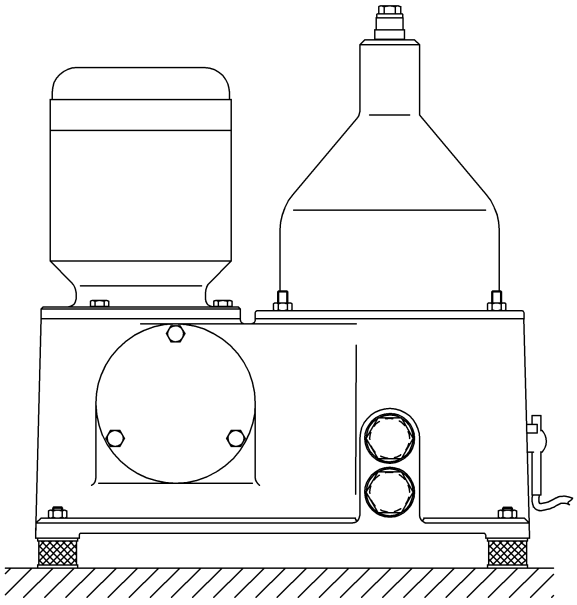
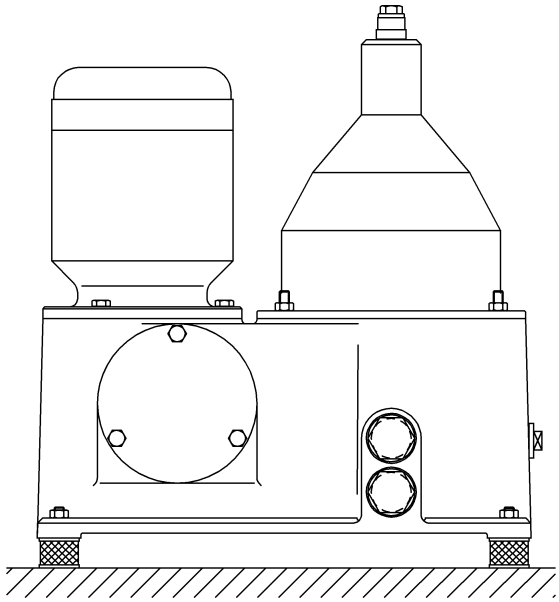
Mechanical Separation
Division

Westfalia Separator
Mineraloil Systems GmbH

Instruction Manual and Parts List

No.:	**2051-9001-010**
Edition:	**1205**
Designation:	**Centrifuge**
Model:	**OTC 3-02-137**
	OTC 3-03-107

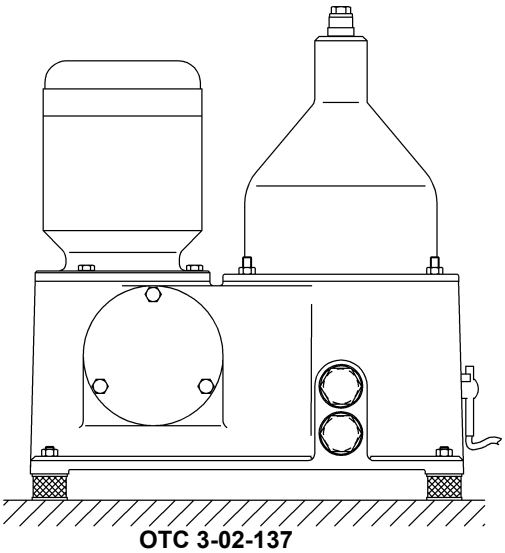




Subject to modification!

The authors are always grateful for comments and suggestions for improving the documentation. They can be sent to

GEA Westfalia Separator Mineraloil Systems GmbH
Werner-Habig-Str. 1
D-59302 Oelde



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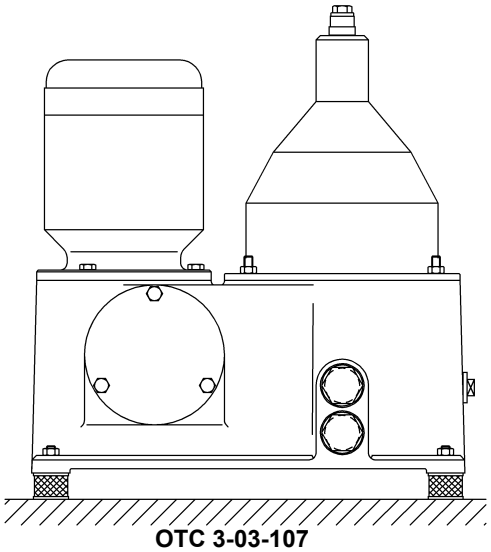

OTC 3-03-107

Westfalia Separator
D-59302 Oelde (F. R. Germany)

Mineraloil Systems GmbH

Model		S/N	
Built in		Ø in mm	
Max. admissible rated bowl speed in min^{-1}			
Max. admissible density in kg/dm^3 of product			
Heavy liquid kg/dm^3		Solids kg/dm^3	
min/max throughput m^3/h			
min/max temp. of product in °C			
min/max housing in bar			

This nameplate must be filled in by the operator.
Please transfer the data from the centrifuge nameplate.

For your safety

- **Strictly adhere to instructions marked with this symbol.**
  This avoids damage to the separator and other equipment.

- **Take special care when carrying out operations marked with this symbol -**
  otherwise danger to life.

Note:

- This symbol is not a safety precaution but rather a reference to information which help to better understand the separator or plant components and the processes.

- **Observe the accident prevention regulations!**

  The local safety and accident prevention regulations apply unconditionally to the operation of the separator. The plant operator must ensure compliance with these regulations.

- **Follow the instructions in the manual.**

  Follow only the instructions given in this manual.
  Repair and maintenance work that goes beyond the scope described in this manual may not be carried out.

- **Operate the separator only in accordance with agreed process and operating parameters**

- **Maintain the separator**

  as specified in this manual.

- **Carry out safety checks on the separator,**

  as described in chapter "Safety precautions" in this manual

- **Liability for the function of the machine passes to the owner.**

  Liability for the function of the machine passes unconditionally to the owner or operator irrespective of existing warranty periods in so far as the machine is improperly maintained or serviced by persons other than Westfalia Separator service personnel or if the machine is not applied in accordance with the intended use.

