent further damage.



WARNING

Disintegration hazard

Pits and spots forming a line may indicate cracks beneath the surface.

All forms of cracks are a potential danger and are totally unacceptable.

Replace the part if corrosion can be suspected of affecting its strength or function.

Other metal parts

Separator parts made of materials other than steel, such as brass or other copper alloys, can also be damaged by corrosion when exposed to an aggressive environment. Possible corrosion damage can be in the form of pits and/or cracks.

Cracks

Cracks can initiate on the machine after a period of operation and propagate with time.

- Cracks often initiate in an area exposed to high cyclic material stresses. These are called fatigue cracks.
- Cracks can also initiate due to corrosion in an aggressive environment.
- Although very unlikely, cracks may also occur due to the low temperature embrittlement of certain materials.

The combination of an aggressive environment and cyclic stresses will speed-up the formation of cracks. Keeping the machine and its parts clean and free from deposits will help to prevent corrosion attacks.

WARNING

Disintegration hazard

All forms of cracks are potentially dangerous as they reduce the strength and functional ability of components.

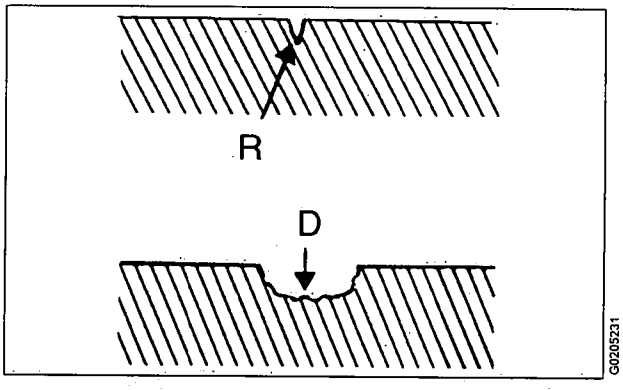
Always replace a part if cracks are present.

It is particularly important to inspect for cracks in rotating parts and especially the pillars between the sludge ports in the bowl wall.

Always contact the supplier if you suspect that the largest depth of the damage exceeds **1,0 mm**. Do not continue to use the separator until it has been inspected and cleared for operation by the supplier.

Erosion

Erosion can occur when particles suspended in the process liquid slide along or strike against a surface. Erosion can become intensified locally by flows of higher velocity.



R. *Smallest permissible radius is* **1 mm**
D. *Largest permissible depth is* **1 mm**

WARNING

Disintegration hazard

Inspect regularly for erosion damage. Inspect frequently if the process liquid is erosive.

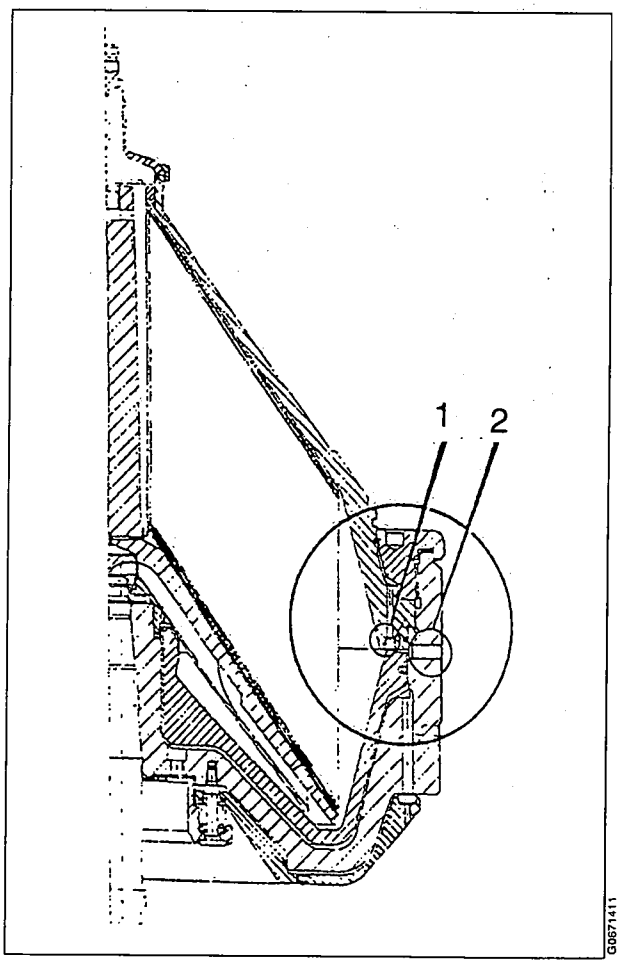
Always contact the supplier if the largest depth of any erosion damage exceeds **1,0 mm**. Valuable information as to the nature of the damage can be recorded using photographs, plaster impressions or hammered-in lead.

Erosion is characterised by:
- Burnished traces in the material.
- Dents and pits having a granular and shiny surface.

Surfaces particularly subjected to erosion are:

1. The sealing edge of the sliding bowl bottom, and the seal ring in the bowl hood.
2. The bowl wall portions ("pillars") between the sludge ports in the bowl body.

Look carefully for any signs of erosion damage. Erosion damage can deepen rapidly and consequently weaken parts by reducing the thickness of the metal.



WARNING

Disintegration hazard

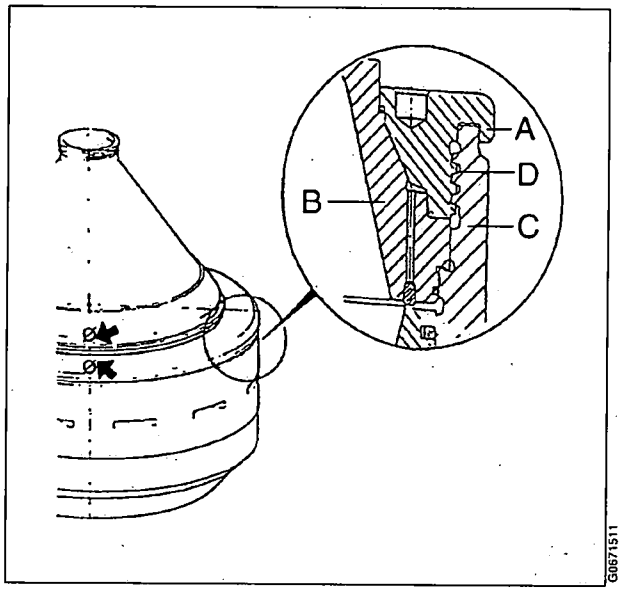
Erosion damage can weaken parts by reducing the thickness of the metal. Pay special attention to the pillars between the sludge ports in the bowl wall. Replace the part if erosion can be suspected of affecting its strength or function.

4.6.7 Check point - Limit for thread wear

Wear - Threads of large lock ring and bowl body

- The purpose of the lock rings (A) is to keep the bowl hood (B) securely in position against the bowl body (C) during operation. No play is permissible here. The threads (D) on the lock ring joint must not be worn to such an extent that the security of the lock ring joint is jeopardized.

  Excessive wear of these threads may involve risk of personal injury or damage of the equipment.

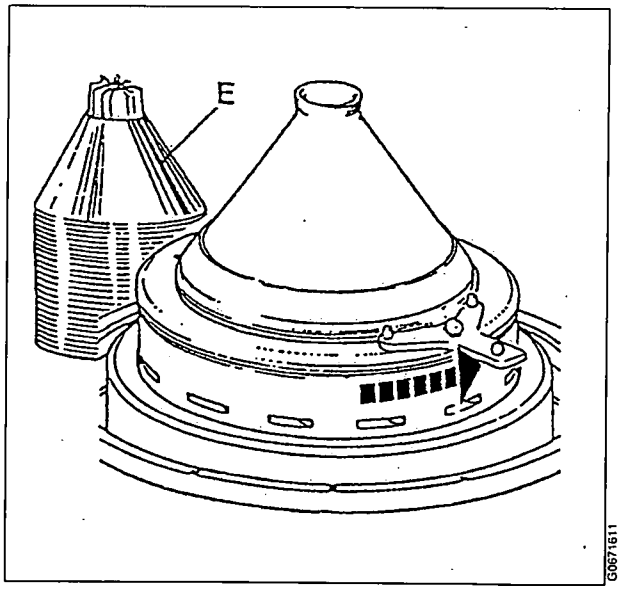


NOTE

By using the hydraulic disc compressing tool, thread wear is reduced to a minimum.

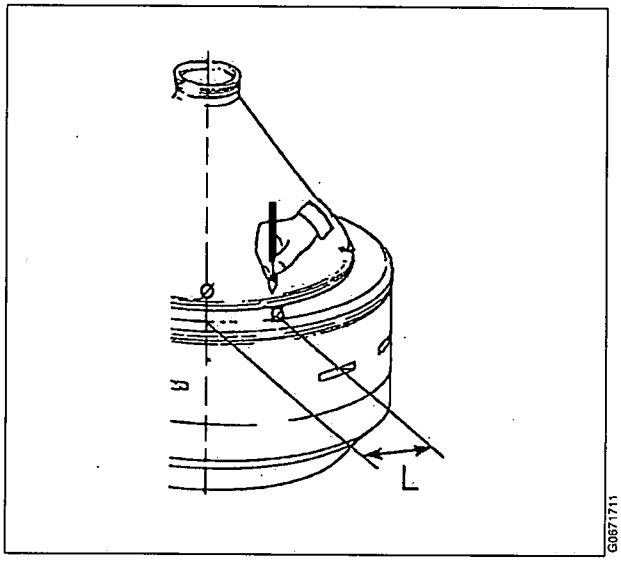
1. When the bowl is new the Ø-marks (see arrow) on bowl hood and lock ring are positioned exactly against each other. After some time, due to thread wear, these marks will pass each other when the lock ring is properly tightened.
2. To check the thread wear, the threads of lock ring and bowl body must be properly cleaned and lubricated first. Remove the disc stack (E) and tighten the lock ring with a few blows of a lead hammer until it is fully tightened. The position of the lock ring relative to the bowl body and hood has now been established.

   If the Ø-marks are exactly aligned with each other, proceed to the chapter "4.6.8 Check point - Disc stack pressure" on page 106.



3. If the Ø-mark on the large lock ring has passed the Ø-mark on the bowl hood, mark the position of the lock ring mark with a felt-tipped marker pen on the bowl hood. This mark indicates the actual position of the lock ring by which the bowl hood is attached to the bowl body. This mark is needed for the following disc stack pressure check.

   Measure the distance "L" between the Ø-marks.
   - If the distance "L" is less than **150 mm** proceed to the chapter "4.6.8 Check point - Disc stack pressure" on page 106.
   - If the distance "L" exceeds **150 mm**, the bowl must **not** be used! Get in touch with the supplier.



WARNING

Disintegration hazard

Wear on the large lock ring thread must not exceed the safety limit. The Ø-mark on the lock ring must not pass the corresponding Ø-mark on the bowl hood by more than the specified distance.

4.6.8 Check point - Disc stack pressure

This check will ensure that the number of discs in the bowl is correct, so that two conditions have been fulfilled:

- The disc stack pressure is sufficient.
- Bowl hood and bowl body are securely attached to each other.

> **NOTE**
>
> Ensure that the disk stack pressure is sufficient to maintain bowl balance.
>
> Insufficient pressure in the disk stack can cause vibration and reduce life of ball bearings.

Assumptions:

- The wear on the lock ring joint has been checked. See "4.6.7 Check point - Limit for thread wear" on page 104.
- The position of the Ø-mark on the lock ring has been marked with a marker pen (only applies if the Ø-marks are **not** exactly aligned with each other).
- All parts of the bowl have been cleaned.
- The sliding bowl bottom and distributing cone are in place.

Procedure:

Insert the complete disc stack in the bowl. The distributor fits into the guide pin and locked so that it cannot be turned in relation to the bowl body.

Remove the lifting eye from the distributor. Place the bowl hood in position. Make sure that the groove in the hood fits into the guide pin in the bowl body. The bowl hood should drop down over the guide pin. Don't remove the bowl hood lifting tool.

Place the large lock ring on the bowl. Fit the lock ring tool on the lock ring and tighten the lock ring by hand.

Fit the hydraulic disc compressing tool. The valve on the tool should point upwards "Unloaded position". Use the handle to tighten the piston rod in the distributor.

Set the valve on the tool into the left position. Pump until no resistance can be felt in the handle. The disc stack has now been compressed by the hydraulic tool against the bowl hood and the axial force of the disc stack against the lock ring joint is thus unloaded.

Tighten the large lock ring by hand, then with a few blows of a lead hammer until it is tight. Pump again and tighten the ring finally with blows of the lead hammer until it is fully tightened.

- If the Ø-mark positions are as in "Check points - Threads of large lock ring and bowl body", proceed to instructions for "Pressure checking".
- If the Ø-mark positions are **not** as in "4.6.7 Check point - Limit for thread wear" on page 104, the reason could be an incorrectly assembled bowl or too many discs in the disc stack. The bowl hood is not attached to the bowl body.

Disassemble the bowl and check that it is correctly assembled. If it is, then remove one or more discs and repeat the above described procedure. See also the instructions " Disc stack" on page 108.

Pressure checking

The position of the Ø-marks are now according to chapter "Check points - Threads of large lock ring and bowl body".

a. The condition that the Ø-marks are exactly aligned with each other has been fulfilled, or

b. The condition that the Ø-mark is exactly aligned with the felt-pen mark has been fulfilled.

Pump a few strokes until no resistance is felt in the handle.

Measure the height (**H1**) of the piston rod (see fig.) with the depth gauge of a slide callipers. Make a note of the reading obtained.

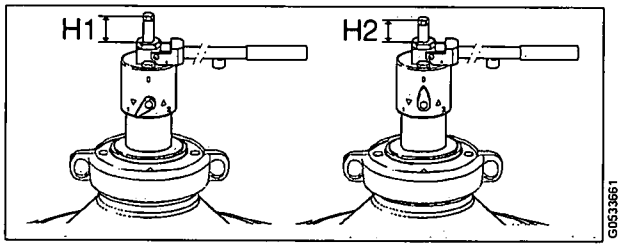
Set the valve on the tool in the upwards position "Unloaded position". The piston rod will now move down slightly when the disc stack is released inside the bowl.

Measure once again the height (**H2**) of the piston rod with the slide callipers and make a note of the reading obtained.

If the height difference H_1-H_2 is less than the measure in the table below, the disc stack pressure is correct.

If the height difference exceeds the measure in the table below, the number of discs is not sufficient. Add one or more discs and repeat the above described check until correct disc stack pressure is obtained.

An insufficient number of discs permits the disc stack to wobble and cause unbalance in the bowl when running, resulting in vibration that cannot be eliminated by balancing.



Measure of disc stack pressure with use of a compressing tool

Bowl disc caulk thickness	Height difference, H_1 - H_2 *)
0,4 mm	1,5 mm
0,5 mm	2,0 mm
0,6 mm	2,0 mm
0,8 mm	2,5 mm

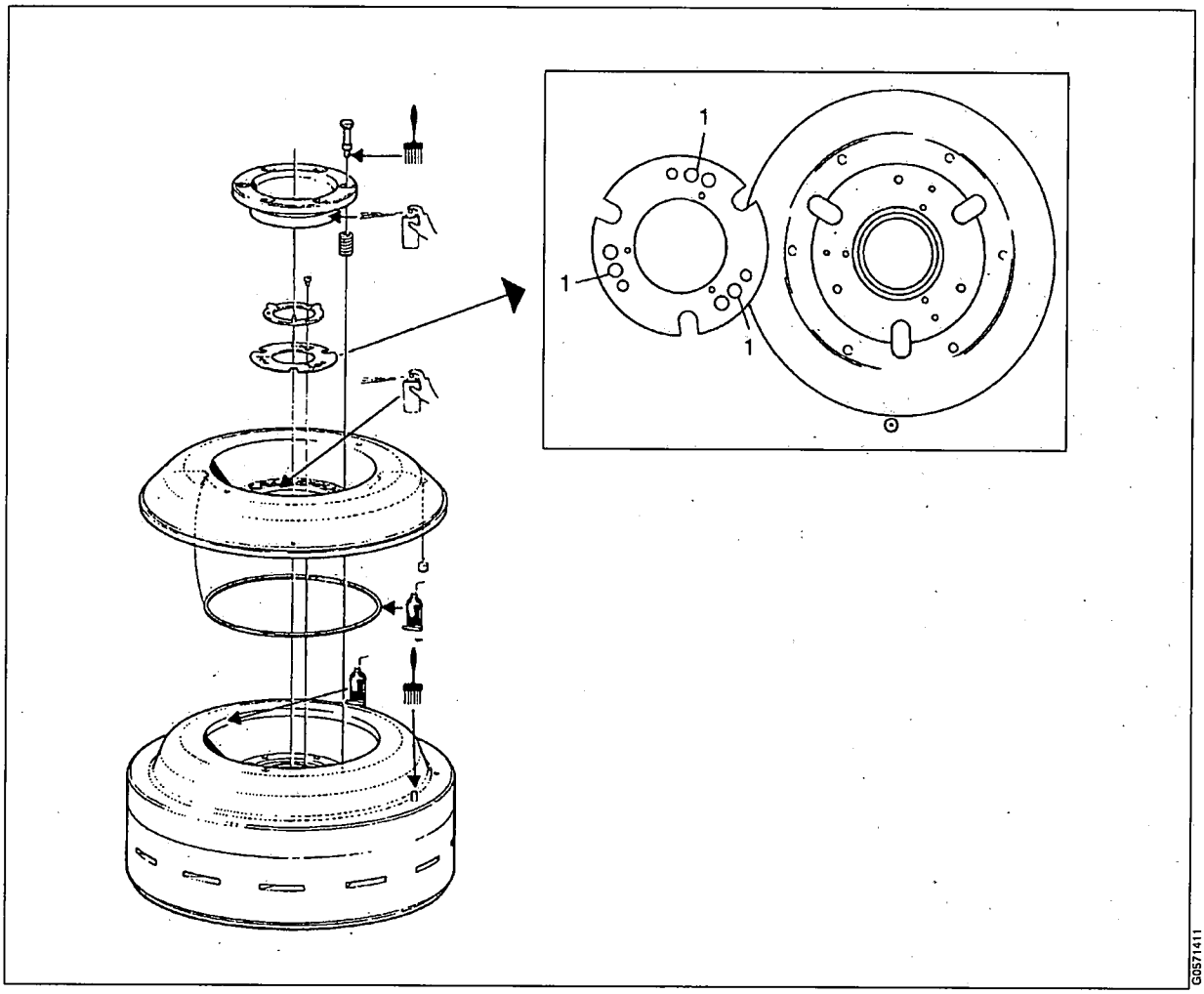
*) Calculated approx. values to be used as guidance

Disc stack

The uppermost disc has thicker caulks than the other ones. The thick-caulked disc must always be located uppermost in the disc stack. If disc stack pressure is too low, add one or more bowl disc (not thick-caulked discs) to the top of the normal-caulked part of the stack. Refit the thick-caulked disc uppermost in the stack. Fit the bowl hood.

4.6.9 Assembly

Ejection mechanism

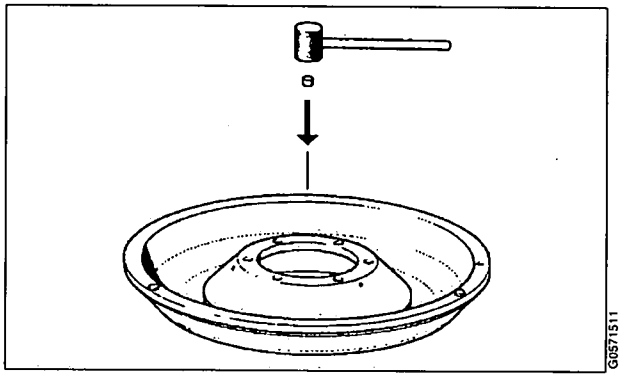


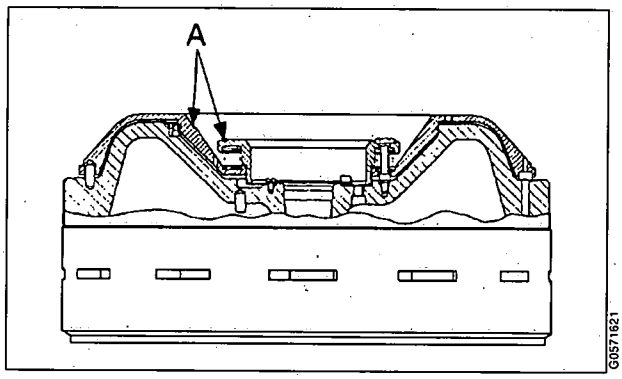
Bowl body

Turn the gasket the right way. A gasket turned the wrong way could block the ducts for operating water. (This gasket is used for many separator types. For the types dealt with in this book the holes "1" have no function.)

Lubrication of ejection mechanism. Specified directions are to be found in this chapter.

When inserting new plugs, use a rubber hammer or the like so as not to damage the sealing surface.

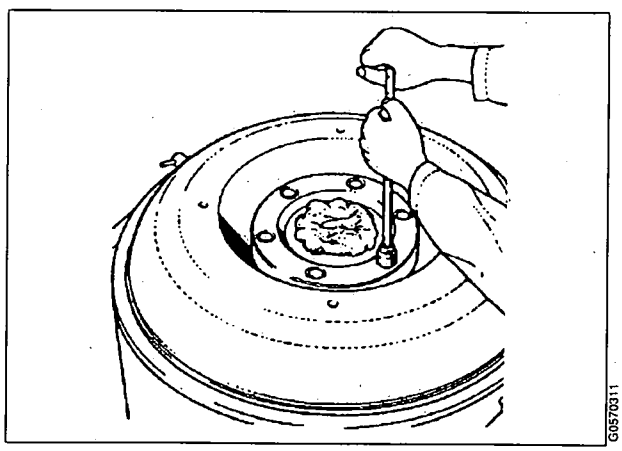




A. *Angular position of spring support indicated by punch marks*

Ejection mechanism - Bowl body

1. Protect the nave bore in bowl body with a rag. Start with two diametrically opposite screws. Then tighten screws successively a little at a time. Final tightening torque **40 Nm**.

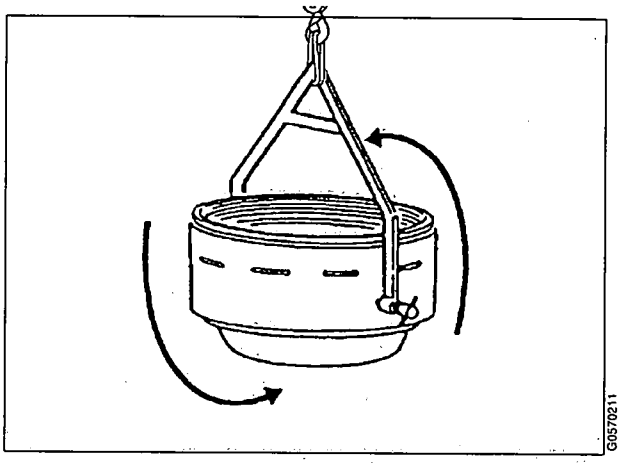


2. Ensure that the screw on the turning tool is properly tightened.

WARNING

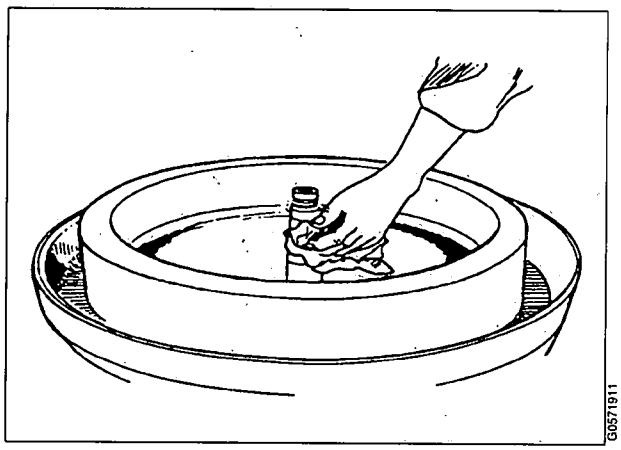
Crush hazard

Risk for jamming injury when turning the bowl body.

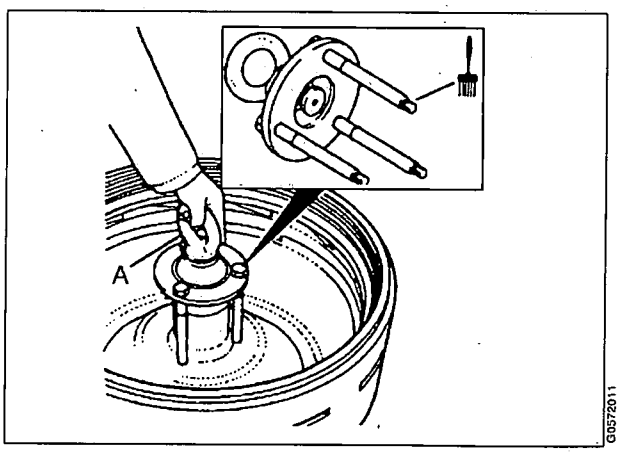


3. Turn the bowl body back upright.
   Refit the two plugs in the bowl body wall when the turning tool has been removed.

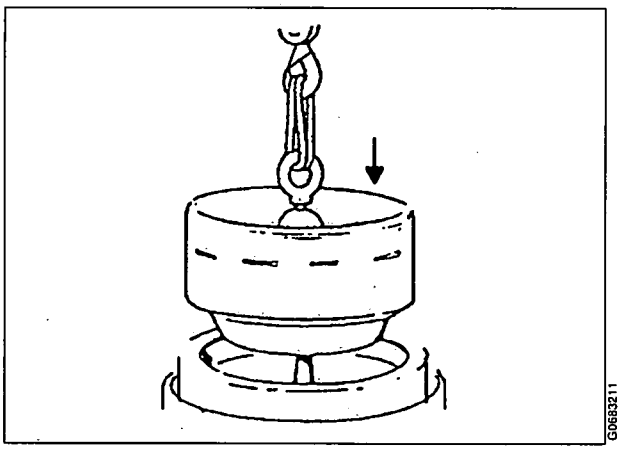
4. Clean spindle taper and nave bore in bowl body.



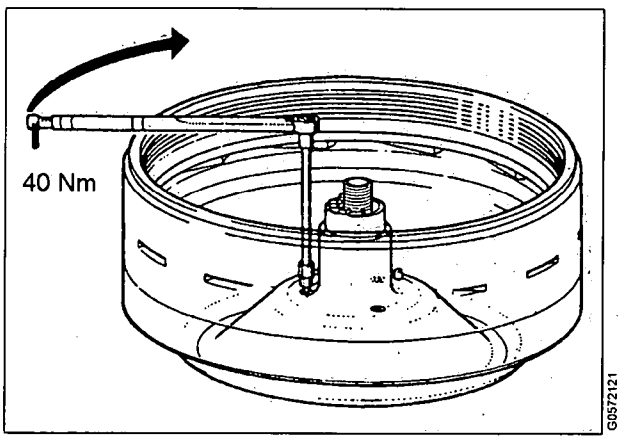
5. Apply the lifting tool of the bowl body.
   Important: Be sure that the three screws beeing properly screwed down into the bowl body. Screw down the centre screw (**A**) to the bottom position. Lift the bowl body onto the spindle.



6. Lower bowl body until central screw rests on spindle top. Now unscrew the centre screw so that bowl body sinks down on the spindle taper.



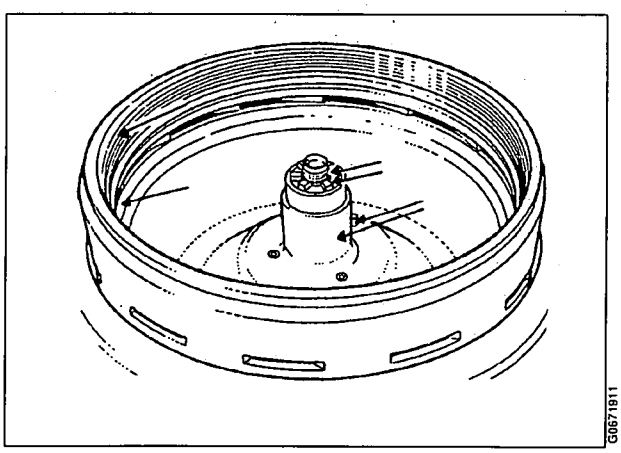
7. Lubricate the screw threads with Molykote 1000 paste. Rotate the bowl body slowly and align it so that the screw holes in its bottom are exactly above the holes in the distributing ring. Lift up the distributing ring and tighten it against the bowl body by means of the three screws. Final tightening torque **40 Nm**.



Bowl body - Sliding bowl bottom - Distributing cone

1. Apply lubricant on
   - threads of bowl body
   - threads of bowl spindle
   - bowl body nave on guiding surface and lugs
   - guide pin in bowl bottom
   - guiding surface for the sliding bowl bottom under the ejection openings in the bowl body.

   See specified "4.6.5 Check point - Lubrication" on page 98 in this chapter.

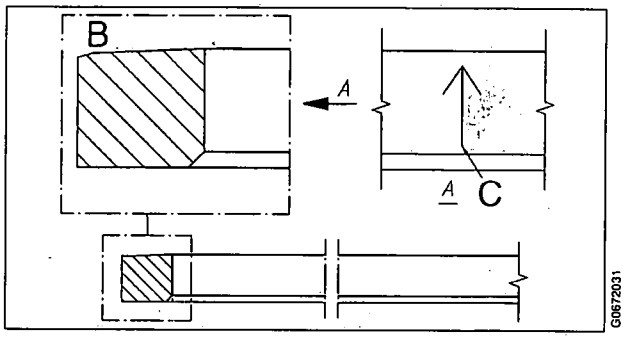


2. Lubricate the rectangular ring outside the rim of the sliding bowl bottom, see "4.6.5 Check point - Lubrication" on page 98 .

   The ring should always be mounted with the chamfered side upwards, see illustration.

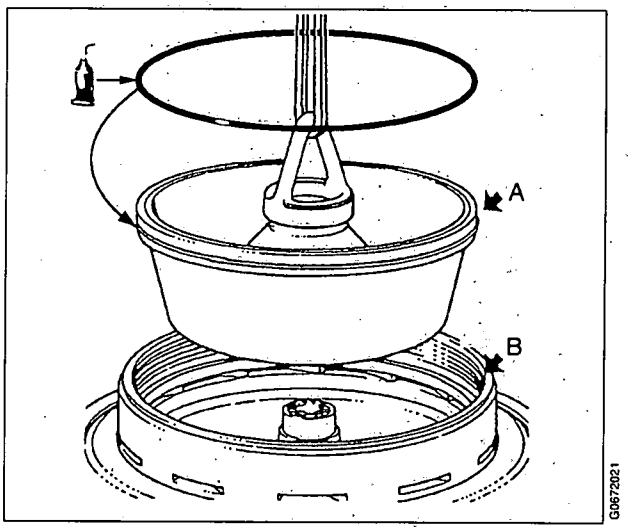
   Note that the arrow on the inside surface of the ring should point upwards (Only valid for W 818 and W618 bowls).

   To facilitate mounting, immerse the ring in hot water before mounting



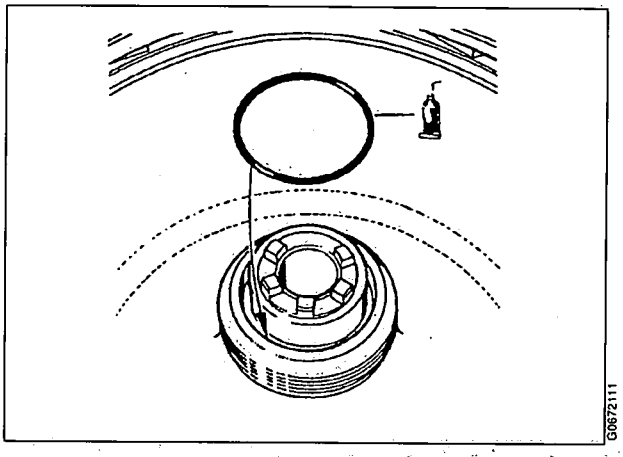
Rectangular ring
A. View
B. Chamfered surface,(always mounted upwards)
C. Arrow stamped on inside surface of the ring (only valid for W 818 and W 618 bowls)

Mount the sliding bowl bottom. Take care to bring the drill mark on the sliding bowl bottom right in front of the guide lug in the bowl body. This will ensure that the sliding bowl bottom drops into correct position.
Note! Guide pin in the bottom.



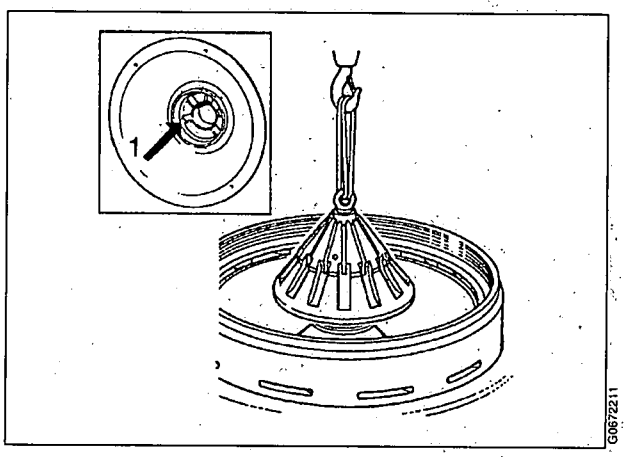
A. Drill mark
B. Guide lug

3. Avoid the risk of deforming the seal ring by fitting if after fitting the sliding bowl bottom. As the bowl is completely full of process liquid under pressure, a defective seal ring can cause leakage of process liquid into the operating water system.



Important!

4. The recesses in the underside of the distributing cone must fit over the lugs on the bowl body nave. The mark on the distributing cone must be in line with the guide lug on the bowl body.

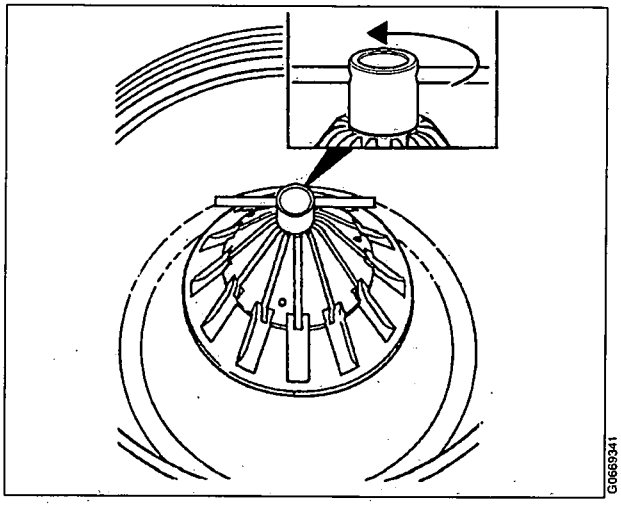


1. Recesses

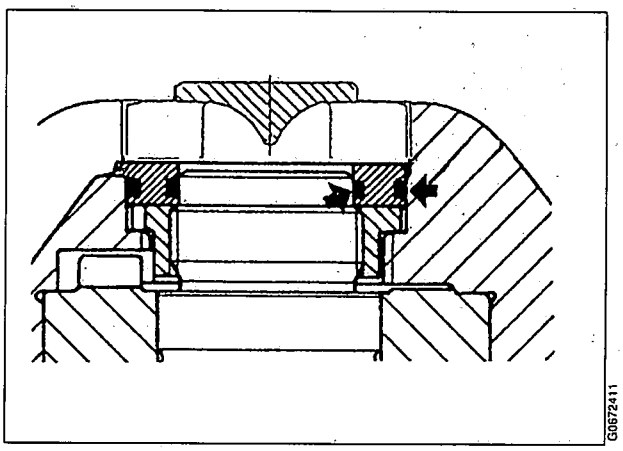
Cap nut - Wing crown - Disc stack - Distributor - Top disc*)

1. Tighten the cap nut firmly by using the special tool.

   Left-hand thread!



2. Apply silicone grease on the two O-rings for the wing crown. Put the O-rings in their grooves and press down the wing crown in the distributing cone. Knock cautiously with a soft hammer to get the wing crown into correct position. Apply a light, non-toxic lubricant onto the guide pins of the distributing cone.

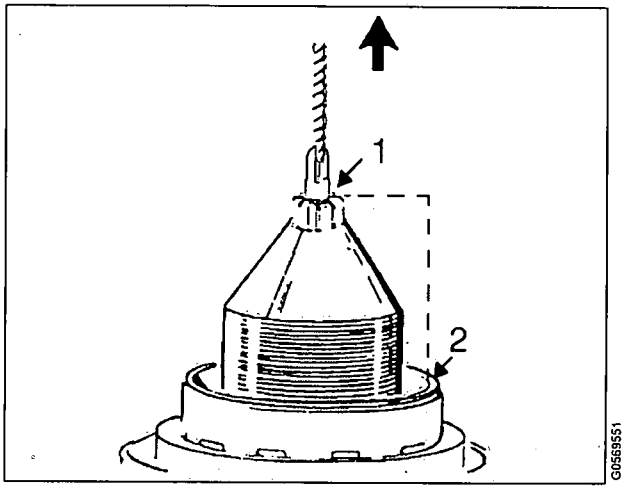


*) Twin phase separators only

3. Disc stack pressure see "4.6.8 Check point - Disc stack pressure" on page 106 in this chapter.

   Important!

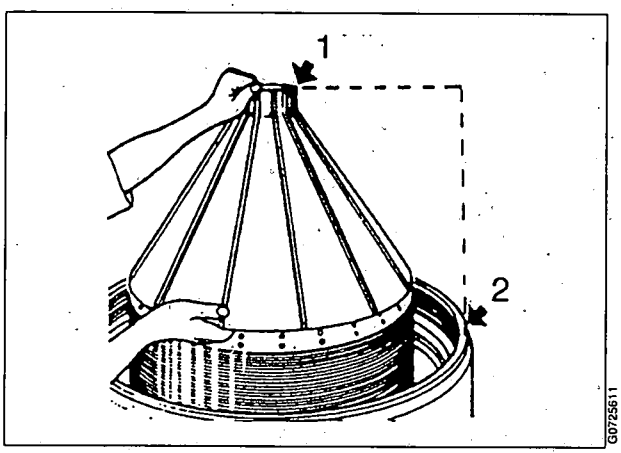
   Make sure that the three guide pins of the distributor enter correctly into corresponding holes in the distributing cone. Do it like this: Place the distributor intentionally slightly offset in relation to the guide lug on the bowl body. Use a screwdriver or similar tool to turn the distributor carefully until it drops into place in the correct position.



1. *Broad rib with groove*
2. *Guide lug*

4. Fit top disc.

   Note: This top disc does not exist in the BB separators.

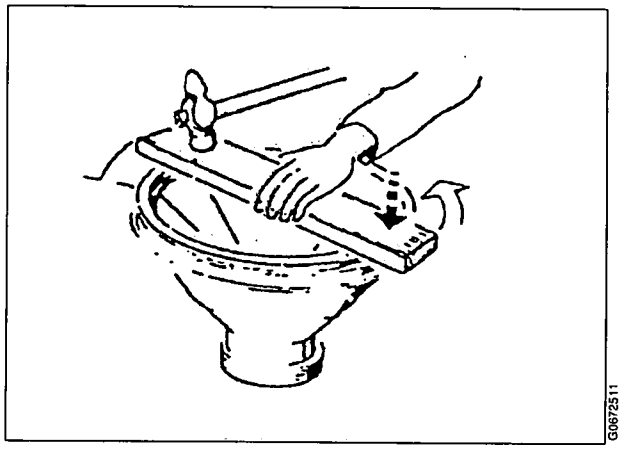


1. *Bore mark*
2. *Guide lug*

Bowl hood

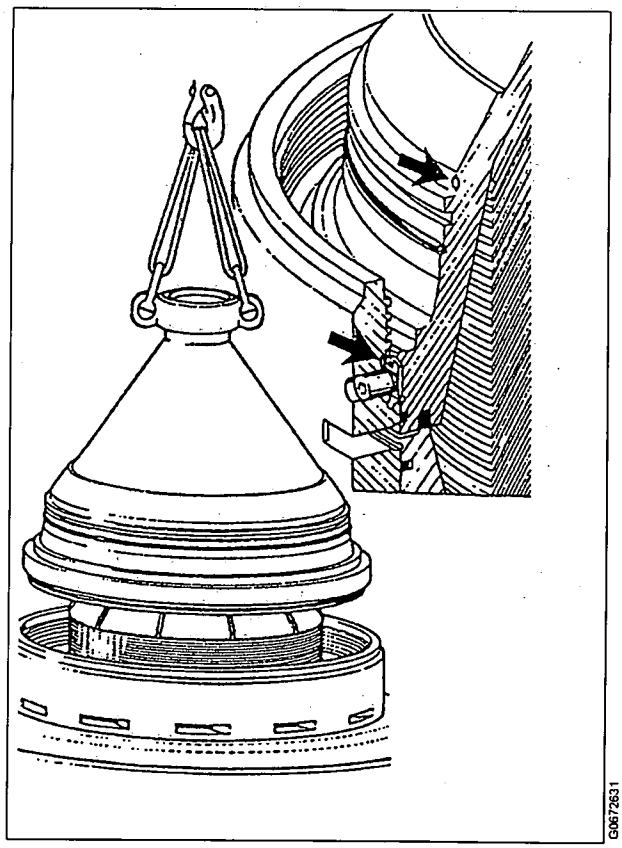
1. When fitting a new seal ring in bowl hood:

   If a new seal ring of nylon (amide resin) proves to be too wide when fitting, this is due to absorption of moisture. It will regain its correct dimensions after drying for about 24 hours at a temperature of 80 - 90 °C. If the ring is too narrow put it in hot water, 70 - 80 °C, for about 5 minutes.



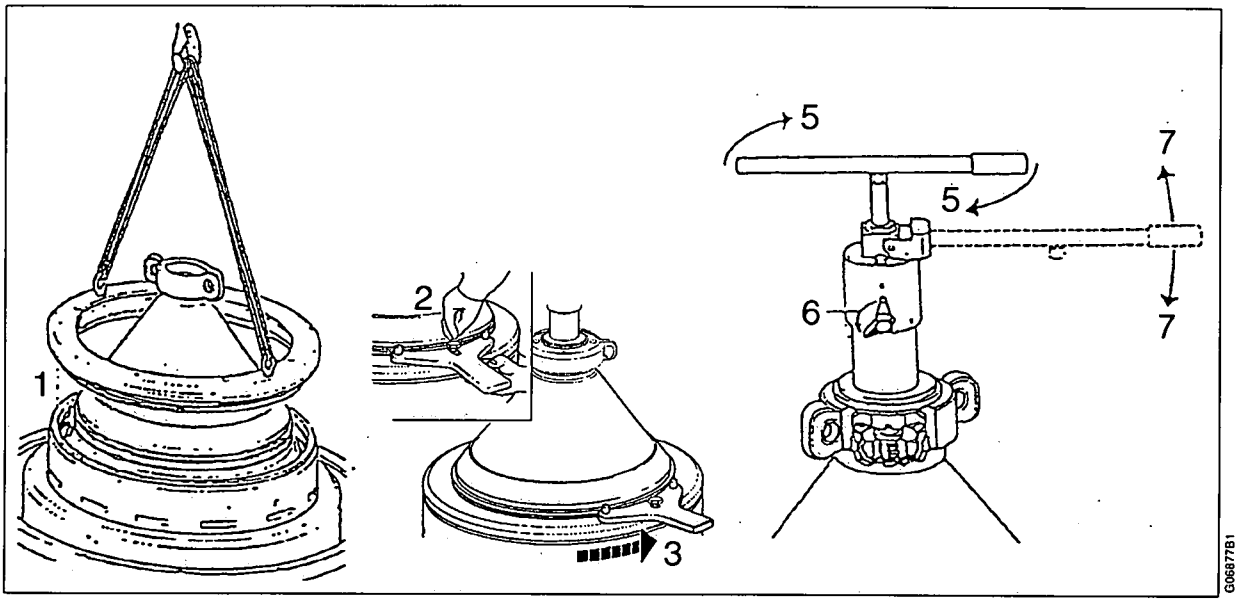
Important!

2. Make sure that the groove in the bowl hood enters the guide lug in the bowl body.



See "4.6.5 Check point - Lubrication" on page 98 in this chapter.

Large lock ring

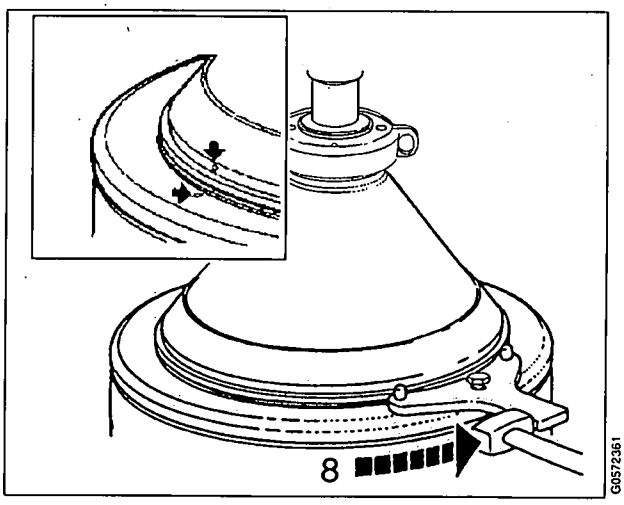


✔ **Check point**
See " Disc stack" on page 108.

Lower the lock ring gently onto the bowl body (1). Fasten the lock ring spanner (2). Screw on the lock ring by hand as far as possible (3). Apply the compressing tool and carry out operations 5-6. Pump (7) and tighten the lock ring by hand (3) alternately a few times.

Ascertain that full pressure is obtained in the compressing tool.

As a rule the lock ring can be tightened by hand until the distance between the Ø-mark on the lock ring and that of the bowl hood is 20-30 mm. The final tightening is carried out by hitting the spanner handle (8) until the spanner handle feels stiff, then check that the Ø-marks are at least aligned with each other.

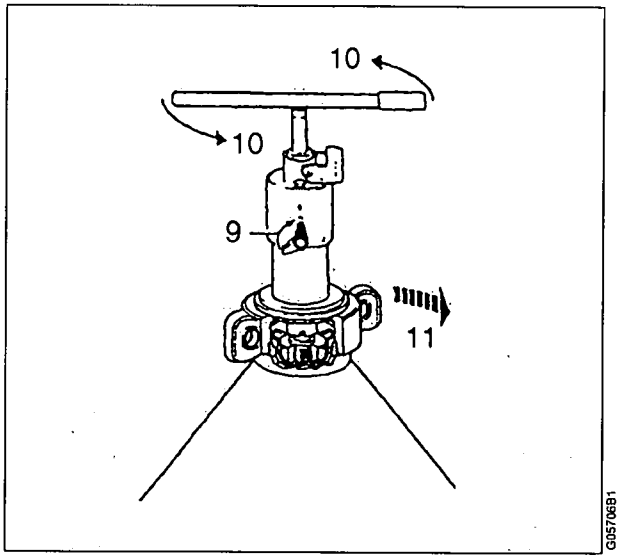


WARNING

Disintegration hazard

It is extremely important that the large lock ring is tightened properly to ensure calm running and avoiding parts coming loose.

Undo and remove tools. Operations (9-11).

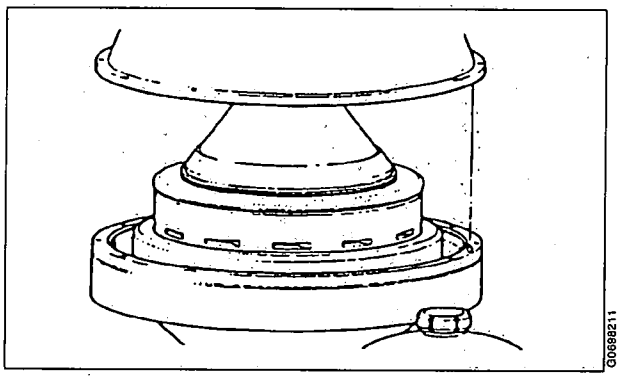


NOTE

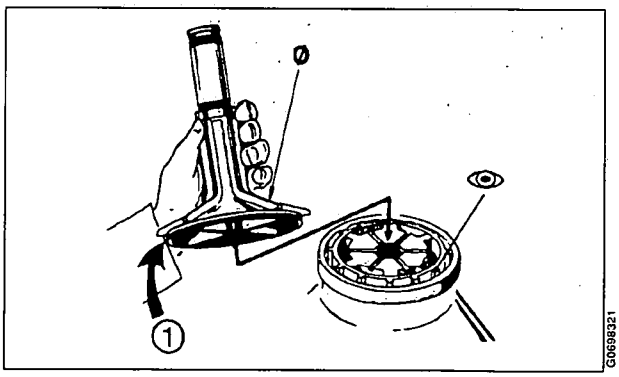
If the paring disc device for operating water also has been assembled, check its height setting by rotating the bowl by hand and make sure the latter rotates freely.

Outlet pipe - Guide sleeve - Small lock ring (Frame hood. Outlet)

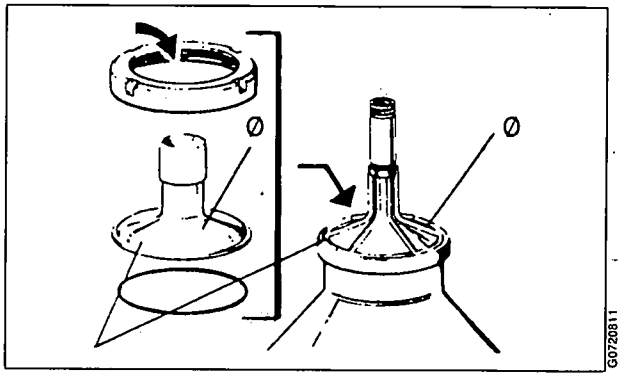
1. Note the angular positioning of the frame hood. Tighten the frame hood with the screws.