  Westfalia Separator shall not be liable for damage which occurs as a result of non-observance of the above. Warranty and liability conditions in the Conditions of Sale and Delivery of Westfalia Separator are not extended by the above.

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1.1 Correct usage

The separator is designed

- in accordance with the chemical and physical properties of the product specified by the customer and
- in accordance with the method of application of the separator agreed with Westfalia Separator.

In particular, products not conforming to the specifications on the nameplate may not be used.

Any mode of operation deviating herefrom is not proper and correct.

Prior to any intended deviation from the agreed operating mode, it is therefore imperative to obtain the consent of Westfalia Separator.

1.2 Safety markings

The safety markings (adhesive and metal plates) are attached to all separators on the hood and frame of the respective separator in such a way that they are clearly visible.

All safety markings on the separator, control system and plant components must always be in perfect condition.

- Clean dirty safety markings.
- Replace damaged safety markings.

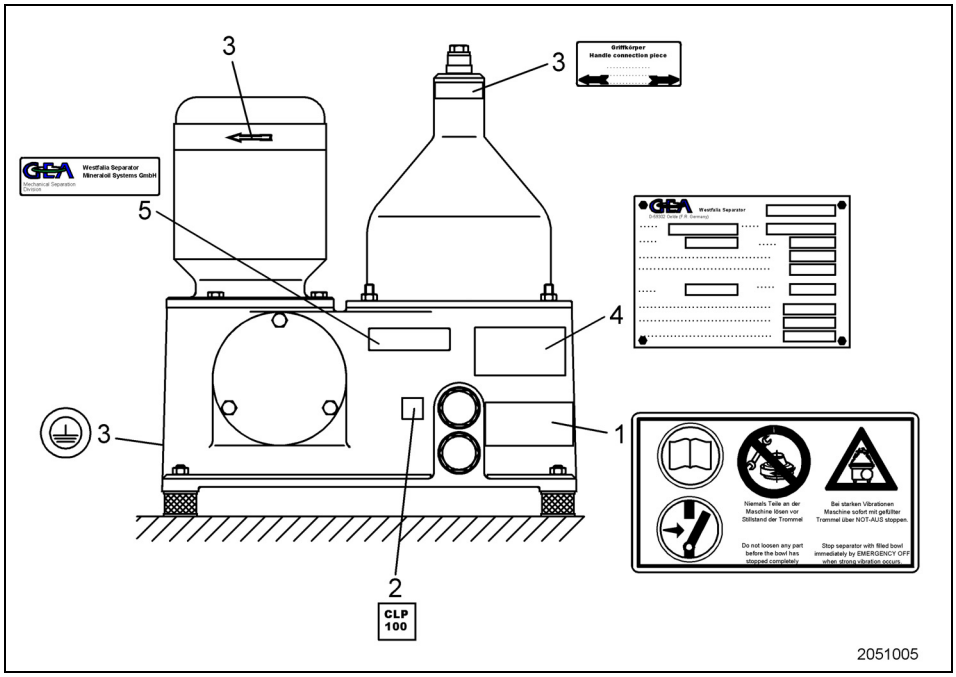


Fig. 1 Example of markings on a separator

1 Safety sticker
2 Oil quality
3 Plates
4 Nameplate
5 Maker's nameplate

The texts and part numbers of the safety markings change depending on the languages required by the customer.

1.2.1 Safety markings and their meaning

The following safety markings must be attached to the separator as adhesive labels.

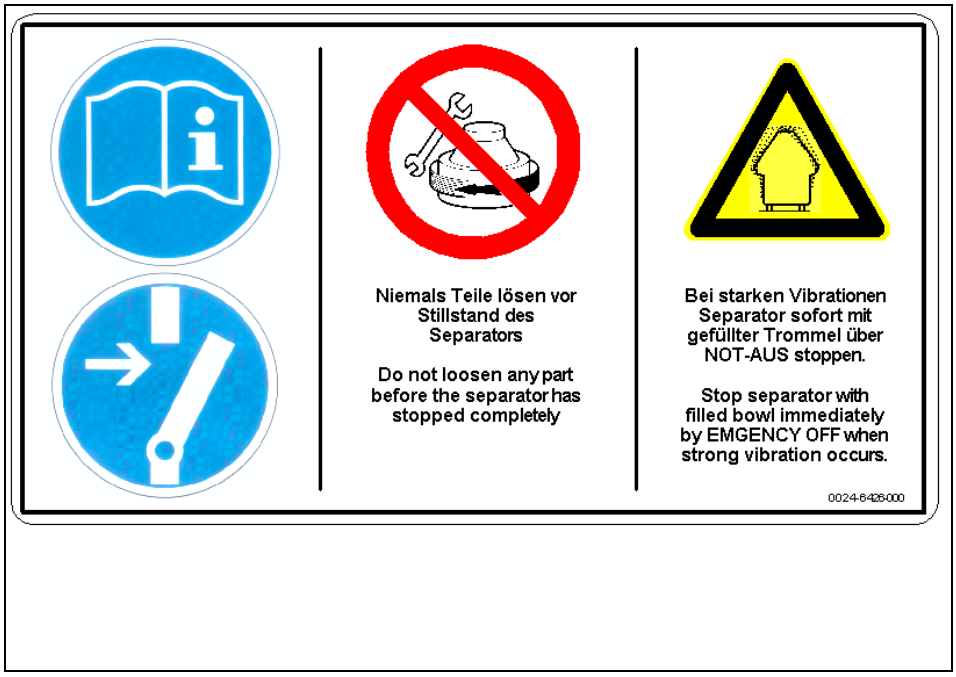


Fig. 2

Fig. 3

Refer to the machine documentation!

- Every person who is assigned the task of installing, operating, maintaining and repairing the machine must have read and understood the documentation.
- The documentation must be complete kept near to the machine and be readily accessible to the operators. It must be available to the operators at all times!

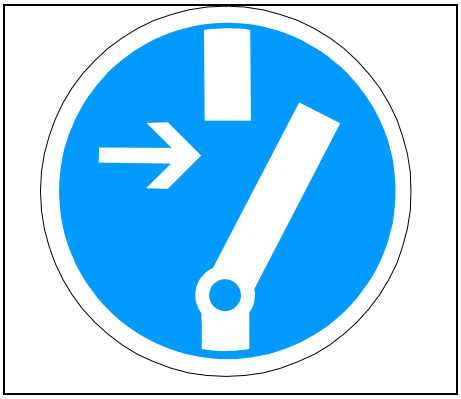


Fig. 4

Before carrying out work, disconnect power to the all components of the monitoring system!
Risk of injury due to electrical voltage and unintended start-up of the separator!

Before carrying out work on the separator and electrical plant components:

- Make sure the separator is at a standstill.
- Switch off all electrical appliances via the main switch,
- Lock the installation to prevent it from being accidentally switched on.

Fig. 5

Danger o life and limb through rotating machine parts!

- **Do not loosen any part and do not carry out maintenance or repair work on the separator before the separator is at a standstill.**
  Methods of how to check standstill are described in the machine documentation.

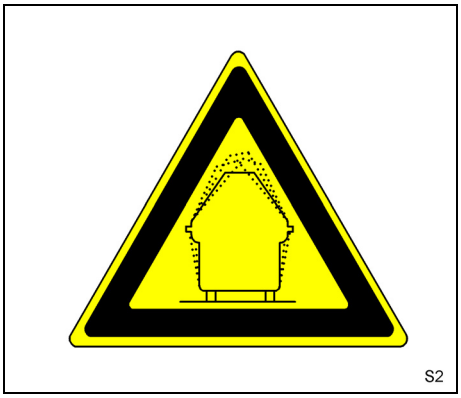


Fig. 6

Warning of unusual noises or vibrations!
When unusual noises or vibrations occur on the separator:

- Immediately shut down the separator with filled bowl via “emergency-off”.
- **Never trigger a bowl ejection!**
- Evacuate the room.
- Do not re-enter the room until the centrifuge has come to a standstill.

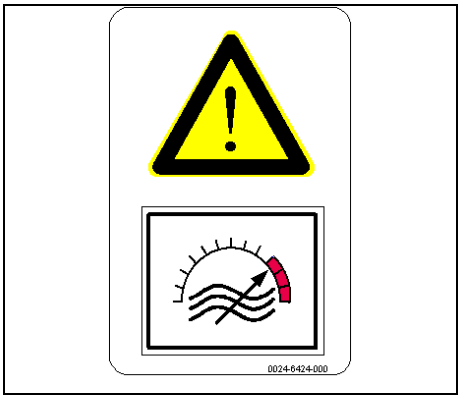


Fig. 7

Frequency converter operation!

- When setting the frequency converter, do not exceed the admissible bowl speed (see nameplate)

Note:
This adhesive plate is only used for frequency converter operation.

Fig. 8

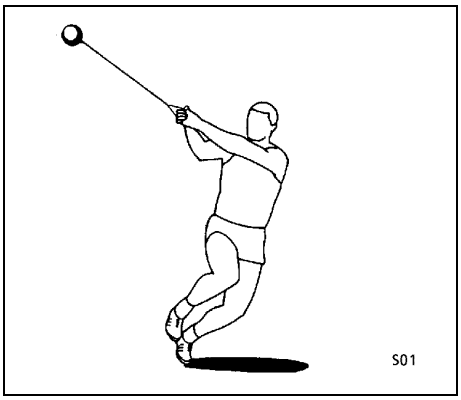
Warning of extreme surface temperatures!

The surfaces of the separator and plant components can be hot!

Note:
This adhesive plate is only used for hot operation.

1.3 Basic operating principles

Separators are used for the separation of liquid mixtures or for the separation of solids out of liquids or liquid mixtures.



High centrifugal forces are produced in the rotating bowl.

Fig. 9

Under the influence of the centrifugal forces, separation of the liquid mixture and/or ejection of the solids particles takes place most rapidly.

The specifically heavier components are displaced to the bowl periphery, whereas the specifically lighter components are displaced towards the centre of the bowl.

The high centrifugal force is produced by very high bowl speeds. On the one hand, high bowl speeds signify high efficiency, while on the other hand, they signify high material stressing of the separator.

1.4 Bowl speed and product

The max. permissible bowl speed is an important parameter when rating the separator. It depends on the chemical and physical properties of the product such as

- temperature, if higher than 100 °C (212 °F) or lower than 0 °C (32 °F),
- density of the fluid and solid components,
- aggressiveness of the product as regards corrosion and erosion (has influence on the selection of the bowl material).

The bowl speed is determined on the basis of these parameters allowing for an adequate safety margin.

Before using a product with properties different from those stated when placing the order, it is imperative to obtain the manufacturer's approval.

1.5 Demands relating to service personnel and spare parts

Fig. 10

- **Use only genuine spare parts from Westfalia Separator.**
  The use of non-genuine parts leads to:
  – Safety risks
  – Lower durability and availability
  – Increased maintenance requirement
  If a safety risk arises, this may have legal consequences for the responsible persons. In this case, Westfalia Separator shall assume no liability or warranty.

- Deploy only well trained personnel for maintenance work, e.g. service personnel from Westfalia Separator or personnel trained by Westfalia Separator. An incorrectly maintained/assembled machine poses a safety risk for the operators.

1.6 Operations on the separator

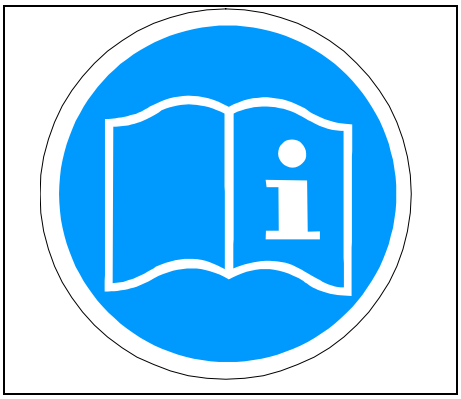


Fig. 11

The separator works reliably, provided that it is operated and maintained in accordance with our operating instructions.