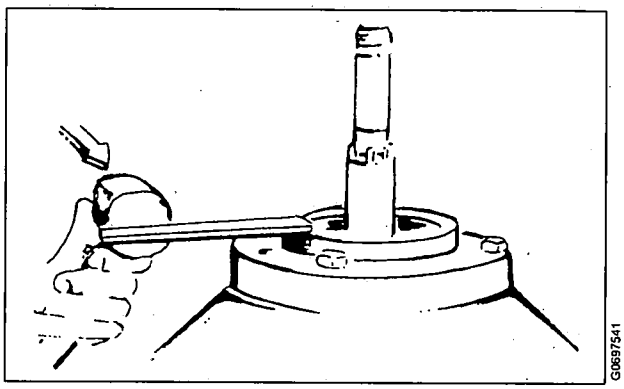
2. **Note**: Make sure that the seal ring (1) is undamaged. The outlet pipe is marked with a punch mark. This mark shall be aligned with the top disc drill mark when assembling (twin phase separators only).



3. The guide sleeve is marked with a punch mark. When fitting the guide sleeve on the outlet pipe, the punch marks shall be exactly aligned with each other (614, 714, 518 and 618, twin phase).



4. Tighten the small lock ring properly.



WARNING

Disintegration hazard

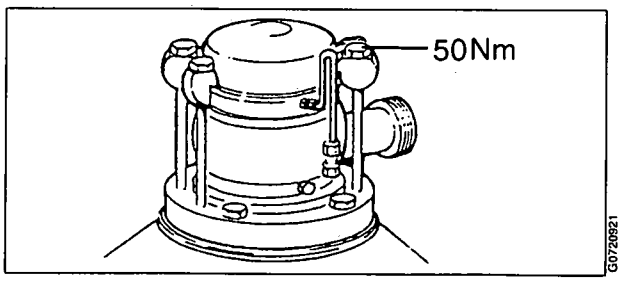
It is very important that the small lock ring is tightened properly to ensure calm running and avoiding parts coming loose.

✔ **Check point**
Radial wobble of outlet pipe.

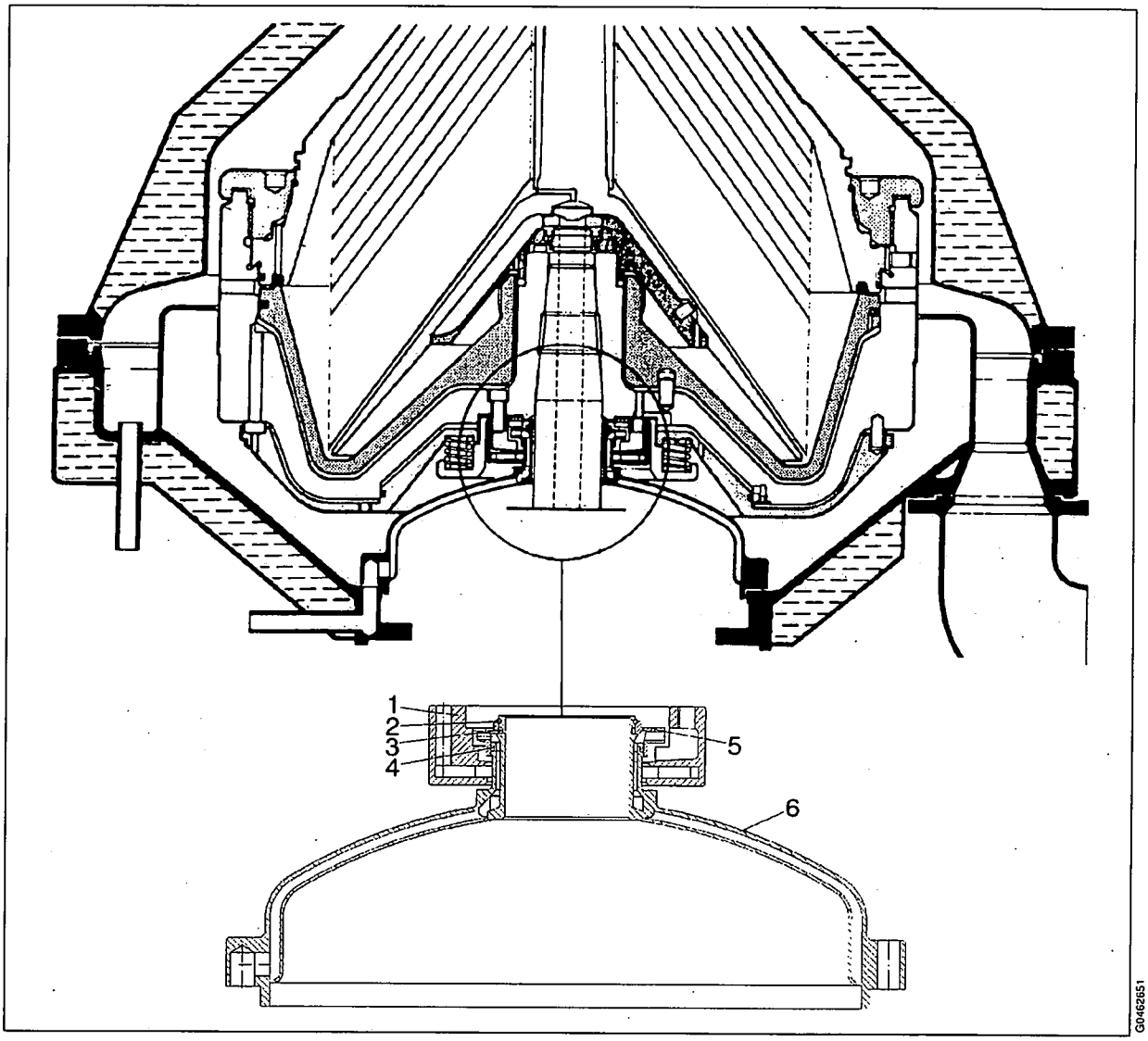
✔ **Check point**
When fitting, check eccentricity between outlet pipe and pump housing. See " Checking eccentricity of outlet pipe / outlet housing" on page 59.

5. Assemble the outlet parts as instructed in chapter "4.3 Outlets (twin phase separators)" on page 49 or "4.4 Outlet (single phase separators)" on page 62.

Note: The hook screws are tightened with a torque of **50 Nm** (5 kpm).

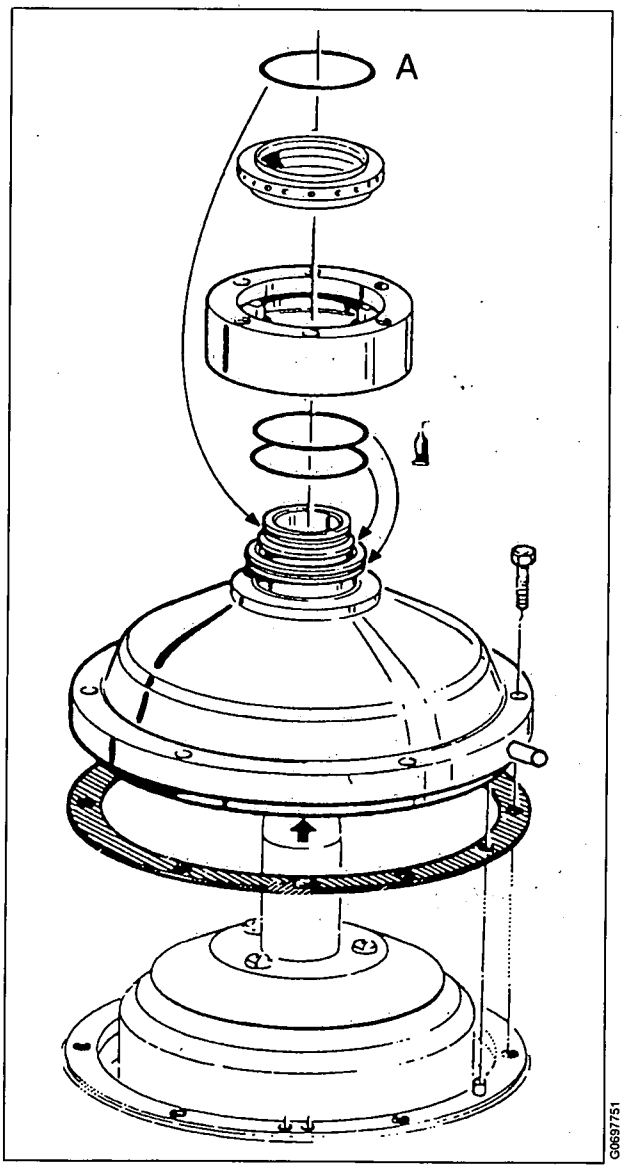


4.7 Paring disc device for operating water



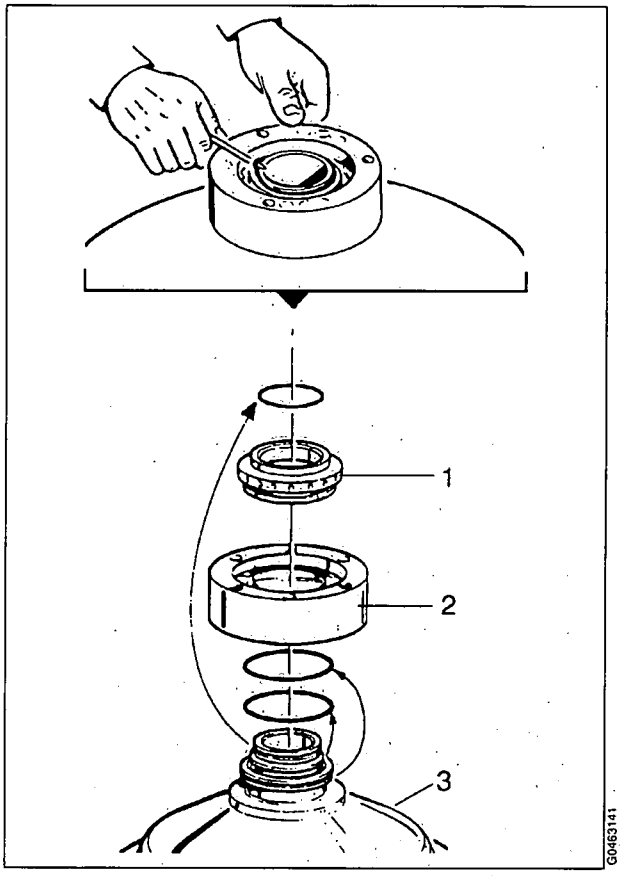
1. Distributing ring
2. O-ring
3. O-ring
4. O-ring
5. Control paring disc
6. Distributing cover

Apply lubricating grease of silicone type on to the two lower O-rings.
See "5.2 Lubricants" on page 181.
The upper O-ring (A), which has a locking function, must not be lubricated.



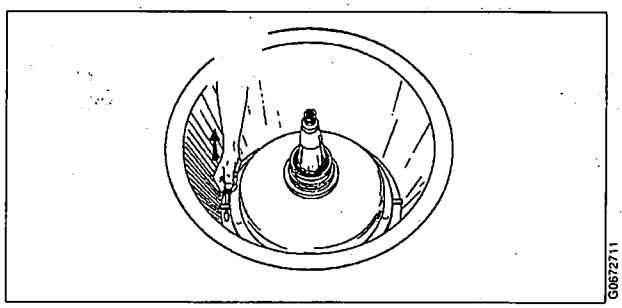
4.7.1 Dismantling

1. Tap the control paring disc carefully with a soft drift, so that the upper O ring is unloaded. Remove the O-ring with a small screwdriver or similar tool. Remove the control paring disc by lifting up the distributing ring.

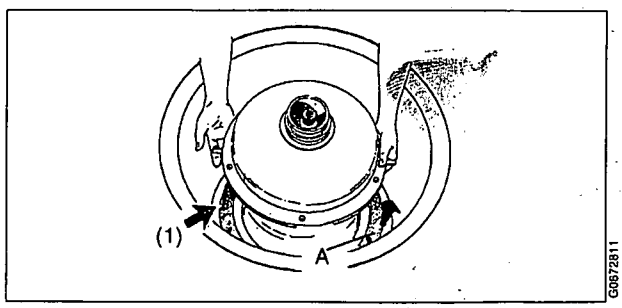


1. *Control paring disc*
2. *Distributing ring*
3. *Distributing cover*

2. Remove the distributing cover as shown in the figure.



3. Notice the guide pin (1).



A. *Height adjusting ring*

4.7.2 Check points - Assembly

Ducts

- Dirt and lime deposits in the ejection mechanism may cause bad ejecting function or none at all.

Clean all ducts with a soft iron wire or the like. Remove deposits on other surfaces with steel wool.

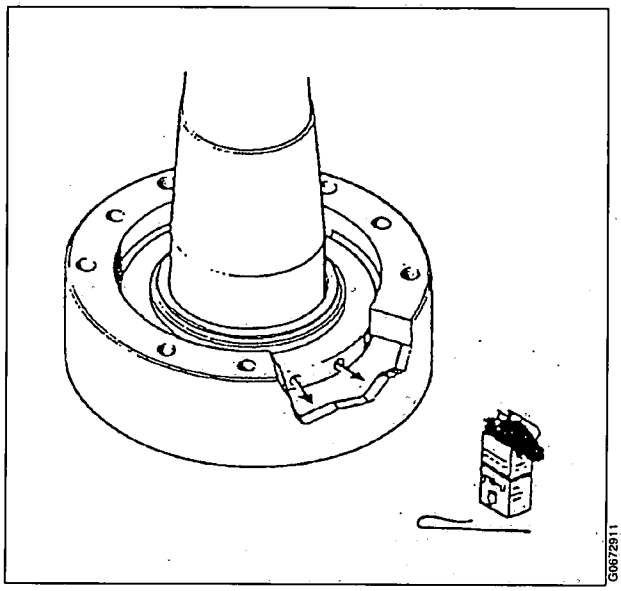
Rechecking water flow:

When the solenoid valve for make-up water is open, there should be **weak** water jets.

At operation the make-up water consumption is zero when the water pressure is less than 50 kPa (0,5 bar).

At discharge the water jets should be **strong** (1,5 - 3 litres / discharge).

Finally, when the machine is completely assembled, make a test run to make sure that the discharge function is in order.



Assembly

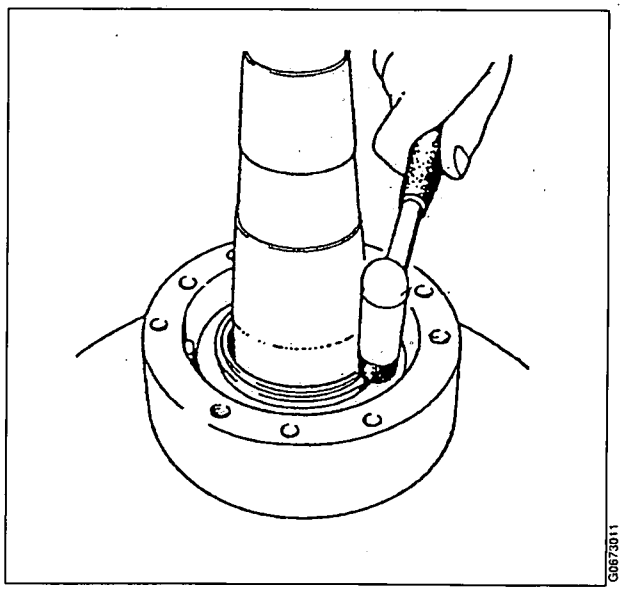
Assembly takes place by reversing the sequence of operations for dismantling. Observe the following:

The distributing cover is angularly positioned by a guide pin.

If it is difficult to press down the control paring disc in position by hand, knock it down cautiously by means of a plastic hammer.

Check that the uppermost O-ring (locking the paring disc) lies properly in its groove without being twisted.

In order to ensure a good sealing between the paring disc and the O-rings, jerk a few times in the distributing ring after assembly.



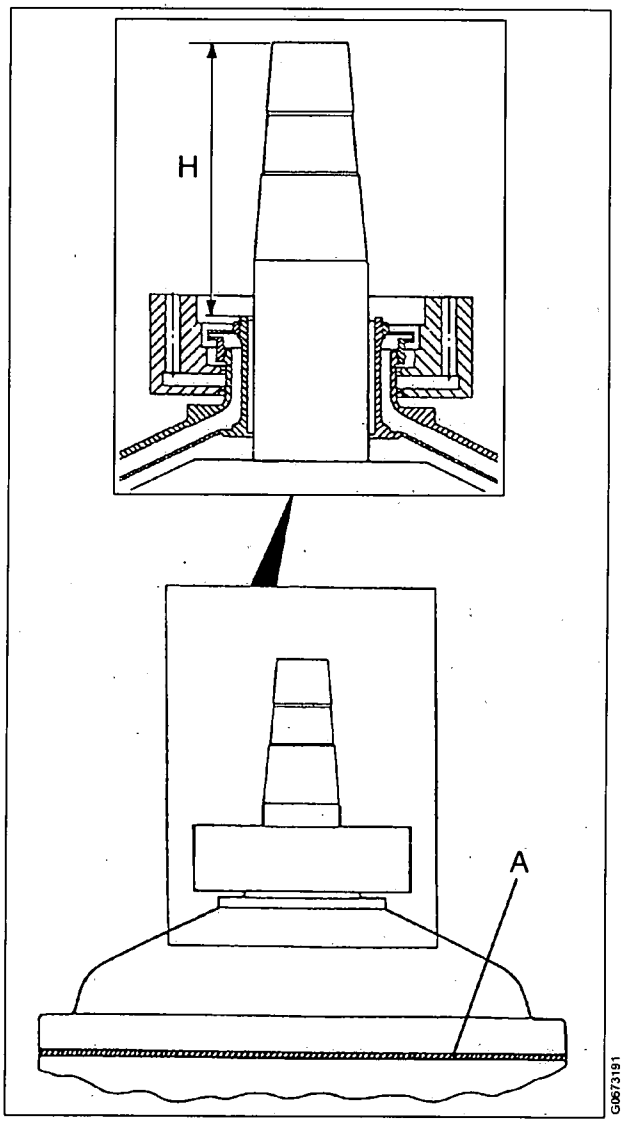
4.7.3 Height adjustment (paring disk)

Alfa Laval ref. 543759, rev. 0 / 539324, rev. 0

Check the height position after each assembly.

Use two steel rules or a depth gauge.

Any adjustment is made by means of one or more height adjusting rings **A** (1,0 mm thickness).



614[1] and 714

H = 185 ±0,5 mm

518[2], 618, 718 and 818

H = 223 ±0,5 mm

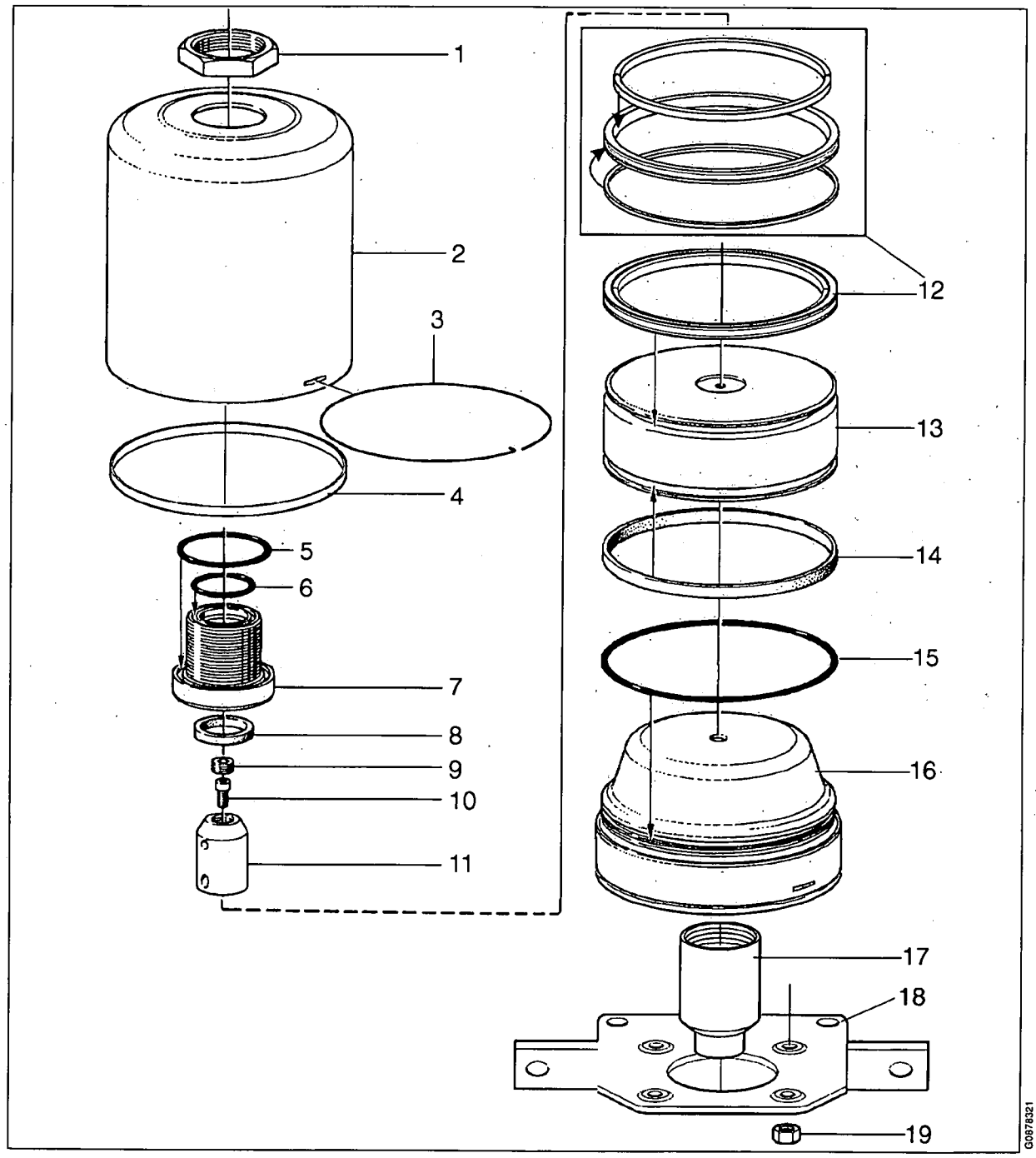
NOTE

Recheck the height position when the bowl has been mounted on the spindle by rotating the bowl by hand and make sure that it moves freely. A scraping noise may be an indication of incorrect positioning – readjust!

[1] For example H **614**HGV
[2] For example C **518**HGV

4.8 Operating water module (OWMC)

4.8.1 Exploded view



1. *Nut*
2. *Cylinder*
3. *Locking wire, upper*
4. *Garter strap*
5. *O-ring*
6. *O-ring*
7. *Outlet*
8. *Turcon variseal "M"*
9. *Nozzle*
10. *Screw*
11. *Two-pulse adapter*
12. *Turcon AQ-seal (3 pieces)*
13. *Piston*
14. *Turcite slidering*
15. *O-ring*
16. *Air tank*
17. *End protection*
18. *Bracket*
19. *Nut*

4.8.2 Dismantling (MS service)

The figures within brackets refer to the exploded view on page 126.

When dismantling, the OWMC Service kit is needed.

1. Shut off the air and operating water supply to the OWMC.

WARNING

Crush hazard

Never dismantle the OWMC when pressurized.

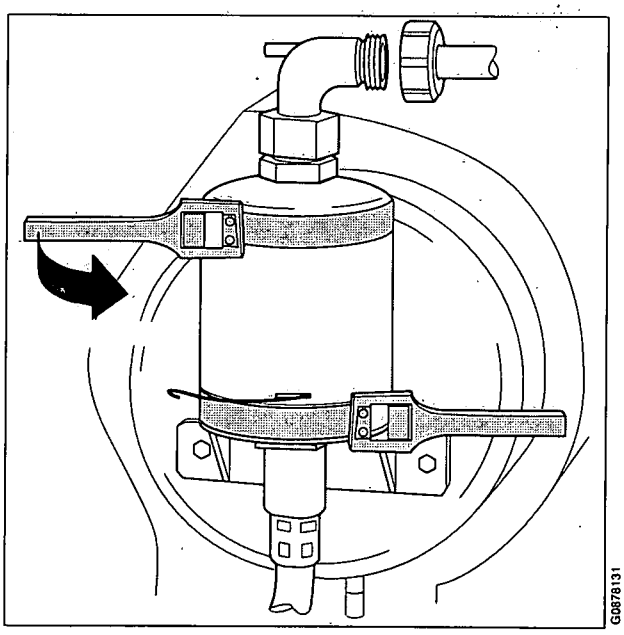
2. Remove the connections for operating water.

NOTE

The Air tank (16) must only be dismantled by Alfa Laval personnel.

3. Turn the cylinder (2) anti-clockwise relative to the air tank (16). The upper locking wire is thereby forced out.

   Use two belt wrenches when turning the cylinder, see the illustration. The lower tool prevents the air tank from rotating.



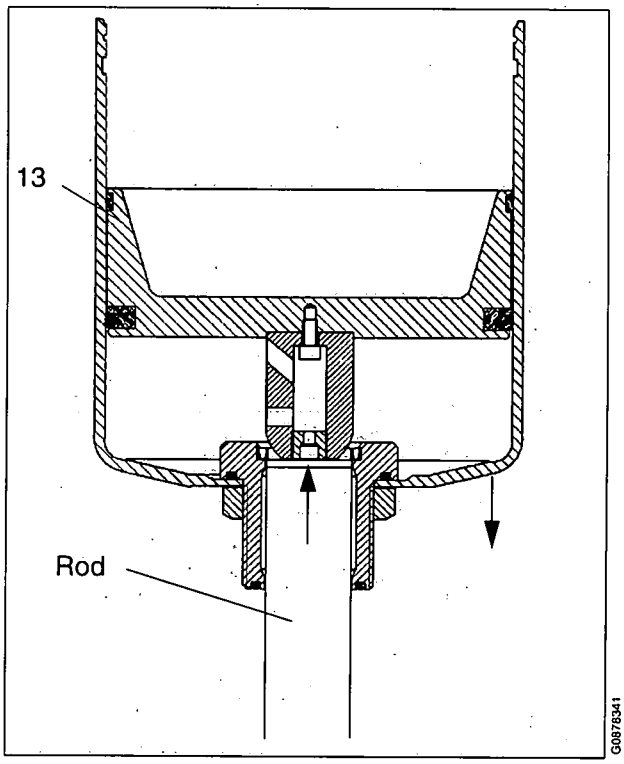
NOTE

Be careful to keep the cylinder straight against the air tank.

NOTE

In order not to damage the water tank, make sure to place the upper wrench at the top of the water tank, as illustrated.

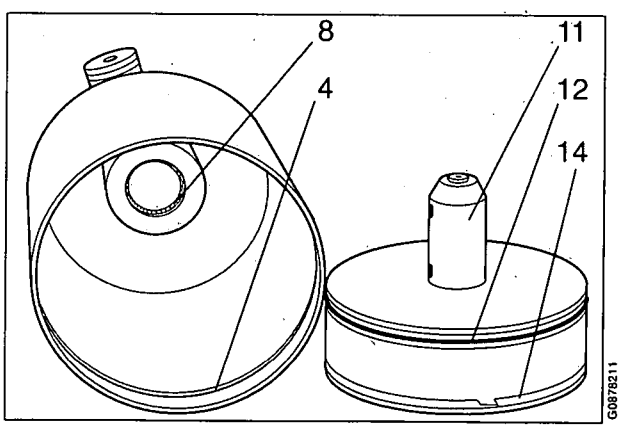
4. Pull off the cylinder (2)
5. Carefully press the piston (13) out of the cylinder using a soft rod or similar.



4.8.3 Check points

Clean and check the condition of the dismantled parts.

- Check the cylinder (2), piston (13) and two-pulse adapter (11) for scratches and scuffing marks.
- Renew the garter strap (4) fitted inside the cylinder.
- Renew the piston seal rings (12 & 14) and the seal (8) which are included in the service kit for the module.
- Renew all other parts included in the service kit.



4.8.4 Assembly (MS service)

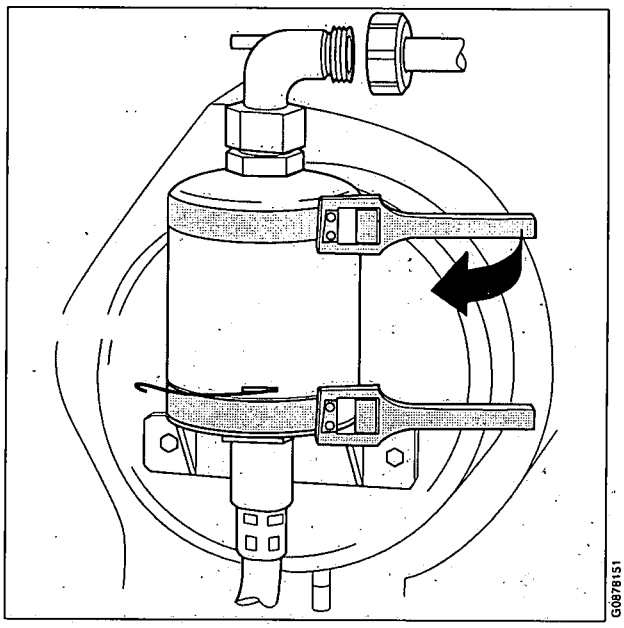
1. Check that the piston and inside of the cylinder are well cleaned.

   Lubricate the inside of the cylinder with the grease included in the Service kit for OWMC.

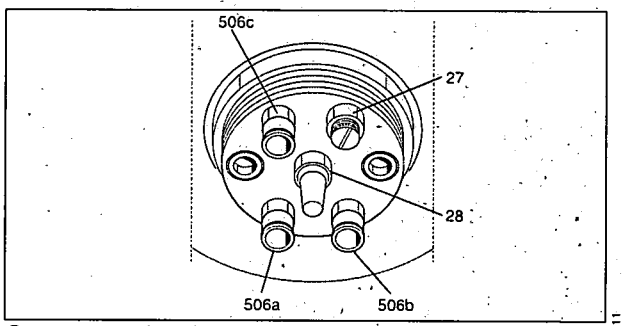
2. Assemble the OWMC unit opposite the dismantling.

NOTE

Make sure that the hole in the groove (for the locking wire end) on the air tank can be seen through the slot on the cylinder.



3. Lubricate the locking wire with the grease included in the Service kit for OWMC.
4. Place the locking wire end in the hole in the air tank. Secure the cylinder to the air tank with the locking wire by turning the cylinder clockwise relative to the air tank until the hook on the locking wire reaches the groove.
5. Fit water and air connections.
6. Turn on the air and operating water supply. Check that there are no leakages.



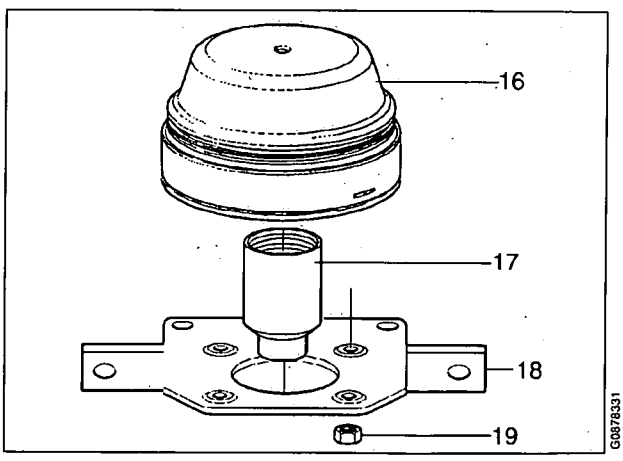
See connection list in the Installation Manual

4.8.5 Air tank

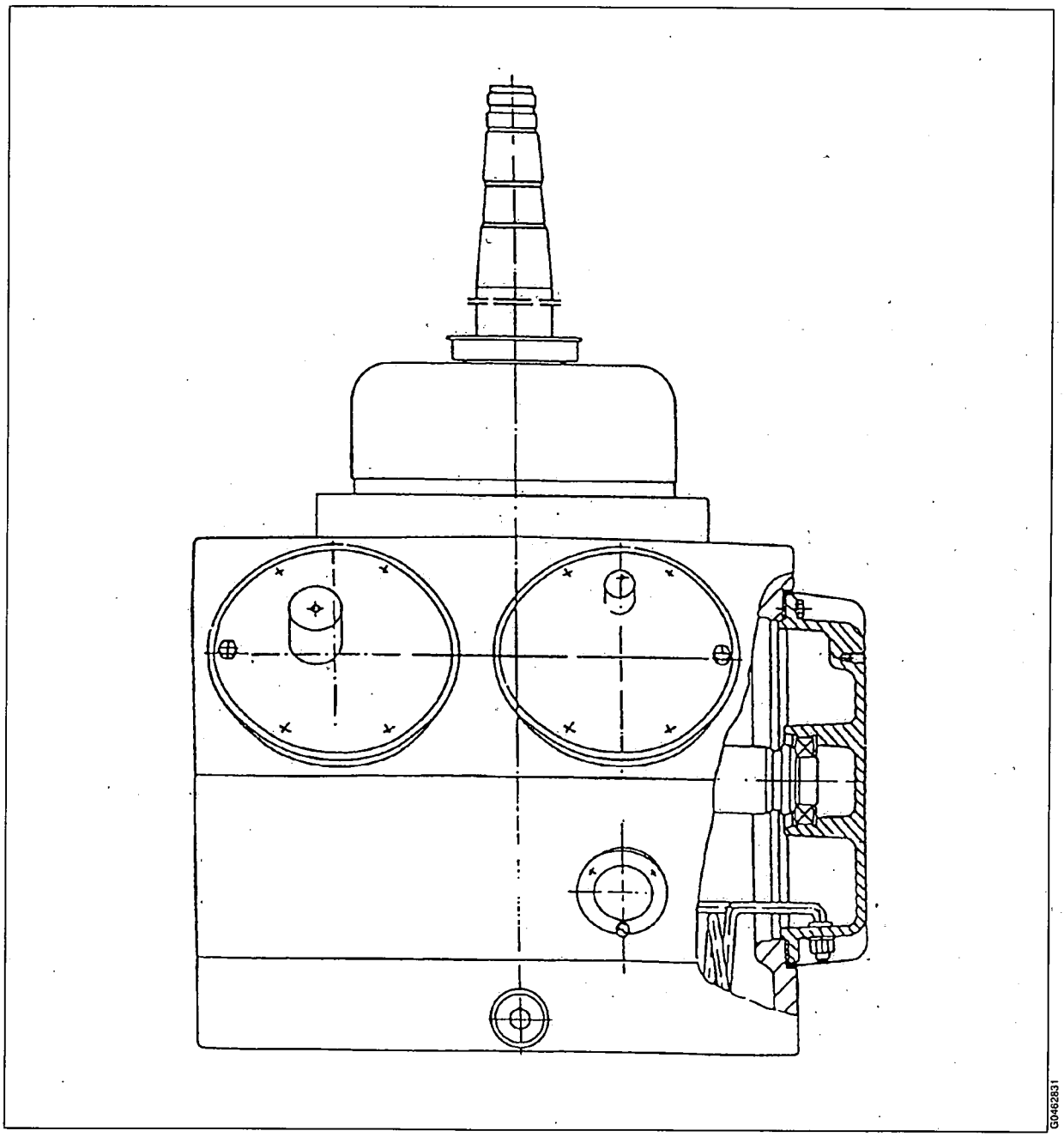
If the air tank has to be dismantled (i.e. repair) it is removed by removing the nuts (19).

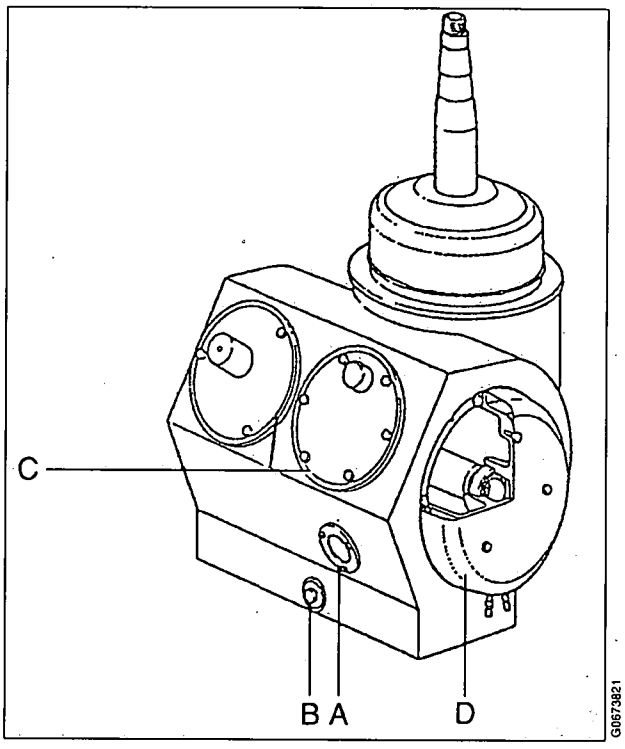
NOTE

If problems are related to the Air tank (16), always contact Alfa Laval representative.

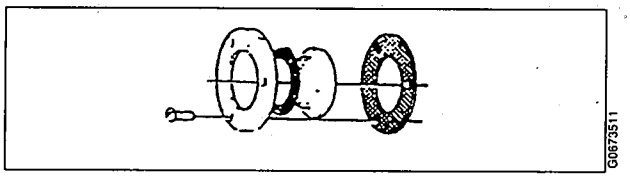


4.9 Frame parts

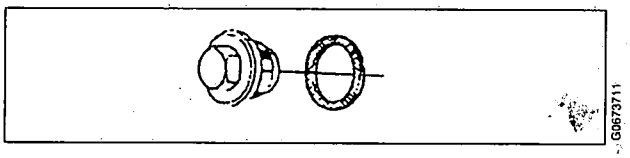




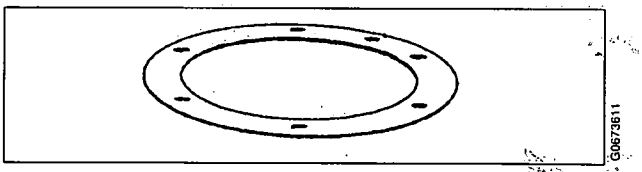
A. Oil gauge glass



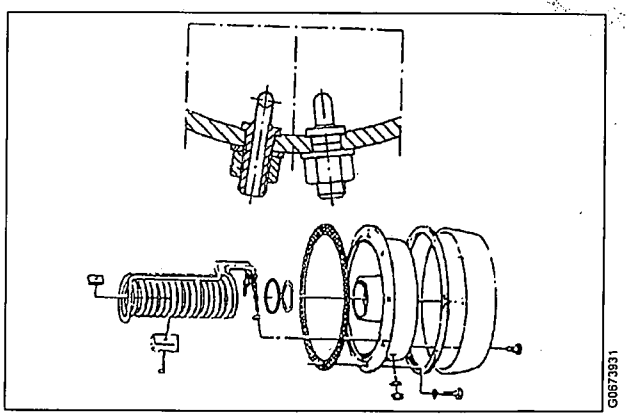
B. Oil drain plug



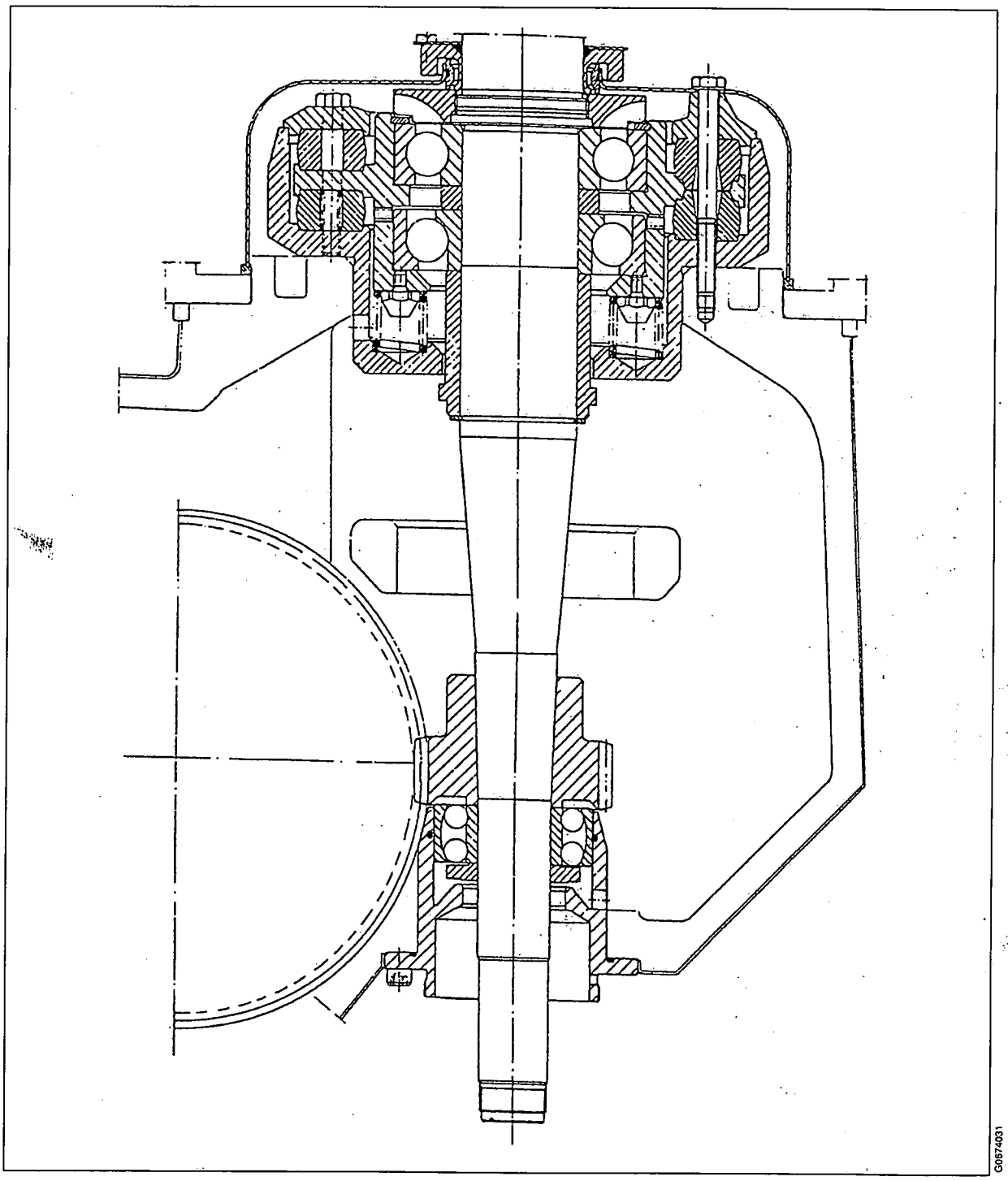
C. Gasket for brake protecting cover and worm wheel guard

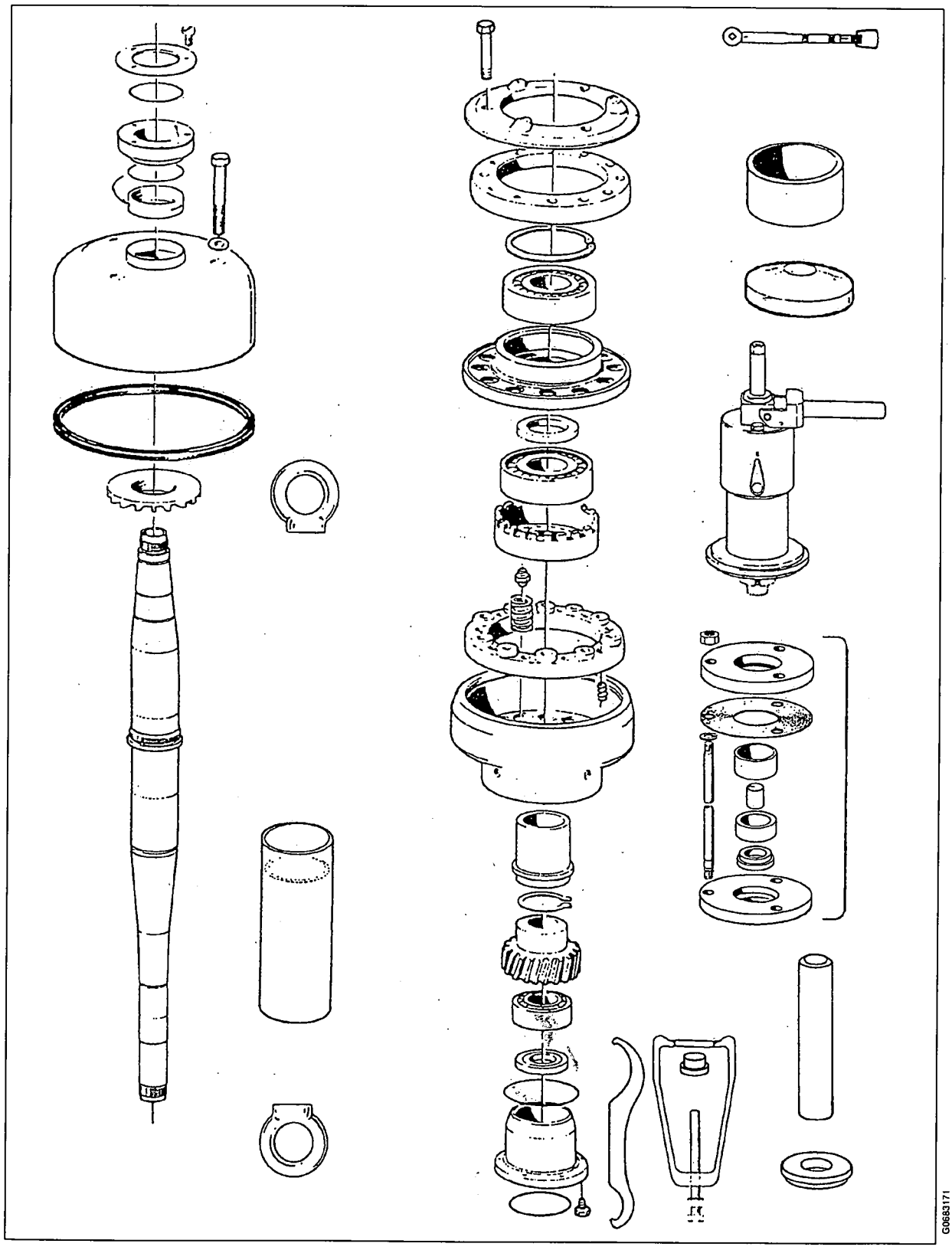


D. Cooling coil
Bearing shield



4.10 Vertical driving device

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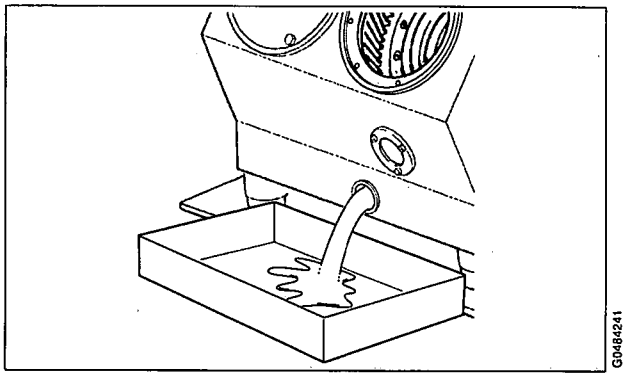
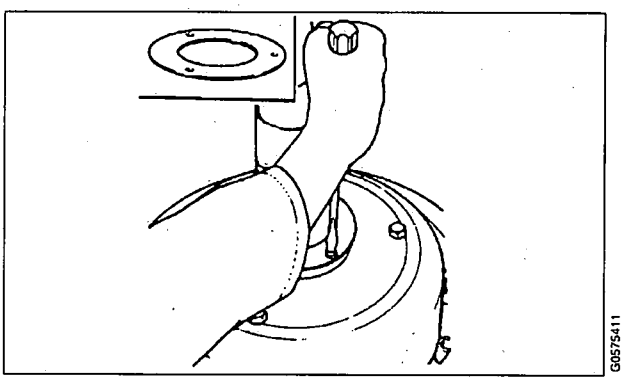
4.10.1 Dismantling

Drain off oil from worm gear housing. The assembly is then accessible after the following parts have been removed in the order stated:

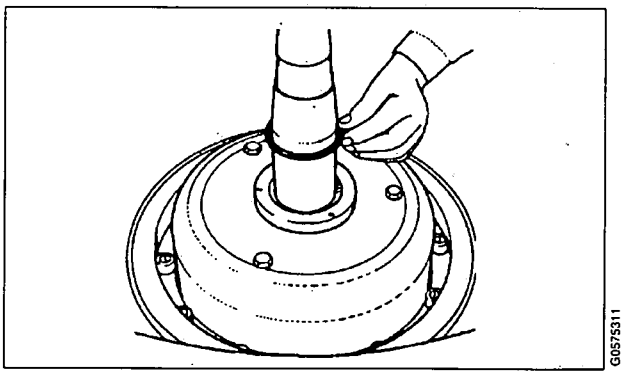
- Outlet
- Frame hood
- Inlet
- Separator bowl and control paring disc device for operating water



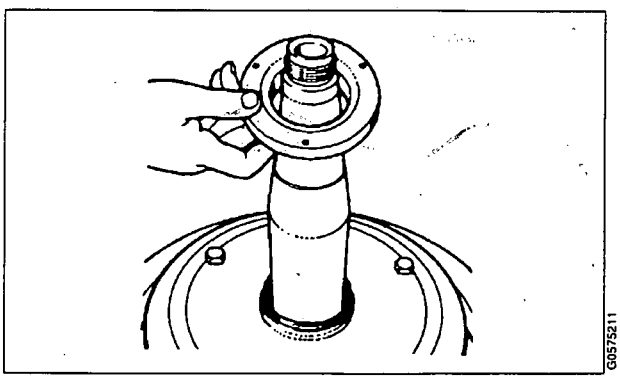
1. Unscrew the three screws and remove the protecting plate.