Special attention must be given to:

- assembly
- starting
- shutting-down
- maintenance and servicing

1.6.1 Assembly

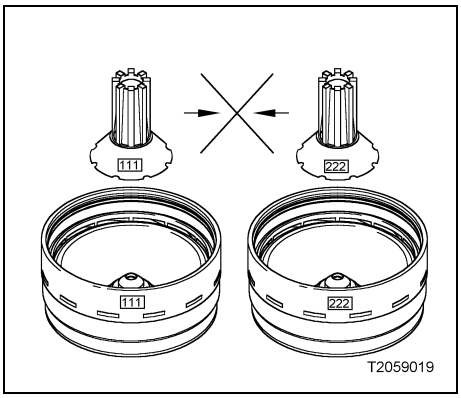


Fig. 12

- If the plant has several separators, be sure not to interchange parts of the different separators.
  Some parts are marked with the serial-number of the machine or with the last three digits of the serial-number.

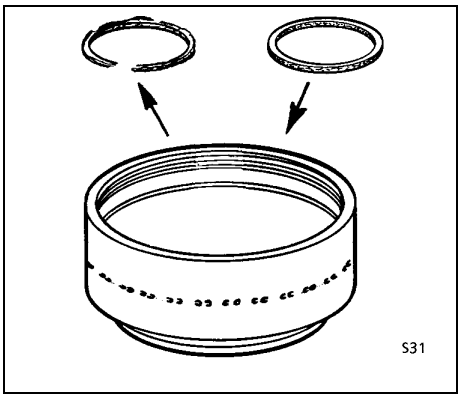


Fig. 13

- Damaged parts must be replaced immediately by new or reconditioned parts.

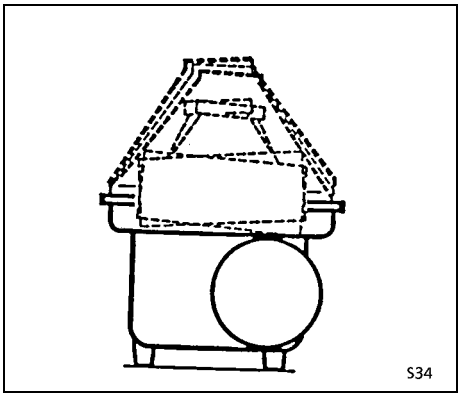


Fig. 14

- After installing certain critical spare bowl parts, the bowl must be re-balanced.

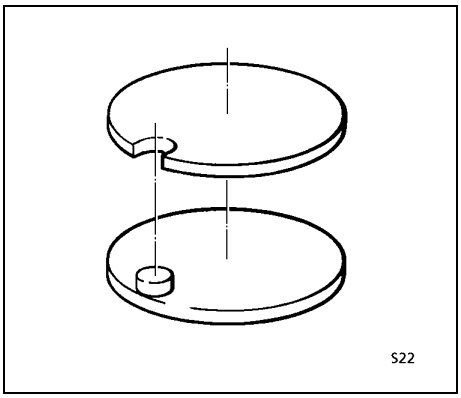


Fig. 15

- Some bowl parts have to be arranged in fixed positions relative to one another.
- Locking devices and alignment marks must be in perfect condition. The separator must not be operated if these locking devices and alignment marks are not in perfect condition.

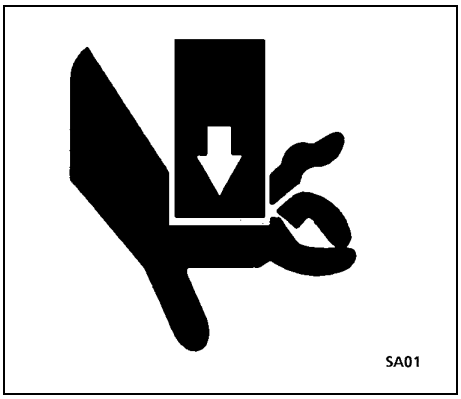


Fig. 16

- When transporting and assembling machine parts, avoid crushing and shear strain.

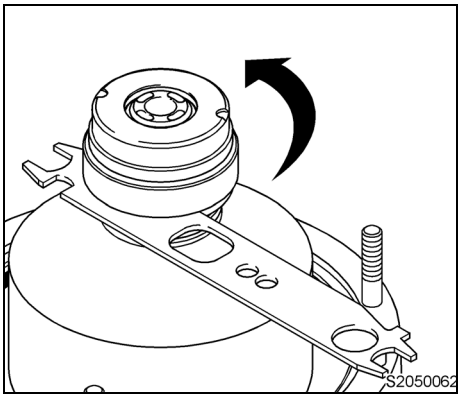


Fig. 17

- When assembling the bowl, be sure to strictly adhere to the instructions given in chapter "bowl", in order to avoid undue imbalance.
- Before starting the bowl, be sure to fit all parts.
- Tighten the bowl lock ring **securely (left-hand thread).**

CAUTION:
A loose lock ring can endanger life!

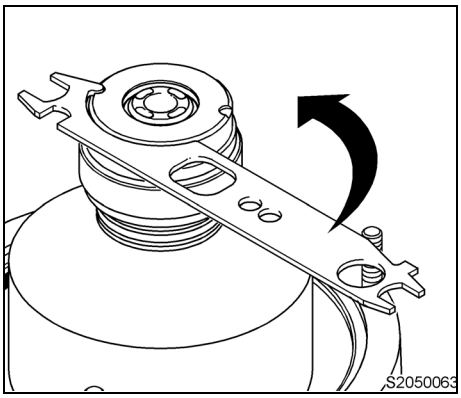


Fig. 18

- **Securely** tighten all other lock rings **(left-hand thread).**

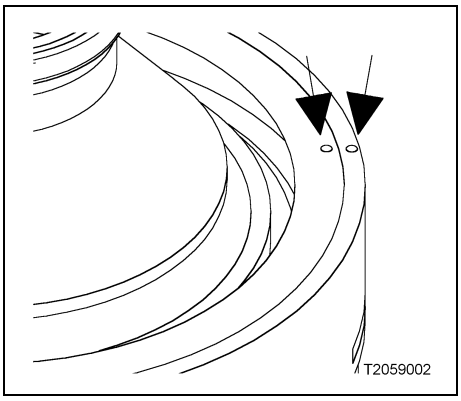


Fig. 19

- Pay attention to the position of the marks!
- The "O" marks must be aligned.

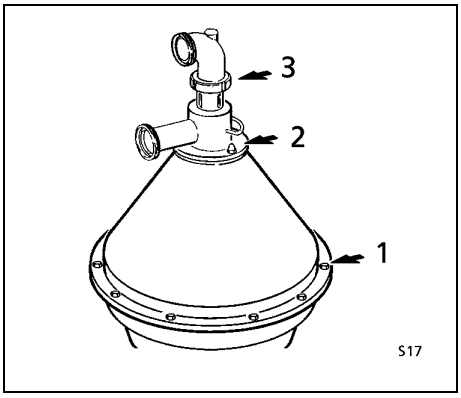


Fig. 20

- Carefully fasten hood 1, feed and discharge housing 2 and centripetal pump 3.

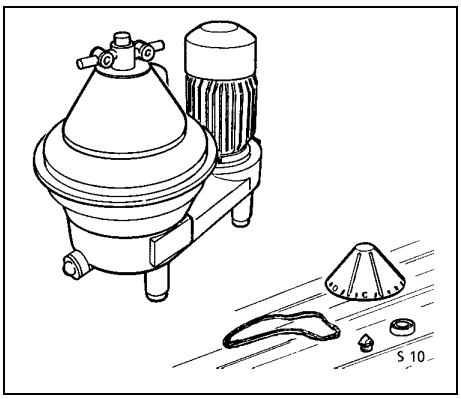


Fig. 21

- Check if the machine is completely assembled and properly installed.

1.6.2 Electrical appliances

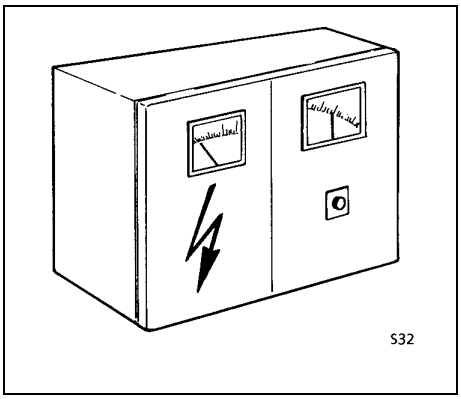


Fig. 22

- The local regulations apply for the electrical appliances and installations.
- Especially the installation guidelines of Westfalia Separator have to be adhered to.
- The frequency and voltage of the power supply must correspond to the machine specifications.
- Carry out voltage equalization.
- Observe legal regulations; e.g. in the EU:
  - Low-voltage guideline 73/23/EWG
  - Electro-magnetic compatibility 89/336/EWG,
  - Guidelines issued by the classification authorities.

1.6.3 Before start-up

- **Check that the machine is correctly assembled.**

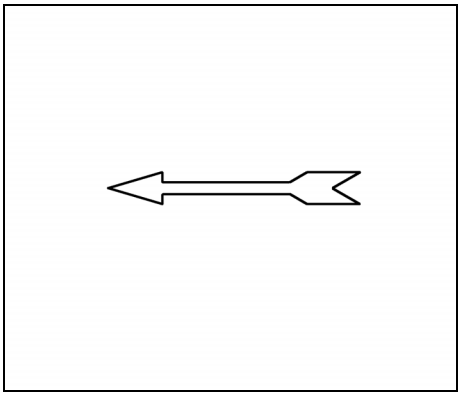


Fig. 23

- The motor must run clockwise (pay attention to direction of rotation arrow!).
- See section 4.2.4.

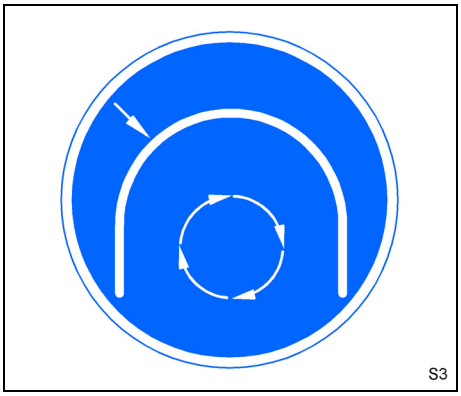


Fig. 24

- The separator may only be operated with protection devices conforming to EN 294.
- Equip solid and liquid discharges accordingly.

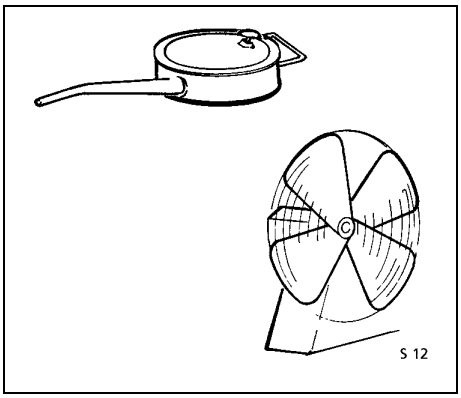


Fig. 25

- Check that the lubrication and cooling systems are serviceable.

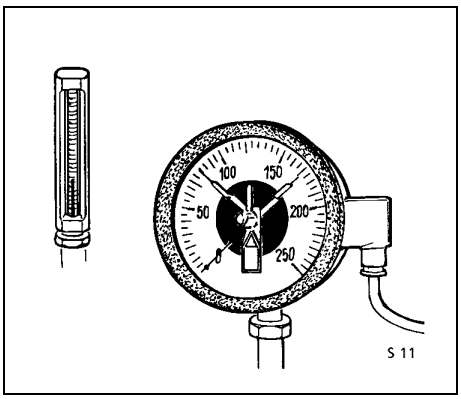


Fig. 26

- Check whether the supervisory equipment is operational and the correct limit values are adjusted.