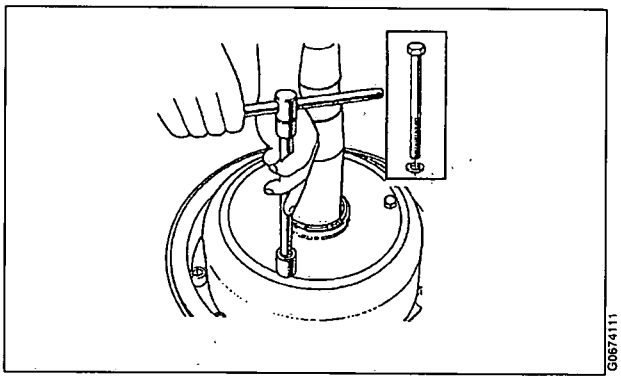
2. Remove the O-ring fitted above the protecting collar.



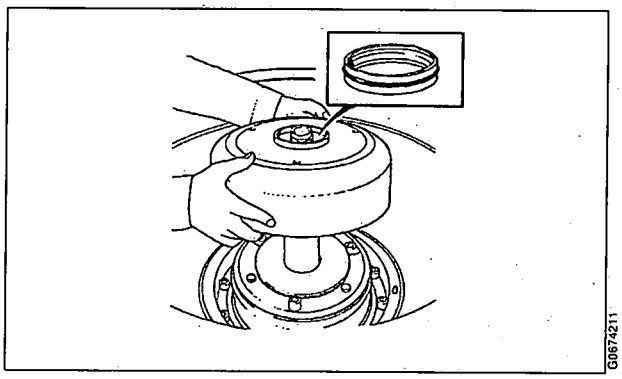
3. Pull off the protecting collar – there are no threads.



4. Unscrew the three screws and remove the guard.

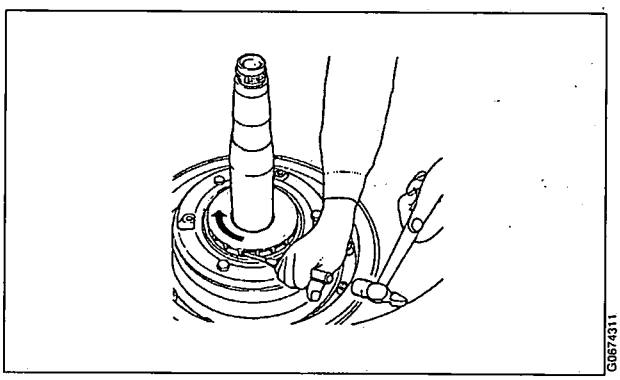


5. Remove the seal fitted in the guard.

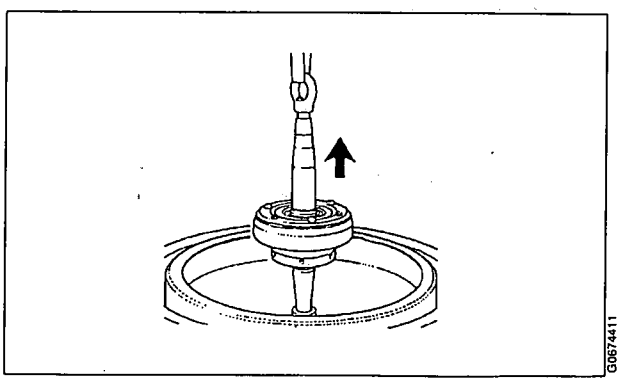


6. Remove the oil fan by hitting with light blows on the wings.

   Left-hand thread!



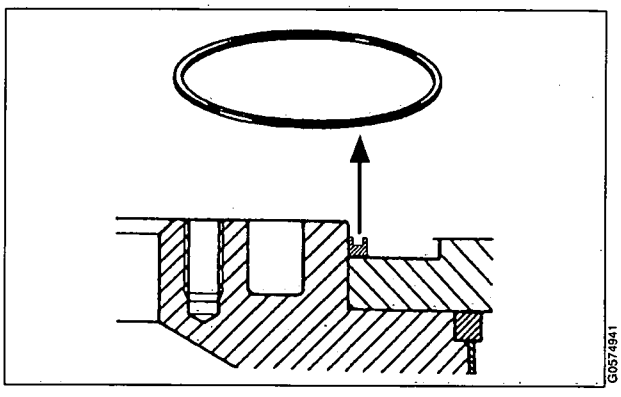
7. To avoid damaging the teeth when lifting the bowl spindle, lift slowly and with great care.



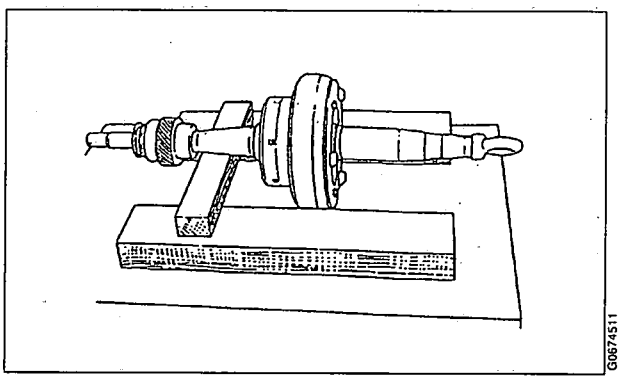
NOTE

Never lift anything but the vertical driving device with the spindle lifting eye.

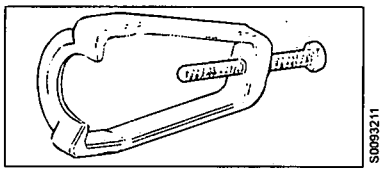
8. Remove the seal ring.

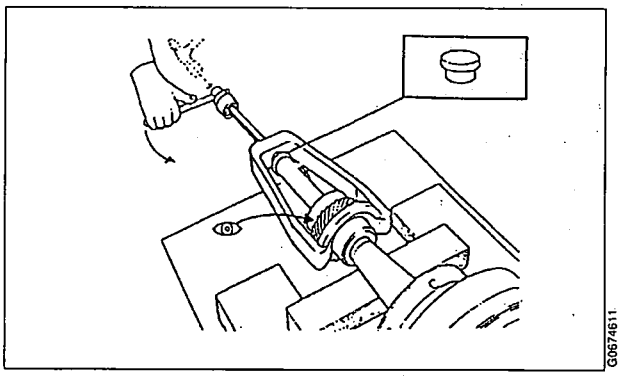


9. Make a wooden support to be used during certain sub-operations



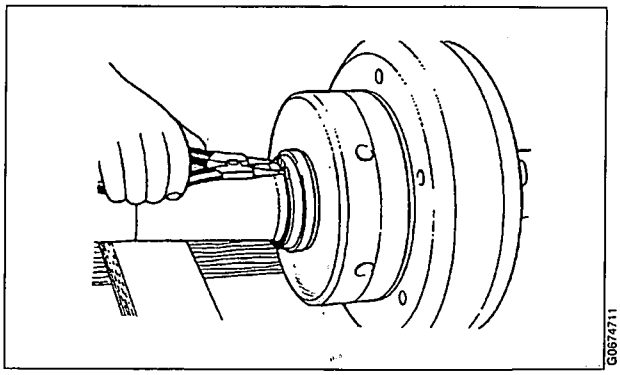
10. Place the plug (included in the tool kit) in the end of the hollow spindle.
Fit the puller tool and pull off the protecting collar, the ball bearing and the worm. Now and then hit on the head of the centre screw.



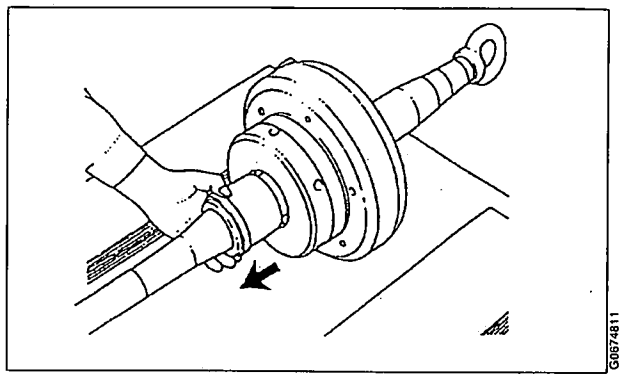


Wear of teeth “4.10.5 Examples of various tooth appearances after operation” on page 156.

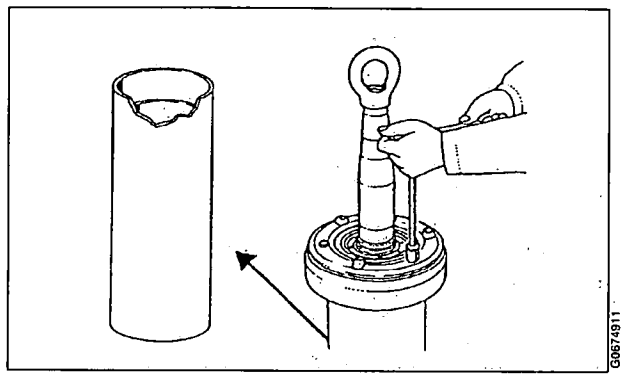
11. Remove the snap ring.



12. Just pull – there are no threads.



13. Place the spindle in the tube included in the set of tools. Loosen the screws of the top bearing cover alternately and a little at a time. Remove the cover.

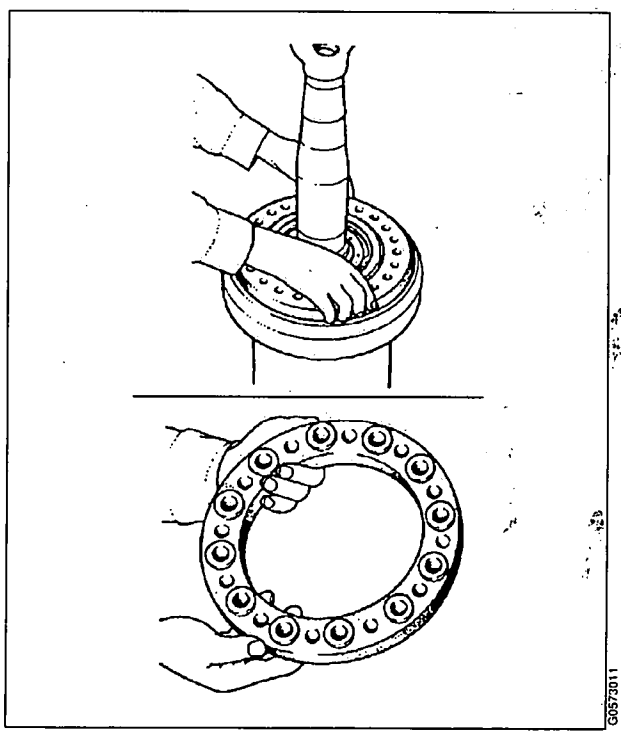


WARNING

Risk for eye injury by flying snap ring

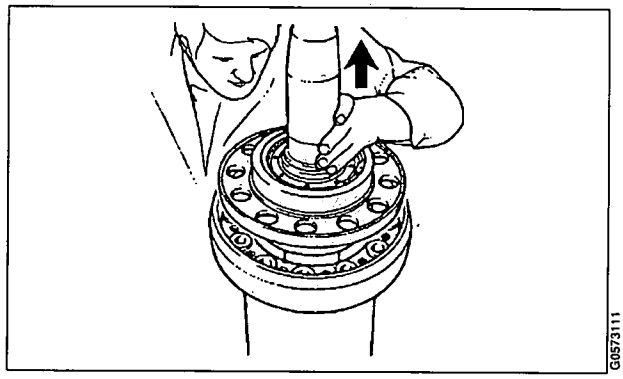
Use the correct pliers for dismantling and assembly of snap ring to avoid accidental release.

14. Remove the upper rubber buffer (not provided with springs).

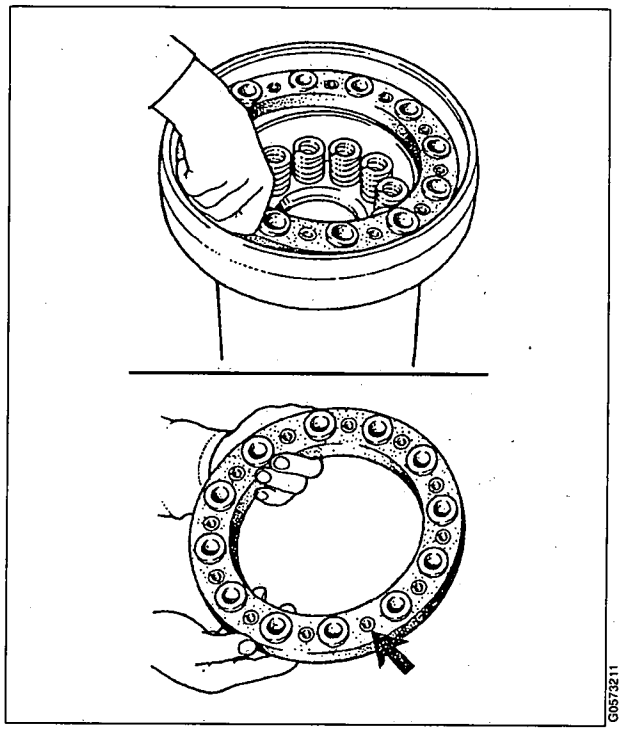


The upper rubber buffer is not provided with springs

15. Lift the spindle out of the spring support.



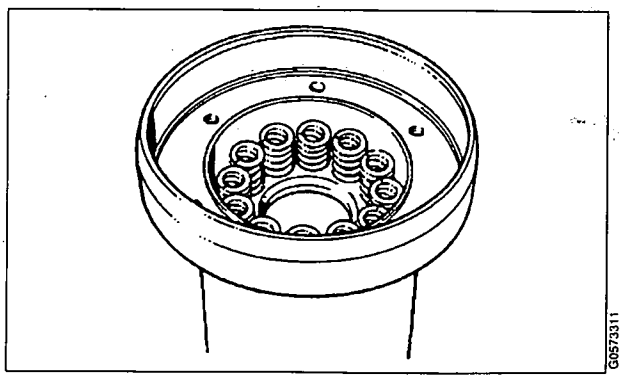
16. Remove the lower rubber buffer (provided with springs) from the top bearing support.

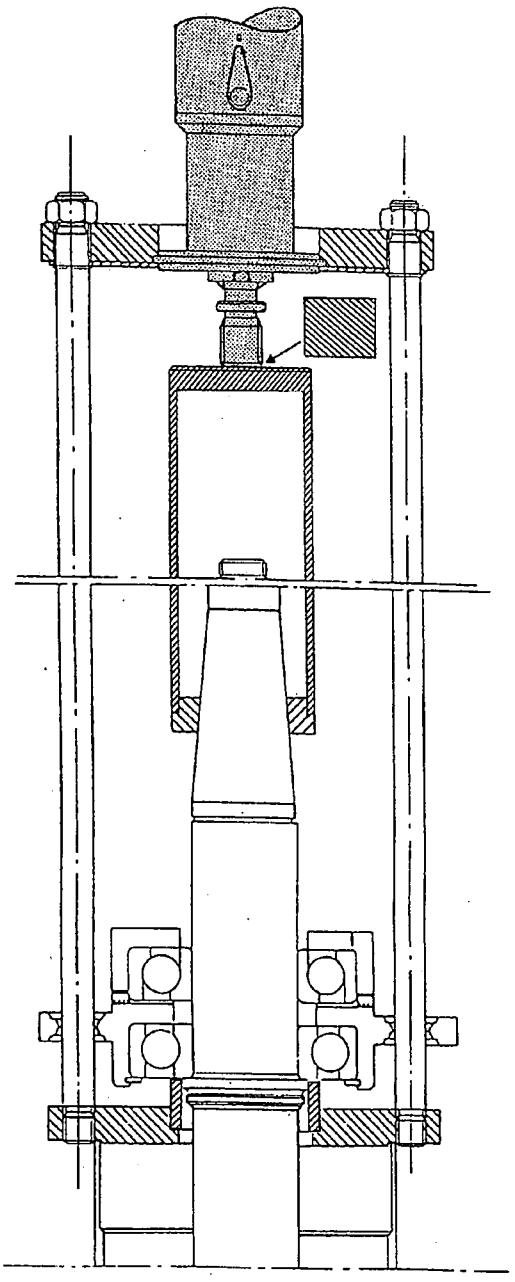


The lower rubber buffer is provided with springs.

17. Remove the springs from the top bearing support.

18. Then remove the top bearing support from the mounting tube.





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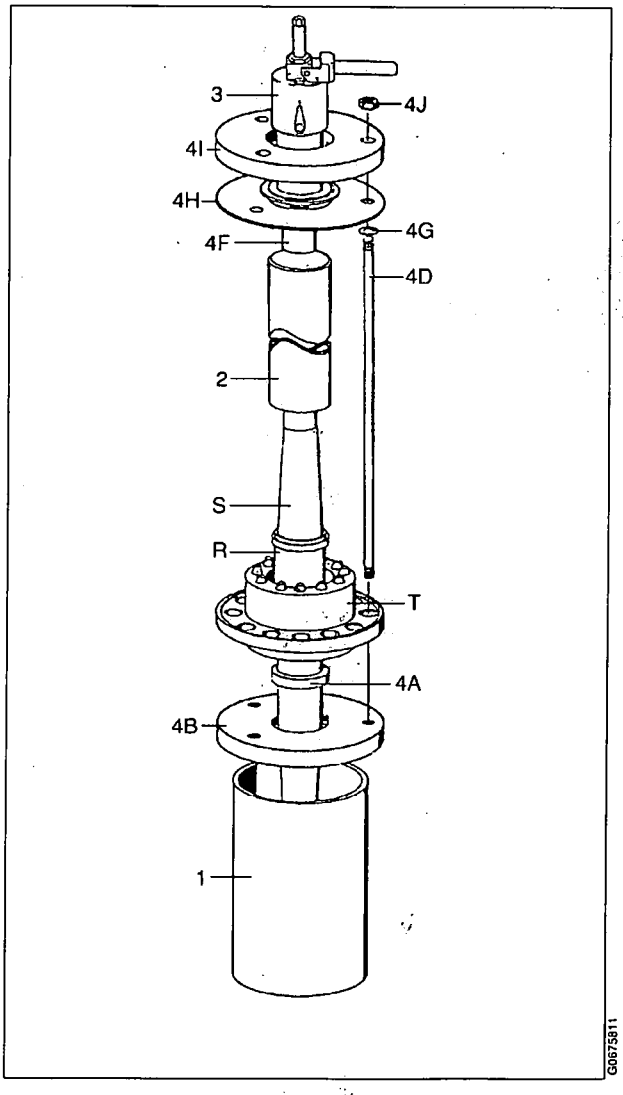
19. Dismantling of top bearings support from the spindle.

Tools:

1. Tube	544288-01
2. End tube	531296-81
3. Compressing tool	543135-06
4. Dismantling and assembly tool	545540-80

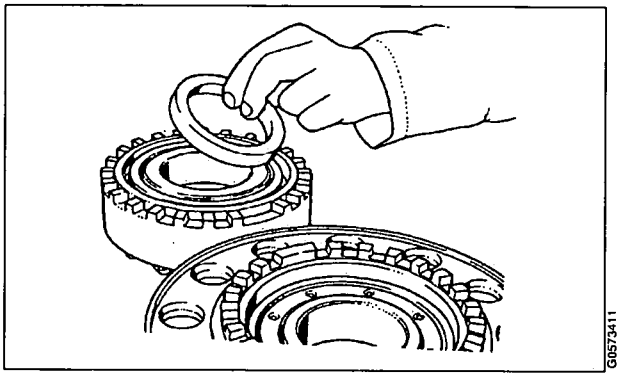
- Arrange the tube (1) on a firm support. Fill the tube with rags to protect the spindle from damage when pressing out.
- Fit the bottom plate (4B) on the tube (1).
- Fit the sleeve (4C) with inside diameter Ø 90 mm on the bottom plate (4B).
- Place the spindle (S) upside down in the bottom plate (4B). Check that the inner race of the ball bearing is in contact with the face of the sleeve (4C).
- Mount the three rods (4D) by fitting them through the holes in the top bearing support (T) and screwing them into the bottom plate (4B).
- Fit the support ring (4E) on the spindle (S). **Note!** The inside diameter of this ring is tapered.
- Fit the end tube (2) over the spindle (S) and let it rest on the support ring (4E).
- Check that the retaining rings (4G) have been fitted. Then fit the washer (4H) for the compressing tool (3) onto the rods (4D).
- Fit the compressing tool (3). **Note!** The piston must be in the top position.
- Fit the top plate (4I) and secure the assembly with the three nuts (4J).
- Arrange the handle of the compressing tool (3) in Pos. 2 and then pump until the piston has reached the bottom position.
- Bring the handle into Pos. 1 and pump until the piston reaches its upper position.
- Place the spacer (4F) between piston and end tube (2).
- Set the handle to Pos. 2 again and continue to pump until the spindle is fully apart from the ball bearings.



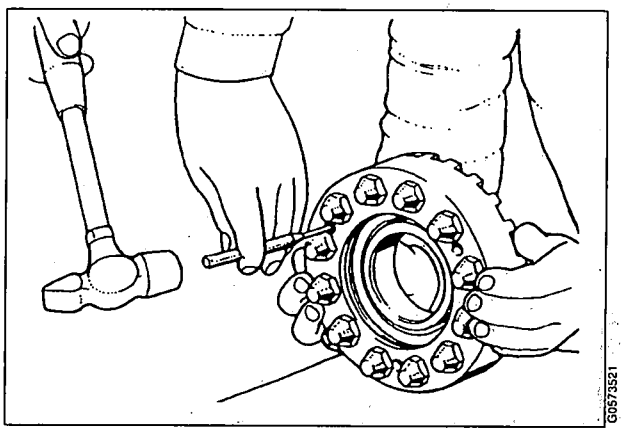
NOTE

Pump slowly during the final stage of pressing out to avoid damage to the spindle when this is released.

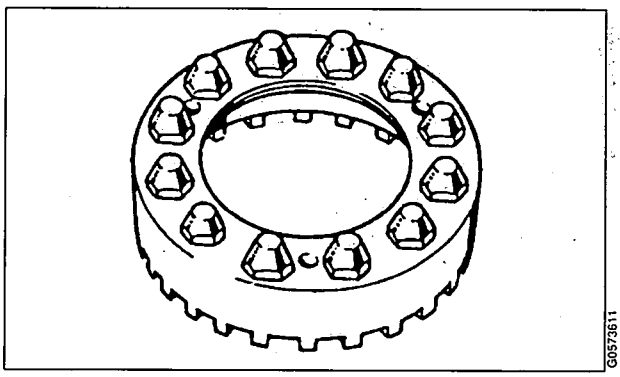
20. The parts removed are the upper and lower ball bearing housings and the spacing sleeve.



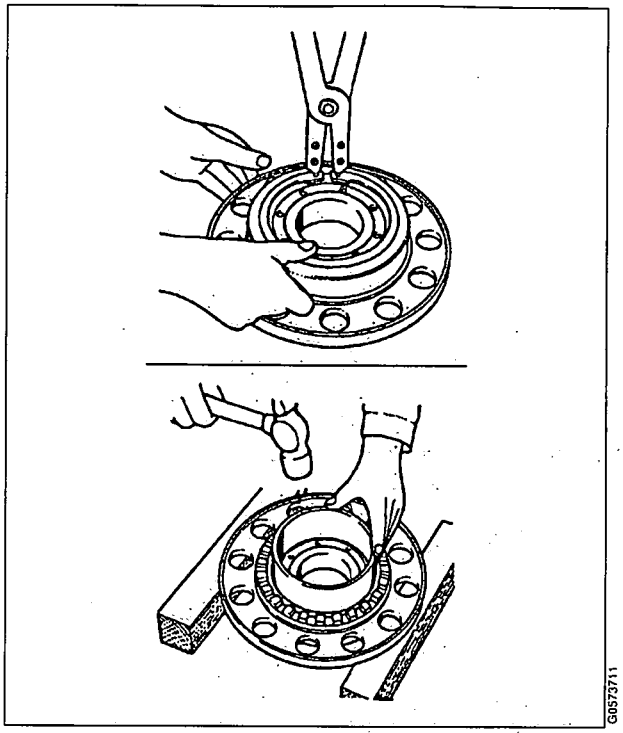
21. Force out the ball bearing.



22. Check the guide pins. Replace any damaged pins but do not loosen the others.



23. Remove the snap ring.
    Force out the ball bearing.

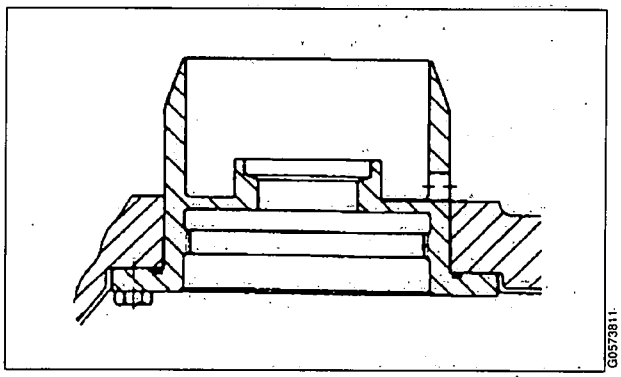


WARNING

Risk for eye injury by flying snap ring

Use the correct pliers for dismantling and assembly of snap ring to avoid accidental release.

24. The bottom bearing housing should normally remain sitting in the frame. It should be dismounted only when it is necessary to replace it, when its O-rings must be replaced or when the separator is to be reconditioned.



4.10.2 Assembly

Note!

- The deep groove ball bearing is to be fitted in the upper housing and the angular contact ball bearing in the lower one.
- Before fitting the bearings, wipe off the bearing seats of the spindle and apply some oil to the seats.
- See chapter "2.9 Ball and roller bearings" on page 31.

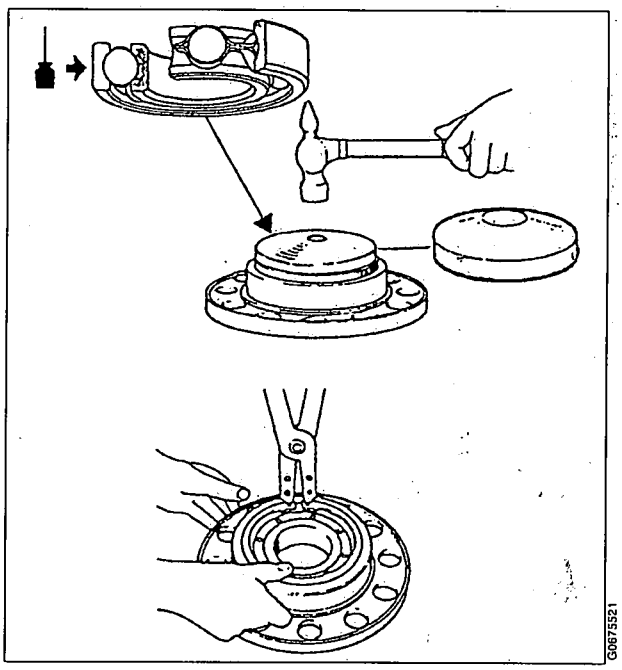
1. If the bottom bearing housing has been removed, fit new O-rings (in- and outside the bottom bearing housing).

2. Lock the upper ball bearing with the snap ring.

WARNING

Risk for eye injury by flying snap ring

Use the correct pliers for dismantling and assembly of snap ring to avoid accidental release.

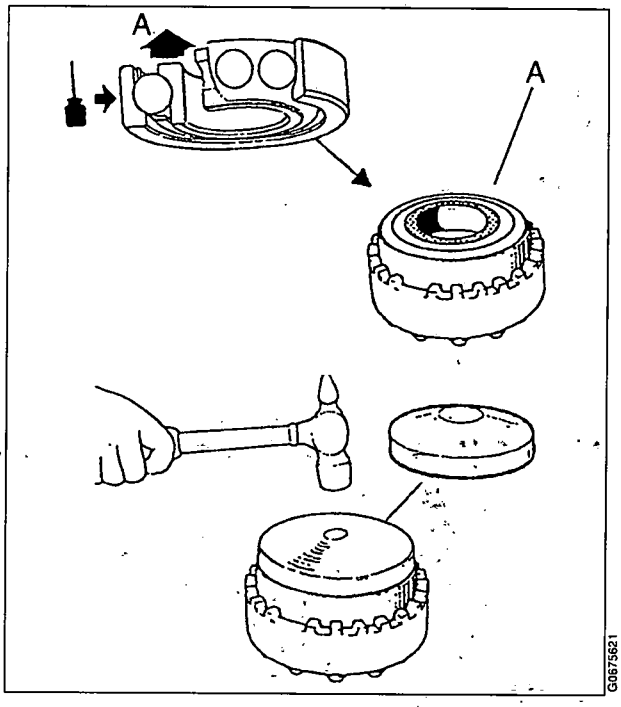


Fitting the deep groove ball bearing

3. Apply the mounting washer and force the ball bearing in position.

   Important:

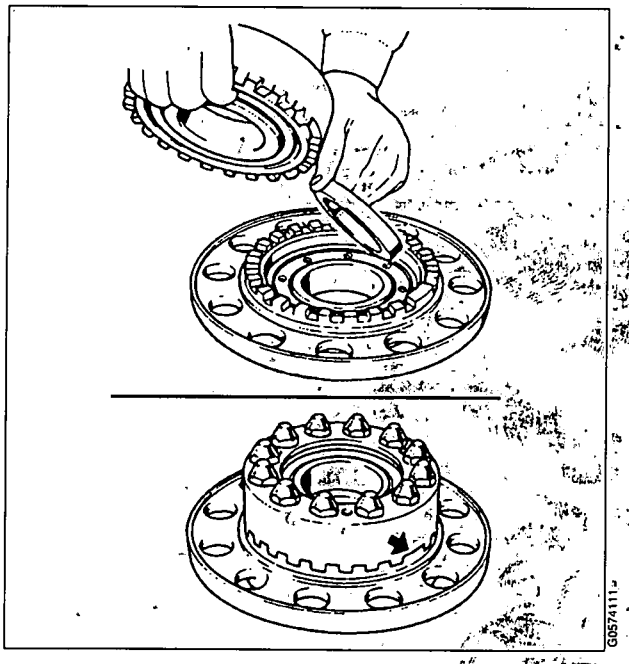
   Turn the angular contact ball bearing the right way - the **wide** shoulder of the **inner** race must face upwards (A).



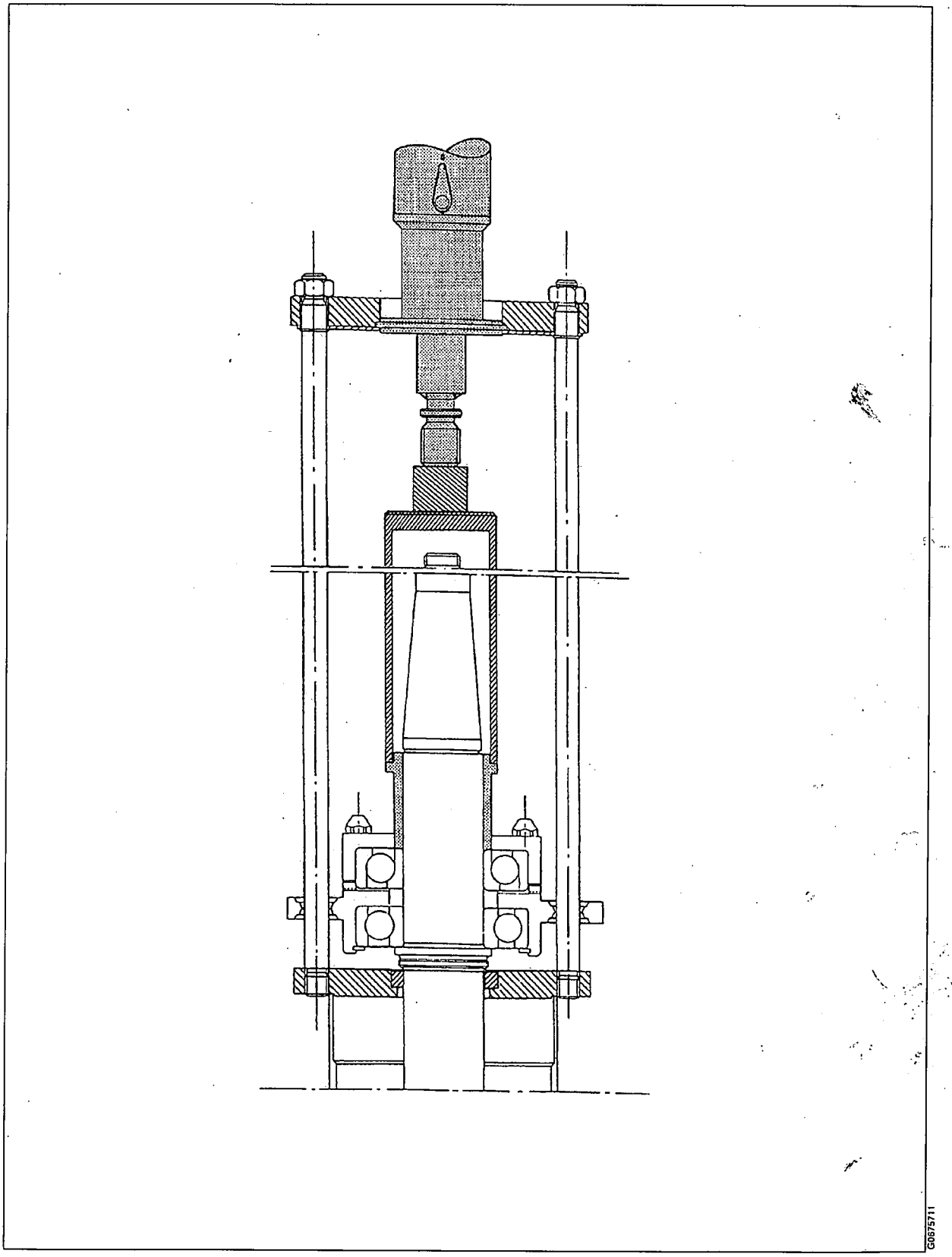
Fitting the angular contact ball bearing

> **NOTE**
>
> A bearing of this kind turned upside down cannot carry any load. It collapses when loaded resulting in breakdown of the machine

4. Assemble the two housings and the space sleeve into a unit.



Assembly of the bearing housing
One tooth and the corresponding recess is wider than the others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5. Assembly of top bearings on the vertical drive

Tools to be used:

1. Tube	544288-01
2. End tube	531296-81
3. Compressing tool	543135-06
4. Dismantling / Assembly tool	545540-80

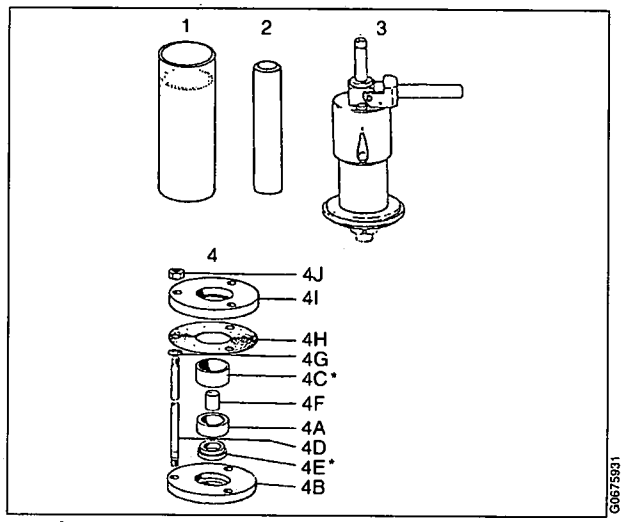
- Arrange the tube (1) on a firm support.
- Fit the bottom plate (4B) on the tube (1).
- Fit the ring (4A) with inside diameter Ø 77 mm in the bottom plate (4B).
- Place the spindle (S) upside down in the bottom plate (4B). **Note**! The collar on the spindle (S) must be resting on the ring (4A).
- Fit the ball bearing housing (T) onto the spindle (S). Note! The top bearing is to be mounted upside down. See fig.
- Mount the sleeve (R), which must be in contact with the inner race of the ball bearing.
- Fit the end tube (2) on the sleeve (R).
- Screw the three rods (4D) into the bottom plate (4B).
- Check that the retaining rings (4G) have been fitted. Fit washer (4H), compressing tool (3) and top plate (4I). Secure the assembly by tightening the three nuts (4J).

Arrange the handle of the compressingcompressingcompressing tool (3) in Pos. 2 and pump until the piston has reached the bottom position.

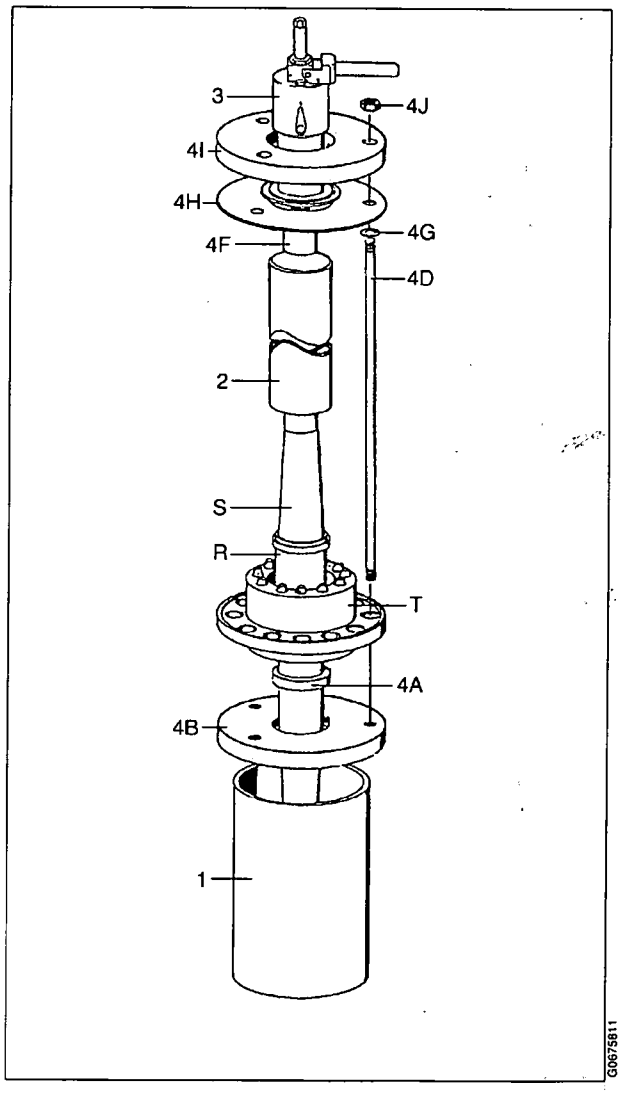
Move the handle to Pos 1. Pump up the piston into the top position.

Place the spacer (4F) between end tube (2) and piston of the compressing tool (3). Bring the handle to Pos. 2 and continue compressing until the inner race of the ball bearing is in contact with the collar on the spindle (S).

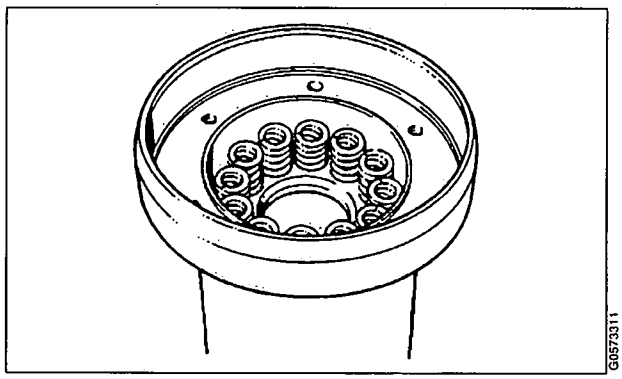
Remove the tool and continue with the mounting of the other parts for the vertical drive.



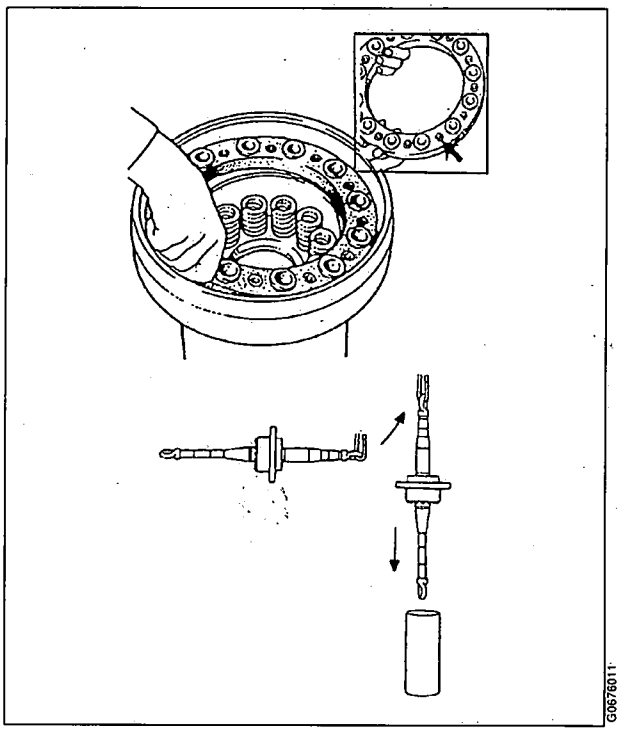
* *Not used during assembly*



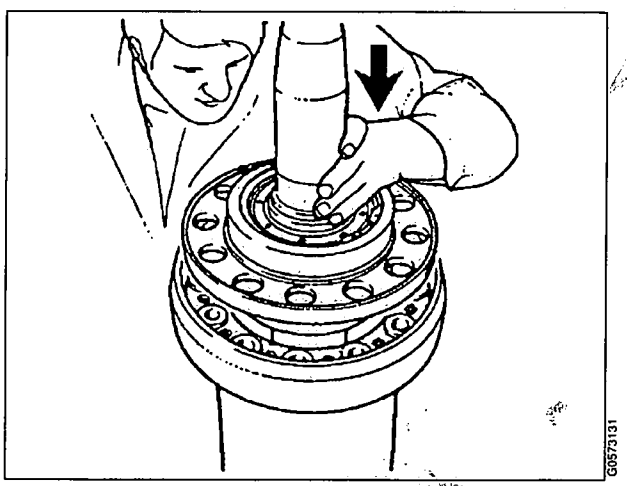
6. Fit the top bearing support in the tube end and put the springs in place.



7. Mount the rubber buffer with springs.

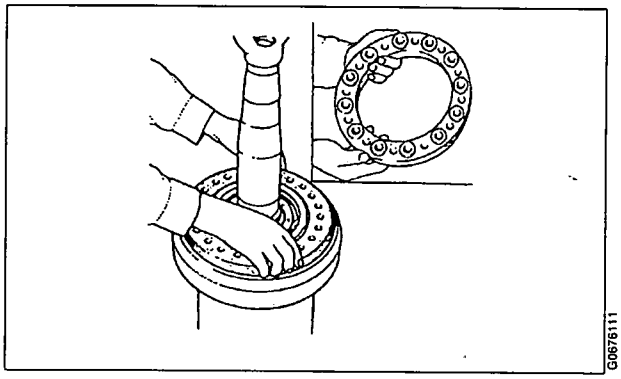


8. Lower the spindle into the top bearing support. Ascertain that the guide pins enter the springs.



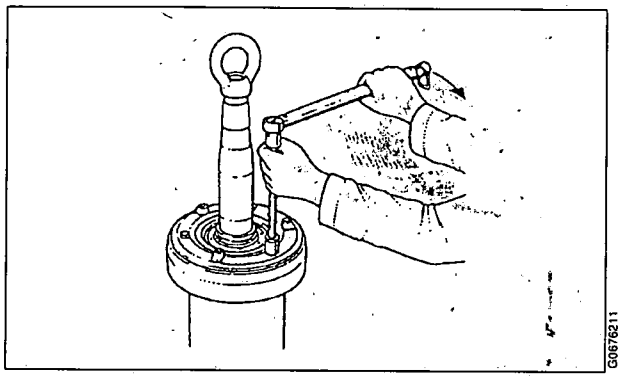
Pour a few drops of oil in the ball bearings (of the same quality as is used in the worm gear housing)

9. Mount the rubber buffer without springs.



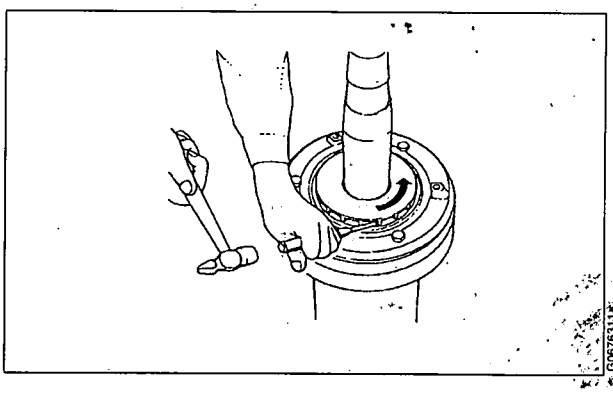
10. Mount the cover and tighten its screws alternately, a little at a time. Do not use pneumatic tools.

    Final tightening torque: **60 Nm**.

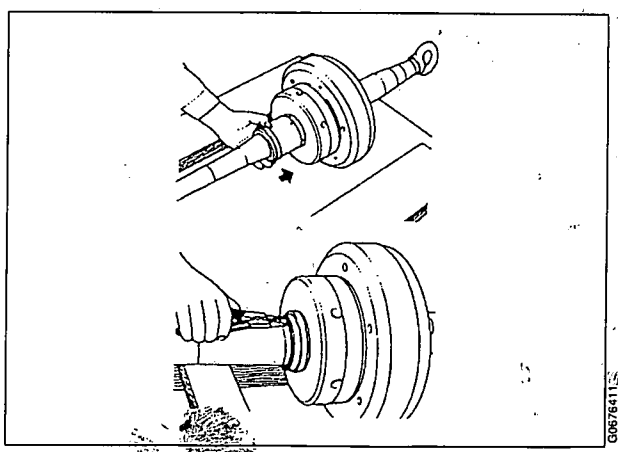


11. Hit with light blows on the wings of the oil fan to tighten it.

    Left-hand thread!



12. Lay down the spindle, fit the sleeve and lock it with the snap ring.

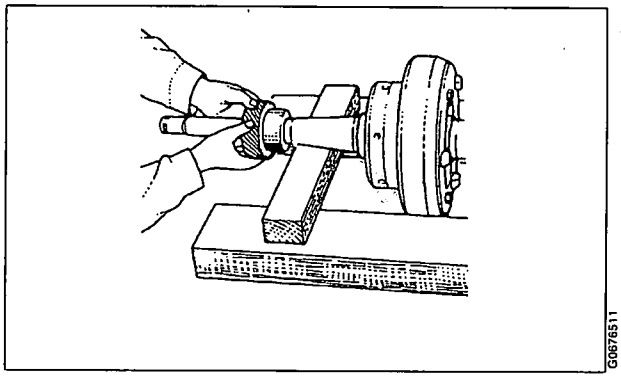


WARNING

Risk for eye injury by flying snap ring

Use the correct pliers for dismantling and assembly of snap ring to avoid accidental release.

13. Make sure that the conical surfaces inside the worm and on the spindle are clean and free from oil before the worm is fitted.



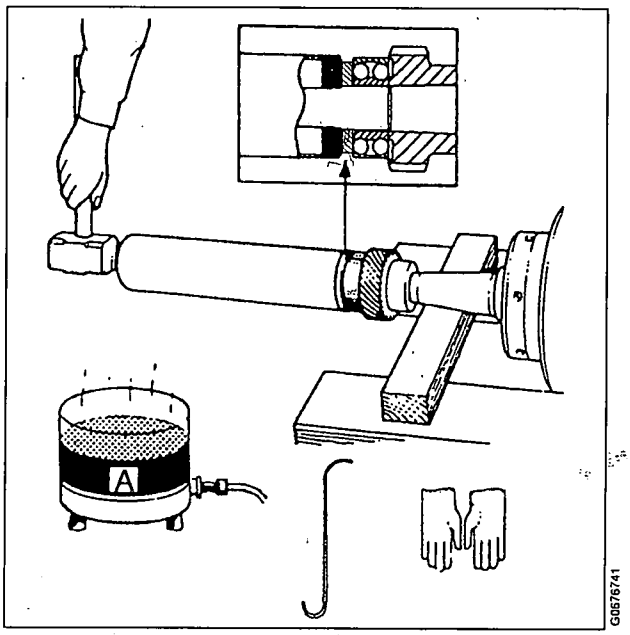
14. Wipe off and grease the bearing seat before fitting the ball bearing.

    The bearing can be assembled either in hot or in cold condition.

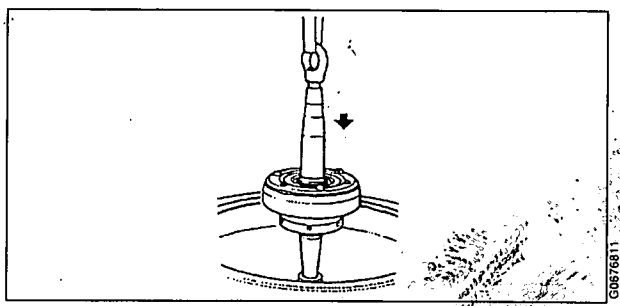
    Assembly in hot condition (recommended by the supplier): Heat the bearing in oil (A), max.100 °C, about 10 minutes, or in a heating cabinet. If the oil heating method is used, the oil must be absolutely clean.

    Also heat the protecting collar.

    Fit the bearing. Fit the protecting collar. When it has cooled, fit the ring and the driving-on tool as shown in the figure and hit it a few times to ascertain that the bearing and the protecting collar are in the correct position.

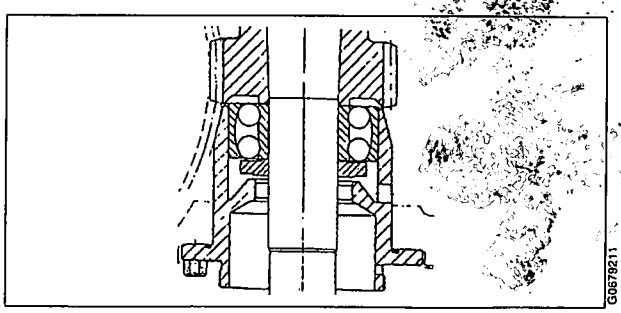


15. To avoid damaging the teeth, the spindle should be lowered with great care.

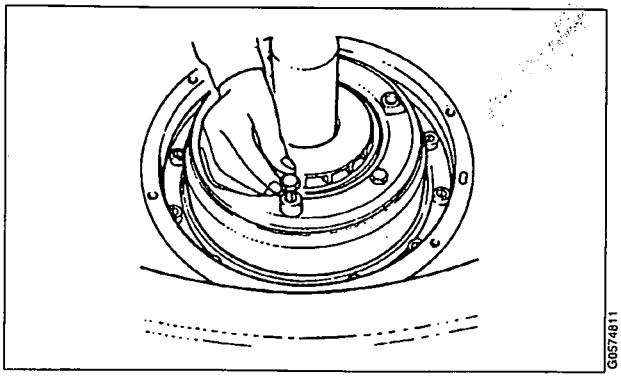


16. Guide the bearing into the bottom bearing housing. If it does not quite bottom in its seat, knock lightly on the spindle top with a tin hammer.

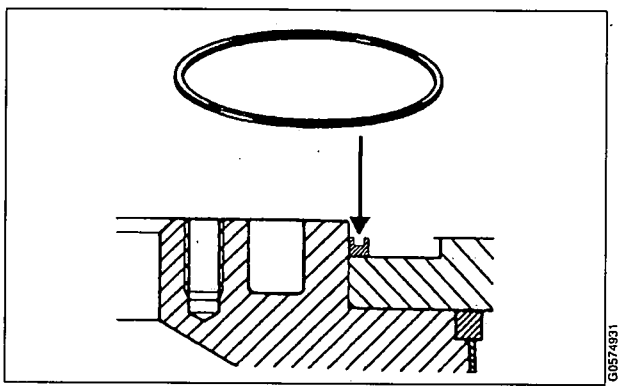
    Wait, however, to knock it down entirely until next suboperation 16 is carried out.



17. Make sure that the ball bearing housings are in their correct angular position by means of one of the screws that fastens the top bearing. Then lower the spindle to the bottom.

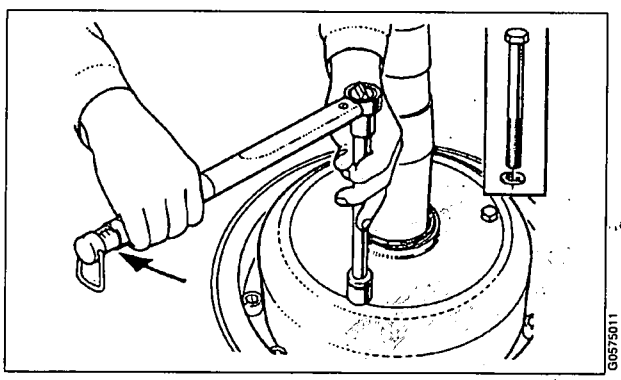


18. Fit the seal ring. Lower the guard into position.

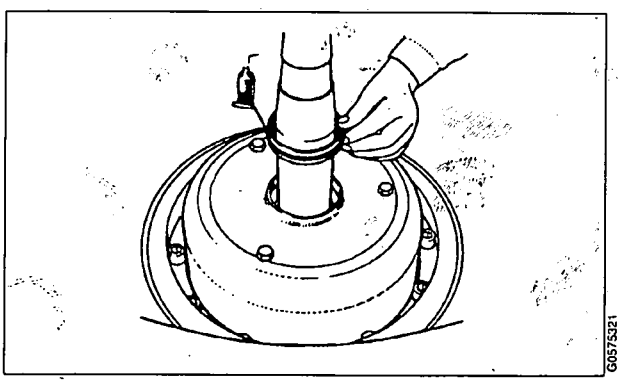


19. Fit new seal rings under the screw heads. Tighten the screws alternately, a little at a time. Do not use pneumatic tools.
Final tightening torque: **40 Nm**.

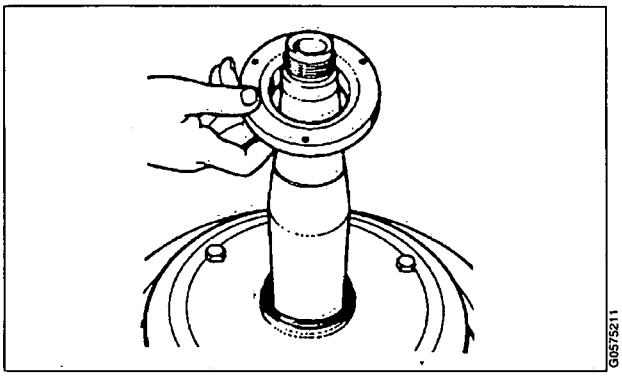
✔ **Check point**
"4.10.3 Check points - Radial wobble of bowl spindle" on page 153.



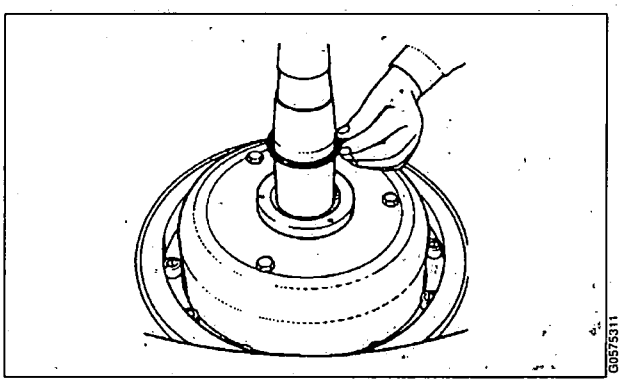
20. Fit the seal.



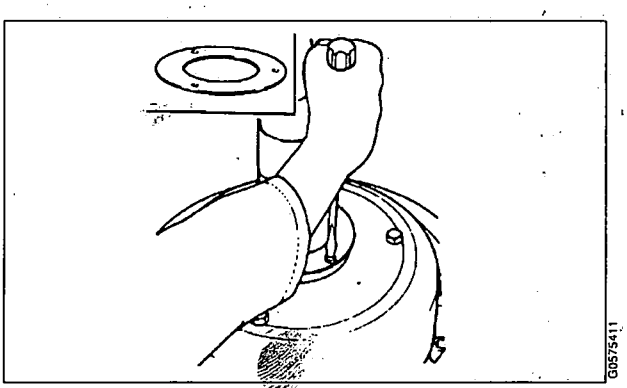
21. Fit the protecting collar and push it **firmly** down against the oil fan.



22. Fit the O-ring dry – do not grease.



23. Fit the protecting plate and tighten the screws.



4.10.3 Check points - Radial wobble of bowl spindle

- Excessive radial wobble at the top of the spindle is indicated by uneven running of the bowl (vibration).

Check the wobble as a precautionary measure at each intermediate service (IS), before every dismantling and after every assembly of the spindle.

Set up a dial indicator on a magnetic stand. Use the key for the large lock ring as a support for the stand – see the figures. (The key can also rest on the protecting cap of the top bearing.)

Measure the wobble at the taper end of the top of the spindle.

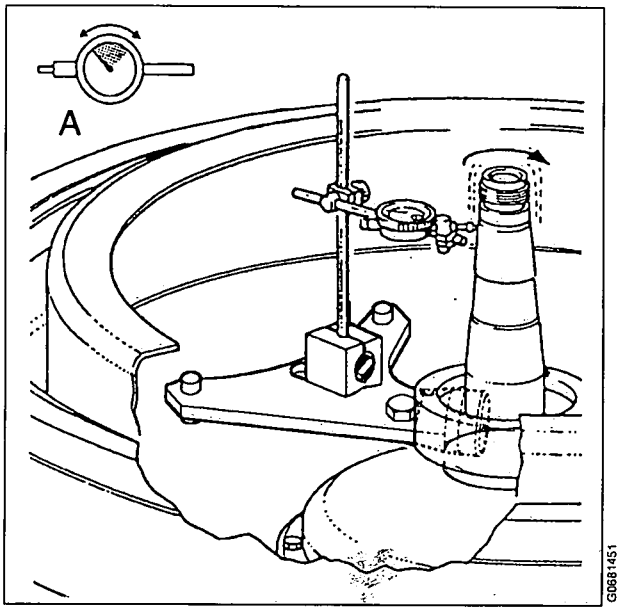
Maximum permissible wobble (**A**) is **0,05 mm**

If the wobble is excessive, the spindle unit must be removed from the frame and dismantled for closer examination. Get in touch with the supplier. The spindle may need to be replaced.

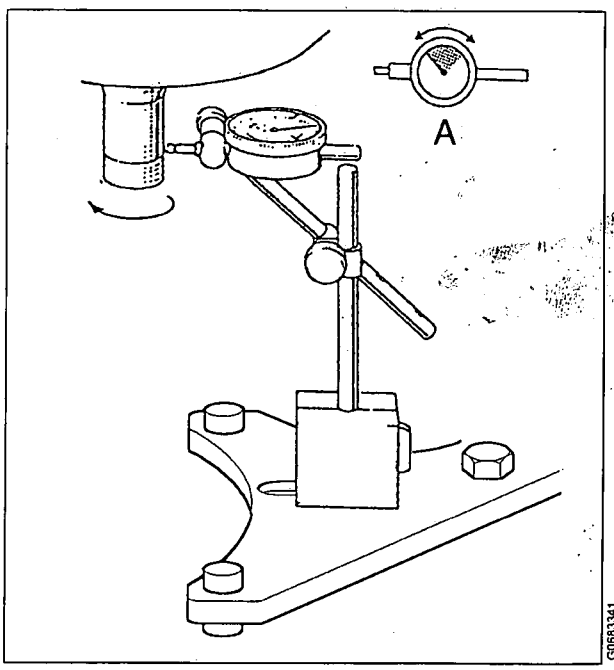
When the separator has a hollow spindle, the wobble should also be checked at the cylindrical part right at the bottom of the spindle above the threads.

Maximum permissible wobble (**A**) is **0,05 mm**

Excessive wobble can cause abnormal wear in the axial seal and result in leakage.



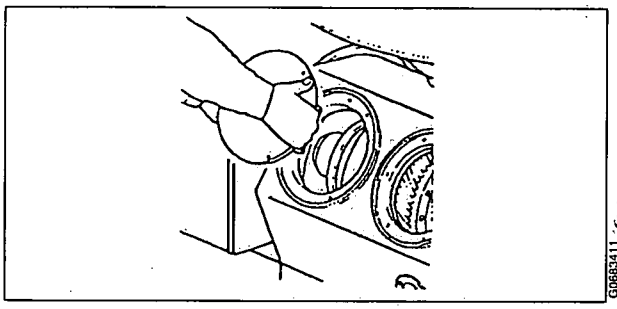
A. *Max. 0,05 mm*

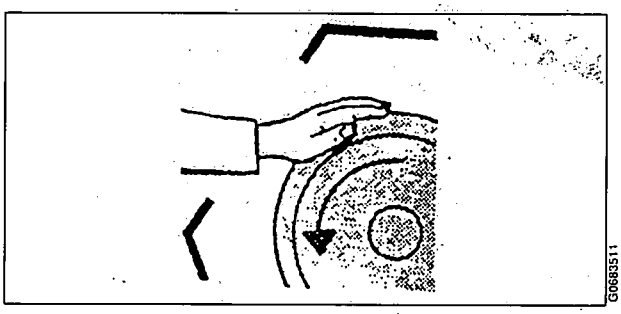


A. *Max. 0,05 mm*

Important!

During indication the spindle must be revolved by hand with the aid of the coupling drum.





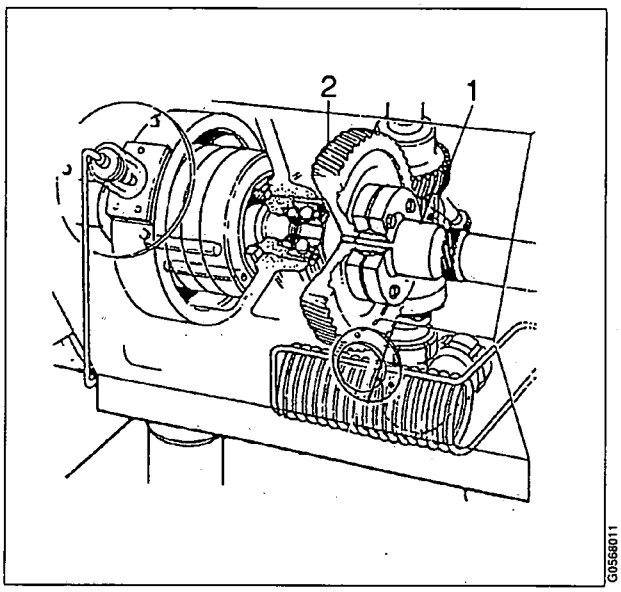
4.10.4 Check points - Worm gearing

Worm and worm wheel (worm gearing)

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 at the same time as the worm wheel.

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

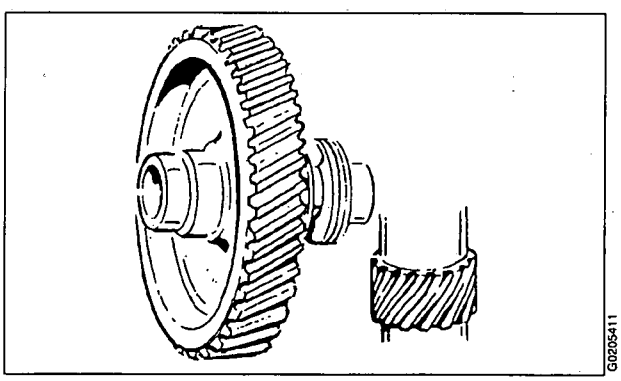
To avoid damaging the teeth when lifting the bowl spindle, first push the worm wheel aside. For the same reason put the spindle in place before mounting the worm wheel.



1. Worm
2. Worm wheel

When replacing the gearing, always ensure that the new parts have the correct number of teeth.

See Technical data in the *Installation Manual*.



WARNING

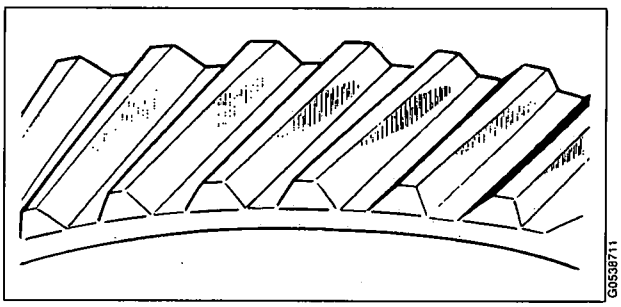
Disintegration hazard

Check that gear ratio is correct for power frequency used. If incorrect, subsequent overspeed may result in a serious breakdown.

4.10.5 Examples of various tooth appearances after operation

Satisfactory teeth

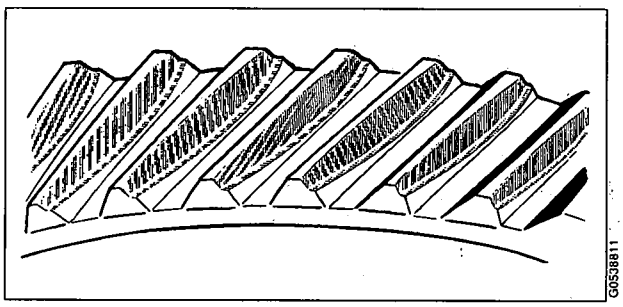
Uniform wear of contact surfaces. Surfaces are smooth. Good contact surfaces will form on the teeth when the gear is subjected only to moderate load during a running-in period.



Worn teeth

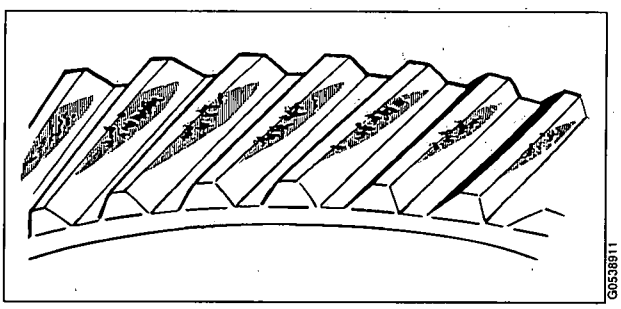
Permissible wear is as a rule 1/3 of the thickness of a tooth, provided that

- the wear is uniform over the whole of the flank of a tooth.
- all teeth are worn in the same way.



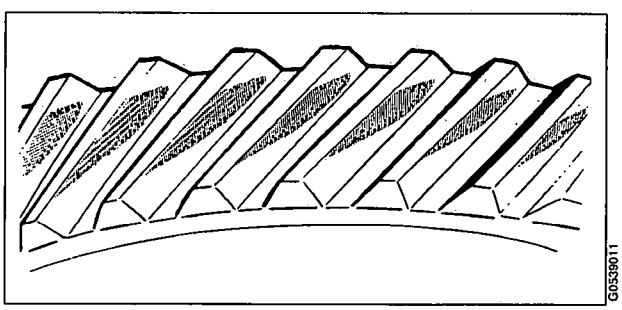
Spalling

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.

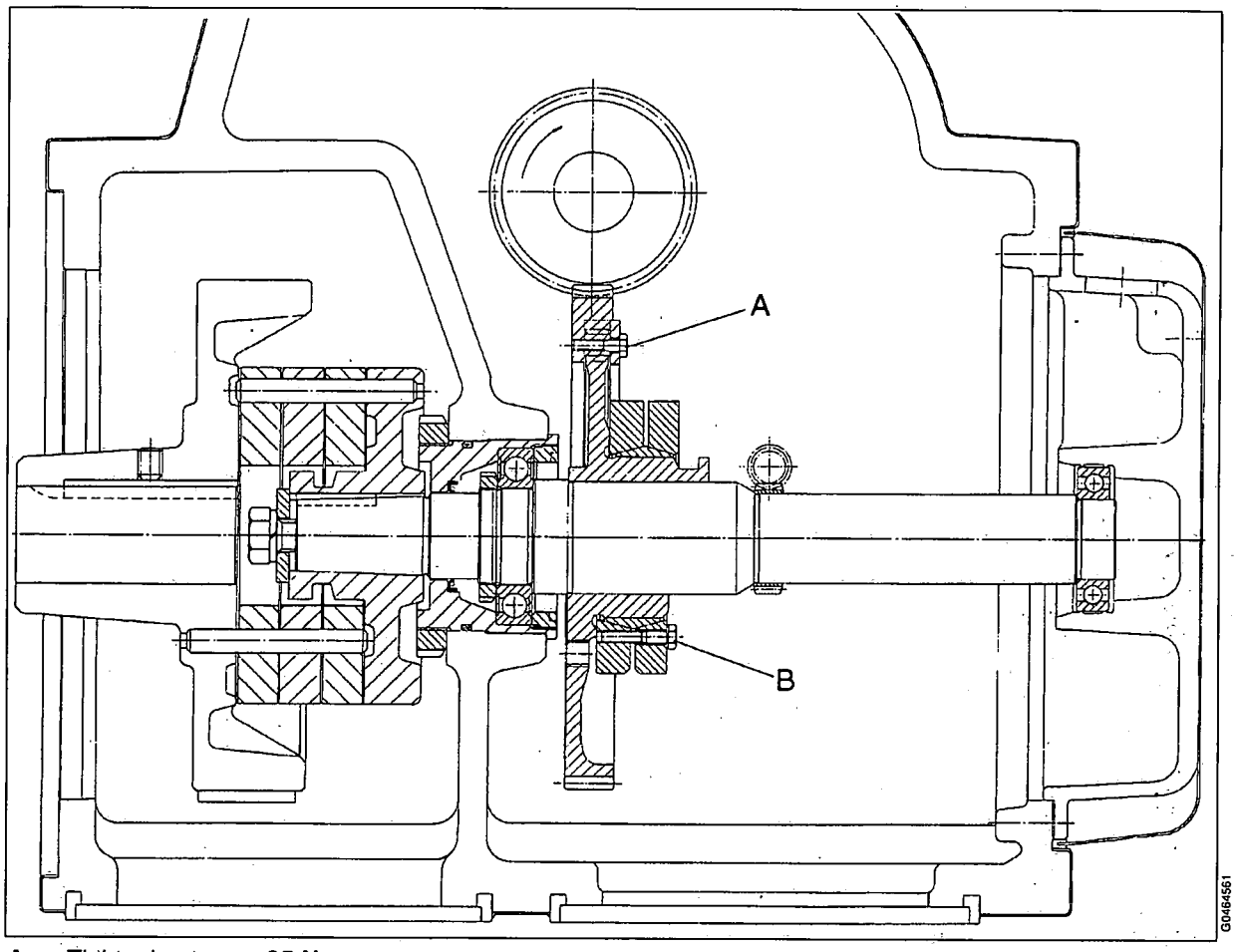


Pitting

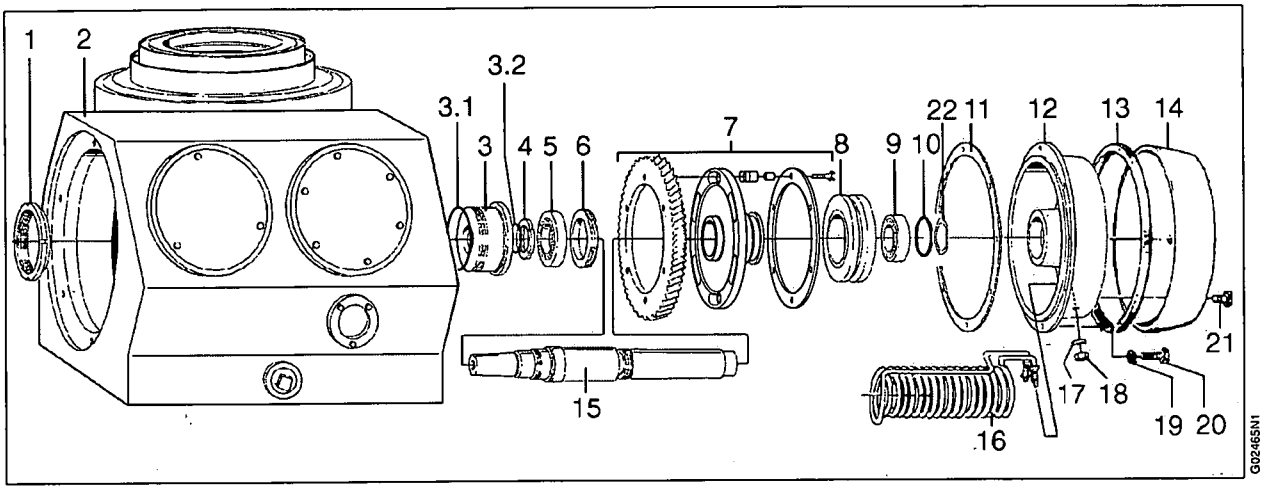
Small cavities in the teeth, so-called pitting. This is often due to excessive load or improper lubrication. Damage of this type need not necessitate immediate replacement, but careful checking at short intervals is imperative.



4.11 Horizontal driving device



A *Tightening torque* **25 Nm**
Locked with Loctite 270
B *Tightening torque* **29 Nm**



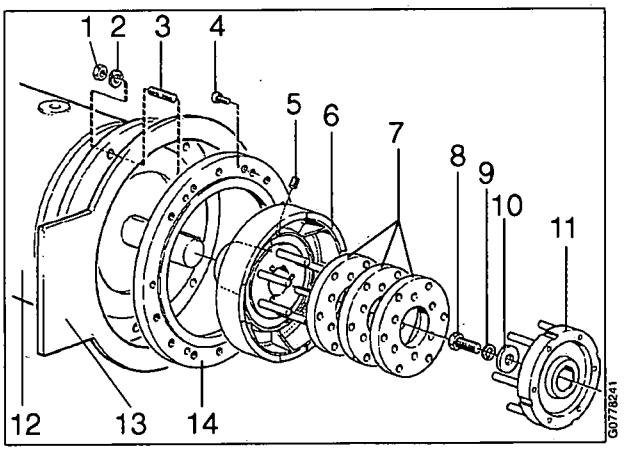
Worm gear end

*1.**	*Round nut*	*7.*	*Worm wheel*	*15.*	*Worm wheel shaft*
2.	*Frame bottom part*	*8.*	*Clamp element*	*16.*	*Cooling coil*
*3.**	*Bearing housing*	*9.*	*Small ball bearing*	*17.*	*Washer*
3.1	*O-ring*	*10.*	*O-ring*	*18.*	*Nut*
3.2	*Seal ring*	*11.*	*Gasket*	*19.*	*Washer*
4.	*Round nut*	*12.*	*Bearing shield*	*20.*	*Screw*
5.	*Large ball bearing*	*13.*	*Seal strip*	*21.*	*Screw*
6.	*Lock ring (left hand thread)*	*14.*	*Guard*	*22.*	*Corrugated shim*

* *The bearing housing should normally remain sitting in the frame. It should be dismantled only when it is necessary to replace it or the O-ring (3.1), or when the separator is to be reconditioned.*
If it is to be removed, observe that the round nut (1) is locked with Loctite. The nut is therefore easier to unscrew when heated.
The bearing housing is also fixed with Loctite.
When fitting a new bearing housing, apply Loctite 603 on its guiding surface against the frame and Loctite 243 on the threads.

Drive motor end

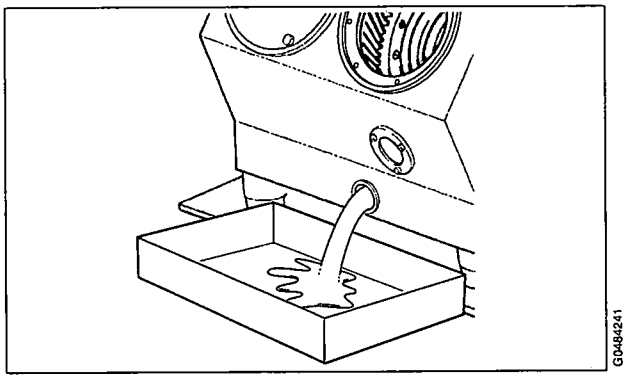
1. *Nut*
2. *Washer*
3. *Stud bolt*
4. *Screw*
5. *Stop screw*
6. *Brake pulley*
7. *Elastic plate*
8. *Screw*
9. *Spring washer*
10. *Washer*
11. *Coupling disc*
12. *Electric motor*
13. *Guide ring*
14. *Motor adapter*



4.11.1 Dismantling

The horizontal driving device is dismantled as follows. It will be easiest to loosen the clamping of the worm wheel if the bowl and spindle are still fitted in the machine.

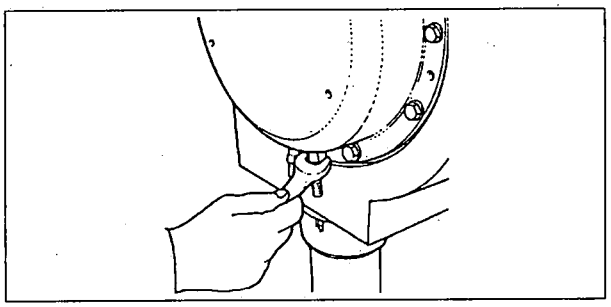
1. Shut off the water supply and disconnect the cooling water connections to the cooling coil in the worm gear housing.
2. Drain off oil from worm gear housing.



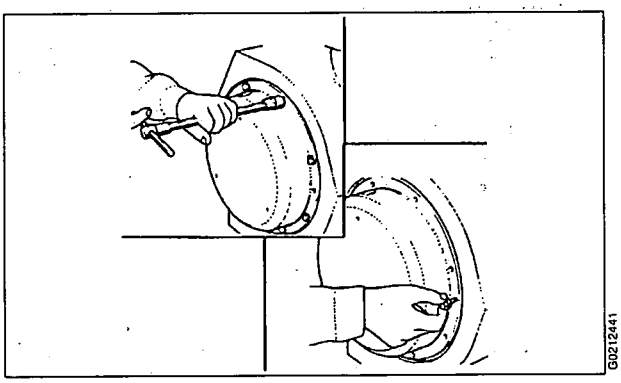
CAUTION

Burn hazards

Lubricating oil and various machine surfaces can be hot and cause burns.



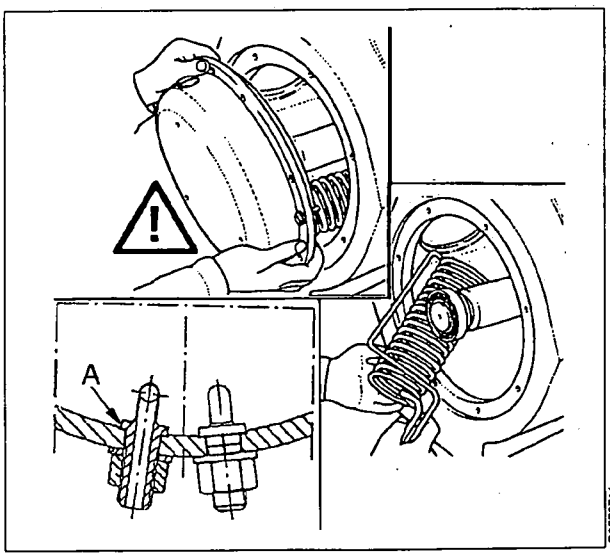
3. Remove the worm wheel guard with the revolution counter.
4. Remove the brake cover.
5. Disconnect the cooling water connections. Remove the bearing shield cover.
6. Remove the nuts and washers of the cooling coil and press the two tube ends into the bearing shield.
7. Remove the bearing shield: Ease it off by means of two of the fastening bolts.



CAUTION

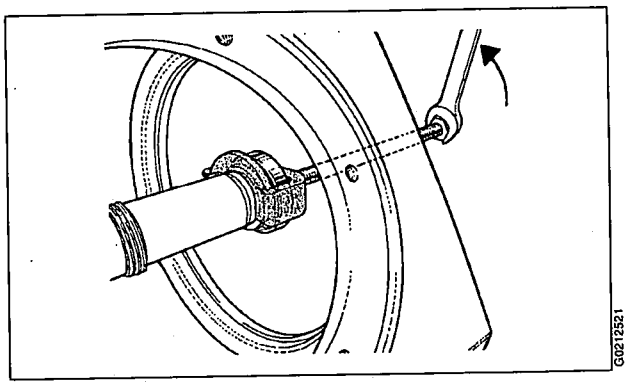
Crush hazard

The shield is quite heavy (15 kg cast iron). Hold the shield firmly or use two longer screws as guide pins so as not to drop it during dismantling.

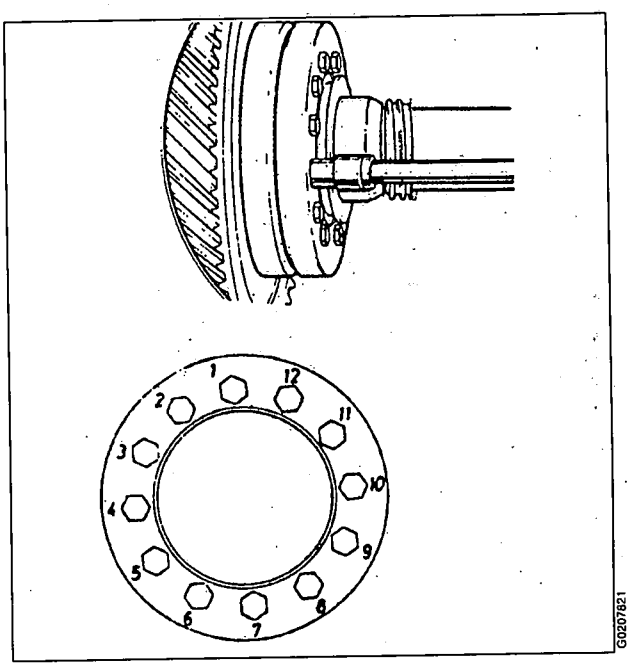


8. Lift out the cooling coil and take care of the gaskets (A).

9. Fit the puller tool and pull off the ball bearing.



10. Loosen the clamp screws uniformly and successively around the clamping rings in the order stated. In the first round, do not loosen them more than 1/4 turn to avoid wryness in the clamping rings. Do not screw out the clamp screws entirely.
11. Remove the clamping element and the worm wheel. See "4.10.5 Examples of various tooth appearances after operation" on page 156

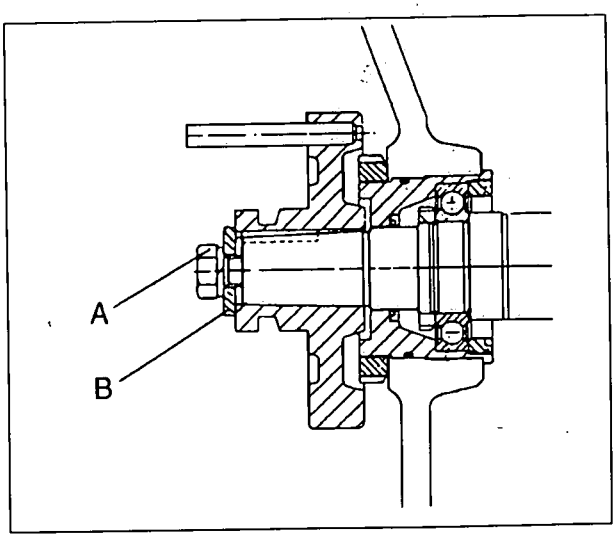


CAUTION

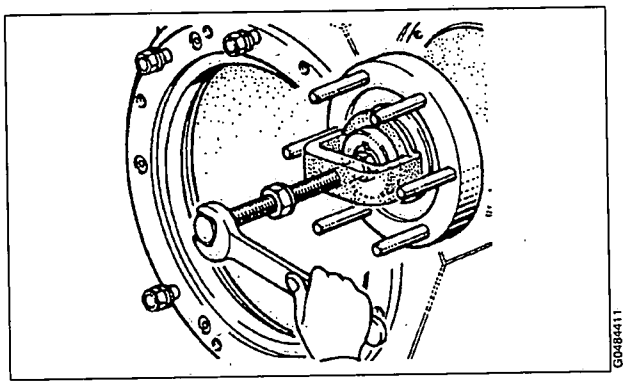
Crush hazard

The worm wheel is quite heavy. Hold it firmly when dismantling. Risk for jamming injury.

12. Remove the motor. See "4.16.2 Removing the motor" on page 174.
13. Remove the rubber discs from the coupling.
14. Unscrew the centre screw (A) and remove the plain washer (B). Then tighten the screw (A) again to protect the shaft during next operation.

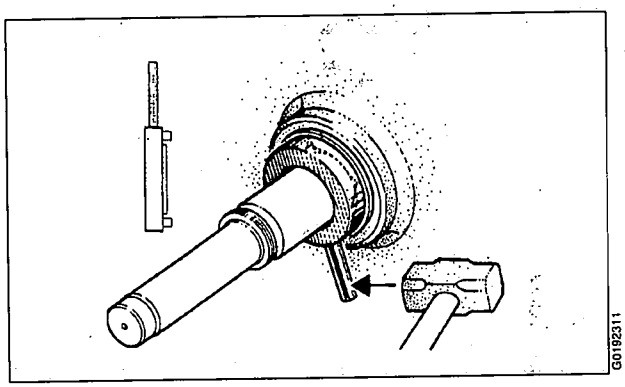


15. Fit the puller tool and pull off the coupling.

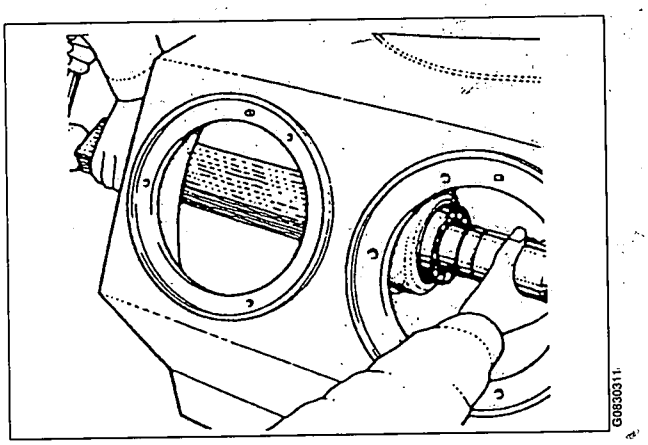


16. Remove the lock ring. Use the pin spanner or a drift.

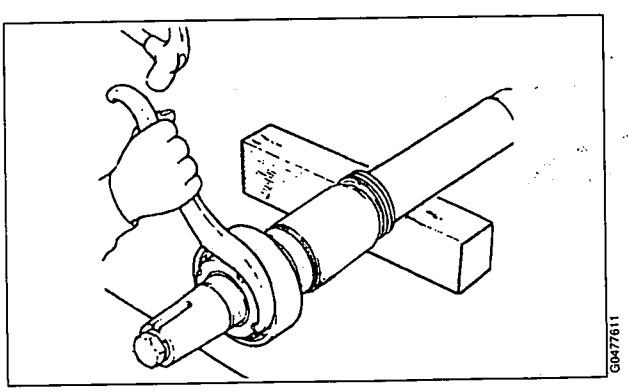
Left-hand thread!



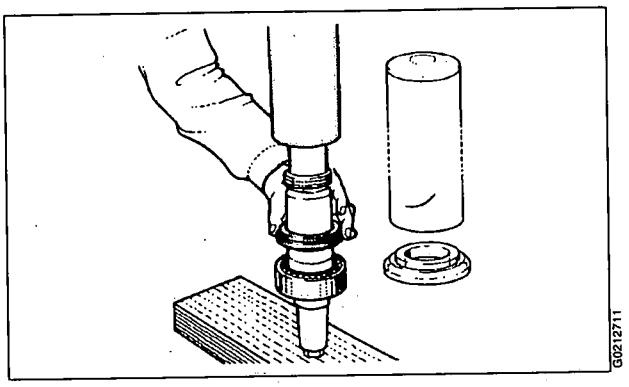
17. Knock loose the worm wheel shaft from the motor side with a piece of wood and a tin hammer.



18. Screw off the round nut.



19. Remove the ball bearing. Position the smaller sleeve against the inner race of the ball bearing. Put a piece of paper or cloth inside the tube in order to avoid damage on the shaft.



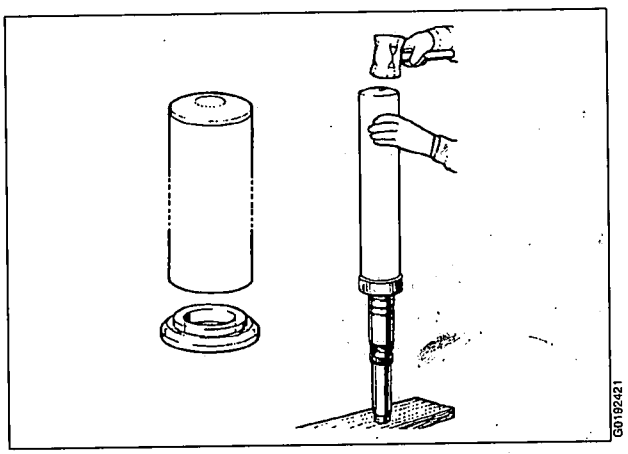
4.11.2 Assembly

Clean and oil the bearing seat on the worm wheel shaft.

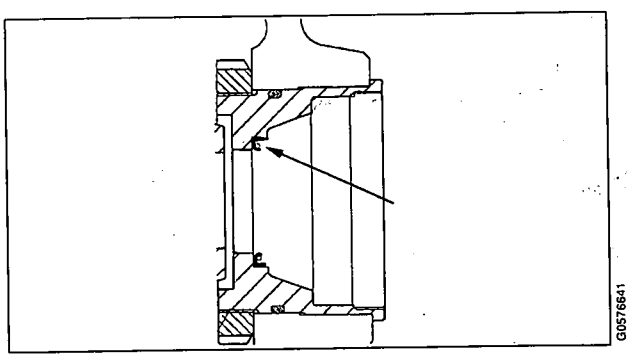
1. Mount the ball bearing in cold condition by using the tools. Use the larger sleeve which acts against the inner race of the ball bearing.

   This procedure is recommended by the supplier.

   Do not heat this ball bearing in oil!

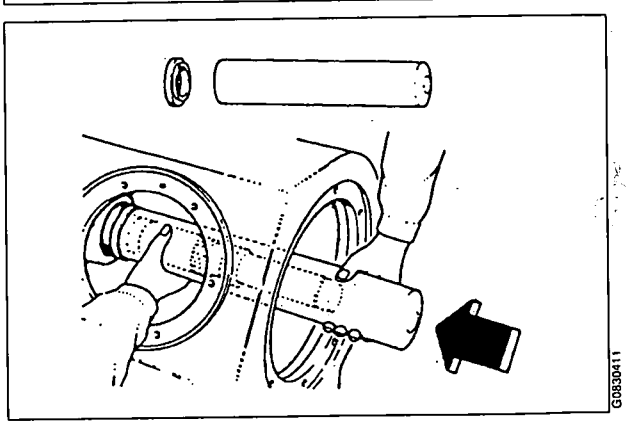


2. Fit a new seal ring (3.2) inside the bearing housing. Use soap water to facilitate mounting.



3. Screw the round nut onto the shaft (compare 18 on previous page).

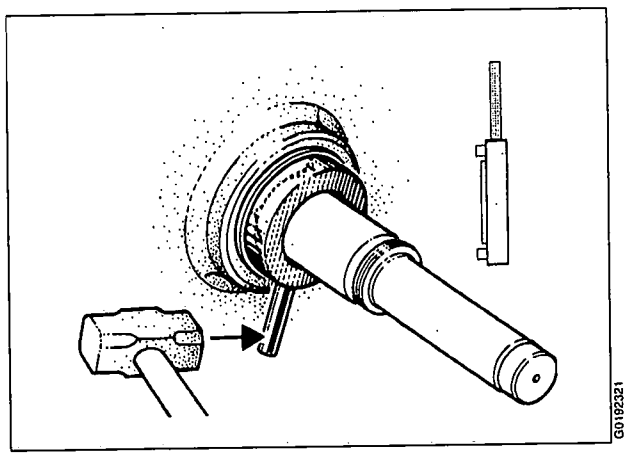
4. Clean the bearing seat in the frame. Apply some oil on the outer race of the ball bearing and carefully force the worm wheel shaft into position. Use the sleeve which acts against the outer race of the ball bearing. Use a tin hammer.



NOTE

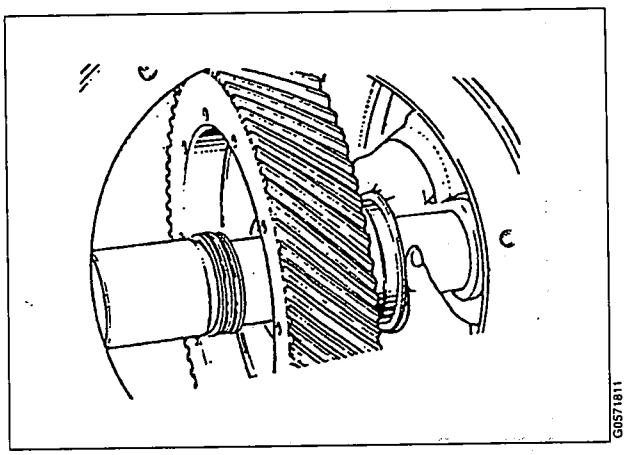
Take caution not to damage the rubber mantled seal ring (3.2) inside the bearing housing when forcing the shaft into position.

5. Mount the lock ring. Use the pin spanner or a drift.
Left-hand thread!



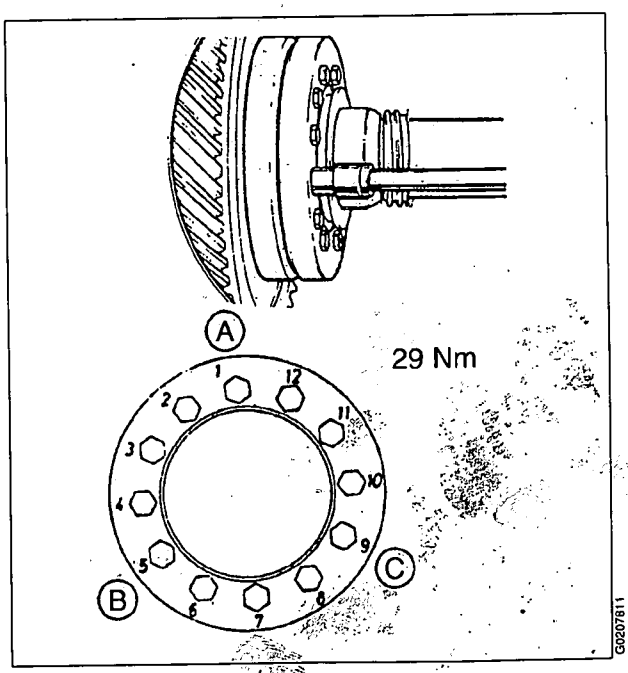
6. Fit the coupling half. Note the key. Fit the centre screw (with spring washer and plain washer) and tighten it. Fit the elastic plates.

7. Before fitting the worm wheel and the clamping element, clean all surfaces thoroughly with a clean cloth. Push the worm wheel on the shaft as far as possible.

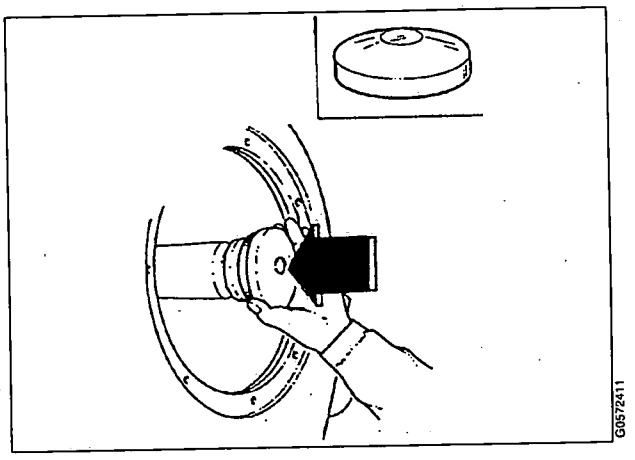


8. Oil the inner surface of the clamping element. The oil must be of the same quality as is used in the worm gear housing. Slip the clamping element onto the worm wheel.

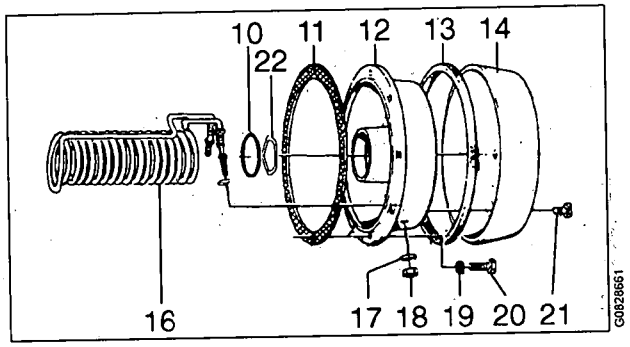
9. First tighten the three clamp screws A, B and C, but only so little that the clamping element just sticks on the worm wheel shaft. Then tighten the clamp screws uniformly and successively around the clamping ring in the order (1 – 12) stated in the figure.
Do not tighten crosswise.
Tightening torque **29 Nm**.
This must be repeated several turns around until full torque on every screw is reached.
Check continuously that the clamping rings remain plane parallel.

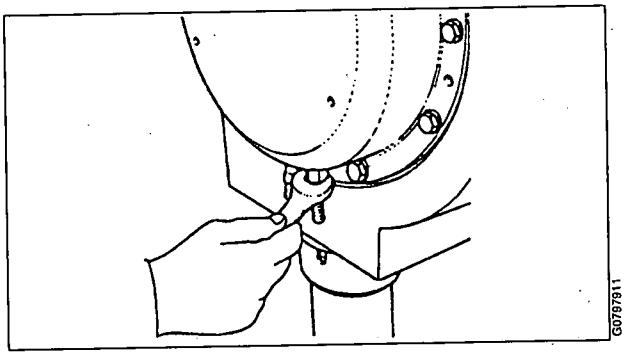


10. Mount the bearing. Apply the mounting washer and hit a few blows on the latter to ascertain that the bearing is in correct position. Use a tin hammer.
11. Make certain that the worm gear housing and the magnet of the cooling coil have been properly cleaned. Insert the cooling coil.