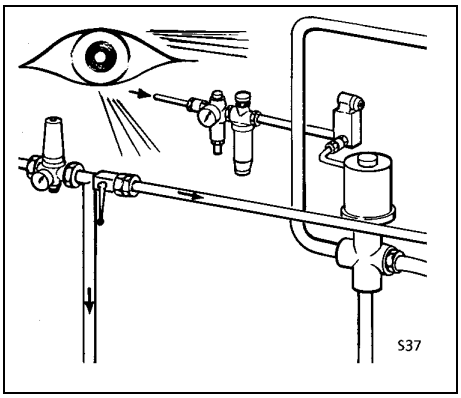


Fig. 27

- Check that the product lines are set to operation.
- Regularly check hoses for signs of ageing.
- Check sight glasses for mechanical damage.
- Damaged parts must be replaced immediately by new or reconditioned parts.

1.6.4 Starting

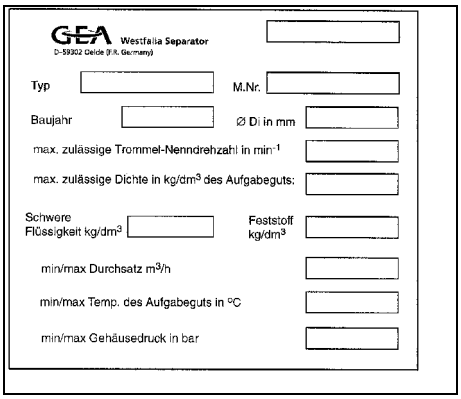


Fig. 28

- Refer to chapter “operation”.
- Note nameplate. The values for
  - bowl speed,
  - density of the heavy liquid,
  - density of the solids (centrifugally dry)

  are maximum values and must not be exceeded.

Fig. 29

- Wear ear protection.

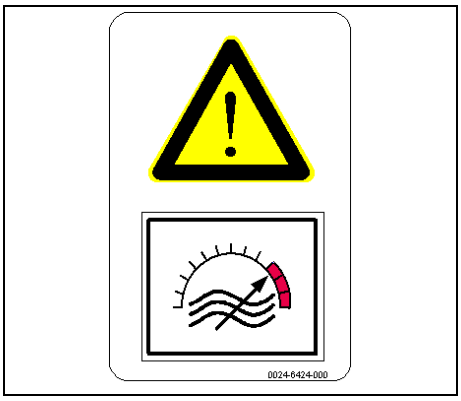


Fig. 30

In case of frequency converter operation:

- Do not under any circumstances manipulate the frequency converter to exceed the permissible bowl speed (see nameplate).
- The separator may only be operated with an independent device for speed limiting.

Fig. 31

- Do not feed product which is categorised as explosive.
- The separator must not be used in areas where explosion protection is required.

Fig. 32

- When processing products harmful to persons, observe the pertinent safety regulations.
- Refer to the safety data sheet of the product.
- Wear protective clothing.

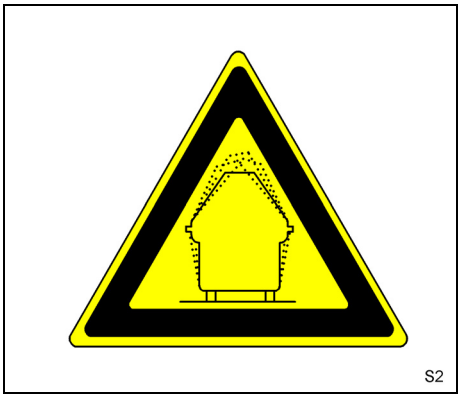


Fig. 33

When unusual noises or vibrations occur on the separator:

- Immediately shut down the separator with filled bowl via “emergency-off”.
- **Never trigger a bowl ejection!**
- Evacuate the room.
- Do not re-enter the room until the centrifuge has come to a standstill.

Fig. 34

Only in case of hot operation:

- Product-contacting parts such as
  - pipes and hoses,
  - hood,
  - solids catcher

  reach temperatures over 80 °C (176 °F).

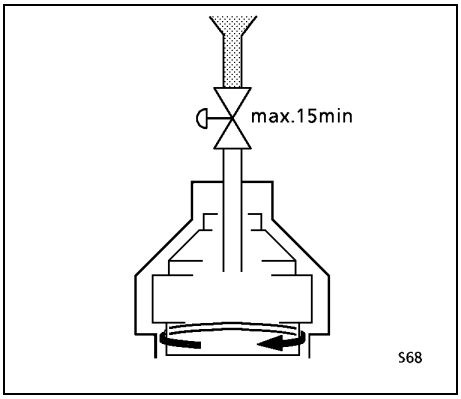


Fig. 35

- The bowl is not allowed to run without liquid supply for more than 15 minutes, as otherwise it would result in overheating of the bowl material.

1.6.5 Shut-down and »Emergency-Off«

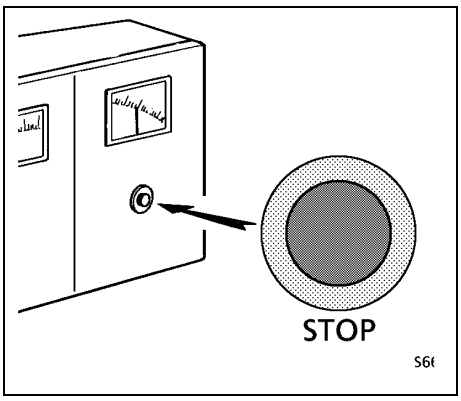


Fig. 36

- For shut-down refer to the chapter "operation".

1.6.6 Maintenance and repair

Unfavourable operating conditions may require shorter maintenance intervals. The factors listed below are unfavourable because they either attack the separator material directly or impair the lubrication/cooling system:

- Aggressive product (chemical or physical)
- High product temperature
- Product with grease-decaying properties
- Environment: Temperature, dust, vapours

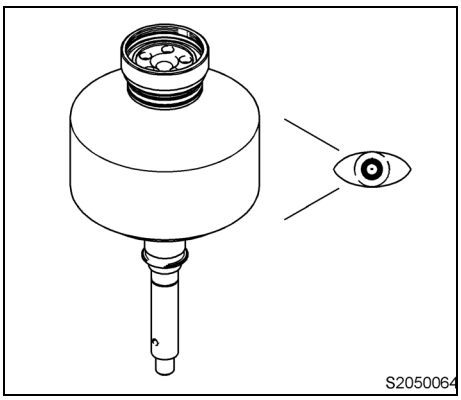


Fig. 37

Particularly high-stressed separator parts like
– threaded ring,
– spindle and
– bowl shell
must be checked regularly to assure safe and efficient operation.

Timely maintenance of the separator and replacement of worn or damaged machine parts is essential for safe operation of the machine.

Maintenance and repair work may only be carried out by the customer to the extent as described in this instruction manual.

Maintenance and repair work not described in this manual may only be carried out by the manufacturer or by "repair shops" authorized by the manufacturer.

We, therefore, recommend in your own interest to have your separator inspected by our service engineers at regular intervals. Such inspections will keep your separator working reliably and prevent undesirable shut-downs.

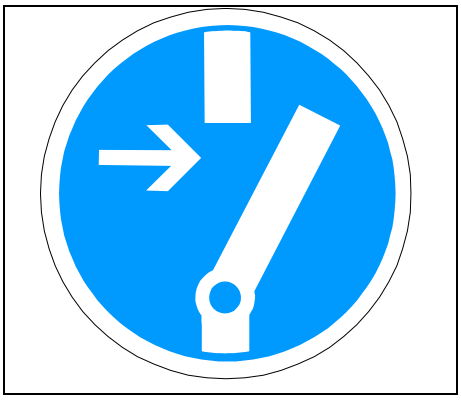


Fig. 38

Before maintenance and servicing:
- Switch off all electrical appliances via the main switch,
- Secure installation against unintended re-starting with locking device.

It is vital that only genuine spare parts from Westfalia Separator are used. Otherwise, safety risks may arise (see section 1.5**).**

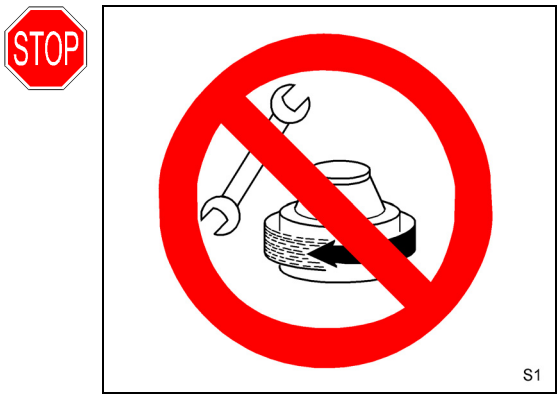


Fig. 39

- **Do not loosen any part before the separator has come to a standstill.**
- See section **3.5** for standstill check options.

Fig. 40

- Do not climb onto or stand on the machine or parts of the machine.
- Make provision for and use a sturdy working platform.

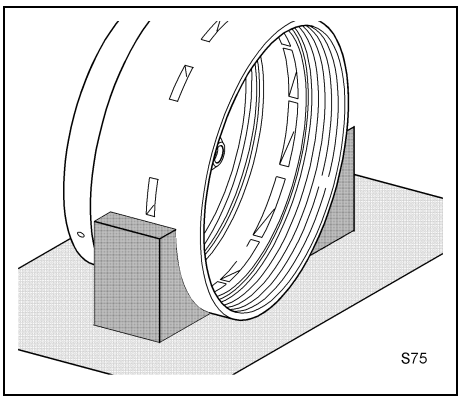


Fig. 41

- Place dismantled machine parts on a suitable base, e.g. rubber mat.
- Take steps to prevent machine parts from overturning and rolling away.

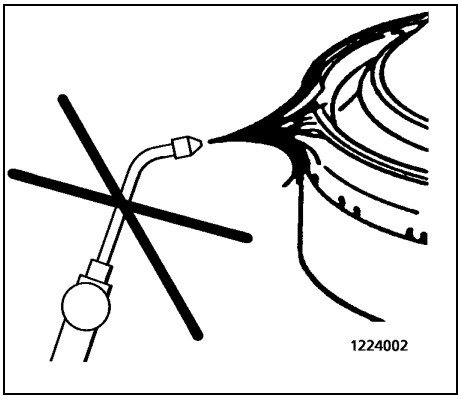


Fig. 42

- **Do not heat bowl parts with the naked flame.**
- **Bowl parts must never be welded. This also applies for hood and solids catcher parts of steam-sterilizable separators.**
- Even during cleaning the bowl parts the temperature must not exceed 100 °C (212 °F).

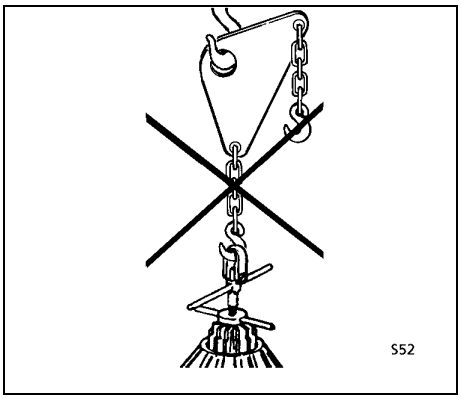


Fig. 43

- Load-carrying equipment such as
  – lifting devices for bowl or distributor,
  – chains etc.
  may only be used for work routines as described in this instruction manual.
- Do not use damaged or incomplete load carrying equipment.

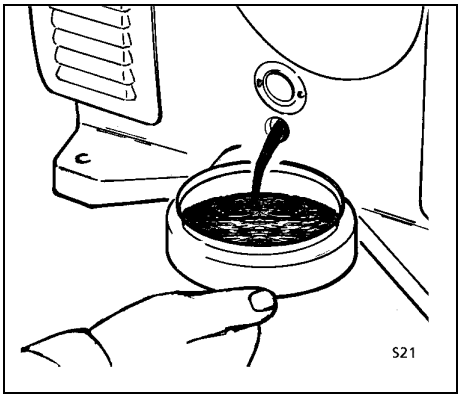


Fig. 44

- Collect dripping oil to prevent danger of slipping or product infection.
- When handling waste oils note:
  – They can be injurious to health, depending on their chemical composition.
  – Waste oil must be disposed of in accordance with local regulations.