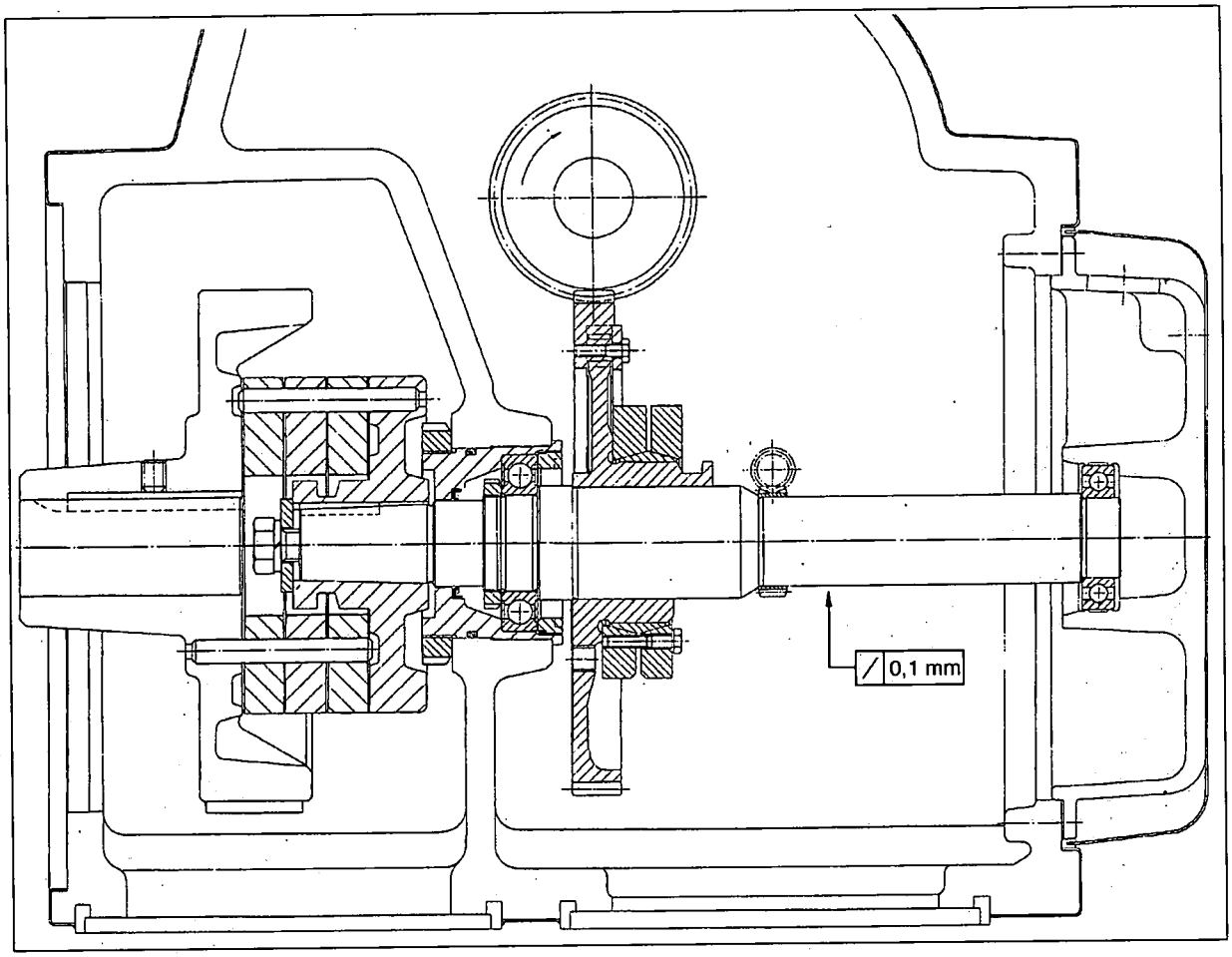


12. Clean the bearing seat in the bearing shield (13). Fit a new corrugated shim (22) and O-ring (10) into the bearing shield.
    The parts are included in the MS-kit.
13. Renew the gasket (11) and fit the bearing shield. Use the two guide pins in the tool set to position the shield. Note that the shield can be fitted in one position only.
    If necessary, pull it into position using the screws or tap its centre with a tin hammer.
14. Press the two tube ends of the cooling coil (16) into the bearing shield.
15. Fit the washers (17) and nuts (18) and tighten the coil to the shield.
16. Connect the cooling water to the coil. Supply the cooling water and check for leakages.
17. Fit the seal strip (13) and the guard (14) covering the bearing shield (see previous illustration).
18. Fill oil before the worm wheel guard is mounted. Quantity: See "Technical data" in *Installation Manual*. Quality: See "5.2 Lubricants" on page 181.
19. Fit the gasket and the worm wheel guard.
20. Fit the motor. Fit the seal strip and the protection cap of the motor.
21. Fit the gasket and the brake cover.





4.11.3 Check points - Radial wobble of worm wheel shaft

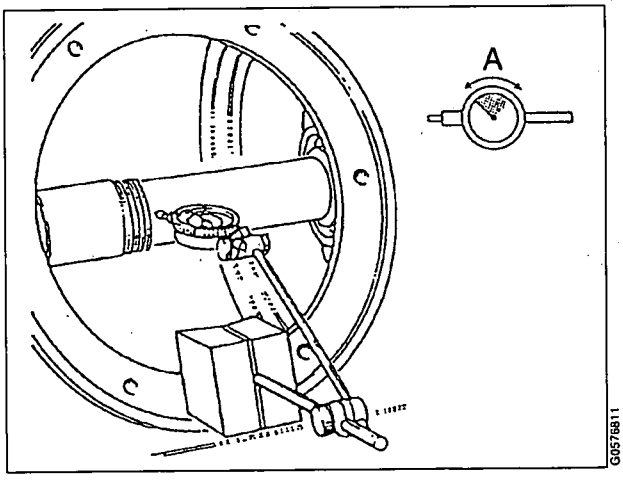


- Excessive wobble on the worm wheel shaft may cause vibration and noise.

Clamp a dial indicator in a magnetic support and fasten the latter to the plane for the worm wheel guard (the gasket should be removed). Revolve the worm wheel shaft by hand.

Max. permissible radial wobble (**A**) is **0,1 mm**.

If the wobble is excessive, the worm wheel shaft must be removed from the frame for closer examination. Get in touch with the supplier. The worm wheel shaft may need to be replaced.



4.12 Remote controlled brake (pneumatic)

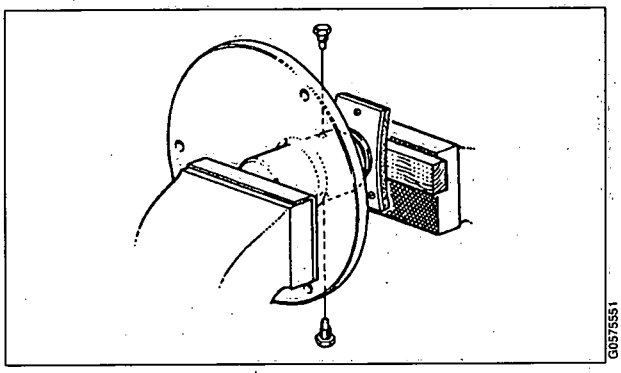
4.12.1 Changing brake lining - Checking for formation of rust

Checking for formation of rust

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

How to carry out the Intermediate Service for the brake unit is described below.

1. Dismantle the brake unit by compressing it in a screw wise and remove the two stop screws (2), see the illustration.



WARNING

Risk for eye injury by flying parts

Be careful when decompressing the unit, the spring power can rip parts.

CAUTION

Inhalation hazard

When handling friction blocks/pads use a dust mask to make sure not to inhalate any dust.

Do not use compressed air for removal of any dust. Remove dust by vacuum or wet cloth.

See Safety instructions for environmental issues regarding correct disposal of used friction blocks/pads.

2. Remove any rust and brake dust from the surface of the brake shoe (7) and the corresponding guiding surface in the cover (1).
   Formation of rust on the brake parts may cause the brake to jam.
3. Rub the surfaces, for instance with Molykote Paste 1000 or similar.
4. Renew the O-ring (3) and check piston (4) and its cylinder in the cover (1). Rub the cylinder with Molykote Paste 1000 or similar.
5. Renew the spring (5) if it has lost its stiffness. Oil the spring when assembly.

NOTE

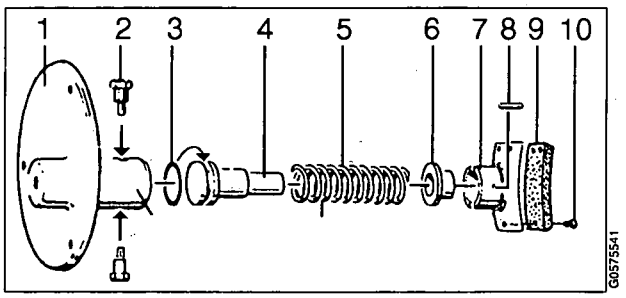
When assembly, depress the brake shoe (7) entirely in the cover (1) before tightening the stop screws (2), otherwise the screws may jam the brake shoe.

WARNING

Risk for eye injury by flying parts

Be careful when compressing the unit, the spring power can rip parts.

6. Supply compressed air to the brake unit and check the brake function.

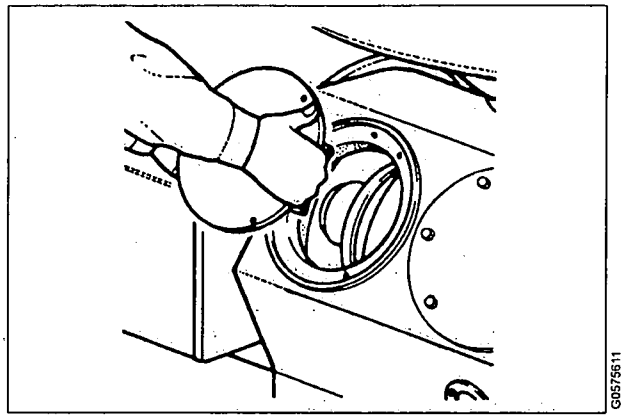


1. *Cover*
2. *Stop screw*
3. *O-ring*
4. *Piston*
5. *Spring*
6. *Gland*
7. *Brake shoe*
8. *Slotted pin*
9. *Friction pad*
10. *Screw*

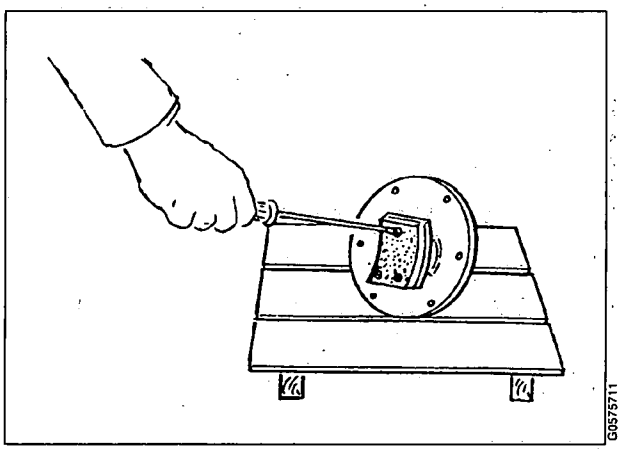
Changing brake lining

- A worn lining will lengthen the braking period.

1. Remove the brake cover.

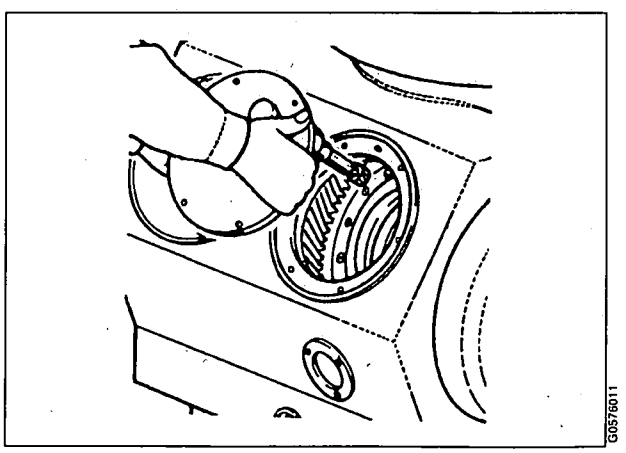


2. Remove the screws and exchange the lining.
Note! The screws are slotted at both ends.



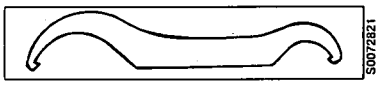
4.12.2 Revolution counter

Remove the cover from the separator frame if not already done.



Dismantle the revolution counter unit for cleaning and examination as described below.

1. Knock out the taper pin (12) and pull off the gear wheel (11).
2. Push out the shaft (3) and protecting collar (1).
3. Unscrew the round nut (10).

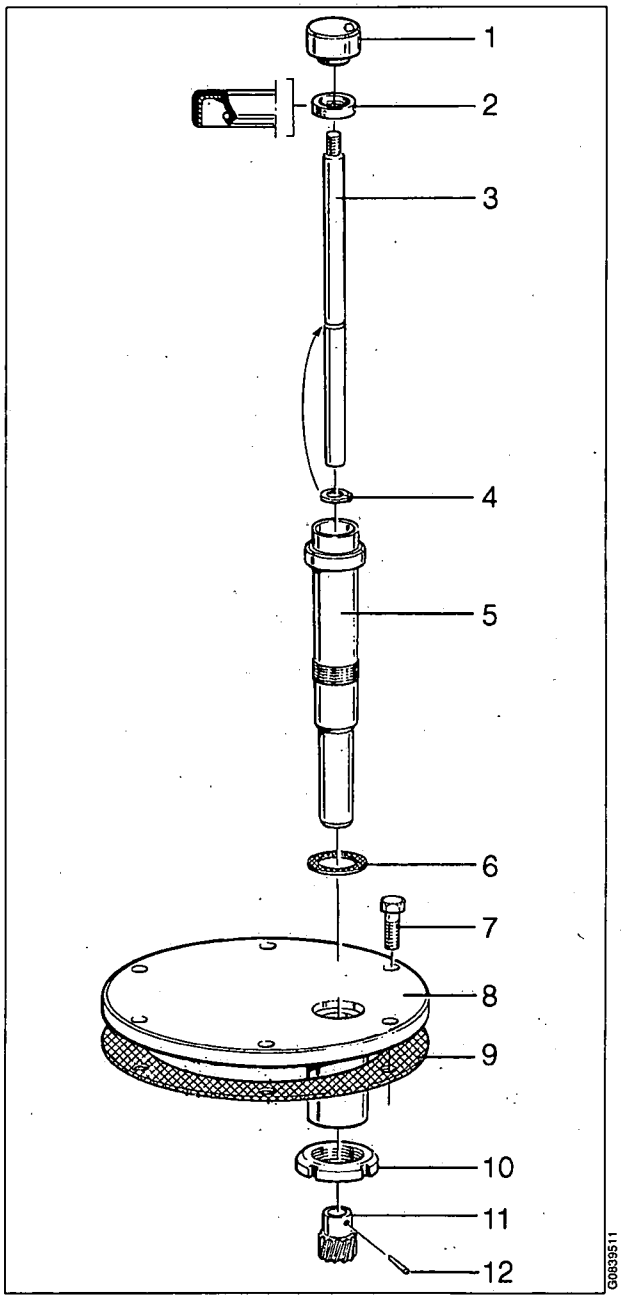


4. Push out the bushing (5) from the cover (8).
5. Clean all parts and examine for wear and damage.
6. Assemble in reverse order.
   Renew the seal ring (2) and rectangular ring (6). These parts are included in the MS-kit.

NOTE

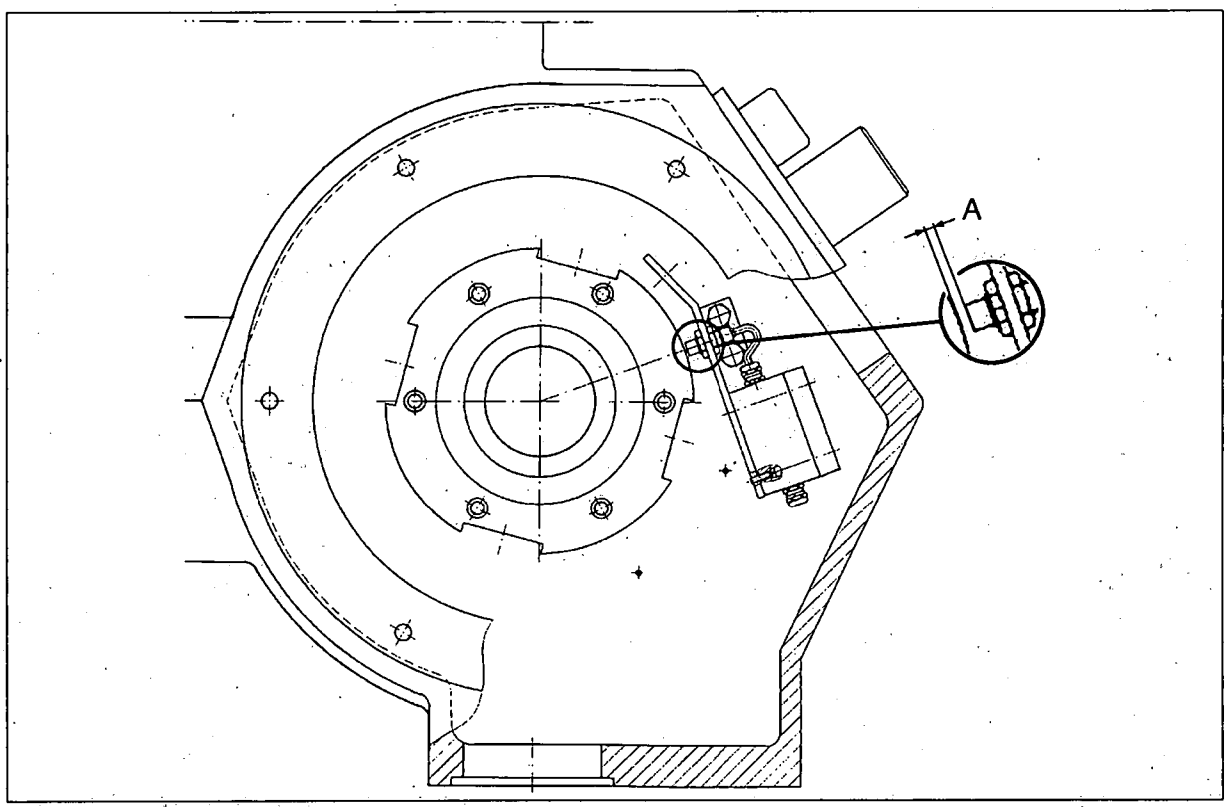
Fit the seal ring (2) in correct direction, see the illustration.

7. Fit a new gasket (9) when mounting the cover on the separator frame.



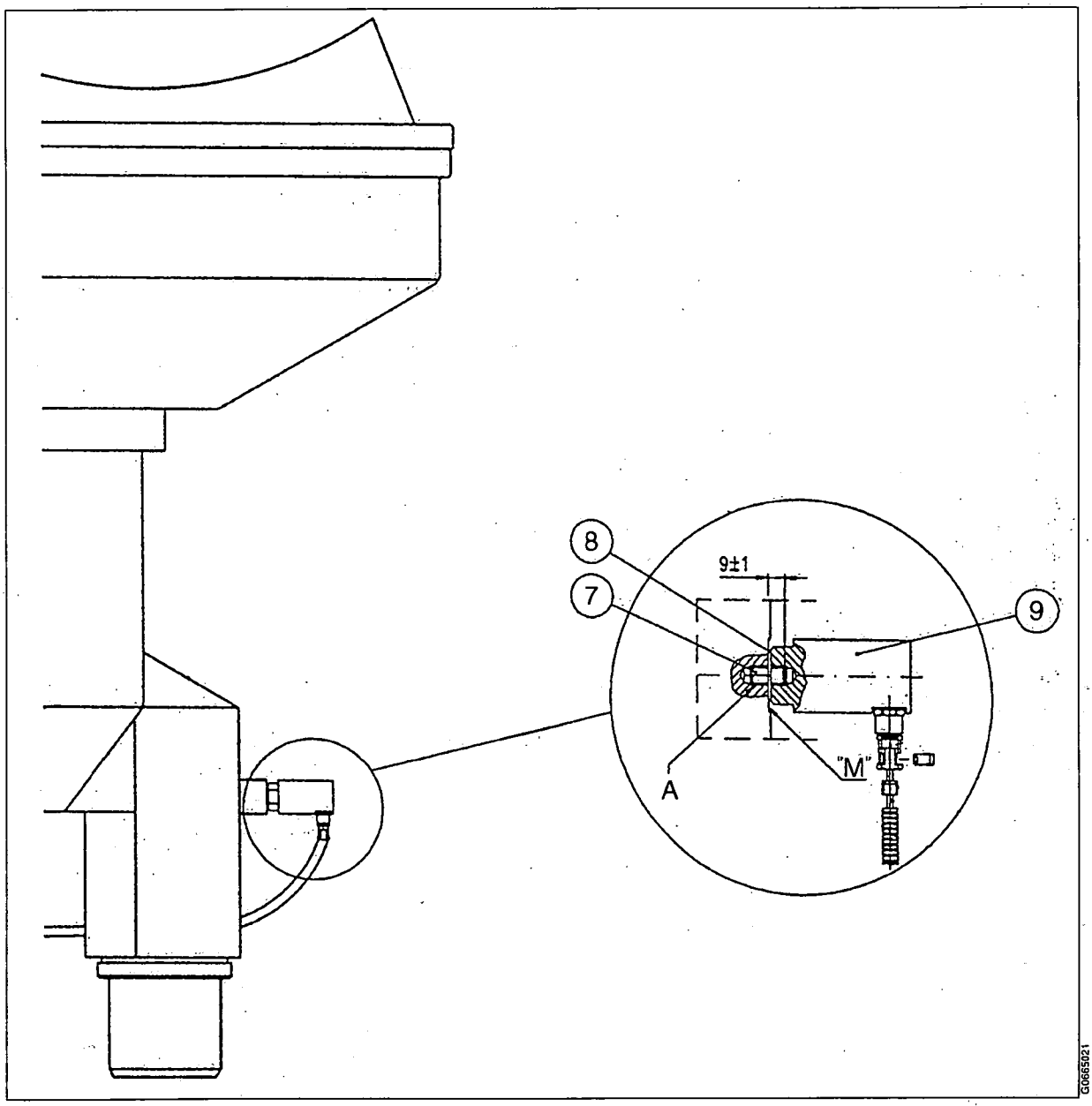
1. *Protecting collar*
2. *Seal ring*
3. *Shaft*
4. *Snap ring*
5. *Bushing*
6. *Rectangular ring*
7. *Screw*
8. *Cover*
9. *Gasket*
10. *Round nut*
11. *Gear wheel*
12. *Taper pin*

4.13 Speed sensor for remote indication (option)



The speed sensor is accessible when the brake cover has been removed.
*The distance (**A**) between the speed sensor head and the wheel should be adjusted to* **1,5 – 2,5 mm**.
For technical data and further information, see Installation Manual.

4.14 Vibration sensor (option)

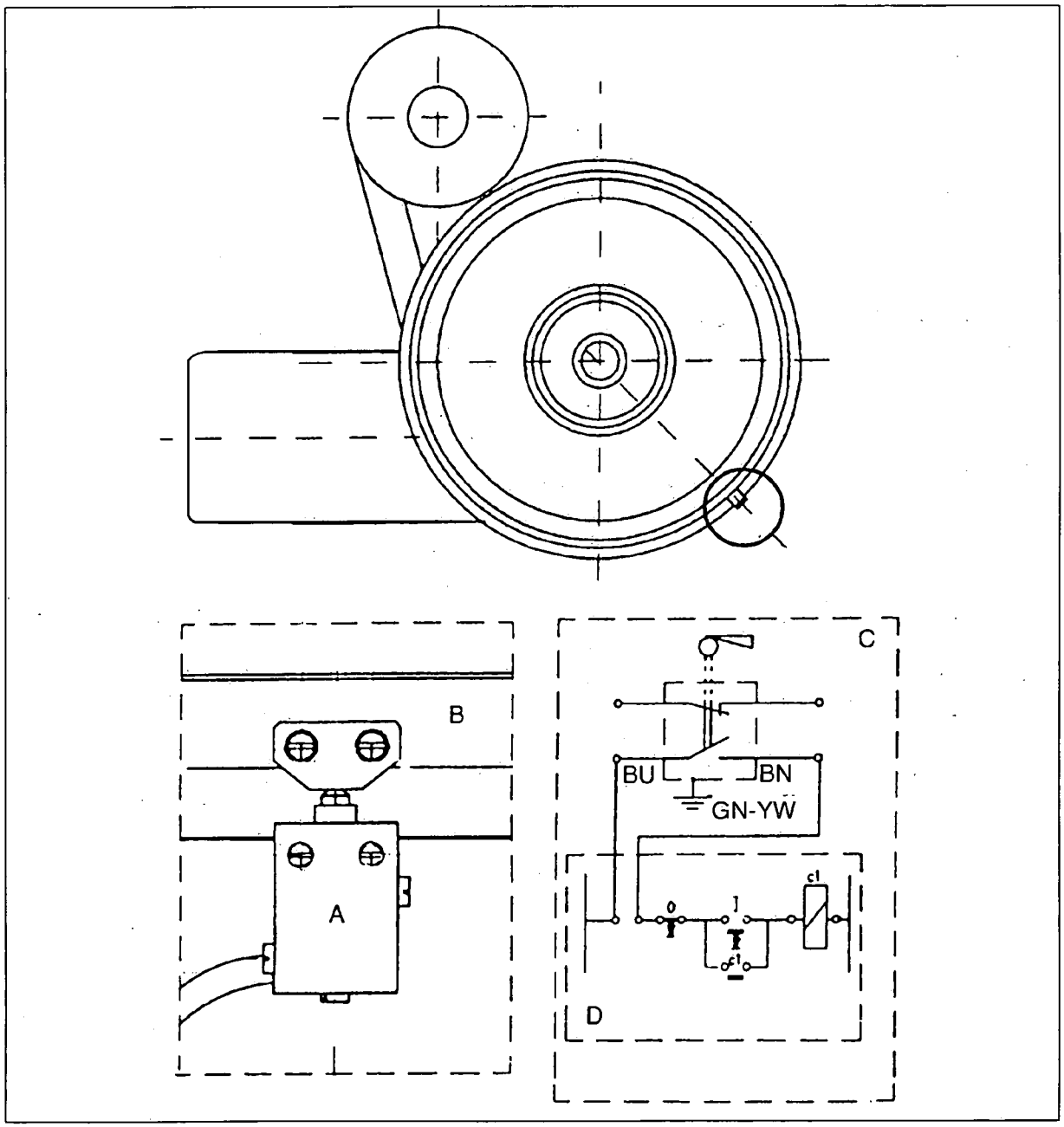


Mounting instructions

- Fit the screw 7 in the frame, secure with Loctite 243 (**A**)
- Fit the vibration sensor 9, adjust with washer(s) 8 in order to get the cable downwards.
- Tightening torque **35 Nm** (3,6 kpm).

For technical data and further information, see Installation Manual.

4.15 Lock switch (option)

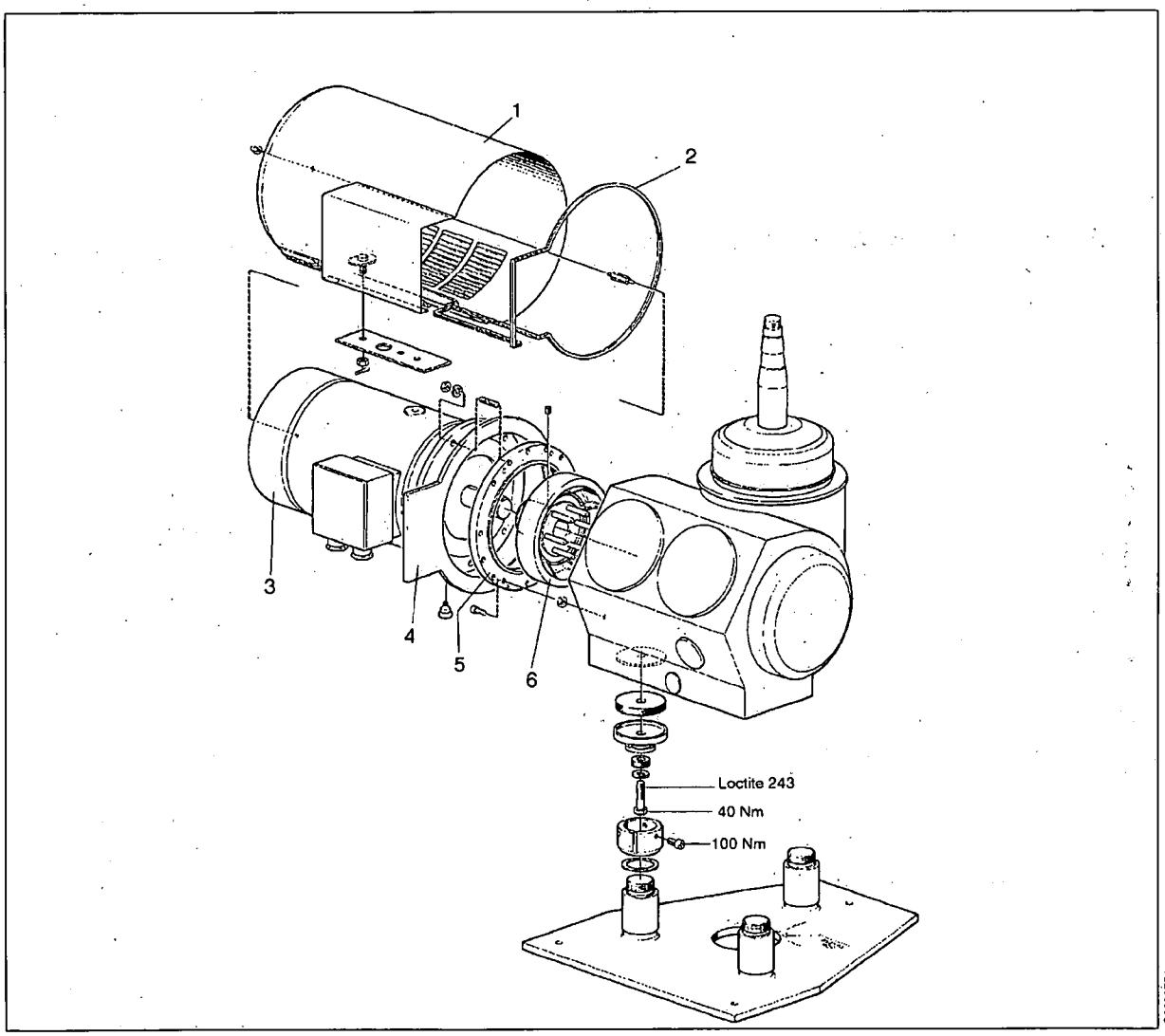


A. Lock switch (activated)
B. Frame hood
C. Safety circuit connection, lock switch not activated
D. Starter, contactor circuit

For technical data and further information, see Installation Manual.

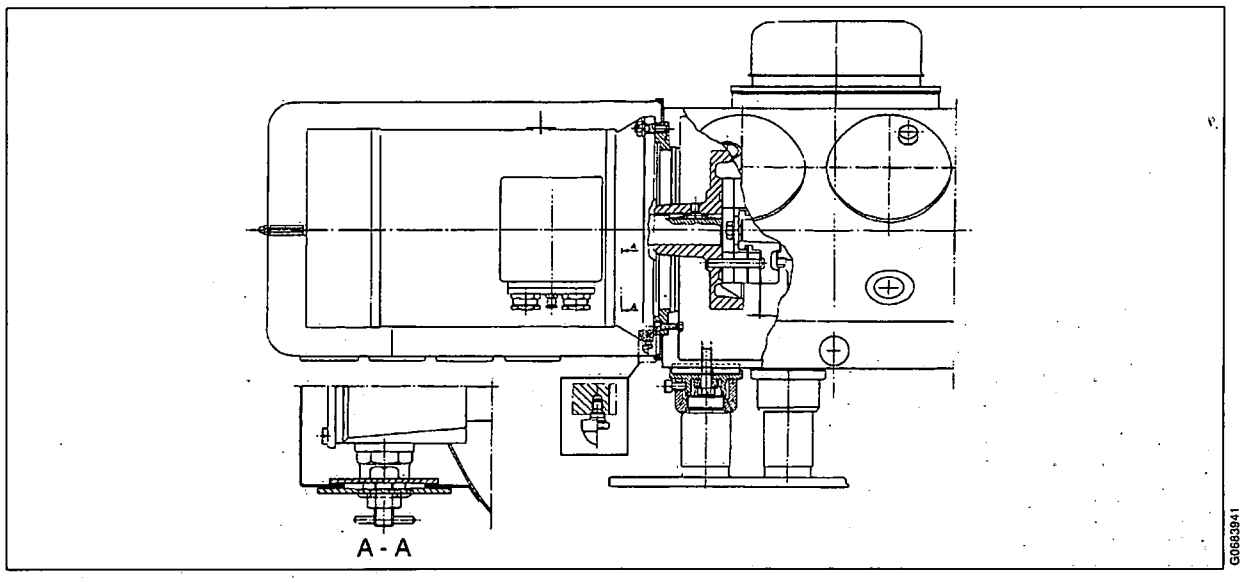
4.16 Motor

4.16.1 Parts for mounting of motor



1. *Protection cap*
2. *Seal strip*
3. *Motor*
4. *Cover*
5. *Motor adapter*
6. *Brake pulley*

4.16.2 Removing the motor



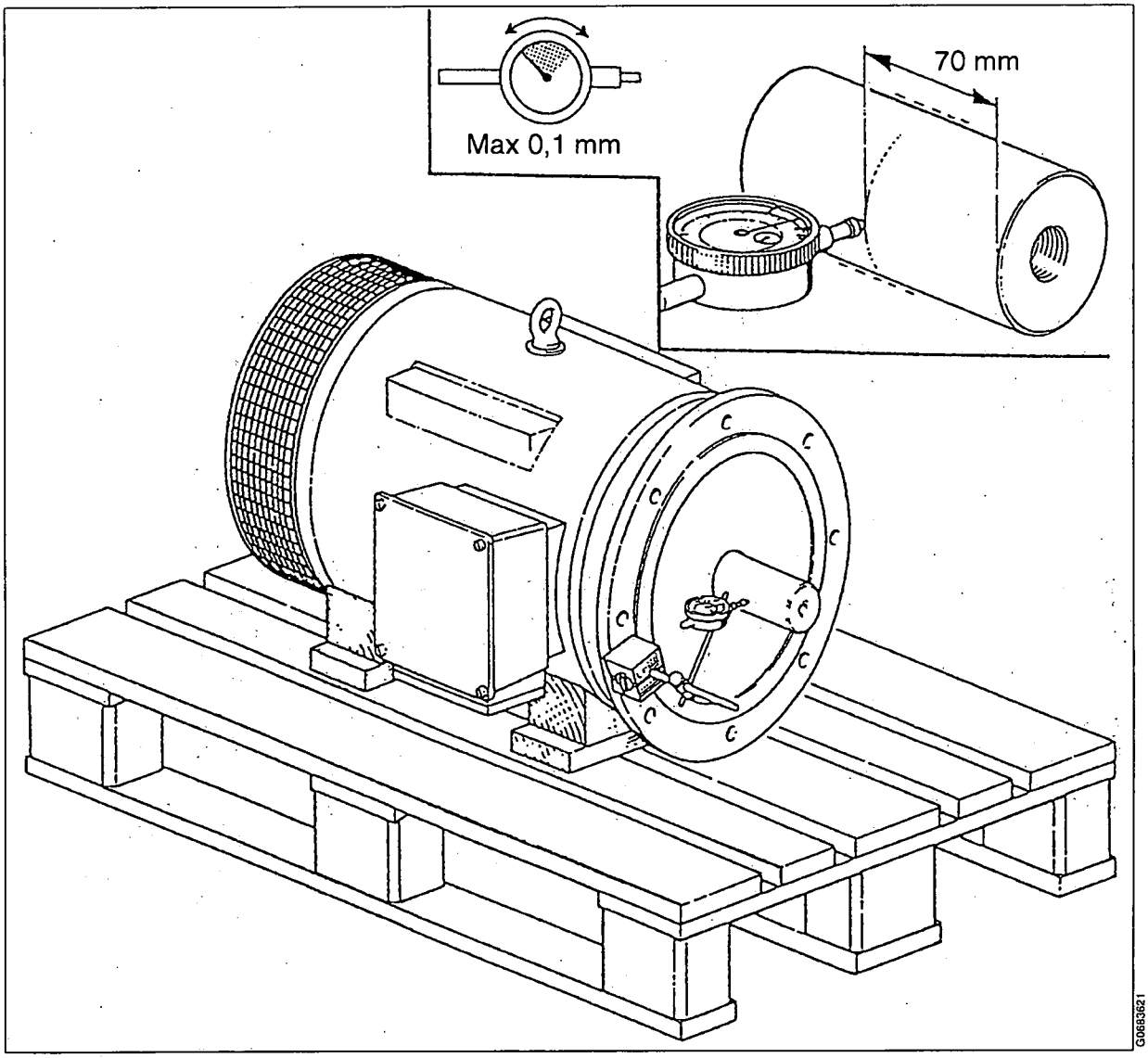
- Remove motor cover.
- Disconnect the electric cables to the motor.
- Fit the lifting eye on top of the motor and tighten it securely.
- Hook up the motor in a hoist. Use a lifting sling between the lifting hook and the lifting eye. Stretch the lifting sling with the hoist.
- Loosen and undo the six nuts fixing the motor flange to the separator frame.
- Pull out the motor with coupling pulley (brake pulley) from the separator frame and lift it away.

WARNING

Disintegration hazard

When power cables have been connected, always check direction of rotation. If incorrect, vital rotating parts could unscrew causing disintegration of the machine.

4.16.3 Check points - Radial wobble of motor shaft



- Excessive wobble on the motor shaft may cause vibration and noise.

Clamp a dial indicator in a magnetic support, and fasten the latter to the flange of the motor. Revolve the motor shaft by hand. Read the wobble on the shaft according to measurement in the figure.

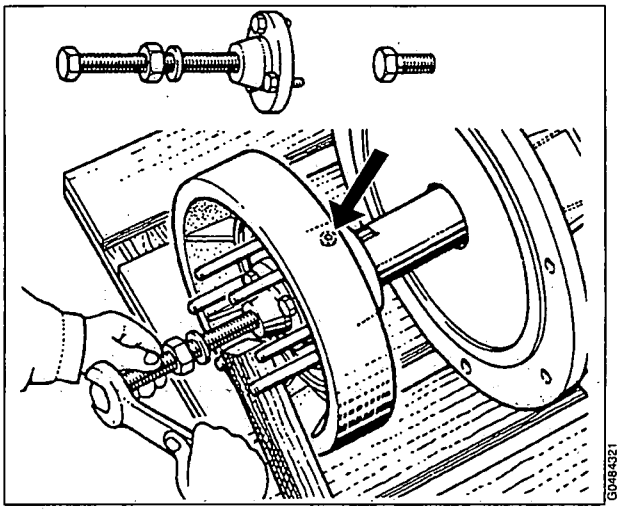
Max permissible radial wobble: See figure.

If the wobble is excessive, contact the supplier.

4.16.4 Dismantling

Loosen the lock screw (arrow). Apply some grease on the centre screw of the tool. Mount a M20 screw on motor shaft. The screw will serve as a support when pulling off the coupling disc. (The screw from the worm wheel shaft may be used, then don't forget to remount it).

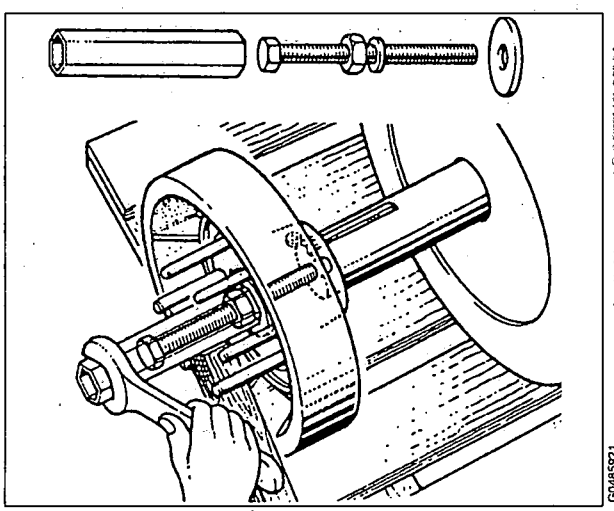
Fit the tool as shown in the illustration and pull off the coupling disc.



4.16.5 Assembly

Lubricate motor shaft, for instance with Molykote paste 1000. Knock the coupling on to the motor shaft as far as possible by means of a piece of wood and a hammer. Screw home the nut on the mounting tool (the centre screw of the dismantling tool) and screw it into the motor shaft.

Apply some grease on the washer ahead of the nut and press the coupling into position by tightening the nut using the socket sleeve and a screw wrench. Lock it with the lock screw.



4.17 Mounting on the foundation feet

The vibration dampers are to be replaced at least every third year, and all at the same time.

Lifting the machine, see *Installation Manual*.

Apply Loctite 243 on the screws (1) and tighten them. Tightening torque **40 Nm** (4 kpm). The dampers must be replaced at least every second year.

Level against the upper face of the three holders (3). When necessary screw the holders so as to compensate for the inclination. Any gap between a holder and the foundation foot must be filled with one or more adjusting washers (4).

Lower the frame on to the foundation feet.

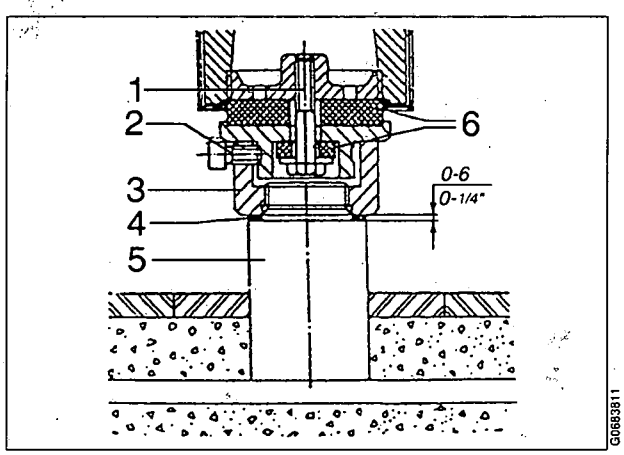
Tighten the set screws (2) by hand (or by a hand tool, if necessary) until all of them are in contact with the frame feet, then tighten them with a tightening torque of **100 Nm**. Mount the bowl and check that the frame is horizontal by means of a spirit level placed on the outer frame rim. Make a new adjustment if necessary.

NOTE

Tighten the set screws (2) before mounting the bowl or the cyclone.

Mount in the order stated

- Separator bowl
- Motor with protecting cover
- Cyclone
- Inlet
- Frame hood
- Outlet
- Operating Water Module, OWMC



1. *Screw and washer*
2. *Set screw*
3. *Holder*
4. *Adjusting washer*
5. *Foundation foot*
6. *Vibration damper*

5 Lubrication

Contents

5.1 Lubrication of electric motor

Correct lubrication interval and recommended type of grease can be found on a plate fixed on the motor. The information can also be found in chapter *Electric motor* in the *Installation Manual*.

Manual lubrication

Regreasing while motor is running

- Remove grease outlet plug or open closing valve if fitted.
- Be sure that the lubrication channel is open.
- Press the specified amount of grease into the bearing.
- Let the motor run 1-2 hours to ensure that all excess grease is forced out of the bearing. Close the grease outlet plug or closing valve if fitted.

Regreasing while motor is at standstill

Regrease motors while running. If this is not possible, lubrication can be carried out while the machine is at a standstill.

- In this case, use only half the quantity of grease, then run the motor for a few minutes at full speed.
- When the motor has stopped, press the rest of the specified amount of grease into the bearing.

After 1-2 running hours close grease outlet plug or closing valve if fitted.

5.2 Lubricants

5.2.1 Recommended lubricating oils

Alfa Laval ref. 553219-04, rev. 1

type of frame **M18** with motor< 52 kW

Two different groups of lubricating oils are approved. They are designated as Alfa Laval lubricating oil groups B and D. The numerical value after the letter states the viscosity grade.

The corresponding commercial oil brands acc. to document 553218-05 and 553218-06, see "5.2.2 Recommended oil brands" on page 182.

Ambient temperature °C	Alfa Laval lubricating oil group	Time in operation Oil change interval
Between +5 and +45	B/320	1500 h
Between +2 and +65	D/320	2000 h

Note:

- In a new installation or after change of gear transmission, change oil after 200 operating hours.
- When the separator is operated for short periods, lubricating oil must be changed every 12 months even if the total number of operating hours is less than stated in the recommendations above.
- Check and prelubricate spindle bearings on separators which have been out of service for 6 months or longer.
- In seasonal operation: Change oil before every operating period.

5.2.2 Recommended oil brands

Alfa Laval ref. 553218-05, rev. 2

NOTE

The data in below tables is based on supplier information in regards to lubrication properties. Trade names and designations might vary from country to country, contact your local supplier for more information.

Brands with Alfa Laval article number are approved and recommended for use.

Alfa Laval lubrication oil group B	
Viscosity grade VG (ISO 3448/3104) Viscosity index VI (ISO 2909)	320 >92
Manufacturer	**Designation**
Bel-Ray	100 Gear oil 90
BP	Energol GR-XP 320
Castrol	Alpha SP 320
ELF	Epona Z 320
Esso/Exxon	Spartan EP 320
Fina	Giran 320
Gulf	EP HD 320
Mobil	Mobilgear 632 (Mobilgear SHC 320) * Synthetic
Optimol	Optigear BM 320
Q8/Kuwait Petroleum	Goya 320
Shell	Omala 320 (Delima HT 320) *Synthetic
Texaco/Caltex	Meropa 320

* These oils must be used when the frame temperature is above 80 °C.

If you can't verify the temperature by measuring, a rough estimate is that 80 °C is when you can touch the surface of lower part of frame for a short time only.

Alfa Laval ref. 553218-06, rev. 4

SpecificationSynthetic lubricating oil, category PAO (ISO-L-) CKE 320

Viscosity grade (ISO 3448/3104) VG 320.

The following are lists of recommended oil brands. Trade names and designations might vary from country to country, contact your local oil supplier for more information.
Brands with Alfa Laval article number are approved and recommended for use.

Alfa Laval lubrication oil group D	
Manufacturer	**Designation**
Alfa Laval	542690-84 (20 litres) 542690-85 (4 litres) 542690-86 (208 litres)
BP	Enersyn HTX 320
Castrol	Alphasyn EP 320 Alphasyn HG 320
Chevron	Tegra 320
ELF	Epona SA 320
Esso/Exxon	Terresstic SHP 320 Terresso SHP 320
Mobil	SHC 630
Optimol	Optigear Synthetic A 320
Q8/Kuwait Petroleum	Schumann 320
Shell	Delima HT 320 Paolina 320 Omala RL 320

The lists of recommended oil brands are not complete. Other oil brands may be used as long as they have equivalently quality as the brands recommended. The oil must have the same viscosity class and ought to follow the ISO standard 12925-1, category ISO-L-CKE (ISO 6743-6) or DIN 51517, part 3 CLP, but shall have a synthetic base oil of polyalphaolefin type (PAO) instead of mineral base oil. The oil must be endorsed for worm gear with brass worm wheel. The use of other lubricants than recommended is done on the exclusive responsibility of the user or oil supplier.

5.2.3 Recommended lubricants

Alfa Laval ref. 553217-01, rev. 8

NOTE

The data in below tables is based on supplier information in regards to lubrication properties. Trade names and designations might vary from country to country, contact your local supplier for more information.

Brands with Alfa Laval article number are approved and recommended for use.

Pastes for non-food applications:

Manufacturer	Designation	Alfa Laval No	
Fuchs Lubritech	Gleitmo 805K Gleitmo 705K		
Dow Corning	Molykote 1000 (Paste) Molykote 1000 (Paste) Molykote G-rapid plus (Paste)	537086-02 (1000 g) 537086-03 (100 g) 537086-04 (50 g)	
Rocol	Antiscuffing (ASP) (Paste)		
Klüber	Wolfracoat C (Paste)		

Bonded coatings:

Manufacturer	Designation	Alfa Laval No	
Fuchs Lubritech	Gleitmo 900 (Varnish or spray)		
Dow Corning	Molykote D321R (Spray) Molykote D321R (Varnish)	535586-01 (300 ml) 535586-02 (60 ml)	

Pastes for food applications

Manufacturer	Designation	Comment	Alfa Laval No	
Fuchs Lubritech	Gleitmo 805			
	Geralyn 2	USDA H1	561764-01 (50 g)	
Dow Corning	Molykote TP 42 Molykote D			
	Molykote Foodslip EP-2	USDA H1 (Mineral oil base)	537086-07 (50 g)	
Klüber	Klüberpaste 46 MR 401			
	Klüberpaste UH1 96-402	USDA H1		
Lubrication Engineers	LE 4025	USDA H1		

Silicone grease for rubber rings:

Manufacturer	Designation	Alfa Laval No	
Dow Corning	Molykote 111 (Compound) Molykote 111 (Compound)	539474-02 (100 g) 539474-03 (25 g)	
Fuchs Lubritech	Gleitmo 750		
Klüber	Unisilkon L 250 L		
Wacker	Silicone P (Paste)		

Silicone grease for food applications:

Manufacturer	Designation	Alfa Laval No	
Dow Corning	Molykote foodslip SR grease	569415-01 (50 g)	

Greases for ball and roller bearings:

> **NOTE**
>
> Always follow the specific recommendation for lubrication as advised by the manufacturer.

Manufacturer	Designation	Alfa Laval No
BP	Energrease MM-EP2 Energrease LS2	
Castrol	APS 2 Grease EPL 2	
Chevron	Dura-Lith Grease EP2	
Elf	Epexa 2	
Esso/Exxon	Beacon EP2 Unirex N2	
Fina	Marson EPL 2A	
Mobil	Mobilith SHC 460 Mobilux EP2	
Gulf	Gulflex MP2	
Q8/Kuwait Petroleum	Rembrandt EP2	
Shell	Alvania EP Grease 2 Albida Grease EP2	
SKF	LGEP2 or LGMT2	
Texaco	Multifak AFB 2	

5.2.4 Lubrication chart, general

Alfa Laval ref. 553216-01, rev. 6

Lubricating points	Type of lubricant
Bowl spindle ball bearings and buffers are lubricated by oil mist	Lubricating oil as specified in "Recommended lubricating oils"
Bowl spindle taper	Lube oil, only a few drops for rust protection
Metal buffers of bowl spindle	Lube oil
Bowl: Sliding contact surfaces and pressure loaded surfaces such as lock rings, threads of lock rings, bowl hood and cap nut	Pastes as specified in "Lubricants"
Rubber seal rings	Grease as specified in "Lubricants"
Friction coupling ball bearings	The bearings are packed with grease and sealed and need no extra lubrication
Electric motor	Follow manufacturer's instructions

NOTE

The **Lubrication chart, general** can be complemented with more detailed charts, showing the lubrication points in detail and what type of lubricant to use.

Instructions related to a specific design of the machine, refer to the general assembly drawings.

Some application processes demand special lubrication.

If not specified otherwise, follow the supplier's recommendation about method of application.

Alfa Laval Lubricating Oil Groups

- **Group A oil:** a high quality gear oil on paraffin base with stable AW (anti wear) additives.
- **Group B oil:** a high quality gear oil on paraffin base with stable EP (extreme pressure) additives.
- **Group D oil:** a synthetic base oil with additives stable at high operating temperatures.
- **Group E oil:** Characteristics as a group D-oil but suitable at a higher operation power (≥55 kW)

Do not mix different oil brands or oils from different oil groups.

Always use clean vessels when handling lubricating oil.

Great attention must be paid not to contaminate the lubricating oil. Of particular importance is to avoid mixing of different types of oil. Even a few drops of motor oil mixed into a synthetic oil may result in severe foaming.

Any presence of black deposits in a mineral type oil is an indication that the oil base has deteriorated seriously or that some of the oil additives have precipitated. Always investigate why black deposits occurs.

If it is necessary to change from one group of oil brand to another it is recommended to do this in connection with an overhaul of the separator. Clean the gear housing and the spindle parts thoroughly and remove all deposits before filling the new oil.

NOTE
Always clean and dry parts (also tools) before lubricants are applied.

CAUTION

Check the oil level before start.
Top up when necessary.
Oil volume = see "Technical Data".

It is of utmost importance to use the lubricants recommended in our documentation.

This does not exclude, however, the use of other brands, provided they have equivalently high quality properties as the brands recommended. The use of oilbrands and other lubricants than recommended, is done on the exclusive responsibility of the user or oil supplier.

Applying, handling and storing of lubricants

Always be sure to follow lubricants manufacturer's instructions.

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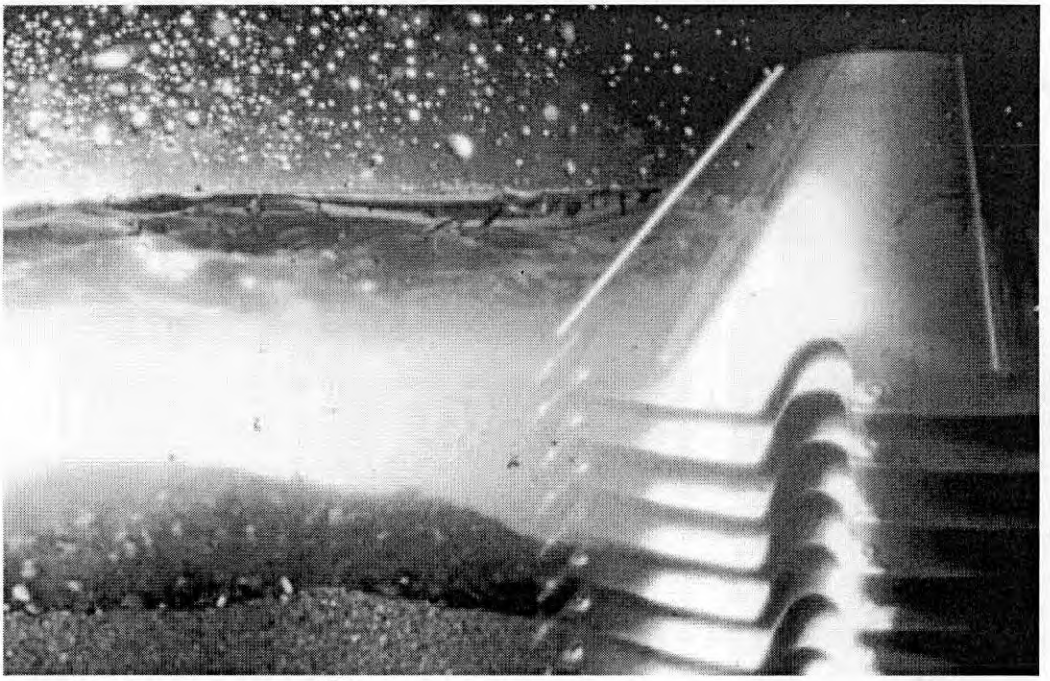

Tetra Centri®

Spare parts catalogue

Reservdelskatalog

Ersatzteilkatalog

Catalogue de piéces de rechange

Catalogue de piezas de recambio

Каталог запасных частеи

Catalogo parti di ricambio

Catalogo de pecas sobressalentes

Varaosaluettelo

Καταλογοσ ανταλλακτικων

Reserveonderdelen-catalogus

Reservedelskatalog

Product No. 881208-02-01/12
Book No. 1271756-02 Rev. 8

Tetra Pak

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Separator Manuals, dept. PPDM
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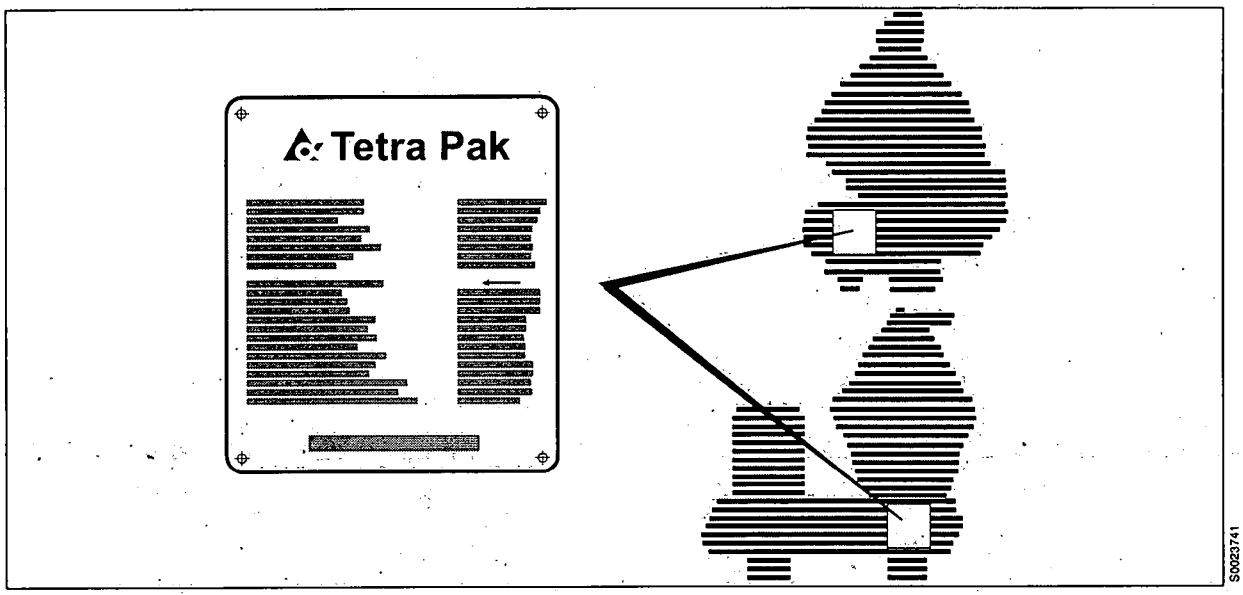
Contents

1 Read this first



en The name plate - the guide for finding the correct spare part numbers.
See also Warnings in chapter "1.1 General information" on page 7.

sv Maskinskylten - en guide till det rätta reservdelsnumret.
Se även Varningar i kapitel "1.1 Allmän information" på sidan 8.

de Das Typenschild - ein Hinweis zur korrekten Ersatzteilnummer.
Siehe auch Warnhinweise in Kapitel "1.1 Allgemeine Informationen" auf Seite 9.

fr La plaque de la machine - un guide pour trouver le numéro de piéce de rechange correct.
Voir à ce propos les mises en garde du chapitre "1.1 Informations générales " en page 10.

es La placa-marca de la máquina - guía del número correcto del repuesto. Consulte también las Advertencias del capítulo "1.1 Información General" en la página 11.

ru Фирменная табличка машины – указатель правилного номера запасной части.
См. также предупреждения в главе "1.1 Общие сведения" на странице 12.

it La targhetta della macchina - guida al corretto numero dei ricambi.
Vedere anche le Avvertenze nel capitolo "1.1 Informazioni generali" a pagina 13.

pt A placa do fabricante da máquina - um guia do número correto das partes sobressalentes.
Consultar também os Avisos no capítulo "Informação Geral 1.1" da página 14.

fi Konekilpi - opastin oikeaan varaosanumeroon.
Katso myös kappaleessa 1.1 sivulla 15 olevaa kohtaa "Yleiset tiedot ".

el Η πινακίδα της μηχανής είναι ο οδηγός του σωστού ανταλλακτικού. Δείτε επίσης τις προειδοποιήσεις του κεφαλαίου "1.1 ΓΕΝΙΚΕΣ ΠΛΗΡΟΦΟΡΙΕΣ", στη σελίδα 16.

nl Het gegevensplaatje - een wegwijzer naar het juiste onderdeelnummer.
Zie ook Waarschuwingen in hoofdstuk "1.1 Algemene informatie", op blz. 17.

da Typeskiltet - en guide til det rette reservedelsnummer.
Se også under Advarsler i kapitel "1.1 Generelle oplysninger" på side 18.

1.1 General information

en

Safeguard your commitment to quality by always using genuine Alfa Laval **spare parts distributed by Tetra Pak.**

Remember, Tetra Pak cannot accept responsibility for the failure of a separator equipped with non-original spare parts. We guarantee the quality and reliability of our products.

S0023621

WARNING B

When changing certain parts in the separator bowl assembly, the vibration level may increase. This can result in shorter life time of components like rolling bearings and gears. If severe unbalance occurs, the rotating bowl assembly can come into contact with the frame causing damage to equipment and injuries to personnel. It is strongly recommended that the exchange of parts is **supervised by an Tetra Pak service engineer**. TetraPak assumes no liability for damage to property or injury to personnel resulting from unauthorized installation of those parts.

WARNING C

Certain bowl parts carry milling marks from the balancing of the complete separator bowl. These parts must not be replaced without rebalancing the complete bowl. Tetra Pak has to be contacted in this matter.

SV

Följ ditt kvalitetstänkande genom att endast använda originalreservdelar distribuerade av Tetra Pak.

Kom ihåg att Tetra Pak inte tar något ansvar för fel på en separator som innehåller icke-originaldelar. Vi garanterar kvaliteten och driftsäkerheten hos våra egna produkter.

S0023621

VARNING B

Om vissa delar i separatorkulan byts ut, kan vibrationsnivån komma att öka. Detta kan i sin tur leda till förkortad livslängd på t.ex. lager och växlar. Om kraftiga vibrationer uppstår, kan den roterande kulan komma att slå i stativets delar, vilket kan medföra allvarlig maskin- och personskada. Det är därför av stor vikt att utbyte av kulans delar **övervakas av en serviceingenjör från Tetra Pak**. Tetra Pak tar inget ansvar för maskin- eller personskador som kan uppkomma på grund av att delar bytts ut av icke auktoriserad personal.

VARNING C

Vissa av separatorkulans delar har urfrästa spår som resultat av balansering av hela kulan. Dessa delar kan inte bytas ut utan att en ombalansering av kulan görs. Kontakta Tetra Pak i detta ärende.

de

Sichern Sie Ihre hohe Qualität durch die ausschließliche Verwendung originaler Ersatzteile, die von Tetra Pak vertrieben werden.

Beachten Sie bitte, daß Tetra Pak keine Verantwortung für den Ausfall eines Separators übernimmt, der mit Nicht-Originalteilen ausgestattet ist. Wir garantieren für die Qualität und Zuverlässigkeit unserer Produkte.

S0023621

WARNUNG B

Durch den Austausch bestimmter Teile in der Separatortrommel-Baugruppe, kann ihr Schwingungspegel steigen. Dies kann zu einer kürzeren Lebensdauer von Teilen, wie z.B. Wälzlagern und Getrieben, führen. Bei einer schweren Unwucht kann die rotierende Trommelbaugruppe in Kontakt mit dem Gestell kommen, was zu Beschädigungen der Ausrüstung oder Personenverletzungen führen kann. Es wird dringend empfohlen, **den Austausch von einem Tetra Pak Service-Ingenieur beaufsichtigen zu lassen**. Tetra Pak übernimmt keine Haftung für eine Gerätebeschädigung oder Personenverletzung aufgrund einer ungenehmigten Montage dieser Teile.

WARNUNG C

Bestimmte Trommelteile haben Fräsmarken vom Auswuchten der kompletten Separatortrommel. Diese Teile dürfen nicht ohne eine Neuauswuchtung der kompletten Trommel ausgetauscht werden. Wenden Sie sich in dieser Angelegenheit an Tetra Pak.

fr

Protégez la qualité de votre équipement en utilisant uniquement des pièces détachées d'origine distribuées par Tetra Pak.

Attention, Tetra Pak décline toute responsabilité en cas de panne d'un séparateur équipé de pièces de rechange qui ne sont pas d'origine. Nous garantissons la qualité et la fiabilité de nos produits.

S0023621

AVERTISSEMENT B

Le remplacement de certaines pièces du bol du séparateur risque d'augmenter le niveau de vibrations, et donc de réduire la durée de vie des composants tels que les paliers à roulements et les engrenages. En cas de déséquilibre trop important, le bol en rotation risque d'entrer en contact avec des pièces du bâti, provoquant ainsi des détériorations de l'équipement et des blessures du personnel. Nous vous incitons fortement à faire réaliser le remplacement **sous la surveillance d'un technicien de maintenance Tetra Pak.** Tetra Pak n'assume aucune responsabilité en cas de détérioration du matériel ou de blessure du personnel résultant d'une installation non approuvée de ces pièces.

AVERTISSEMENT C

Certaines pièces du bol présentent des marques de repérage effectuées lors de l'équilibrage du bol du séparateur. Il ne faut pas remplacer ces pièces sans avoir au préalable procédé à un nouvel équilibrage de l'ensemble du bol. Tetra Pak doit être contacté à ce propos.

es

Conserve su compromiso con la calidad utilizando siempre piezas originales distribuidas por Tetra Pak.

Recuerde que Tetra Pak no acepta ninguna responsabilidad por el fallo de una separadora equipada con repuestos no originales. Alfa Laval garantiza la calidad y la fiabilidad de sus productos.

S0023621

ADVERTENCIA B

Cuando se cambian ciertas piezas del conjunto del rotor de la separadora, puede que se produzca un aumento del nivel de vibraciones, lo que puede provocar un desgaste de algunos componentes, como los rodamientos de rodillos y los engranajes. Si se produce un desequilibrado importante, el conjunto del rotor en movimiento puede rozar con el bastidor, causando serios daños al equipo y al personal. Se recomienda encarecidamente que el cambio sea **supervisado por un técnico de mantenimiento de Tetra Pak**. Tetra Pak no se hace responsable de los daños materiales o daños personales provocados por la instalación no autorizada de esas piezas.

ADVERTENCIA C

Algunas piezas del rotor llevan marcas estampadas para el equilibrado del rotor completo de la separadora. Siempre que se cambien estas piezas se debe equilibrar de nuevo todo el rotor. Hay que ponerse en contacto con Tetra Pak para este asunto.

ru

Пользуйтесь только качественными оригинальными запасными деталями распространяемыми фирмой Tetra Pak.

Помните: компания Tetra Pak не несет ответственность за нарушения работы сепаратора, на котором установлены не подлинные запасные детали. Мы гарантируем качество и надежность нашей продукции.

S0023621

ПРЕДУПРЕЖДЕНИЕ В

В случае замены некоторых частей устройства барабана сепаратора может повыситься уровень вибрации.Это может привести к сокращению срока службы компонентов, таких как подшипники и привод. В случае значительного дисбаланса, устройство вращающегося барабана может войти в контакт со станиной, что приведет к серьезному повреждению оборудования и травмам обслуживающего персонала. Настоятельно рекомендуется, чтобы замена была **проконтролирована инженером по обслуживанию компании Tetra Pak**. Компания Tetra Pak не несет никакой ответственности за повреждения собственности или травмы персонала в результате неразрешенной установки этих деталей.

ПРЕДУПРЕЖДЕНИЕ С

На некоторых частях барабана поставлены отметки после балансировки барабана сепаратора полностью. Эти части не могут быть заменены без повторной балансировки всего устройства барабана сепаратора. По данным вопросам обращайтесь в фирму Tetra Pak.

it

Salvaguardate la qualità del vostro separatore utilizzando sempre ricambi originali distribuite da Tetra Pak.

Ricordate che la Tetra Pak non accetta alcuna responsabilità in caso di difetti al separatore dovuti all'utilizzo di ricambi non originali. La Tetra Pak garantisce la qualità e l'affidabilità esclusivamente dei propri prodotti.

S0023621

AVVERTENZA B

In seguito alla sostituzione di alcune parti del tamburo del separatore, il livello di vibrazioni può aumentare. Questo può comportare la riduzione della vita utile di componenti quali cuscinetti a rulli ed ingranaggi. In caso di elevato spostamento, il tamburo può entrare a contatto con le parti del telaio provocando seri danni all'attrezzatura e lesioni alle persone. Si raccomanda caldamente di far **controllare la sostituzione da un tecnico di assistenza Tetra Pak**. La Tetra Pak non assume alcuna responsabilità per danni alle cose o lesioni al personale dovuti all'installazione non autorizzata delle suddette parti.

AVVERTENZA C

Alcune parti del tamburo dipendono dal bilanciamento complessivo del tamburo del separatore. Le suddette parti non possono essere sostituite senza procedere ad un nuovo bilanciamento. Contattare la Tetra Pak.

pt

Salvaguarde a sua decisão de manter a qualidade usando sempre peças sobressalentes originais distribuídas pela Tetra Pak.

Não se esqueça de que a Tetra Pak não assume quaisquer responsabilidades pela avaria dum separador que não esteja equipado com peças originais. Por isso, asseguramos a garantia da qualidade e fiabilidade dos nossos produtos.

S0023621

AVISO B

Ao mudar determinadas peças no conjunto do rotor da separadora, poderá provocar um aumento da vibração. Tal poderá originar a redução do tempo de duração dos componentes, tais como rolamentos de roletes e engrenagens. Caso se verifique um desequilíbrio acentuado, o conjunto do rotor giratório poderá entrar em contacto com a estrutura, vindo a provocar danos no equipamento e ferimentos pessoais. Recomenda-se vivamente que a substituição de peças seja **vistoriada por um técncico de serviço da Tetra Pak.** A Tetra Pak não assume qualquer responsabilidade por danos em bens ou ferimentos pessoais resultantes da instalação não autorizada daquelas peças.

AVISO C

Determinadas partes do rotor contêm marcas de atrito do balanceamento do rotor do separador completo. Estas peças não devem ser substituídas sem reequilibrar o rotor completo. Para isto, a Tetra Pak tem de ser contactada.

fi

Turvaa laadukas kokonaisuus käyttämällä aina aitoja, Tetra Pakin toimittamia varaosia.

Muista, ettei Tetra Pak voi vastata sellaisen separaattorin toimintahäiriöstä, jossa on käytetty muita kuin alkuperäisiä varaosia. Me takaamme omien tuotteidemme laadun ja luotettavuuden.

S0023621

VAROITUS B

Kun separaattorin kuula-asennelman tiettyjä osia vaihdetaan, sen tärinän taso voi kasvaa. Tämä voi johtaa joidenkin osien, kuten vierintälaakereiden ja hammasvaihteiden, käyttöiän lyhenemiseen. Jos asennelma joutuu pahasti epätasapainoon, pyörivä kuula-asennelma voi koskettaa runkoa ja aiheuttaa laite- ja henkilövahinkoja. Suosittelemme, että **Tetra Pakin huoltoinsinööri valvoo** vaihtoa. Tetra Pak ei ota vastuuta omaisuudelle tai henkilökunnalle aiheutuneista vahingoista, mikäli ne johtuvat näiden osien väärin suoritetusta asennuksesta.

VAROITUS C

Tietyissä kuulan osissa on merkinnät koko separaattorikuulan tasapainotuksesta. Näitä osia ei saa vaihtaa ilman, että koko kuula tasapainotetaan. Ota yhteyttä Tetra Pakiin tässä asiassa.

el

Διασφαλίστε την ποιότητα χρησιμοποιώντας πάντοτε γνήσια ανταλλακτικά που διανέμονται από την Tetra Pak.

Σας υπενθυμίζουμε ότι η Tetra Pak δεν αναλαμβάνει ευθύνη για τη βλάβη διαχωριστήρα που δεν είναι εξοπλισμένος με αυθεντικά ανταλλακτικά. Εγγυώμαστε την ποιότητα και την αξιοπιστία των προϊόντων μας.

S0023621

ΠΡΟΣΟΧΗ B

Όταν αλλάζετε ορισμένα εξαρτήματα στο σύστημα του τυμπάνου του διαχωριστήρα, η στάθμη κραδασμών μπορεί να αυξηθεί. Αυτό μπορεί να έχει σαν αποτέλεσμα μικρότερη διάρκεια ζωής των εξαρτημάτων, όπως ρουλεμάν και γρανάζια. Σε περίπτωση σοβαρής έλλειψης ζυγοστάθμισης, το περιστρεφόμενο σύστημα του τυμπάνου μπορεί να έλθει σε επαφή με το πλαίσιο, προκαλώντας ζημιές στο μηχάνημα και τραυματισμό του προσωπικού. **Οι οποιεσδήποτε αλλαγές εξαρτημάτων πρέπει να γίνονται υπό την επίβλεψη μηχανικού της Tetra Pak.** Η Tetra Pak δεν φέρει καμμία ευθύνη για υλικές ζημιές ή για τραυματισμό του προσωπικού λόγω τοποθέτησης αυτών των εξαρτημάτων από μη εξουσιοδοτημένα άτομα.

ΠΡΟΣΟΧΗ C

Ορισμένα εξαρτήματα του τυμπάνου φέρουν ίχνη φρεζαρίσματος από τη ζυγοστάθμιση ολόκληρου του συστήματος του τυμπάνου του διαχωριστήρα. Αυτά τα εξαρτήματα δεν πρέπει να αντικατασταθούν χωρίς να ξαναγίνει ζυγοστάθμιση ολόκληρου του συστήματος του τυμπάνου του διαχωριστήρα. Για το θέμα αυτό θα πρέπει να επικοινωνήσετε με την Tetra Pak.

nl

Verzeker u van optimale kwaliteit door altijd originele reserveonderdelen te gebruiken, die door Tetra Pak worden gedistribueerd.

Wij wijzen u erop, dat Tetra Pak geen verantwoordelijkheid kan aanvaarden voor defecten aan een separator die is uitgerust met niet-originele reserveonderdelen. Wij garanderen de kwaliteit en de betrouwbaarheid van onze producten.

S0023621

WAARSCHUWING B

Als er bepaalde onderdelen van de separatortrommel worden vervangen, kan het trillingsniveau veranderen. Dit kan leiden tot een verkorte levensduur van onderdelen als rollagers en tandwielen. Als er sprake is van een ernstige mate van onbalans, kan de roterende trommel in contact komen met het frame, wat kan leiden tot ernstige schade aan goederen of tot persoonlijk letsel. Het is dan ook ten sterkste aan te raden om onderdelen te laten vervangen **onder supervisie van een onderhoudstechnicus van Tetra Pak**. Tetra Pak aanvaardt geen enkele aansprakelijkheid voor schade aan goederen of persoonlijk letsel als gevolg van onoordeelkundige installatie van die onderdelen.

WAARSCHUWING C

Op bepaalde onderdelen van de trommel zitten freesmarkeringen van het uitbalanceren van de gehele separatortrommel. Deze onderdelen mogen niet worden vervangen zonder dat de gehele trommel opnieuw wordt uitgebalanceerd. Hiervoor dient contact te worden opgenomen met Tetra Pak.

da

Beskyt din investering i kvalitet ved altid at anvende originale reservedele distribueret af Tetra Pak.

Husk at Tetra Pak påtager sig intet ansvar for fejl i separatorer, der er udstyret med uoriginale reservedele. Vi indestår for vore produkters kvalitet og driftssikkerhed.

S0023621

ADVARSEL B

Ved udskiftning af visse dele i separatorkuglen, kan vibrationsniveauet blive forøget. Dette kan forkorte levetiden for komponenter som kuglelejer og tandhjul. I tilfælde af kraftige vibrationer kan den roterende separatorkugle komme i kontakt med rammedele, hvilket kan medføre alvorlig beskadigelse af udstyr og personskade. Det anbefales på det kraftigste, at udskiftningen sker **under tilsyn af en servicetekniker fra Tetra Pak.** Tetra Pak påtager sig intet ansvar for ting- eller personskade som følge af ikke-autoriseret montering af disse dele.

ADVARSEL C

Visse kugledele er forsynet med mærker fra afbalanceringen af den samlede separatorkugle. Ved udskiftning af disse dele skal der foretages en ny afbalancering af den samlede kugleenhed. Tetra Pak skal kontaktes i dette anliggende.

1.2 Translation list

Översättningslista
Übersetzungsliste
Liste de traduction
Lista de traducciones

en	sv	de	fr	es
Part no.	Reservdelsnummer	Teil-Nr.	Numéro de pièce	Pieza No.
Qty	Antal	Anzahl	Quantité	Cantidad
Description	Benämning	Bezeichnung	Dénomination	Descripción
Notes	Anmärkningar	Anmerkungen	Remarques	Notas
Machine type	Maskintyp	Maschinentyp	Type de machine	Tipo de máquina
Product no.	Produktnr	Produktnummer	Numéro de produit	Número de producto
Machine unit description	Maskinblocksbenämning	Bezeichnung des Maschinenblocks	Dénomination de partie de machine	Descripción de sección de la máquina
Machine unit no.	Maskinblocksnr	Maschinenblock Nr.	Partie de machine nº	No. de sección de máquina
Subassembly description	Undergruppsbenämning	Bezeichung der Untergruppe	Dénomination de sous-ensemble	Descripción de subconjunto
Subassembly no.	Undergruppsnr	Untergruppe Nr.	Nº de sous-ensemble	Número de subconjunto
See page	Se sidan	Siehe Seite	Voir page	Véase la página
Fig. ref.	Figurhänvisning	Bildhinweise	Réf. de fig.	Referencia de figura
Product name	Produktnamn	Produktname	Nom du produit	Nombre del producto
Exchange necessitates rebalancing of bowl	Utbyte nödvändiggör ombalansering av kulan	Austausch erfordert Wiederauswuchtung der Trommel	Le remplacement nécessite le rééquilibrage du bol	El racmbio requiere el reequilibrado del rotor
See separate spare parts list	Se separat reservdelslista	Siehe separate Ersatzteilliste	Voir liste séparée des pièces de rechange	Véase la lista de piezas separada
Not delivered as spare part	Levereras ej som reservdel	Nicht als Ersatzteil geliefert	Non livré comme piéce de rechange	No se entrega como pieza de recambio

Translation list

Словарь перевда
Lista traduzioni
Lista para tradução
Käännösluttelo

en	ru	it	pt	fi
Part no.	Деталь №	Nr. parte	Numero de peca	Varaosanumero
Qty	Кол–во	Quantita	Quantidade	Lukumäärä
Description	Наименование	Descrizione	Descricao	Nimitys
Notes	Примечания	Note	Notas	Huomautuksia
Machine type	Машина тнпа	Tipo macchina	Tipo de maquina	Konetyyppi
Product no.	Артикул №	Nr.produtto	No. do produto	Tuotteen no
Machine unit description	Наименование блока машины	Descrizione unita macchina	Descricao da unidade da maquina	Koneenosan nimitys
Machine unit no.	Блок машины №	Nr. unita macchina	Numero de unidade da maquina	Koneenosan no
Subassembly description	Наименование группы	Descrizione sottogruppo	Descriao do subconjunto	Alaryhmän nimitys
Subassembly no.	Группа №	Nr. sottogruppo	Número de subconjunto	Alaryhmän no
See page	См. страницу	Vedi pagina	Véase la página	Ks sivu
Fig. ref.	Ссылка на зскиз	Rif. fig.	Referencia de figura	Kuvaviite
Product name	Наименование артикула	Nome prodotto	Nombre del producto	Tuotteen nimi
Exchange necessitates rebalancing of bowl	Замена требует балансировки барабана	La sostituzione comporta la iequilibratura del tamburo	El racmbio requiere el reequilibrado del rotor	Vaihdettaessa kuula tasapainoitettava uudelleen
See separate spare parts list	См. отдельный перечень запасных частей	Vedi lista separata delle parti di ricambio	Véase la lista de piezas separada	Katso erillistä varaosaluetteloa
Not delivered as spare part	Не поставлена вместе с запасными частями	Non fornito come parte di ricambio	No se entrega como pieza de recambio	Ei toimiteta varaosana

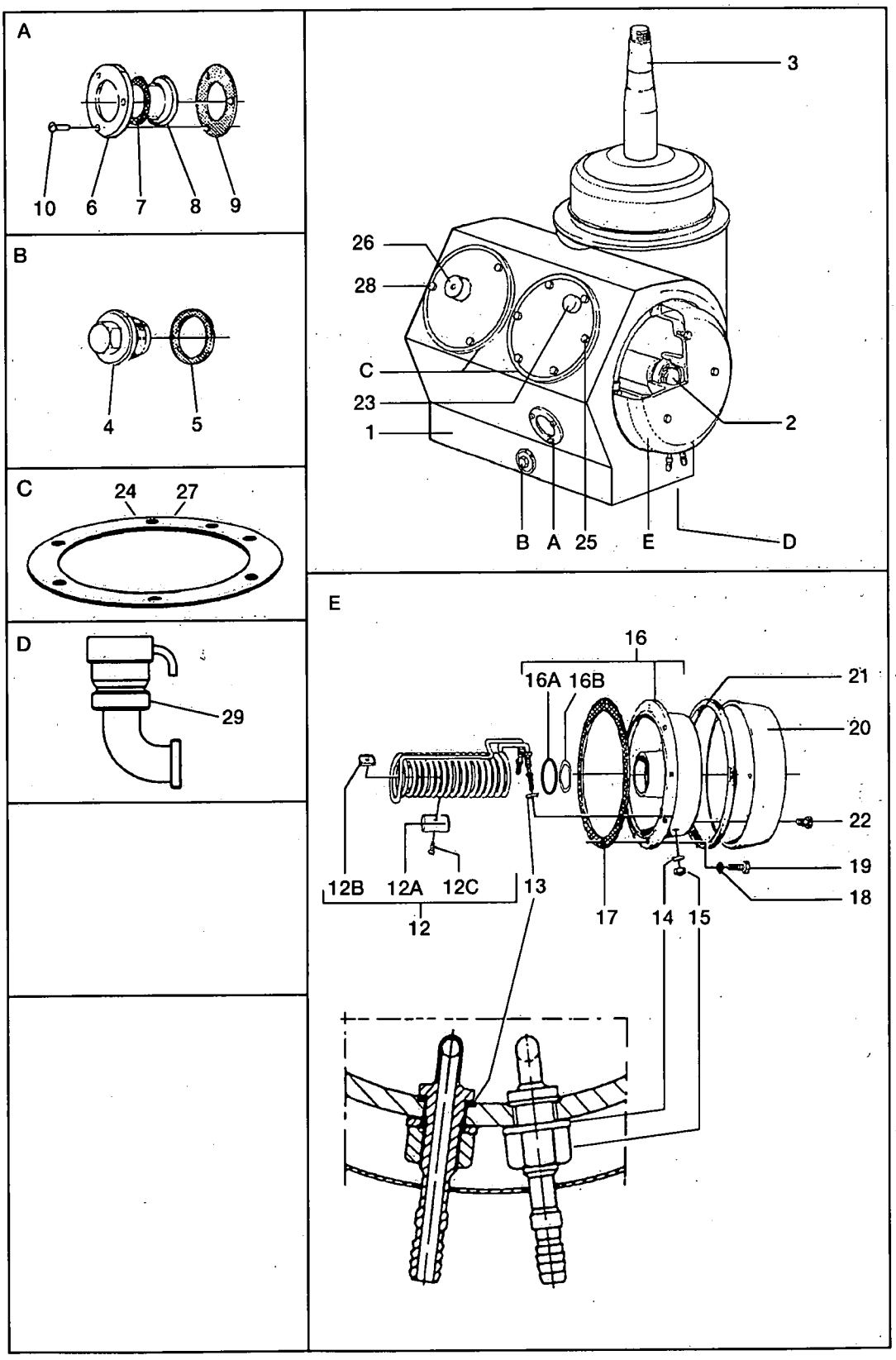
Translation list

ΓΛΩΣΣΑΡΙ
Vertaallijst
Oversζttelseliste

en	el	nl	da
Part no.	Αριθμός ανταλλακτικού	Onderdeelnr.	Reservedelsnummer
Qty	Σύνολο	Hoeveelheid	Antal
Description	Περιγραφή	Beschrijving	Betegnelse
Notes	Παρατηρήσεις	Opmerkingen	Bemaerkninger
Machine type	Τύπος μηχάνηματος	Machinetype	Maskintype
Product no.	Αριθμός προϊόντος	Produktnr.	Produktnr.
Machine unit description	Περιγραφή συγκροτήματος μηχανής	Machineblokbenaming	Maskinbetegnelse
Machine unit no.	Αριθμός συγκροτήματος μηχανής	Machineblokbenamning	Maskinnr.
Subassembly description	Περιγραφή υποσυγκροτήματος	Subgroepbenamning	Undergruppsbetegnelse
Subassembly no.	Αριθμός υποσυγκροτήματος	Subgroepnr.	Undergruppenr.
See page	Βλέπε σελίδα	Zie blz.	Se side
Fig. ref.	Παραπομπή σε εικόνα	Afb. ref.	Figurhenvisning
Product name	Ονομασία προϊόντος	Produktnaam	Produktnavn
Exchange necessitates rebalancing of bowl	Ανταλλαγή απαιτεί επαναρρύθμιση ισορροπίας του τύμπανου	Vervangning vereist herbalanceren van de kogel	Udskriftning kraever ny afbalcering af kuglen
See separate spare parts list	Βλέπε ειδική λίστα ανταλλακτικών	Vervangning vereist van de kogel	Se spaat reservedelsliste
Not delivered as spare part	Δεν παραδίδεται ως ανταλλακτικό	Niet geleverd als reserveonderdeel	Levereres ikke som reservedel

2 Machine bottom part

Ref	Part No	Description	Machine unit number or Subassembly description 553136- -62	-58	-60	Notes
			Quantity			
		50 Hz with SMS coupling	↓			
		60 Hz with SMS coupling		↓		
		60 Hz with Clamp coupling			↓	
1	556407 83	Frame bottom part complete	1	1	1	
2	546423 03	Driving device horizontal		1	1	See page 24
2	546423 07	Driving device horizontal	1			See page 24
3	546800 01	Driving device vertical	1			See page 26
3	546800 78	Driving device vertical		1	1	See page 26
4	526189 01	Drain screw	1	1	1	
5	223316 05	Rectangular ring	1	1	1	
6	523215 02	Fixing plate	1	1	1	
7	37167	Rectangular ring	1	1	1	
8	38685	Glass disc	1	1	1	
9	528723 01	Gasket	1	1	1	
10	221131 08	Screw	3	3	3	
12	534126 83	Cooling coil	1	1	1	
12 A	534127 01	Magnet	1	1	1	
12 B	534128 01	Washer	1	1	1	
12 C	260250 05	Screw	1	1	1	
13	73665	Rectangular ring	2	2	2	
14	223101 37	Washer	2	2	2	
15	221803 40	Nut	2	2	2	
16	560804 80	Bearing shield	1	1	1	
16 A	223406 36	O-ring	1	1	1	
16 B	554216 02	Corrugated shim	1	1	1	
17	43626	Gasket	1	1	1	
18	223101 61	Washer	8	8	8	
19	221041 01	Screw	8	8	8	
20	528709 01	Guard	1	1	1	
21	43630	Seal strip	1	1	1	
22	221041 20	Screw	2	2	2	
23	528753 85	Worm wheel guard	1	1	1	See page 28
24	528732 01	Gasket	1	1	1	
25	221041 20	Screw	6	6	6	
26	535336 81	Remote control brake	1	1	1	See page 30
27	528732 01	Gasket	1	1	1	
28	221041 20	Screw	3	3	3	
29	546657 89	Inlet device	1	1		See page 32
29	546657 90	Inlet device			1	See page 34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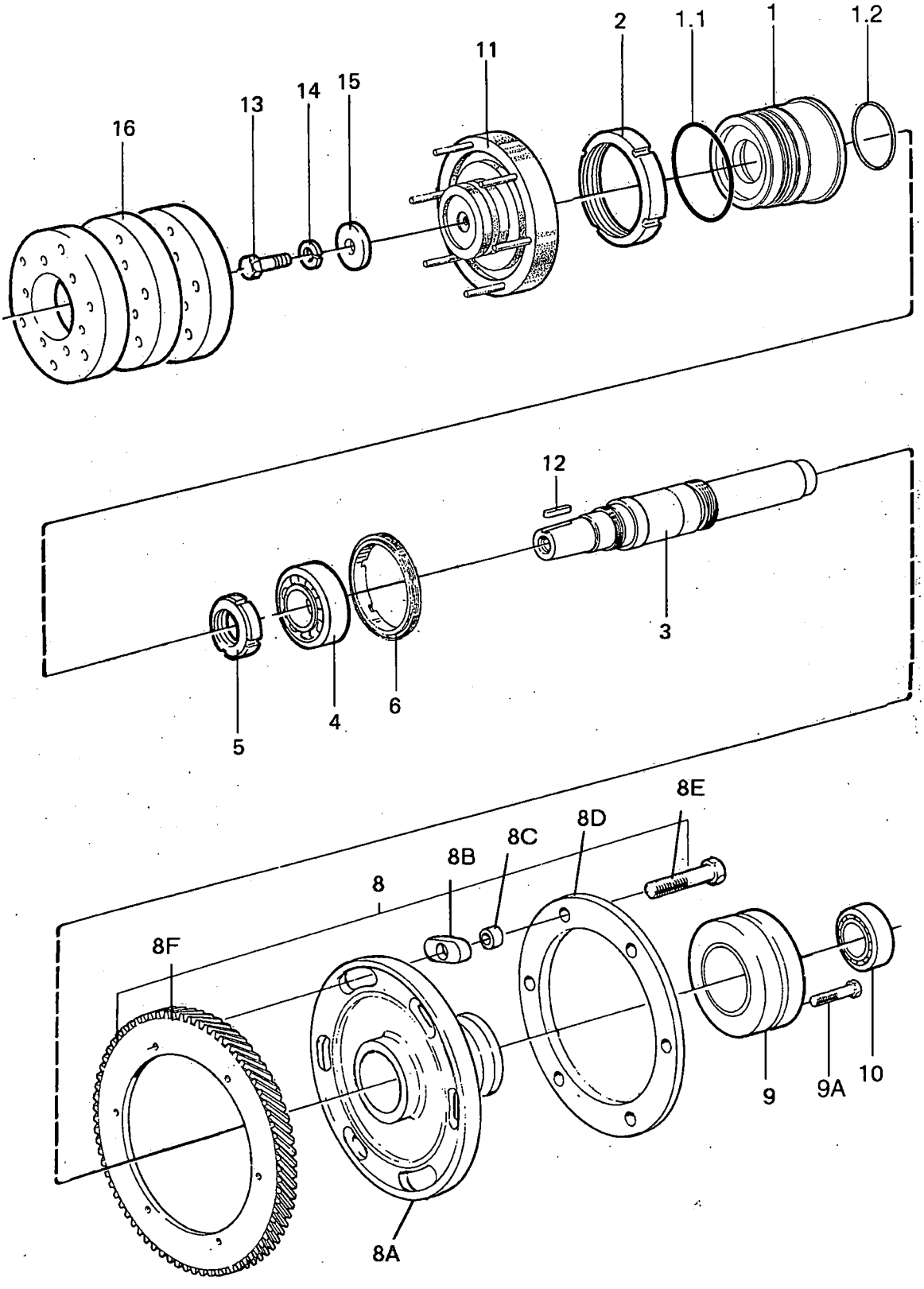
2.1 Driving device horizontal

Ref	Part No	Description	Machine unit number or Subassembly description 546423- -07 -03								Notes
			Quantity								
		50 Hz 60 Hz	↓	↓							
1	567260 01	Bearing housing	1	1							
1.1	546198 53	O-ring	1	1							
1.2	223521 98	Seal ring	1	1							
2	541985 01	Round nut	1	1							
3	546424 80	Worm wheel shaft	1	1							
4	233211 94	Ball bearing	1	1							
5	67478	Round nut	1	1							
6	544789 01	Lock ring	1	1							
8	545803 86	Worm wheel complete		1							
8	545803 88	Worm wheel complete	1								
8 A	545705 02	Nave	1	1							
8 B	545704 01	Buffer	6	6							
8 C	545703 01	Sleeve	6	6							
8 D	545706 01	Ring	1	1							
8 E	221036 20	Screw	6	6							
8 F	545725 08	Gear rim		1							
8 F	545725 10	Gear rim	1								
9	541988 01	Clamp element	1	1							
9 A	221035 61	Hexagon head screw	12	12							
10	8379	Ball bearing	1	1							
11	544783 81	Coupling pulley	1	1							
12	223610 32	Flat key	1	1							
13	260001 39	Screw	1	1							
14	223107 28	Spring washer	1	1							
15	541991 01	Washer	1	1							
16	304153 01	Elastic plate	3	3							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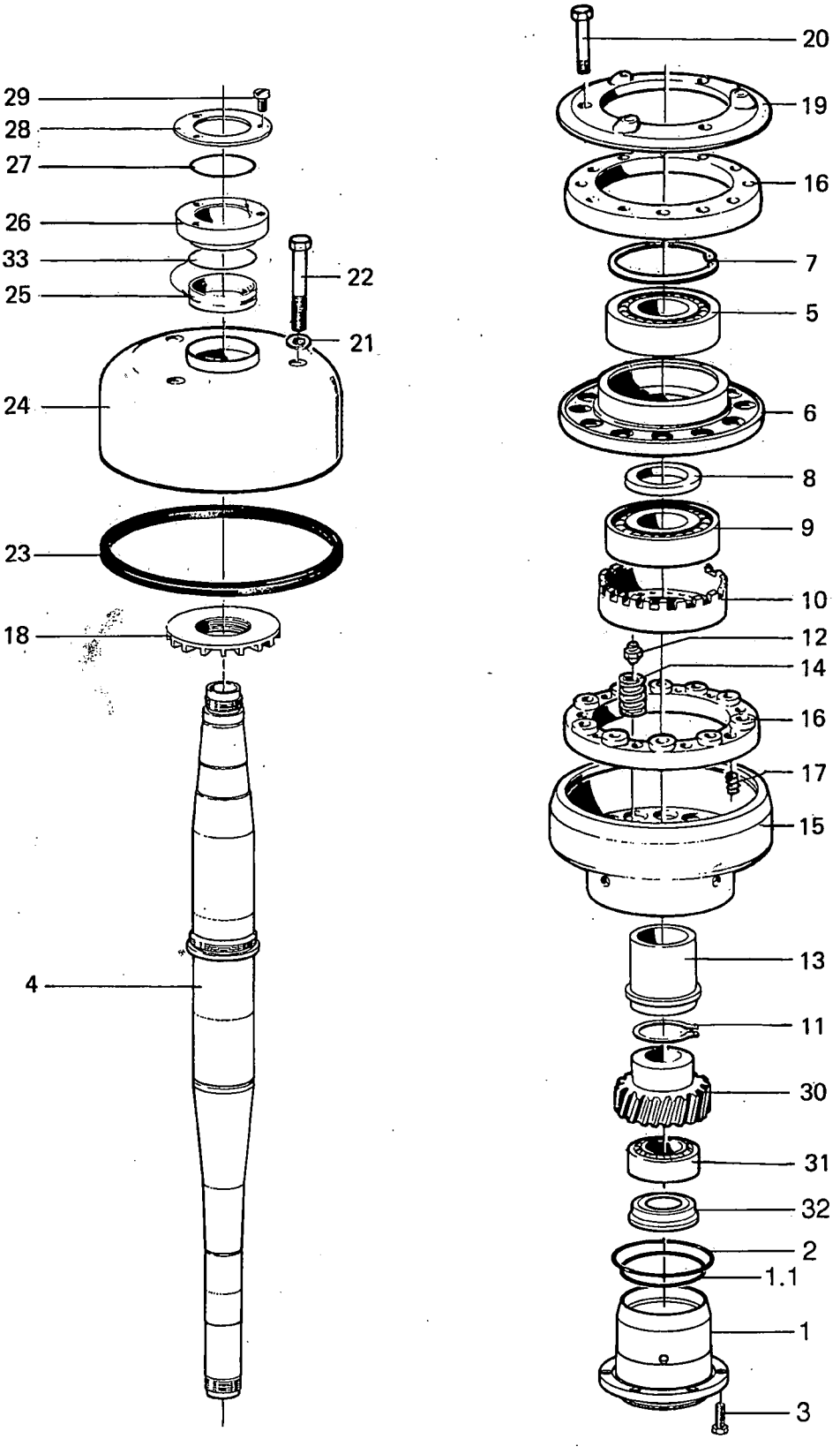
2.2 Driving device vertical

Ref	Part No	Description	Machine unit number or Subassembly description 546800- -01 -78		Notes
			Quantity		
		50 Hz 60 Hz	↓	↓	
1	566326 01	Bottom bearing housing	1	1	
1.1	521121 27	O-ring	1	1	
2	223406 17	O-ring	1	1	
3	221721 12	Screw	6	6	
4	546804 03	Bowl spindle	1	1	
5	548747 07	Ball bearing	1	1	
6	542451 02	Ball bearing housing	1	1	
7	223642 49	Snap ring	1	1	
8	533415 01	Spacing sleeve	1	1	
9	548745 04	Ball bearing	1	1	
10	542450 02	Bearing housing	1	1	
11	223641 01	Snap ring	1	1	
12	538129 01	Guide pin	12	12	
13	543318 01	Sleeve	1	1	
14	260083 41	Compression spring	12	12	
15	542452 02	Top bearing support	1	1	
16	529639 02	Rubber buffer	2	2	
17	707.14	Spring	12	12	
18	542026 02	Oil fan	1	1	
19	542027 02	Top bearing cover	1	1	
20	221045 35	Screw	3	3	
21	541453 05	Usit ring	3	3	
22	221046 16	Screw	3	3	
23	555231 01	Seal ring	1	1	
24	543179 01	Guard	1	1	
25	544271 01	Seal ring	1	1	
26	544272 01	Protecting collar	1	1	
27	223412 18	O-ring	1	1	
28	543188 01	Protecting plate	1	1	
29	221131 07	Screw	3	3	
30	541661 01	Worm		1	
30	541661 05	Worm	1		
31	548746 04	Ball bearing	1	1	
32	567119 01	Protecting collar	1	1	
33	223406 36	O-ring	1	1	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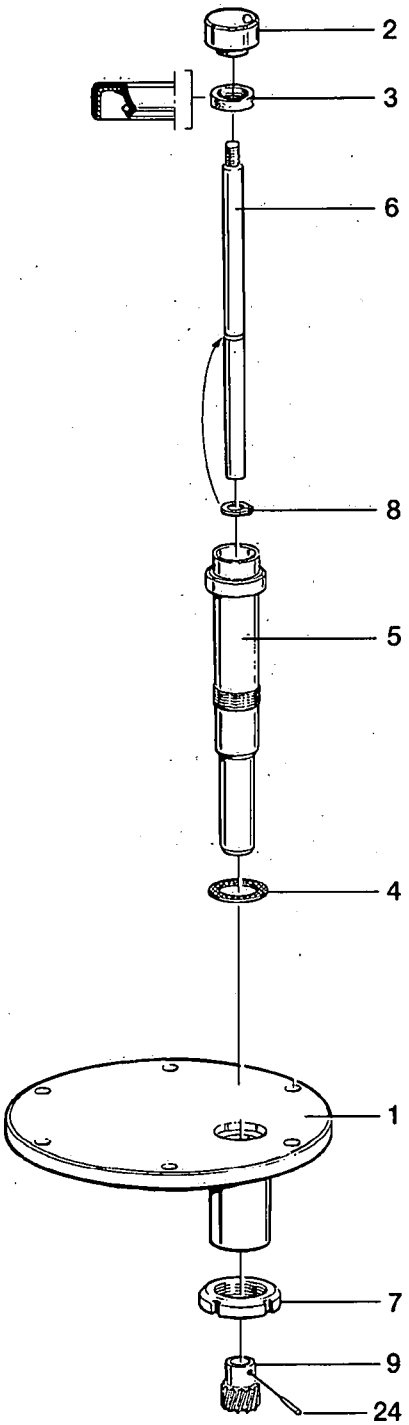
2.3 Worm wheel guard

Ref	Part No	Description	Machine unit number or Subassembly description 528753- -85	Notes
			Quantity	
1	544165 02	Worm wheel guard	1	
2	526694 03	Protecting collar	1	
3	223521 08	Seal ring	1	
4	223434 02	Rectangular ring	1	
5	528743 01	Bushing	1	
6	526693 04	Shaft	1	
7	67473	Round nut	1	
8	67542	Snap ring	1	
9	69214	Gear wheel	1	
24	69226	Taper pin	1	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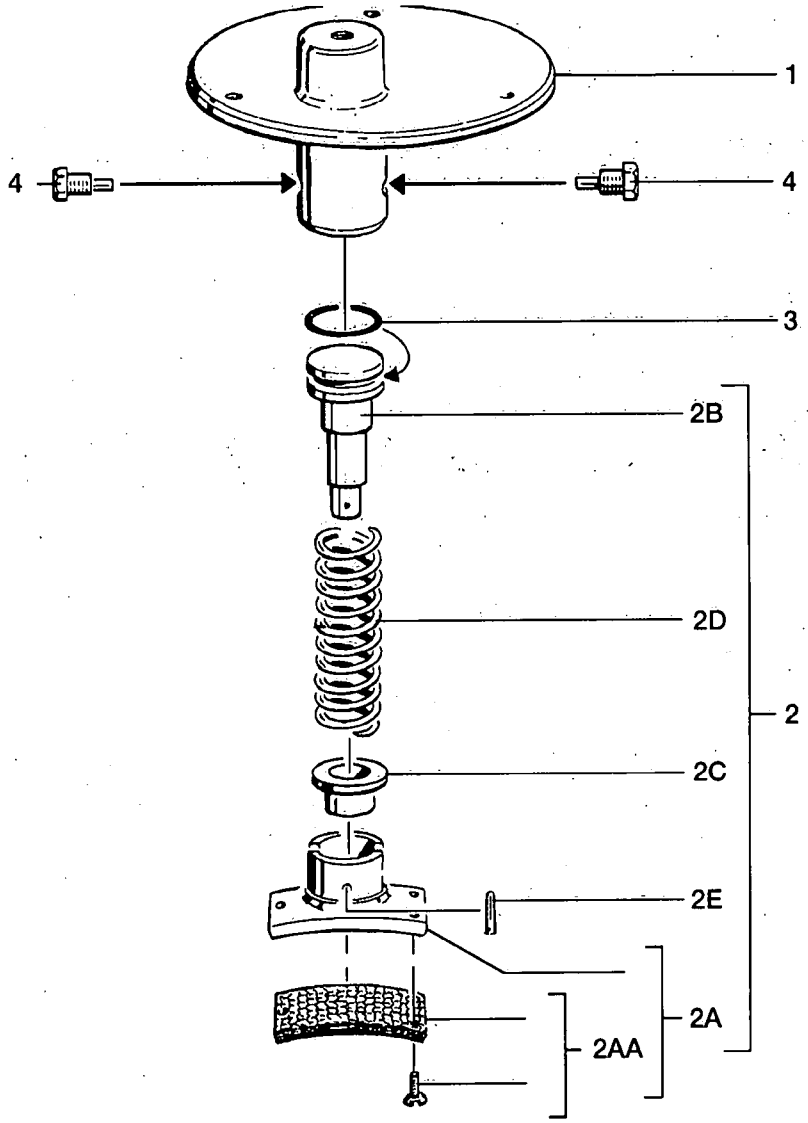
2.4 Remote control brake

Ref	Part No	Description	Machine unit number or Subassembly description 535336- -81	Notes
			Quantity	
1	544788 80	Protecting cover	1	
2	535201 83	Brake shoe	1	
2A	537602 86	Brake shoe	1	
2AA	310637 84	Friction pad	1	
2B	535202 01	Piston rod	1	
2C	535206 01	Gland	1	
2D	226214 83	Spring	1	
2E	67960	Slotted pin	1	
3	223406 27	O-ring	1	
4	535207 01	Stop screw	2	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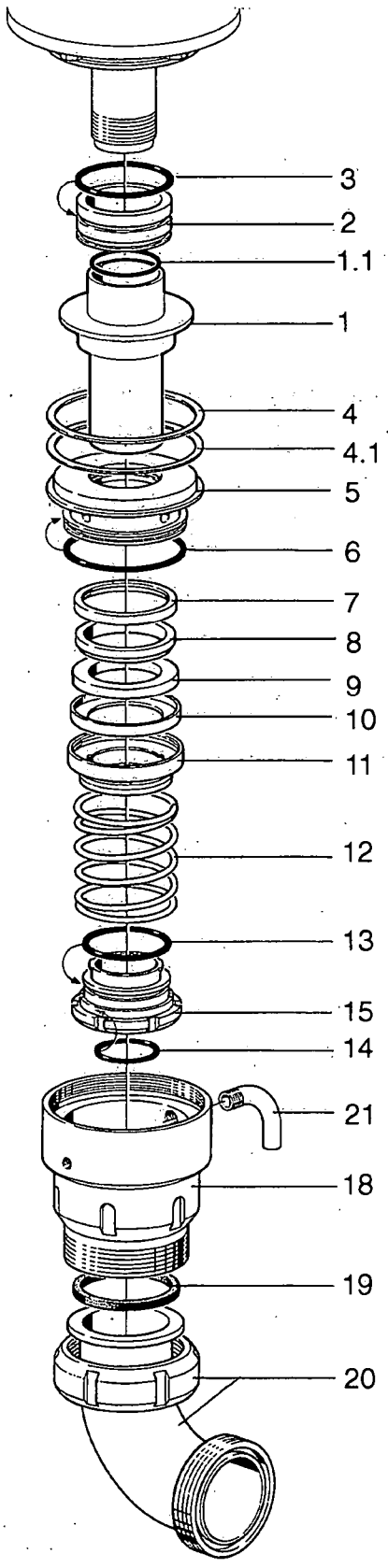
2.5 Inlet device, SMS coupling

Ref	Part No	Description	Machine unit number or Subassembly description 546657- -89	Notes
			Quantity	
1	567120 01	Sleeve	1	
1.1	223406 24	O-ring	1	
2	546635 01	Throttle ring	1	
3	223406 15	O-ring	1	
4	546637 01	Height adjusting ring 1,0 mm	3	
4.1	546637 02	Height adjusting ring 0,5 mm	1	
5	546610 01	Intermediate part	1	
6	223406 14	O-ring	1	
7	540829 05	Gasket	1	
8	541648 05	Seal ring	1	
9	541649 06	Wear ring	1	
10	540829 06	Gasket	1	
11	541650 01	Holder for wear ring	1	
12	545499 02	Compression spring	1	
13	260104 79	O-ring	1	
14	223406 58	O-ring	1	
15	546450 01	Guide sleeve	1	
18	546655 01	Inlet housing	1	
19	190605 *	Rectangular ring	1	
20	191033	Elbow pipe	1	
21	545461 01	Tube bend	1	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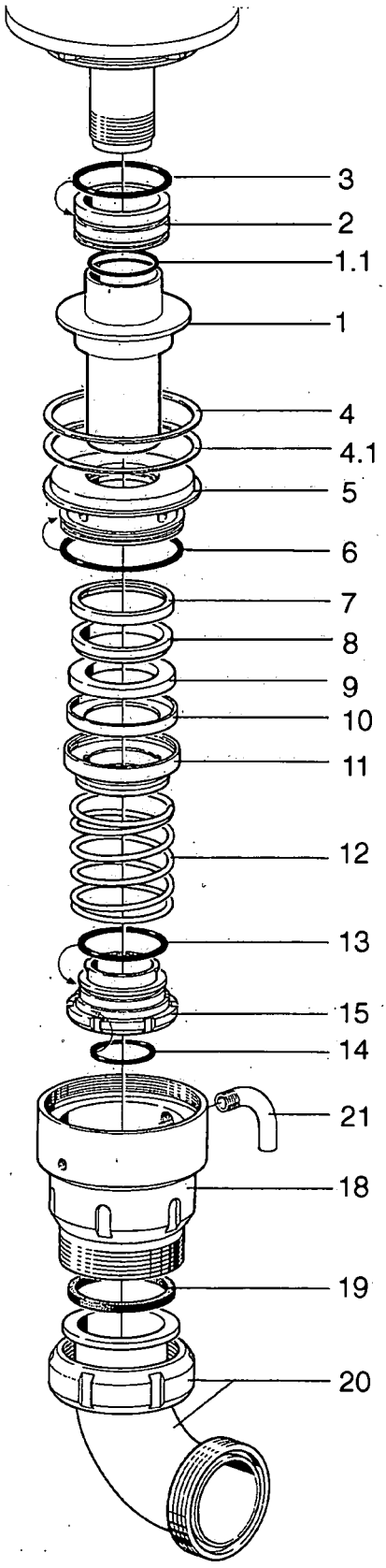
2.6 Inlet device, Clamp coupling

Ref	Part No	Description	Machine unit number or Subassembly description 546657- -90	Notes
			Quantity	
1	567120 01	Sleeve	1	
1.1	223406 24	O-ring	1	
2	546635 01	Throttle ring	1	
3	223406 15	O-ring	1	
4	546637 01	Height adjusting ring 1,0 mm	3	
4.1	546637 02	Height adjusting ring 0,5 mm	1	
5	546610 01	Intermediate part	1	
6	223406 14	O-ring	1	
7	540829 05	Gasket	1	
8	541648 05	Seal ring	1	
9	541649 06	Wear ring	1	
10	540829 06	Gasket	1	
11	541650 01	Holder for wear ring	1	
12	545499 02	Compression spring	1	
13	260104 79	O-ring	1	
14	223406 58	O-ring	1	
15	546450 01	Guide sleeve	1	
21	545461 01	Tube bend	1	
22	548412 01	Inlet housing	1	
23	538247 04	Clamp coupling	1	
24	538248 03	Gasket	1	
25	541709 80	Elbow pipe	1	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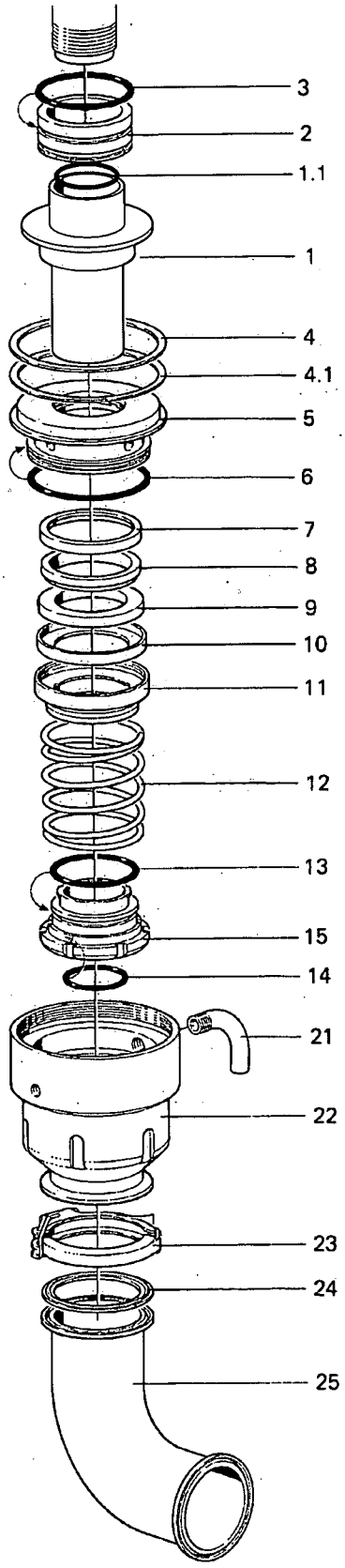
2.5 Inlet device, SMS coupling

Ref	Part No	Description	Machine unit number or Subassembly description 546657- -89	Notes
			Quantity	
1	567120 01	Sleeve	1	
1.1	223406 24	O-ring	1	
2	546635 01	Throttle ring	1	
3	223406 15	O-ring	1	
4	546637 01	Height adjusting ring 1,0 mm	3	
4.1	546637 02	Height adjusting ring 0,5 mm	1	
5	546610 01	Intermediate part	1	
6	223406 14	O-ring	1	
7	540829 05	Gasket	1	
8	541648 05	Seal ring	1	
9	541649 06	Wear ring	1	
10	540829 06	Gasket	1	
11	541650 01	Holder for wear ring	1	
12	545499 02	Compression spring	1	
13	260104 79	O-ring	1	
14	223406 58	O-ring	1	
15	546450 01	Guide sleeve	1	
18	546655 01	Inlet housing	1	
19	190605	Rectangular ring	1	
20	191033	Elbow pipe	1	
21	545461 01	Tube bend	1	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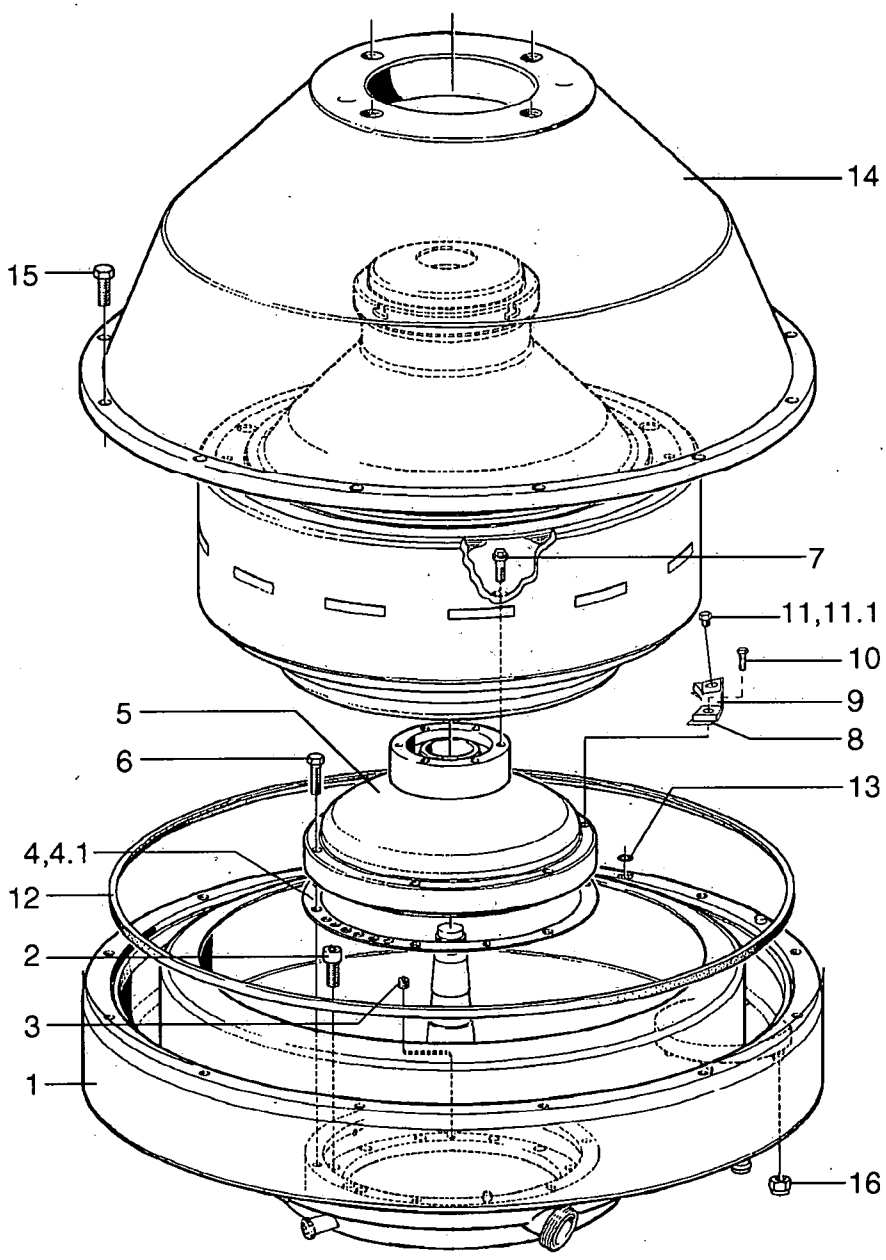
3 Machine top part

Frame top part (ring cover) without wing in the sediment outlet

Ref	Part No	Description	Machine unit number or Subassembly description 562032- -02 Quantity	Notes
1	562030 80	Frame top part	1	
2	221731 08	Screw	6	
3	260080 36	Set screw	3	
4	555245 01	Height adjusting ring 1,0 mm	3	
4.1	555245 02	Height adjusting ring 2,0 mm	1	Alternative
5	528249 91	Paring disc device	1	See page 38
6	221046 04	Screw	6	
7	545633 01	Screw	3	
8	555453 01	Gasket	1	
9	555447 02	Nozzle holder	1	
10	221031 29	Screw	2	
11	542931 01	Nozzle	1	
11.1	526350 03	Plug	1	Alternative
12	545318 03	Seal strip	1	
13	223406 25	O-ring	1	
14	546541 80	Frame hood	1	
15	2210463 23	Screw	12	
16	221891 17	Lock nut	4	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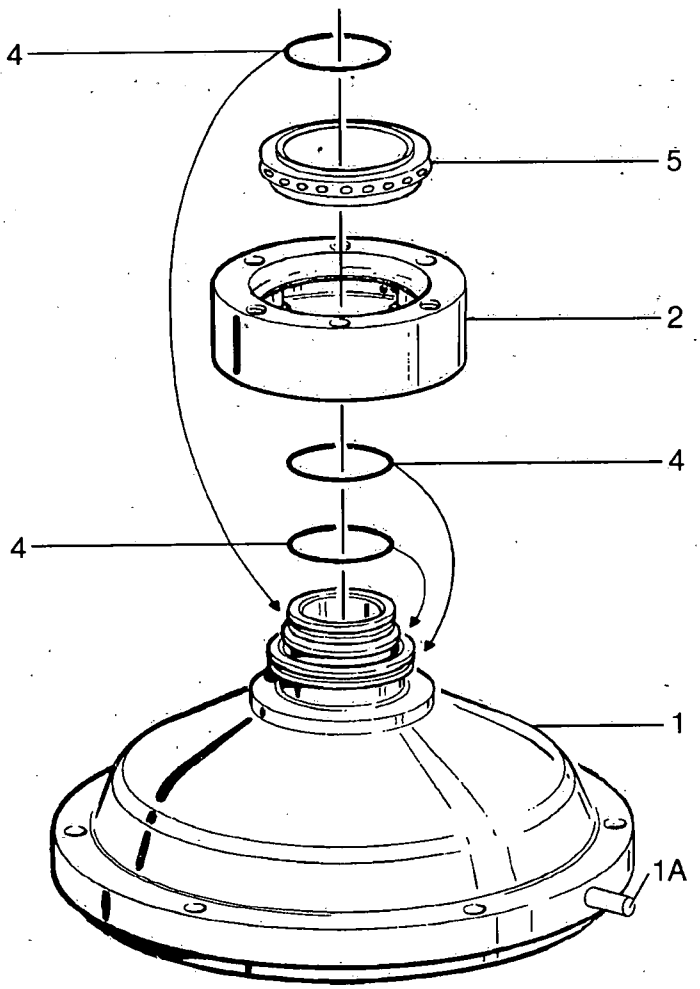
3.1 Paring disc device

Ref	Part No	Description	Machine unit number or Subassembly description 528249- -91	Notes
			Quantity	
1	539242 84	Distributing cover	1	
1 A	74403	Cylindrical pin	2	
2	566319 01	Distributing ring	1	
4	74634	O-ring	3	
5	544326 01	Control paring disc	1	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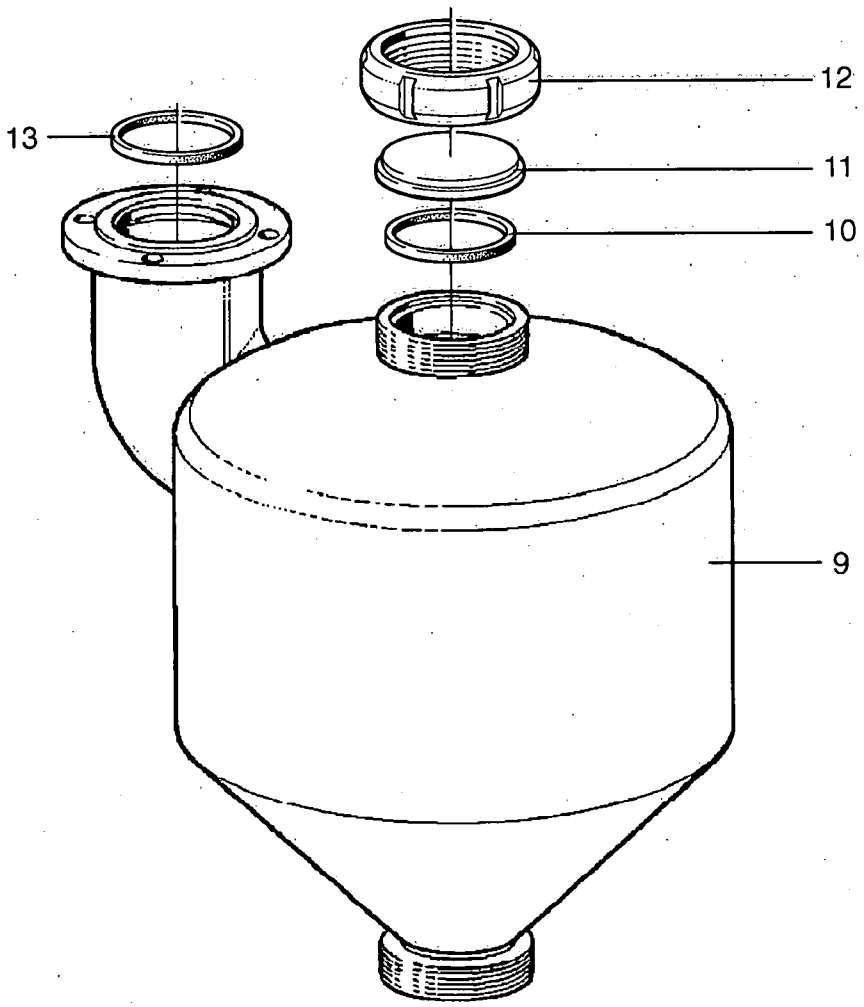
4 Cyclone

Ref	Part No	Description	Machine unit number or Subassembly description 542991- -82	Notes
			Quantity	
9	542991 03	Cyclone	1	
10	31317 0886 1	Rectangular ring	1	
11	31317 0334 1	Washer	1	
12	31317 0884 1	Coupling nut	1	
13	31317 0886 1	Rectangular ring	1	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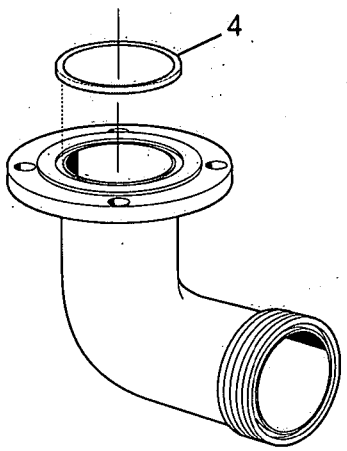
5 Outlet pipe, SMS Connection

Ref	Part No	Description	Machine unit number or Subassembly description 562051- -80	Notes
			Quantity	
4	31317 0886 1	Rectangular ring	1	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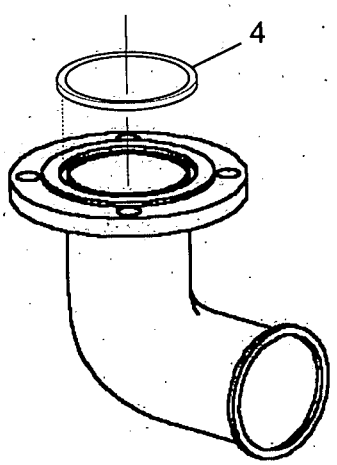
6 Outlet pipe, Clamp Connection

Ref	Part No	Description	Machine unit number or Subassembly description 560722- -80	Notes
			Quantity	
4	31317 0886 1	Rectangular ring	1	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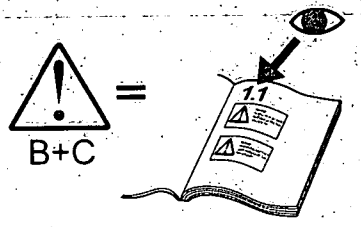
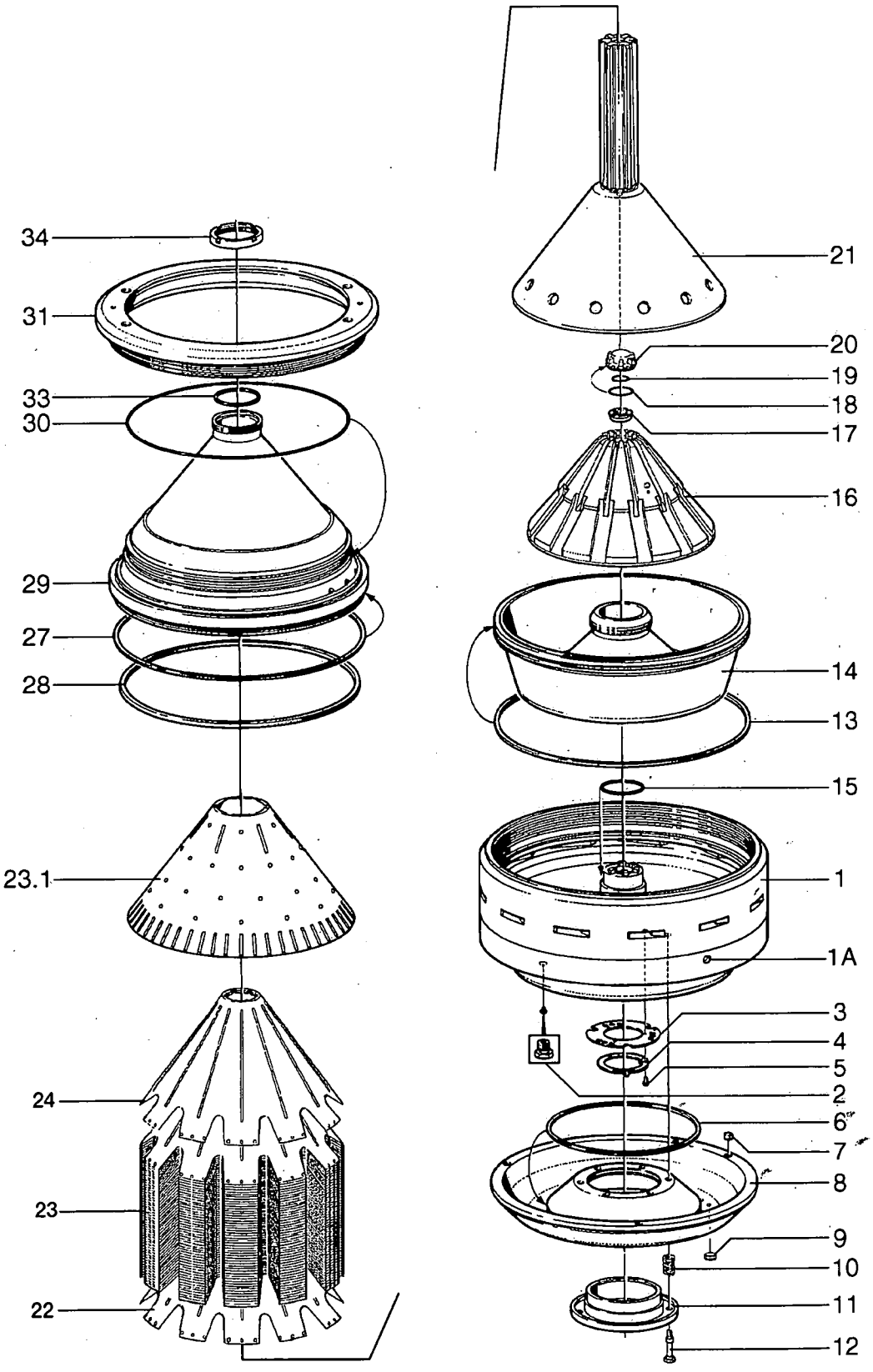
7 Separator bowl, Clarifier

With caulks 0,4 mm

Ref	Part No	Description	Machine unit number or Subassembly description 546821- -07 Quantity	Notes
1	543672 81	Bowl body	1	C
1 A	561815 01	Plug	2	
2	538124 08	Nozzle Ø 5,0 mm	1	
3	543343 01	Gasket	1	
4	529608 01	Sleeve with wings	1	
5	221131 03	Screw	3	
6	543422 01	Rectangular ring	1	
7	540742 01	Valve plug	3	
8	543673 02	Operating slide	1	B
9	562197 01	Plug	2	
10	226214 27	Spring	18	
11	543690 81	Spring support	1	B
12	221726 31	Screw	6	
13	563022 03	Rectangular ring	1	
14	541917 04	Sliding bowl bottom	1	
15	223412 12	O-ring	1	
16	544370 81	Distributing cone	1	B
17	542182 01	Cap nut	1	
18	223406 64	O-ring	1	
19	223406 58	O-ring	1	
20	545769 02	Sleeve with wings	1	
21	544061 02	Distributor	1	B
22	553327 82	Bowl disc	1	
23	553327 80	Bowl disc	239	
23.1	553716 81	Bowl disc	1	
24	553327 80	Bowl disc	3	
27	74355	O-ring	1	
28	544130 01	Seal ring	1	
29	537874 04	Bowl hood	1	C
30	67566	O-ring	1	
31	543708 02	Lock ring	1	B
33	529799 08	Rectangular ring	1	
34	519164 01	Lock ring	1	

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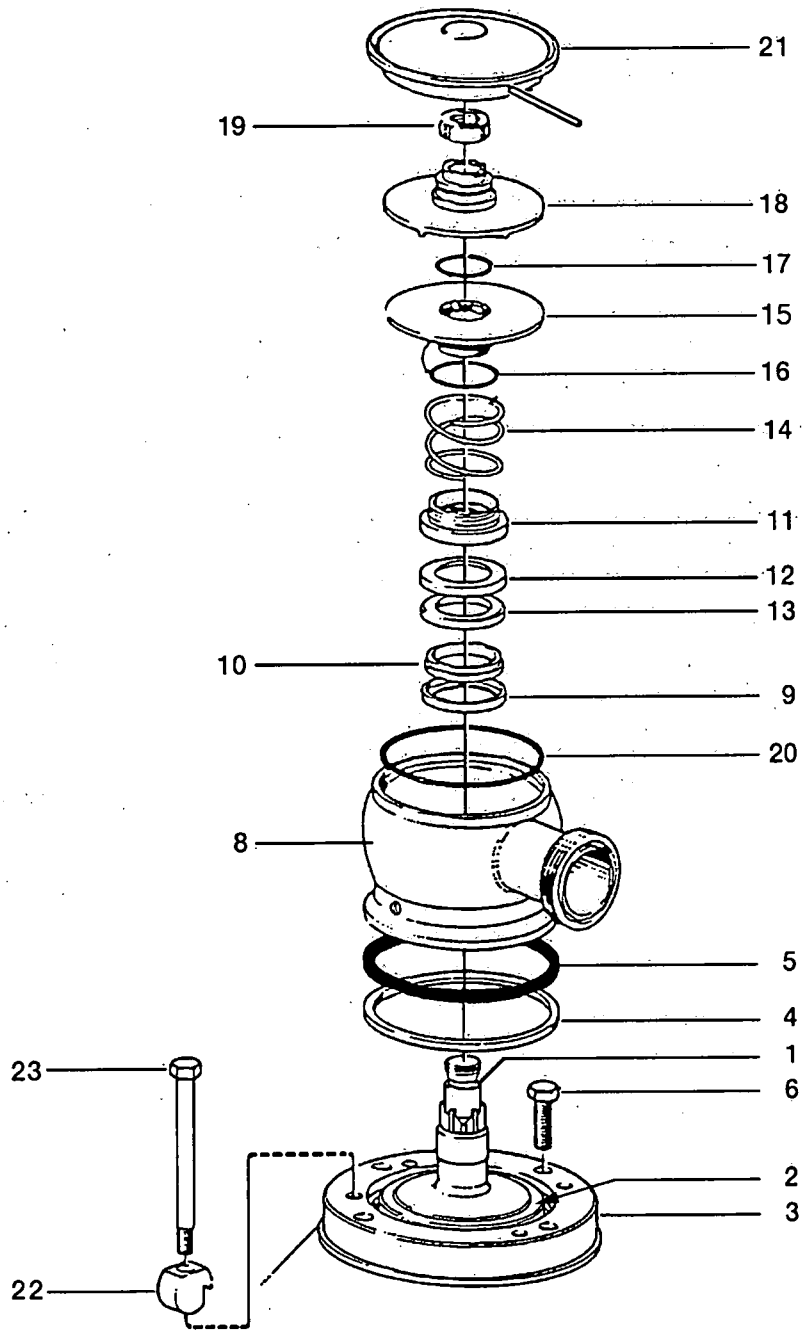
8 Outlet device, SMS coupling

Ref	Part No.	Description	Machine unit number or Subassembly description 562011- -01	Notes
			Quantity	
1	560596 01	Outlet pipe	1	
2	546198 62	O-ring	1	
3	559875 01	Centering ring	1	
4	223412 85	O-ring	1	
5	559880 01	Height adjusting ring 4,0 mm	1	
5	559880 02	Height adjusting ring 5,0 mm	1	Alternative
5	559880 03	Height adjusting ring 6,0 mm	1	Alternative
5	559880 04	Height adjusting ring 7,0 mm	1	Alternative
5	559880 05	Height adjusting ring 8,0 mm	1	Alternative
6	2210463 23	Screw	4	
8	560597 80	Discharge housing lower	1	
9	540829 05	Gasket	1	
10	541648 05	Seal ring	1	
11	541650 01	Holder for wear ring	1	
12	540829 06	Gasket	1	
13	541649 06	Wear ring	1	
14	260083 48	Compression spring	1	
15	540527 02	Impeller bottom part Ø 140 mm	1	
16	260104 79	O-ring	1	
17	223406 24	O-ring	1	
18	540519 02	Impeller top part Ø 140 mm	1	
19	543462 01	Round nut	1	
20	2234121 25	O-ring	1	
21	563910 02	Discharge cover complete	1	
22	538092 01	Hook	4	
23	546218 02	Screw	4	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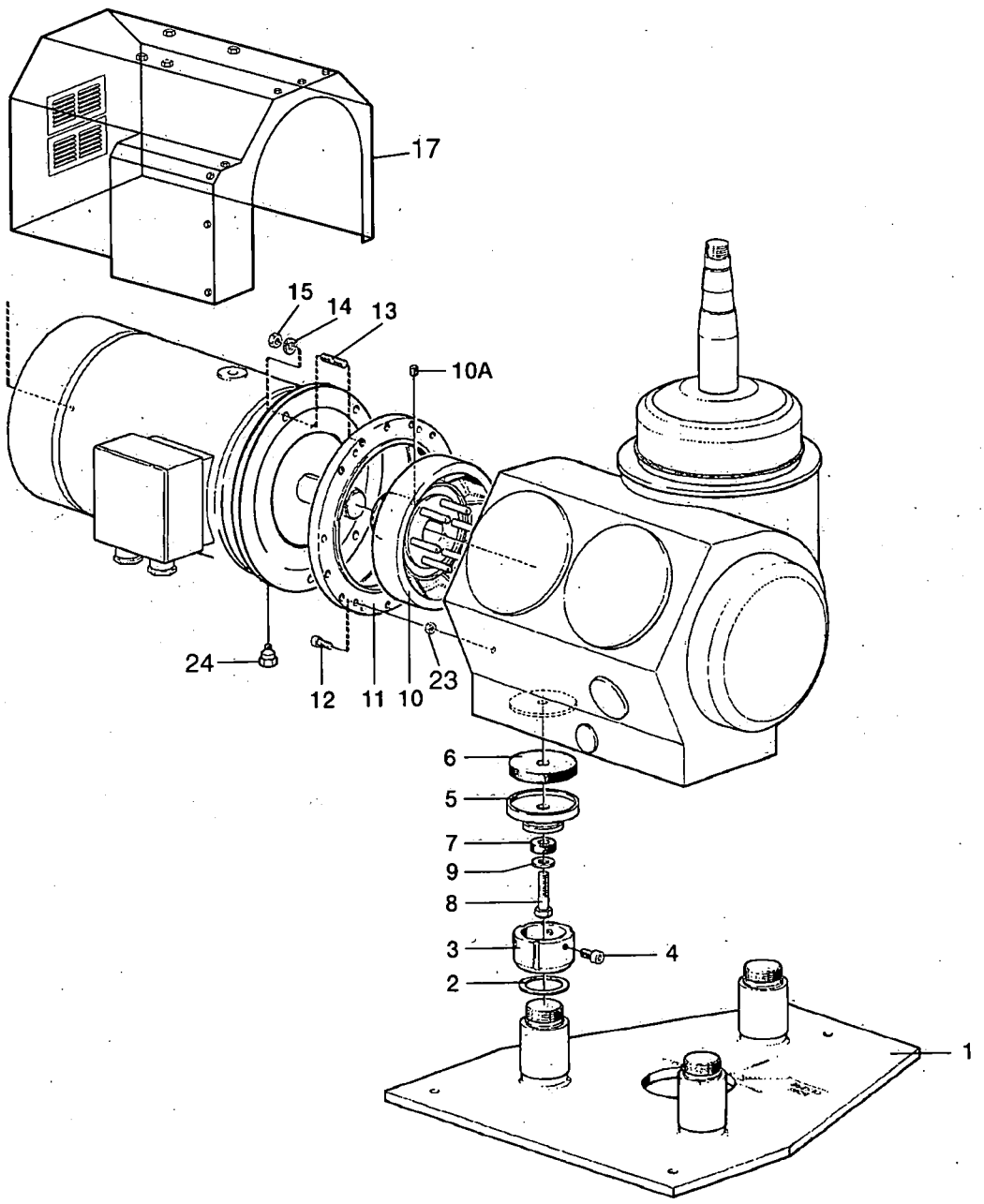
9 Parts for mounting of CT-motor

Ref	Part No	Description	Machine unit number or Subassembly description 546093- -22	Notes
			Quantity	
1	543688 80	Foundation plate	1	
2	785332 02	Adjusting washer	18	
3	528729 02	Holder	3	
4	221731 11	Screw	9	
5	526186 02	Frame foot	3	
6	528738 02	Rubber cushion	3	
7	65235	Rectangular ring	3	
8	260001 21	Screw	3	
9	223142 04	Washer	3	
10	544782 80	Brake pulley	1	
10 A	221581 74	Screw	1	
11	544781 02	Motor adapter	1	
12	221726 22	Screw	6	
13	260176 01	Stud bolt	6	
14	70490	Washer	6	
15	221803 34	Nut	6	
17	569042 81	Guard	1	
23	221803 33	Nut	6	
24	569043 01	Block	1	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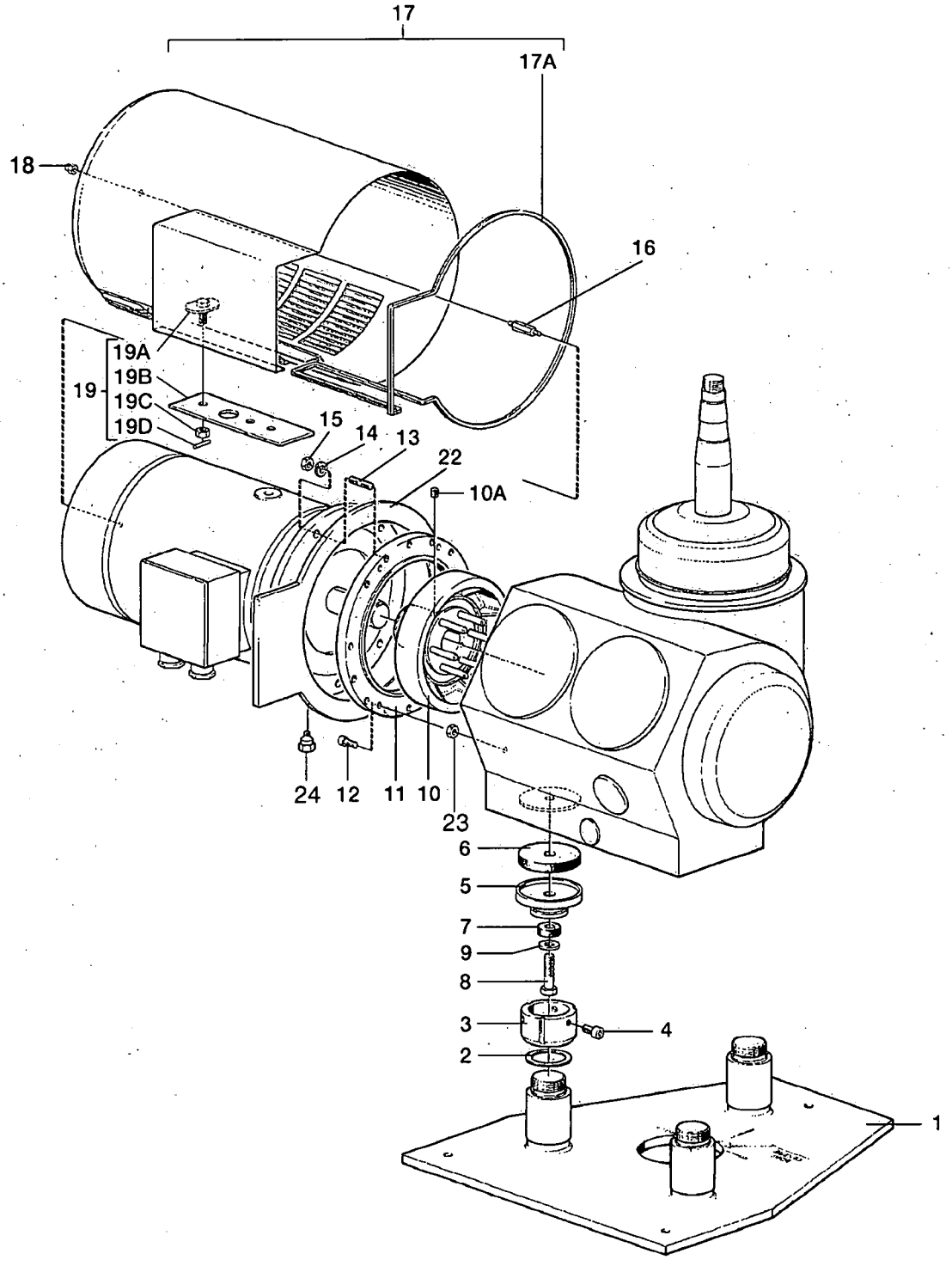
10 Parts for mounting of standard motor, VFD

Ref	Part No	Description	Machine unit number or Subassembly description 546093- -26	Notes
			Quantity	
1	543688 80	Foundation plate	1	
2	785332 02	Adjusting washer	18	
3	528729 02	Holder	3	
4	221731 11	Screw	9	
5	526186 02	Frame foot	3	
6	528738 02	Rubber cushion	3	
7	65235	Rectangular ring	3	
8	260001 21	Screw	3	
9	223142 04	Washer	3	
10	544782 80	Brake pulley	1	
10 A	221581 74	Screw	1	
11	544781 02	Motor adapter	1	
12	221726 22	Screw	6	
13	260176 01	Stud bolt	6	
14	70490	Washer	6	
15	221803 34	Nut	6	
16	568593 80	Screw complete	1	
17	566399 80	Protecting cap	1	
17 A	43631	Seal strip	2	
18	221803 29	Nut	1	
19	562164 81	Cover	1	
19 A	562163 80	Locking plate complete	2	
19 B	566584 01	Cover	1	
19 C	221803 40	Nut	2	
19 D	68617	Slotted pin	2	
22	566562 80	Guide ring	1	
23	221803 33	Nut	6	
24	569043 01	Block	1	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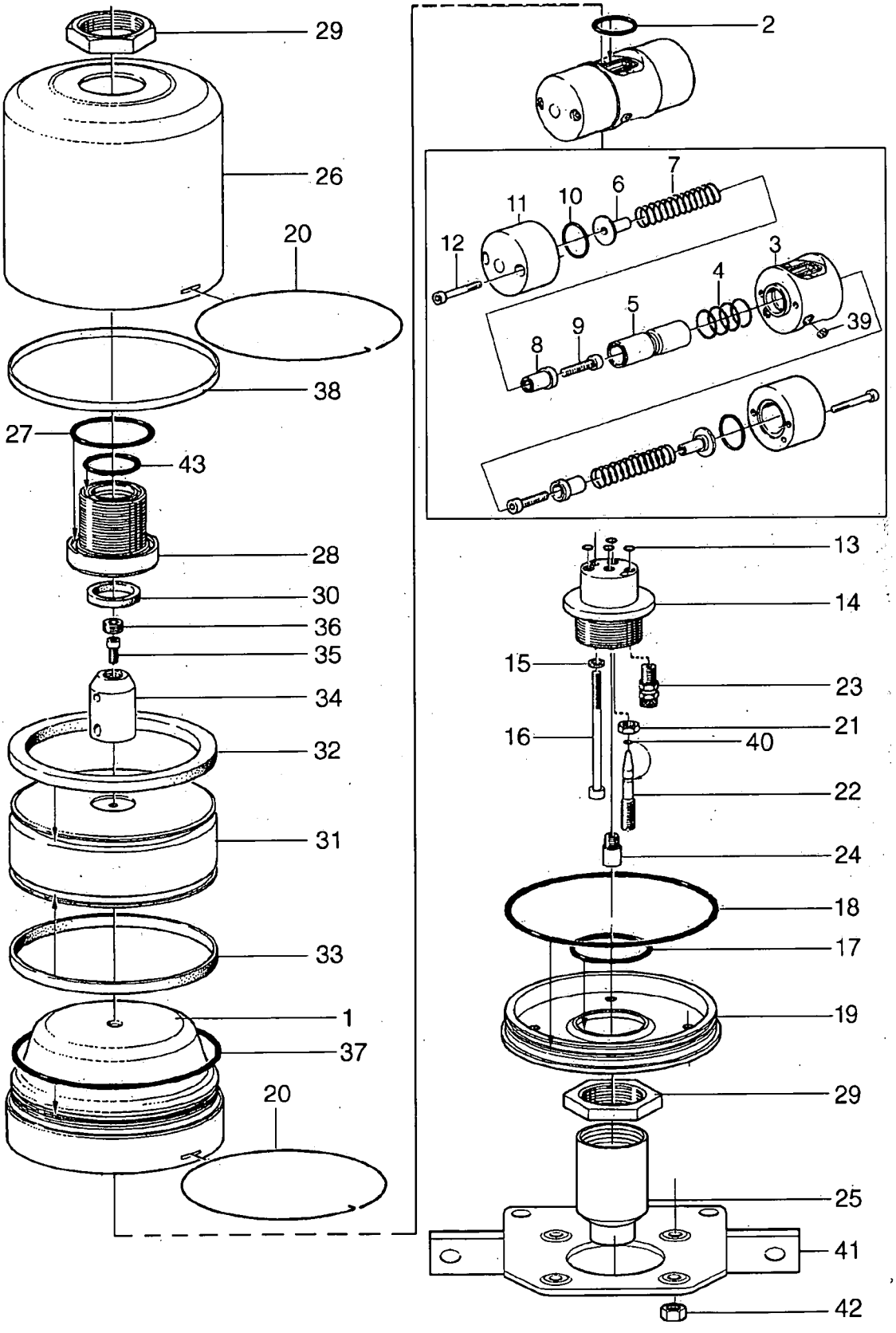
11 Operating water module compact

Ref	Part No	Description	Machine unit number or Subassembly description 559872- -02	Notes
			Quantity	
1	559867 02	Air tank	1	
2	544311 10	O-ring	1	
3	559869 01	Valve body	1	
4	544311 11	O-ring	4	
5	559856 01	Valve spindle	1	
6	559855 01	Spring guide	2	
7	559866 01	Compression spring	2	
8	559854 01	Spacing	2	
9	221711 24	Screw	2	
10	544311 09	O-ring	2	
11	559858 01	Valve cup	2	
12	221706 24	Screw	4	
13	544311 08	O-ring	6	
14	559868 01	Valve connection	1	
15	559892 10	Sealing washer	2	
16	559892 09	Hexagon socket head screw	2	
17	223406 32	O-ring	1	
18	223406 43	O-ring	1	
19	559863 80	Cylinder cover	1	
20	559891 01	Locking wire	2	
21	559892 08	Nut	1	
22	559857 01	Needle	1	
23	558710 01	Nipple	3	
24	558926 01	Silencer	1	
25	559870 01	End protection	1	
26	559864 01	Cylinder	1	
27	546198 76	O-ring	1	
28	559865 01	Outlet	1	
29	559892 07	Nut	2	
30	559892 01	Turcon variseal "m"	1	
31	559861 01	Piston	1	
32	559892 03	Turcon aq-seal	1	
33	559892 02	Turcite slydring	1	
34	559862 02	2 pulse adapter	1	
35	221711 07	Screw	1	
36	559892 04	Nozzle Ø 4.0 mm	1	
37	223406 42	O-ring	1	
38	559892 06	Garter strap	1	
39	559892 05	Nozzle Ø 4.2 mm	1	
40	544311 07	O-ring	1	
41	562065 80	Bracket	1	
42	221803 28	Nut	4	
43	223406 29	O-ring	1	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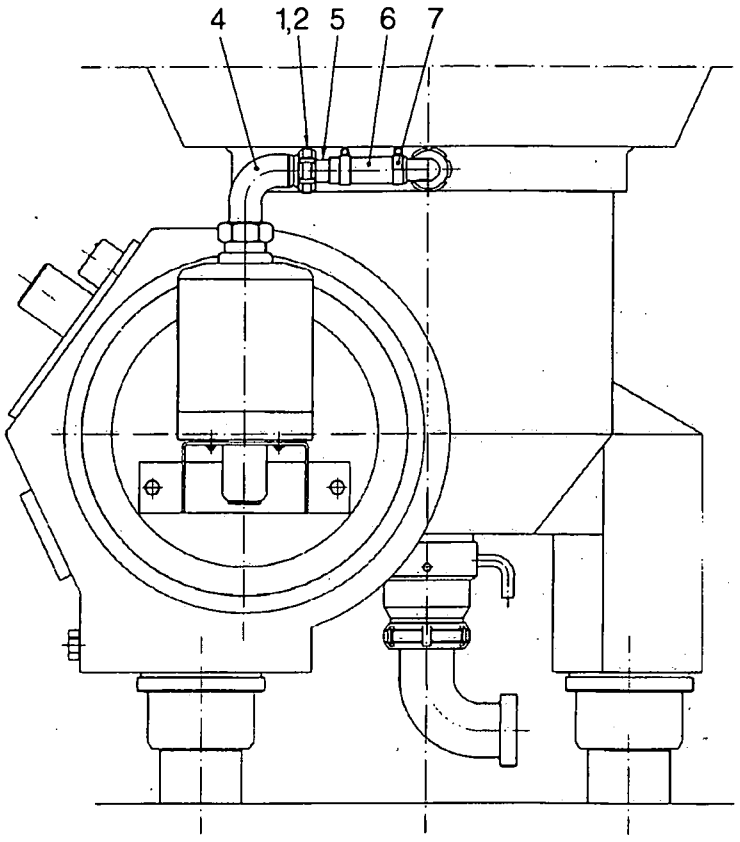
12 Fittings for OWMC

Ref	Part No	Description	Machine unit number or Subassembly description 562136- -01	Notes
			Quantity	
1	190613	Coupling nut	2	
2	190601	Rectangular ring	2	
3	562161 80	Bent hose liner	1	
4	562138 01	Elbow pipe	1	
4 A	555655 02	Check valve	1	
5	191577	Hose liner	1	
6	544779 11	Hose	1	
7	42174	Hose clip	2	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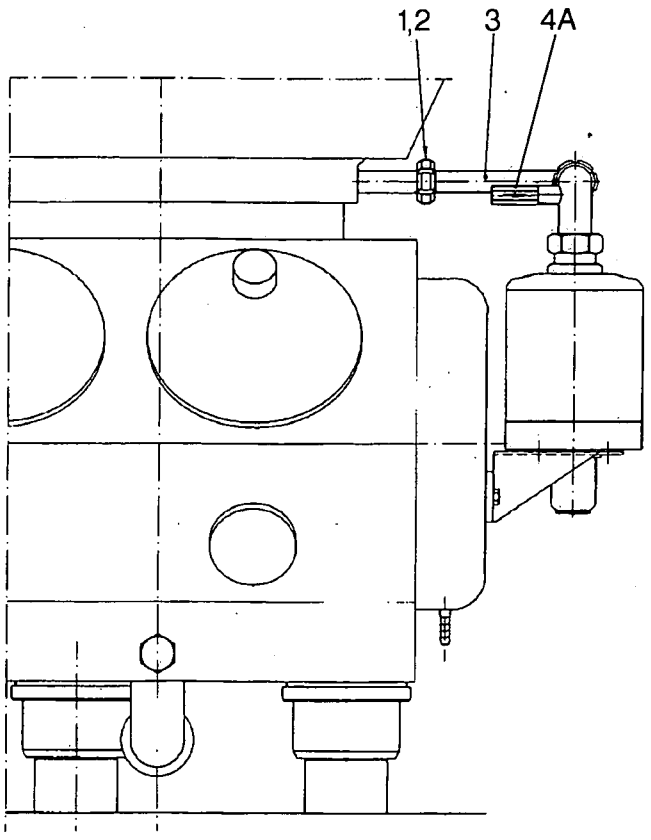
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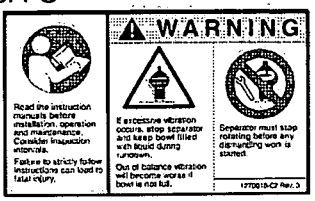
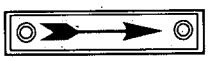
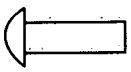
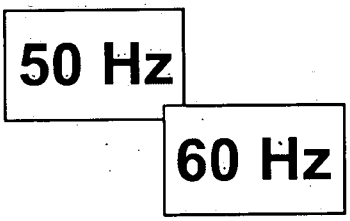
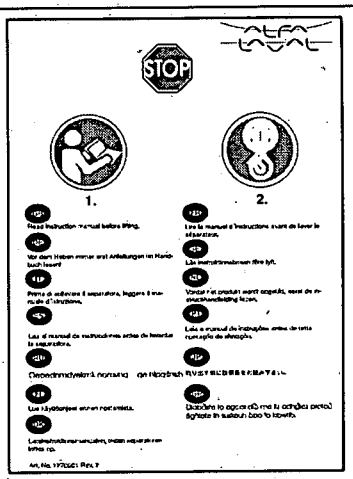
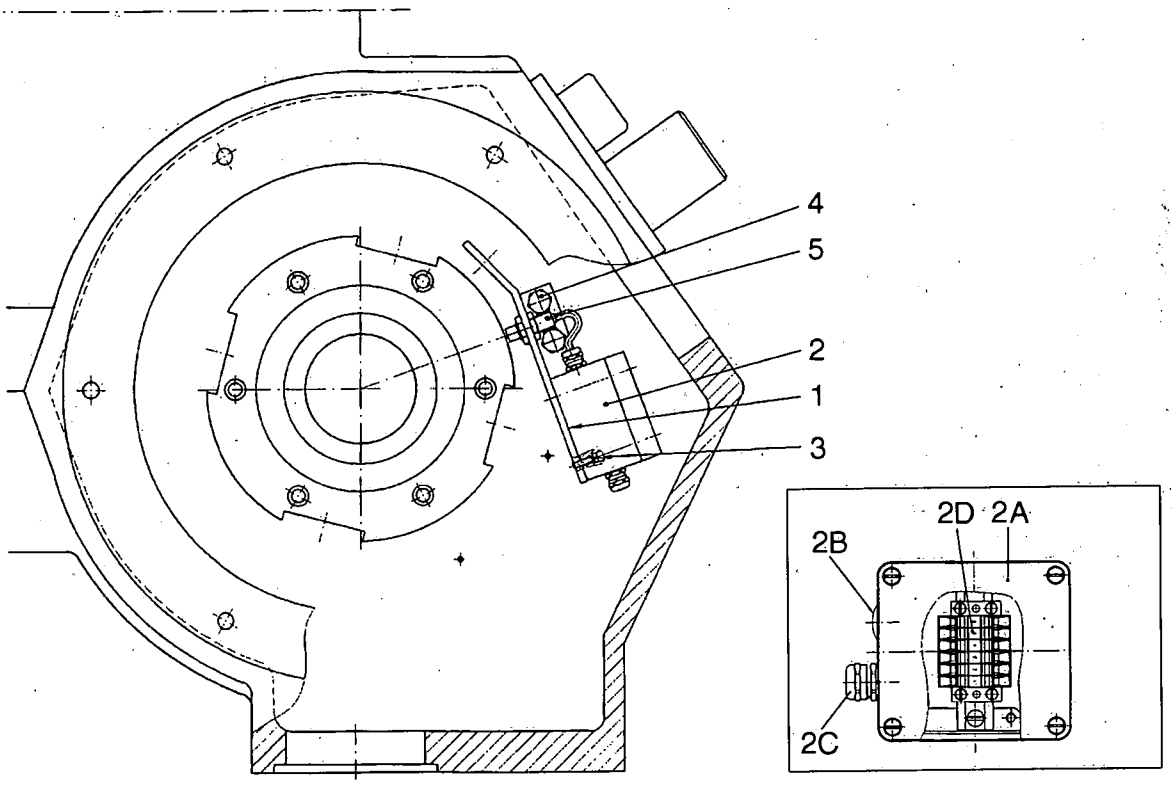
13 Set of plates

Ref	Part No	Description	Machine unit number or Subassembly description 549572- -22	Notes
			Quantity	
3	1270019	Set of safety labels	1	
3A	1270018 01	Safety label sv	1	
3B	1270018 02	Safety label en	1	
3C	1270018 03	Safety label de	1	
3D	1270018 04	Safety label fr	1	
3E	1270018 05	Safety label es	1	
3F	1270018 06	Safety label ru	1	
3G	1270018 07	Safety label it	1	
3H	1270018 08	Safety label pt	1	
3I	1270018 09	Safety label pl	1	
3J	1270018 10	Safety label el	1	
3K	1270018 11	Safety label fi	1	
3L	1270018 12	Safety label zh	1	
3M	1270018 13	Safety label da	1	
3N	1270018 14	Safety label ar	1	
3O	1270018 15	Safety label nl	1	
3P	1270018 16	Safety label cs	1	
3Q	1270018 17	Safety label ja	1	
3R	1270018 18	Safety label ko	1	
3S	1270018 19	Safety label no	1	
5	52406	Plate with arrow	1	
6	68387	Rivet	2	
7	553171 01	Label 50 Hz	1	
7	553272 01	Label 60 Hz	1	
8	1270001	Lifting instruction	1	
9	554214 02	Cable tie	1	

1	2	3,3A-S 
4	5 	6 
7 	8 	9 

14 Speed sensor kit (Sensor included)

Ref	Part No	Description	Machine unit number or Subassembly description 562052- -01 -02		Notes
			Quantity		
		NAMUR PNP	↓	↓	
1	562062 01	Holder	1	1	
2	562182 80	Junction box	1	1	
2A	562182 01	Junction box	1	1	
2B	552851 01	Stopping plug	2	2	
2C	560311 03	Cable gland	4	4	
2D	561654 01	Terminal row	1	1	
3	221121 50	Screw	2	2	
4	221041 26	Screw	2	2	
5	552042 01	Inductive sensor	1		
5	561858 01	Inductive sensor		1	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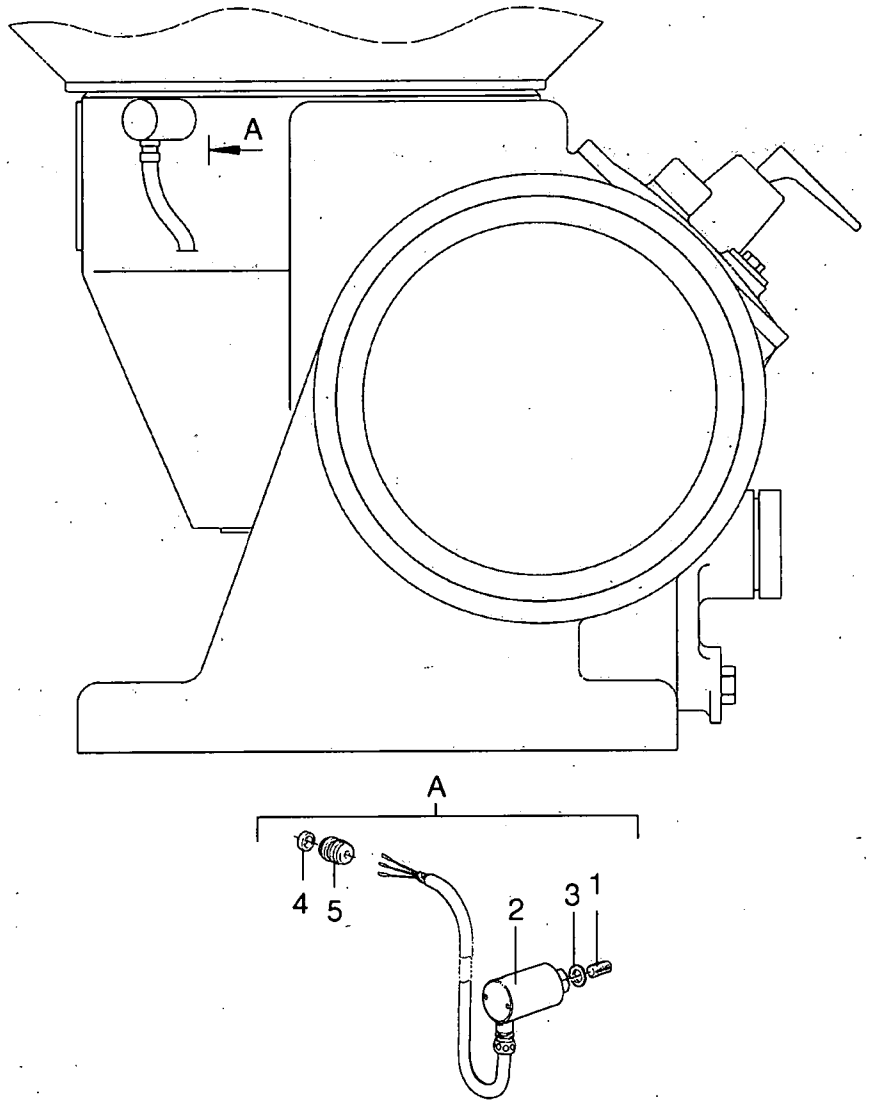
15 Vibration sensor kit, Schenck

Ref	Part No	Description	Machine unit number or Subassembly description 553652- -01	Notes
			Quantity	
1	260080 15	Set screw	1	
2	552158 01	Vibration sensor	1	
3	223132 04	Washer	2	
4	560310 01	Ferrite core	1	See Interconnection diagram
5	560311 01	Cable gland	1	See Interconnection diagram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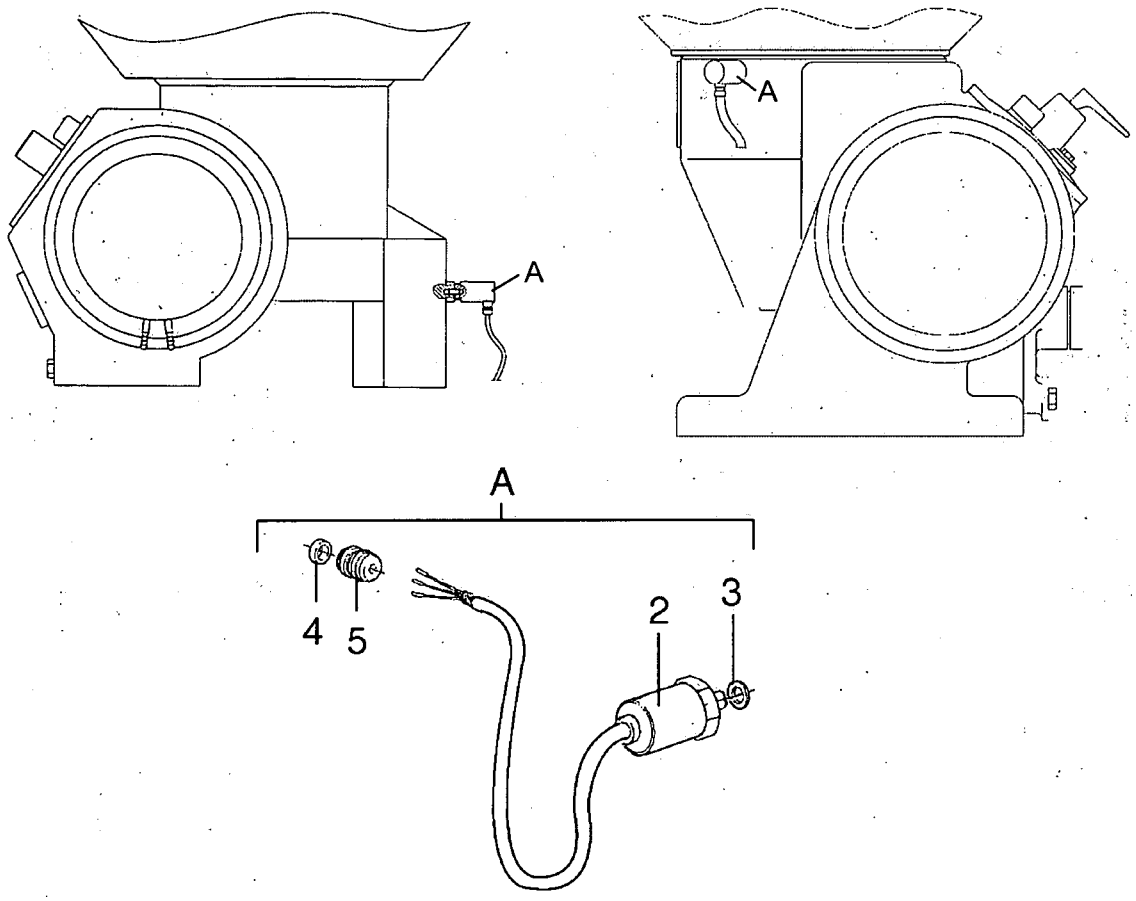
16 Vibration sensor kit, Monitran

Ref	Part No	Description	Machine unit number or Subassembly description 553652- -04	Notes
			Quantity	
2	567112 01	Vibration sensor	1	
3	223132 04	Washer	2	
4	560310 01	Ferrite core	1	See Interconnection diagram
5	560311 01	Cable gland	1	See Interconnection diagram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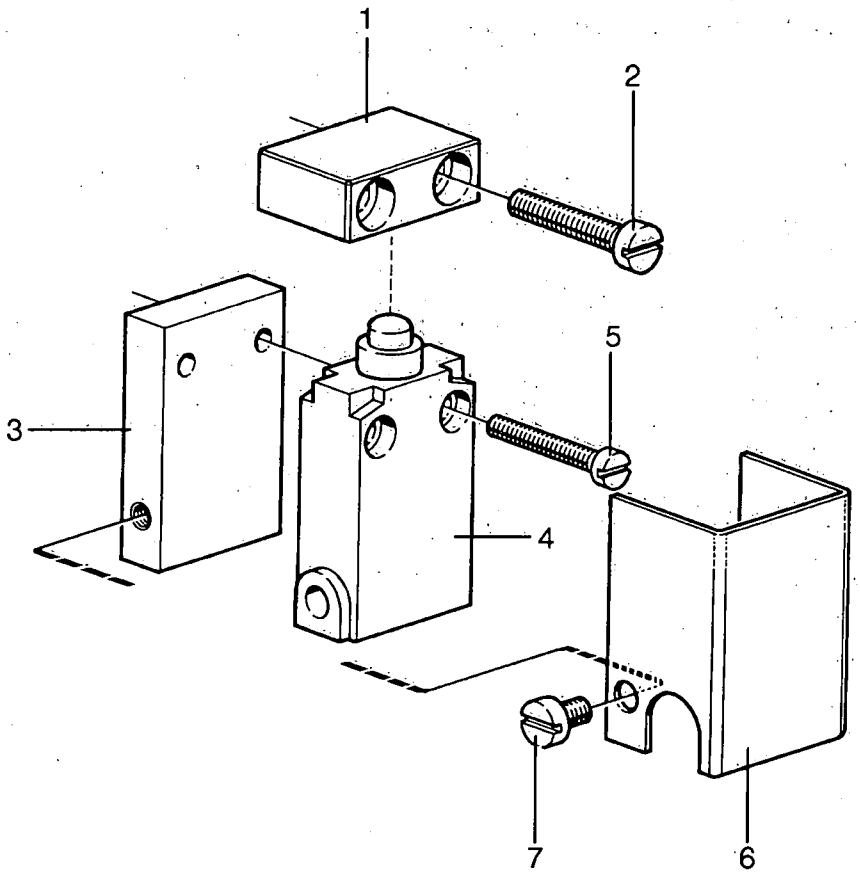
17 Lock switch kit

Ref	Part No	Description	Machine unit number or Subassembly description 546611- -80	Notes
			Quantity	
1	546633 01	Lock switch actuator	1	
2	221126 56	Screw	2	
3	546401 01	Support	1	
4	551337 01	Limit switch	1	
5	221121 52	Screw	2	
6	546403 01	Guard	1	
7	67844	Screw	2	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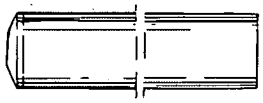
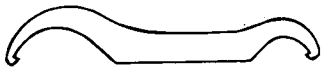
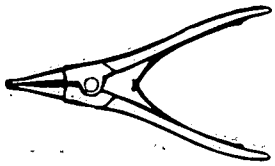
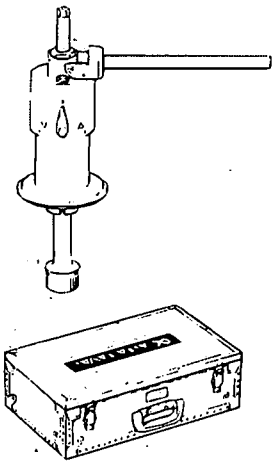
18 Set of tools

Ref	Part No	Description	Machine unit number or Subassembly description 555535- -12	Notes
			Quantity	
3	531296 81	Driving-off tool	1	Vertical, horizontal device
6	555518 80	Lifting tool	1	Distributing cone
7	72978	Socket 11 mm (1/2")	1	
7.1	527353 09	Socket 30 mm (1/2")	1	
7.2	527353 17	Socket 16 mm (1/2")	1	
8	69696	Hook spanner	1	Coupling nut
10	42386	Snap ring pliers (shaft)	1	
11	543135 06	Compressing tool for bowl	1	See separate IB
15	72243	T-handle	1	
16	72244	Extension rod 240-255 mm	1	
16.1	527348 01	Extension rod 125-150 mm	1	
18	527353 05	Socket 18 mm (1/2")	1	
19	73085	Socket 24 mm (1/2")	1	
21	75420	Socket 13 mm (1/2")	1	
22	528380 85	Lifting tool	1	Bowl disc
22 A	71405	Slotted pin	2	
22 B	67782	Cylindrical pin	2	
23	543307 81	Lifting tool	1	Bowl body
23 A	544088 02	Screw	3	
23 B	543309 01	Lifting eye	1	
23 C	543310 01	Washer	1	
23 D	221711 02	Screw	1	
23 E	68372	Snap ring	3	
24	530313 02	Plug	1	Dismounting worm
25	540131 80	Lifting tool	1	Spindle (top)
25.1	540131 82	Lifting tool	1	Spindle (bottom)
26	545533 80	Lifting tool	1	Sliding bowl bottom
28	66445	Snap ring pliers (hole)	1	
29	543346 80	Spanner	1	Lock ring large
29 A	2210462 11	Screw	1	
29 B	223101 37	Washer	1	
30	539917 80	Spanner for lock ring	1	Lock ring small

3 	5	6 
7 7.1 7.2 	8 	10 
11 	15 	16 16.1 
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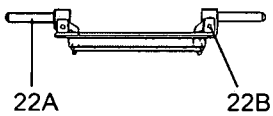
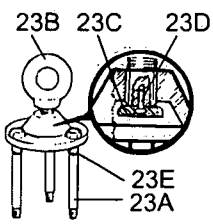
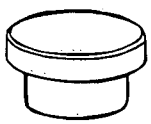
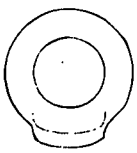
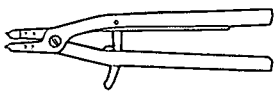
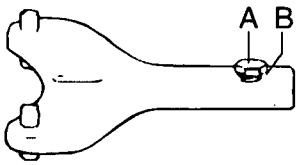
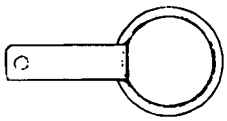
21 	22 	23 
24 	25 25.1 	26 
28 	29 	30 

Ref	Part No	Description	Machine unit number or Subassembly description 555535- -12	Notes
			Quantity	
32	260154 05	Lifting eye bolt	2	Lock ring large, operating slide
33	546855 01	Ring	1	Mounting bottom bearing
34	543550 01	Ring	1	Mounting ball bearing
35	543551 01	Ring	1	Dismounting ball bearing
36	543552 01	Mounting tool	1	Ball bearing worm wheel shaft
37	543553 80	Dismounting tool	1	Brake pulley
42	64324	Tin hammer 4.4 kg	1	
49	545756 80	Puller	1	Ball bearing worm wheel shaft
49 A	260001 41	Screw	1	
50	554955 81	Turning tool bowl body	1	
50 A	554960 80	Screw	1	
50 B	1270022	Safety label on reversing tool	1	
51	260164 03	Hexagon socket 8 mm (1/2")	1	
51.1	260164 06	Hexagon socket 14 mm (1/2")	1	
54	260161 01	Ratchet handle	1	
63	545530 80	Lifting ring, bowl hood	1	Bowl hood
65	540610 03	Centering tool	1	Outlet 546665, 562012, -13, -14
65.1	540610 01	Centering tool	1	Outlet 546664, -66, 562011
68	38954	Spring	1	Outlet device runout radial
69	545537 80	Lifting tool	1	
69 A	545531 02	Lifting stirrup	1	
69 B	545536 01	Lifting pin	1	
69 C	222116 41	Slotted pin	1	
69 D	223101 64	Washer	1	
69 E	226314 27	Belleville washer	14	
69 F	223101 64	Washer	1	
69 G	221803 23	Nut	1	
70	544264 01	Pressure washer	1	Mounting top bearing
71	544273 01	Sleeve	1	Dismounting ball bearing
72	544372 01	Drift	1	Dismounting ball bearing
73	544288 01	Tube	1	Rack for vertical device
74	544261 01	Ring	1	Mounting ball bearing

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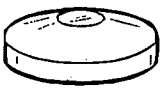
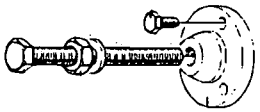
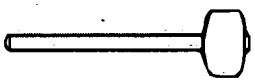
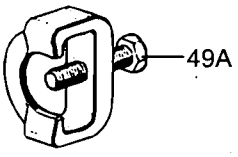
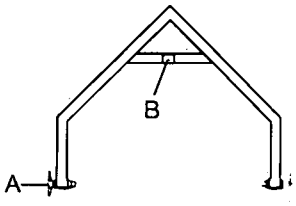
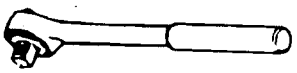
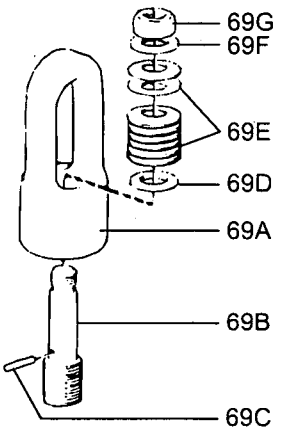
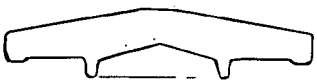
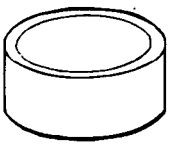
35 	36 	37 
42 	49 	50 
51 51.1 	54 	63 
65, 65.1 	68 	69 
70 	71 	
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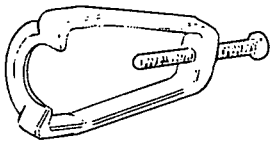
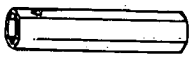
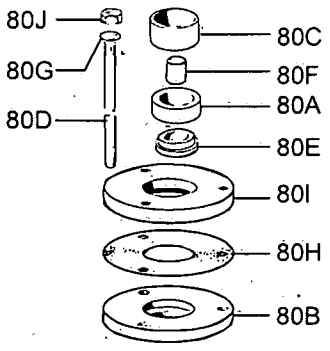
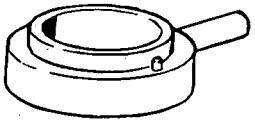
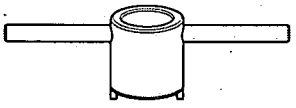
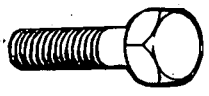
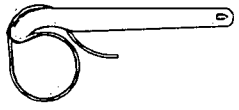
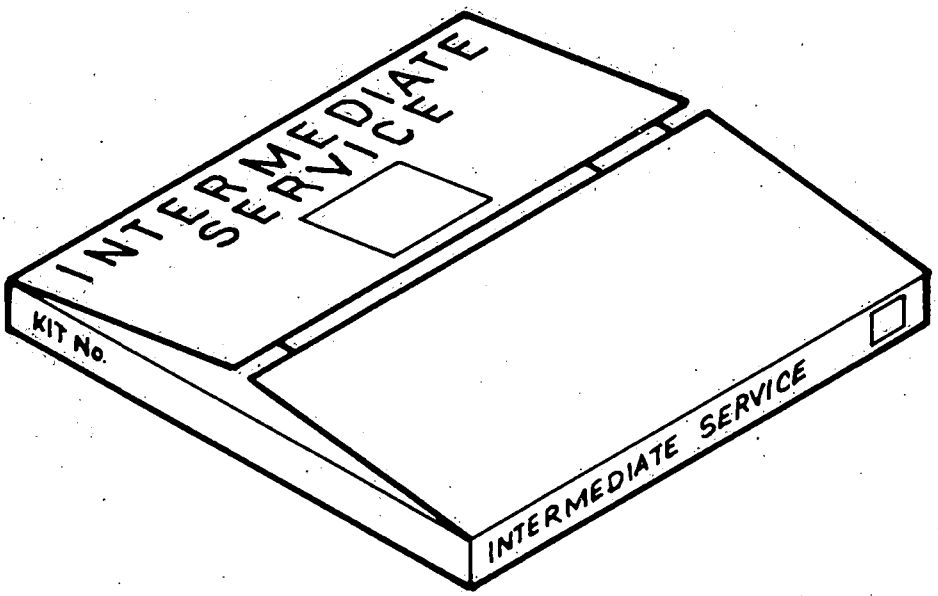
Ref	Part No	Description	Machine unit number or Subassembly description 555535- -12	Notes
			Quantity	
75	544302 02	Puller	1	Worm wheel, worm
76	521196 16	Tubular socket 36 mm	1	
77	544371 01	Torque wrench	1	
78	528905 08	Ring spanner 21 mm, 24 mm	1	Motor
79	537441 01	Washer	1	Mounting brake pulley
80	545540 80	Mounting and dismounting tool	1	Vertical device top bearing
80 A	545547 01	Ring	1	
80 B	545541 01	Plate lower	1	
80 C	545546 01	Sleeve	1	
80 D	545544 01	Bar	3	
80 E	545545 01	Support ring	1	
80 F	545548 01	Intermediate part	1	
80 G	68372	Snap ring	3	
80 H	545543 01	Washer	1	
80 I	545542 01	Plate upper	1	
80 J	221803 35	Nut	3	
81	545529 80	Pin spanner	1	Lock ring horizontal device
82	555511 80	Mounting tool	1	Cap nut
83	553188 02	Lifting eye	3	Separator
84	2210463 34	Screw	3	Separator
85	562097 01	Guide pin	2	
86	537446 01	Belt pipe wrench	1	

75 	76 	77 
78 	79 	80 
81 	82 	
83 	84 	85 
86 		

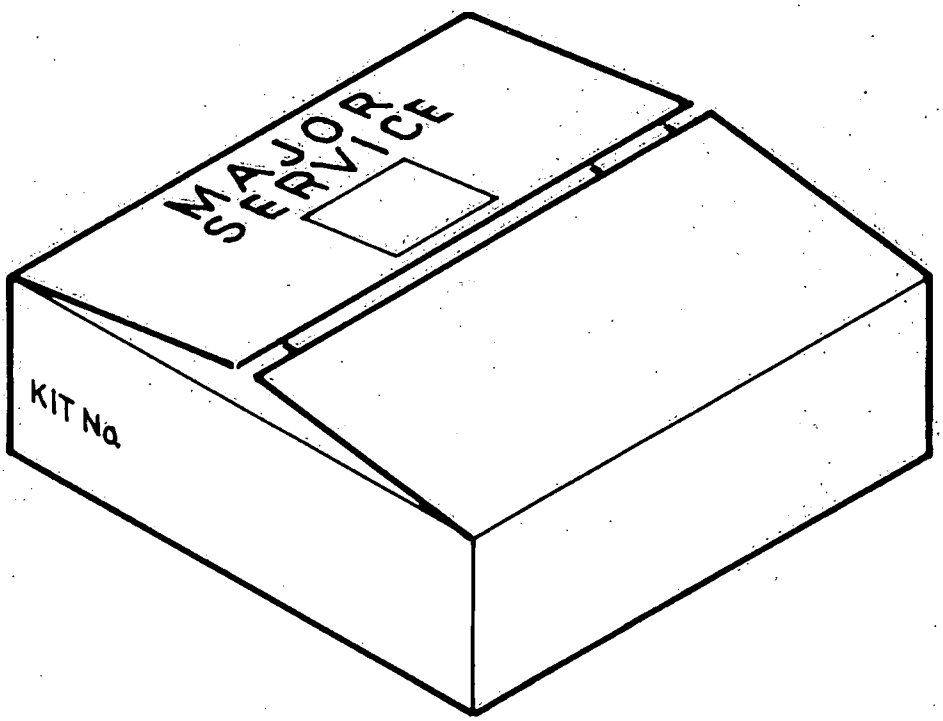
19 Intermediate service kit, SMS coupling

Ref	Part No	Description	Machine unit number or Subassembly description 549232- -19 Quantity	Notes
1	543343 01	Gasket	1	Spring support/ Bowl body
2	543422 01	Rectangular ring	1	Operating slide/ Bowl body
3	540742 01	Valve plug	3	Operating slide/ Bowl body
5	223412 12	O-ring	1	Bowl body/ Sliding bowl bottom
7	223406 64	O-ring	1	Wing insert/ Distributing cone
8	223406 58	O-ring	1	Spindle/ Cap nut
9	74355	O-ring	1	Bowl hood/ Bowl body
10	544130 01	Seal ring	1	Bowl hood/ Sliding bowl bottom
11	67566	O-ring	1	Bowl hood/ Lock ring
14	529799 08	Rectangular ring	1	Bowl hood/ Guide sleeve
20	540829 05	Gasket	1	Outlet housing/ Seal ring
22	541648 05	Seal ring	1	Outlet device
24	223406 24	O-ring	1	Guide sleeve/ Impeller lower
25	260104 79	O-ring	1	Impeller/ Holder for wear ring
26	540829 06	Gasket	1	Wear ring/ Holder for wear ring
33	2234121 25	O-ring	1	Outlet housing lower/ Intermediate part
39	223406 15	O-ring	1	Throttle ring/ Bottom bearing housing
40	223406 14	O-ring	1	Intermediate part/ Inlet housing
42	540829 05	Gasket	1	Seal ring/ Intermediate part
43	541648 05	Seal ring	1	Inlet device
45	540829 06	Gasket	1	Holder for wear ring/ Wear ring
46	260104 79	O-ring	1	Guide sleeve/ Holder for wear ring
47	223406 58	O-ring	1	Spindle/ Guide sleeve
49	190605	Rectangular ring	1	Pipe bend/ Inlet housing
50	74634	O-ring	3	Distributing cover/ Control paring disc
51	223316 05	Rectangular ring	1	Frame bottom part/ Drain screw
52	528732 01	Gasket	1	Frame bottom part/ Worm wheel guard
53	539474 03	Silicone grease	1	
54	554336 01	Lubricating paste	1	
55	223412 85	O-ring	1	Centering ring/ Outlet housing
56	546198 62	O-ring	1	Lock ring/ Outlet housing
57	310637 84	Friction pad	1	
58	540829 06	Gasket	2	
59	541649 06	Wear ring	2	


INTERMEDIATE SERVICE
KIT No.
INTERMEDIATE SERVICE

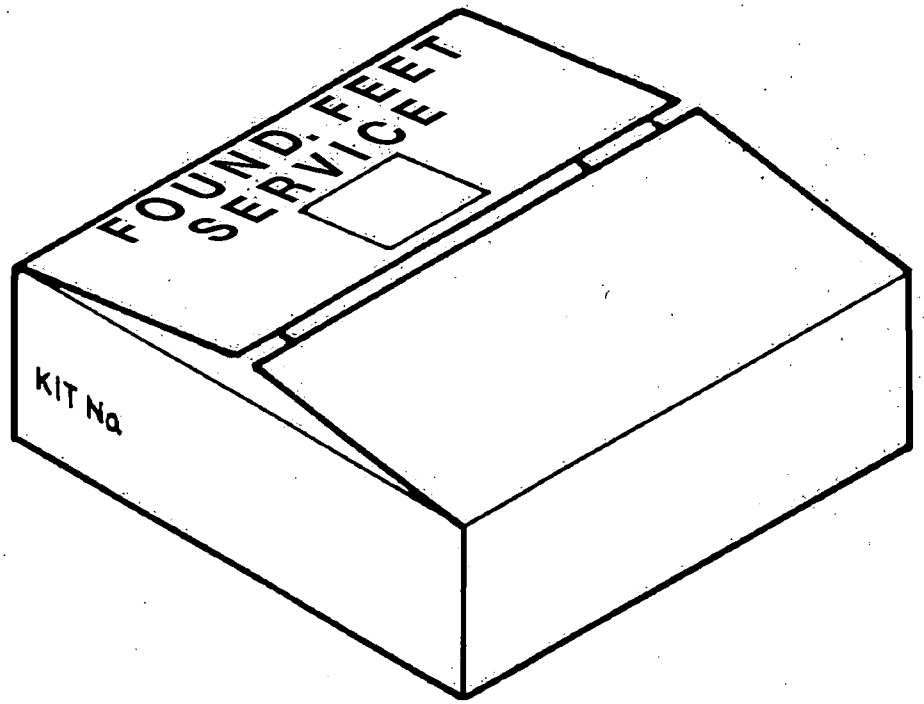
20 Major service kit

Ref	Part No	Description	Machine unit number or Subassembly description 549223- -38 Quantity	Notes
1	37167	Rectangular ring	1	Glass disc/ Fixing plate
2	528723 01	Gasket	1	Frame/ Glass disc
3	73665	Rectangular ring	2	Cooling coil/ Bearing shield
3.8	223521 98	Seal ring	1	Bearing housing/ Worm wheel shaft
3.9	546198 53	O-ring	1	Bearing housing
4	43626	Gasket	1	Frame/ Bearing shield
5	43630	Seal strip	1	Frame/ Guard
6	223406 36	O-ring	1	Ball bearing /Bearing shield
7	233211 94	Ball bearing	1	Worm wheel shaft
8	8379	Ball bearing	1	Worm wheel shaft
9	304153 01	Elastic plate	3	Coupling pulley
10	223406 17	O-ring	1	Frame/ Bottom bearing housing
11	548747 07	Ball bearing	1	Upper neck bearing
12	223642 49	Snap ring	1	Upper neck bearing/ Bearing housing
13	548745 04	Ball bearing	1	Lower neck bearing
14	223641 01	Snap ring	1	Spindle/ Sleeve
16	529639 02	Rubber buffer	2	Neck bearing housing
17	541453 05	Usit ring	3	Screw/ Neck bearing cover
18	555231 01	Seal ring	1	Frame top part/ Guard
19	544271 01	Seal ring	1	Oil fan/ Protection collar
20	223412 18	O-ring	1	Spindle/ Protection collar
21	548746 04	Ball bearing	1	Bottom bearing
22	223406 36	O-ring	1	Seal ring/ Guard
28	555245 01	Height adjusting ring	2	Frame top part/ Paring disc device
29	545318 03	Seal strip	1	Frame top part/ Frame hood
30	223406 25	O-ring	1	Frame top part/ Frame hood
31	528732 01	Gasket	1	
32	223521 08	Seal ring	1	
33	223434 02	Rectangular ring	1	
34	223406 27	O-ring	1	
35	190601	Rectangular ring	2	
36	3131 7 0886 1	Rectangular ring	2	
38	223521 98	Seal ring	1	Bearing housing/ Worm wheel shaft
39	546198 53	O-ring	1	Bearing housing
40	521121 27	O-ring	1	Ball bearing/ Bottom bearing housing
41	223406 24	O-ring	1	Sleeve/ Bowl spindle
42	563022 03	Rectangular ring	1	Sliding bowl bottom/ Bowl body


MAJOR
SERVICE
KIT No.

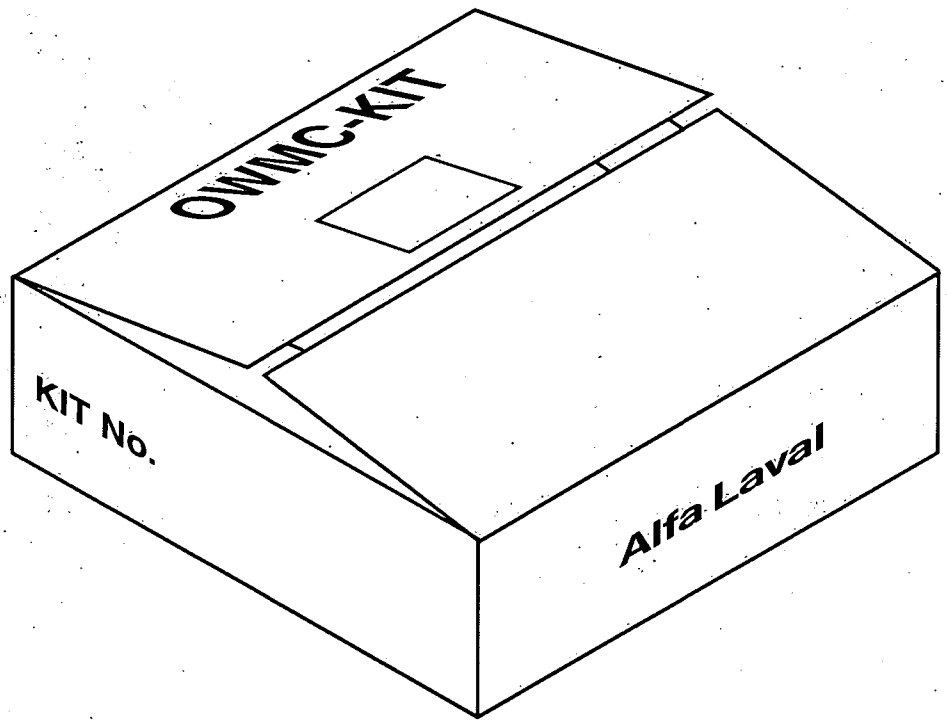
21 Service kit for foundation feet

Ref	Part No	Description	Machine unit number or Subassembly description 553048- -01	Notes
			Quantity	
1	221731 11	Screw	9	
2	528738 02	Rubber cushion	3	
3	65235 .	Rectangular ring	3	
4	260001 21	Screw	3	


FOUND. FEET
SERVICE
KIT No.

22 OWMC service kit

Ref	Part No	Description	Machine unit number or Subassembly description 558446- -05	Notes
			Quantity	
1	544311 10	O-ring	1	Air tank/ Valve body
2	544311 11	O-ring	4	Valve body/ Valve spindle
3	544311 09	O-ring	2	Valve cup/ Valve body
4	544311 08	O-ring	6	Valve body/ Valve connection
5	559892 10	Sealing washer	2	Valve connection/ Screw
6	223406 32	O-ring	1	Cylinder cover/ Valve connection
7	223406 43	O-ring	1	Cylinder cover/ Air tank
8	559891 01	Locking wire	2	Air tank/ Cylinder
9	546198 76	O-ring	1	Outlet/ Cylinder
10	559892 01	Turcon variseal "m"	1	Outlet/ 2 pulse adapter
11	559892 03	Turcon aq-seal	1	Piston/ Cylinder
12	559892 02	Turcite slydring	1	Piston/ Cylinder
13	223406 42	O-ring	1	Air tank/ Cylinder
14	544311 07	O-ring	1	Needle/ Valve connection
15	223406 29	O-ring	1	Outlet/ Fittings for OWMC
16	559892 06	Garter strap	1	Air tank/ Cylinder
18	555612 01	High protection grease	1	


OWMC-KIT
KIT No.
Alfa Laval

23 Cross reference list

Part No	Page	Ref
8379	76	8
8379	24	10
37167	76	1
37167	22	7
38685	22	8
38954	70	68
42174	56	7
42386	68	10
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43630	76	5
43630	22	21
43631	52	17 A
52406	58	5
64324	70	42
65235	78	3
65235	50	7
65235	52	7
66445	68	28
67473	28	7
67478	24	5
67542	28	8
67566	74	11
67566	46	30
67782	68	22 B
67844	66	7
67960	30	2 E
68372	68	23 E
68372	72	80 G
68387	58	6
68617	52	19 D
69214	28	9
69226	28	24
69696	68	8
70490	50	14
70490	52	14
70714	26	17
71405	68	22 A
72243	68	15
72244	68	16
72978	68	7
73085	68	19
73665	76	3
73665	22	13
74355	74	9
74355	46	27
74403	38	1 A
74634	38	4
74634	74	50
75420	68	21

Part No	Page	Ref
190601	56	2
190601	76	35
190605	32	19
190605	74	49
190613	56	1
191033	32	20
191577	56	5
221031 29	36	10
221035 61	24	9 A
221036 20	24	8 E
221041 01	22	19
221041 20	22	22
221041 20	22	25
221041 20	22	28
221041 26	60	4
221045 35	26	20
221046 04	36	6
221046 16	26	22
221121 50	60	3
221121 52	66	5
221126 56	66	2
221131 03	46	5
221131 07	26	29
221131 08	22	10
221581 74	50	10 A
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221706 24	54	12
221711 02	68	23 D
221711 07	54	35
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221721 12	26	3
221726 22	50	12
221726 22	52	12
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221803 23	70	69 G
221803 28	54	42
221803 29	52	18
221803 33	50	23
221803 33	52	23
221803 34	50	15
221803 34	52	15
221803 35	72	80 J
221803 40	22	15
221803 40	52	19 C
221891 17	36	16
222116 41	70	69 C

Part No	Page	Ref
223101 37	22	14
223101 37	68	29 B
223101 61	22	18
223101 64	70	69 D
223101 64	70	69 F
223107 28	24	14
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223406 24	48	17
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223406 32	80	6
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223406 36	76	6
223406 36	22	16 A
223406 36	76	22
223406 36	26	33
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223406 42	54	37
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223406 43	54	18
223406 58	74	8
223406 58	32	14
223406 58	34	14
223406 58	46	19
223406 58	74	47
223406 64	74	7
223406 64	46	18
223412 12	74	5
223412 12	46	15

Part No	Page	Ref
223412 18	76	20
223412 18	26	27
223412 85	48	4
223412 85	74	55
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223434 02	76	33
223521 08	28	3
223521 08	76	32
223521 98	76	38
223521 98	24	1 2
223521 98	76	3 8
223610 32	24	12
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223642 49	76	12
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226214 83	30	2 D
226314 27	70	69 E
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233211 94	76	7
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260001 39	24	13
260001 41	70	49 A
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260083 48	48	14
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260104 79	34	13
260104 79	48	16
260104 79	74	25
260104 79	74	46
260154 05	70	32
260161 01	70	54
260164 03	70	51
260164 06	70	51 1
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260176 01	52	13
260250 05	22	12 C
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304153 01	24	16
310637 84	30	2 AA
310637 84	74	57
519164 01	46	34
521121 27	76	40
521121 27	26	1 1
521196 16	72	76

Part No	Page	Ref
523215 02	22	6
526186 02	50	5
526186 02	52	5
526189 01	22	4
526350 03	36	11.1
526693 04	28	6
526694 03	28	2
527348 01	68	16.1
527353 05	68	18
527353 09	68	7.1
527353 17	68	7.2
528249 91	36	5
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529639 02	76	16
529799 08	74	14
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534126 83	22	12
534127 01	22	12 A
534128 01	22	12 B
535201 83	30	2
535202 01	30	2 B
535206 01	30	2 C
535207 01	30	4
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537441 01	72	79
537446 01	72	86
537602 86	30	2 A
537874 04	46	29
538092 01	48	22
538124 08	46	2

Part No	Page	Ref
538129 01	26	12
538247 04	34	23
538248 03	34	24
539242 84	38	1
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540131 82	68	25 1
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541648 05	74	43
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541649 06	48	13
541649 06	74	59
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541661 05	26	30
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541988 01	24	9
541991 01	24	15
542026 02	26	18
542027 02	26	19
542182 01	46	17
542450 02	26	10

Part No	Page	Ref.
542451 02	26	6
542452 02	26	15
542931 01	36	11
542991 03	40	9
543135 06	68	11
543179 01	26	24
543188 01	26	28
543307 81	68	23
543309 01	68	23 B
543310 01	68	23 C
543318 01	26	13
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543422 01	46	6
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543551 01	70	35
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543708 02	46	31
544061 02	46	21
544088 02	68	23 A
544130 01	74	10
544130 01	46	28
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544264 01	70	70
544271 01	76	19
544271 01	26	25
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544273 01	70	71
544288 01	70	73
544302 02	72	75
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544311 07	54	40
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544311 09	80	3
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544311 10	80	1
544311 10	54	2
544311 11	80	2
544311 11	54	4

Part No	Page	Ref.
544326 01	38	5
544370 81	46	16
544371 01	72	77
544372 01	70	72
544779 11	56	6
544781 02	50	11
544781 02	52	11
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544782 80	52	10
544783 81	24	11
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545318 03	76	29
545461 01	32	21
545461 01	34	21
545499 02	32	12
545499 02	34	12
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545530 80	70	63
545531 02	70	69 A
545533 80	68	26
545536 01	70	69 B
545537 80	70	69
545540 80	72	80
545541 01	72	80 B
545542 01	72	80 I
545543 01	72	80 H
545544 01	72	80 D
545545 01	72	80 E
545546 01	72	80 C
545547 01	72	80 A
545548 01	72	80 F
545633 01	36	7
545703 01	24	8 C
545704 01	24	8 B
545705 02	24	8 A
545706 01	24	8 D
545725 08	24	8 F
545725 10	24	8 F
545756 80	70	49
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545803 88	24	8
546198 53	76	39
546198 53	24	11
546198 53	76	39
546198 62	48	2
546198 62	74	56
546198 76	80	9

Part No	Page	Ref.
546198 76	54	27
546218 02	48	23
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546403 01	66	6
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546423 07	22	2
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546637 01	34	4
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546637 02	34	4.1
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546657 90	22	29
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546800 78	22	3
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546855 01	70	33
548412 01	34	22
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548745 04	76	13
548746 04	76	21
548746 04	26	31
548747 07	26	5
548747 07	76	11
551337 01	66	4
552042 01	60	5
552158 01	62	2
552851 01	60	2 B
553171 01	58	7
553188 02	72	83
553272 01	58	7
553327 80	46	23
553327 80	46	24
553327 82	46	22
553716 81	46	23.1
554214 02	58	9
554216 02	22	16 B
554336 01	74	54
554955 81	70	50
554960 80	70	50 A
555231 01	76	18

Part No	Page	Ref.
555231 01	26	23
555245 01	36	4
555245 01	76	28
555245 02	36	4.1
555447 02	36	9
555453 01	36	8
555511 80	72	82
555518 80	68	6
555612 01	80	18
555655 02	56	4 A
556407 83	22	1
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559857 01	54	22
559858 01	54	11
559861 01	54	31
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559865 01	54	28
559866 01	54	7
559867 02	54	1
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559870 01	54	25
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559880 02	48	5
559880 03	48	5
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559892 01	80	10
559892 01	54	30
559892 02	80	12
559892 02	54	33
559892 03	80	11
559892 03	54	32
559892 04	54	36
559892 05	54	39
559892 06	80	16
559892 06	54	38
559892 07	54	29
559892 08	54	21
559892 09	54	16
559892 10	80	5

Part No	Page	Ref.
559892 10	54	15
560310 01	62	4
560310 01	64	4
560311 01	62	5
560311 01	64	5
560311 03	60	2 C
560596 01	48	1
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560804 80	22	16
561654 01	60	2 D
561815 01	46	1 A
561858 01	60	5
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562062 01	60	1
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562097 01	72	85
562138 01	56	4
562161 80	56	3
562163 80	52	19 A
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562182 01	60	2 A
562182 80	60	2
562197 01	46	9
563022 03	46	13
563022 03	76	42
563910 02	48	21
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566326 01	26	1
566399 80	52	17
566562 80	52	22
566584 01	52	19 B
567112 01	64	2
567119 01	26	32
567120 01	32	1
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569043 01	50	24
569043 01	52	24
785332 02	50	2
785332 02	52	2
1270001	58	8
1270018 01	58	3 A
1270018 02	58	3 B
1270018 03	58	3 C
1270018 04	58	3 D
1270018 05	58	3 E
1270018 06	58	3 F
1270018 07	58	3 G

Part No	Page	Ref.
1270018 08	58	3 H
1270018 09	58	3 I
1270018 10	58	3 J
1270018 11	58	3 K
1270018 12	58	3 L
1270018 13	58	3 M
1270018 14	58	3 N
1270018 15	58	3 O
1270018 16	58	3 P
1270018 17	58	3 Q
1270018 18	58	3 R
1270018 19	58	3 S
1270019	58	3
1270022	70	50 B
2210462 11	68	29 A
2210463 23	48	6
2210463 23	36	15
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2234121 25	48	20
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