1.7 Corrosion

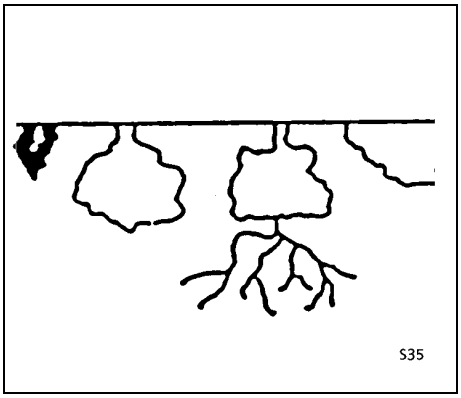
Corrosion can also affect bowl parts made of stainless steel. This corrosion can be flat-spread or pit- or crack-shaped and merits special attention.

Corrosion on stainless steel bowl material should be examined thoroughly and documented.

Flat-spread corrosion can usually be measured (reduction of wall thickness)

Pit- or crack-shaped corrosion cannot be measured without the risk of damage. At the initial stage pit-shaped corrosion is generally caused by chlorine ions.

Depending on the stressing of the part, pit-shaped corrosion can result in crack-shaped corrosion.



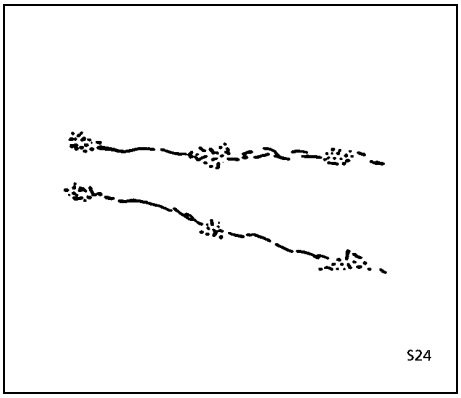
Possible formation of pit-shaped corrosion.

Fig. 45

Such pittings can only be investigated by a materials expert.

In case of crack-shaped corrosion attack with or without superposed flat-spread and pit-shaped corrosion on main bowl components, **the machine must be shut down immediately**.

Contact your nearest Westfalia Separator representative for a thorough examination.



Pittings

Pittings which are close together or form a linear pattern can signify crack formation beneath the surface.

Such pittings should be investigated by a materials expert.

Fig. 46

1.8 Erosion

Erosion is caused by solid particles in the process liquid.

These solid particles grind marks into the surfaces with which they come into contact.

The following factors favour the occurrence of erosion:

- hard solids particles
- high throughput capacities

The first signs of erosion should be carefully observed and documented. Erosion can deepen rapidly, thereby weakening the bowl material.

Contact your nearest Westfalia Separator representative for a thorough examination. Information on the nature of the damage can be provided by photos, plaster casts or lead molds.

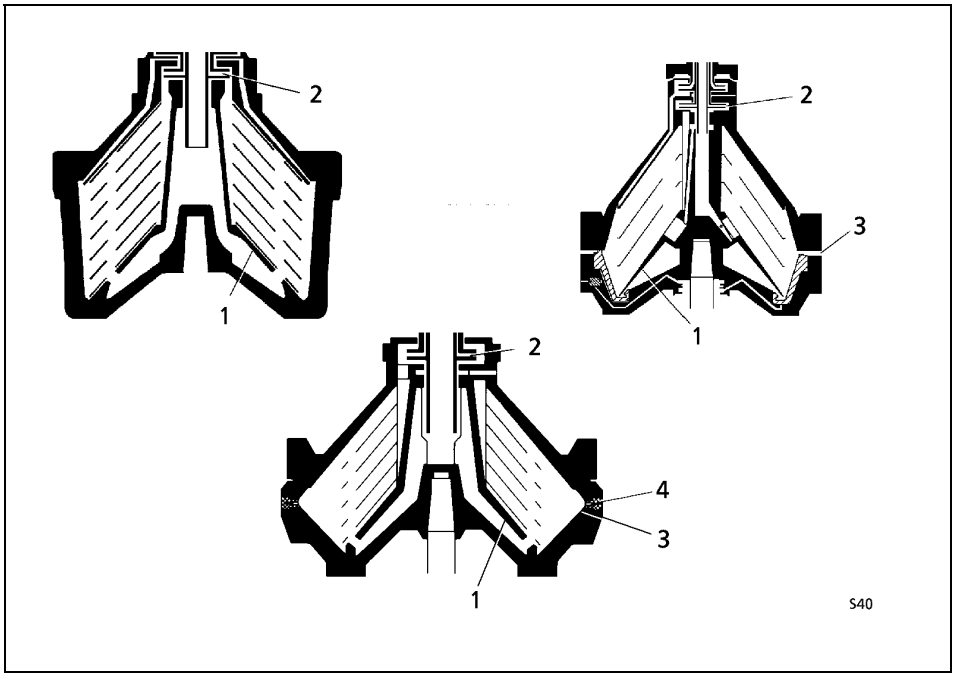


Fig. 47

The surfaces most susceptible to erosion are:

1) the bottom of the distributor, the rising channels and the ribs,
2) the centripetal pump (cavitation),
3) all surfaces in the area of the solids discharge ports,
4) the nozzles.

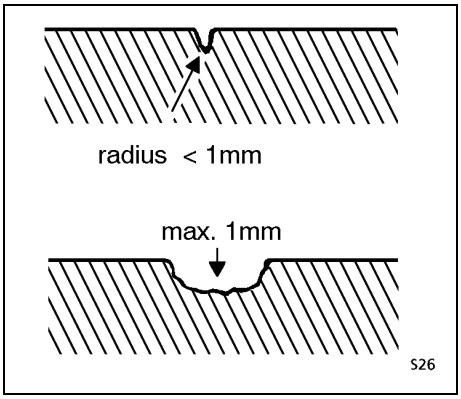


Fig. 48

Signs of erosion which you should immediately report to your nearest Westfalia Separator representative:

- The bottom of the erosion mark has a radius smaller than 1 mm (large notch effect).
- The depth of erosion mark exceeds 1 mm (0.04 inch) at the deepest point.

2 Machine description

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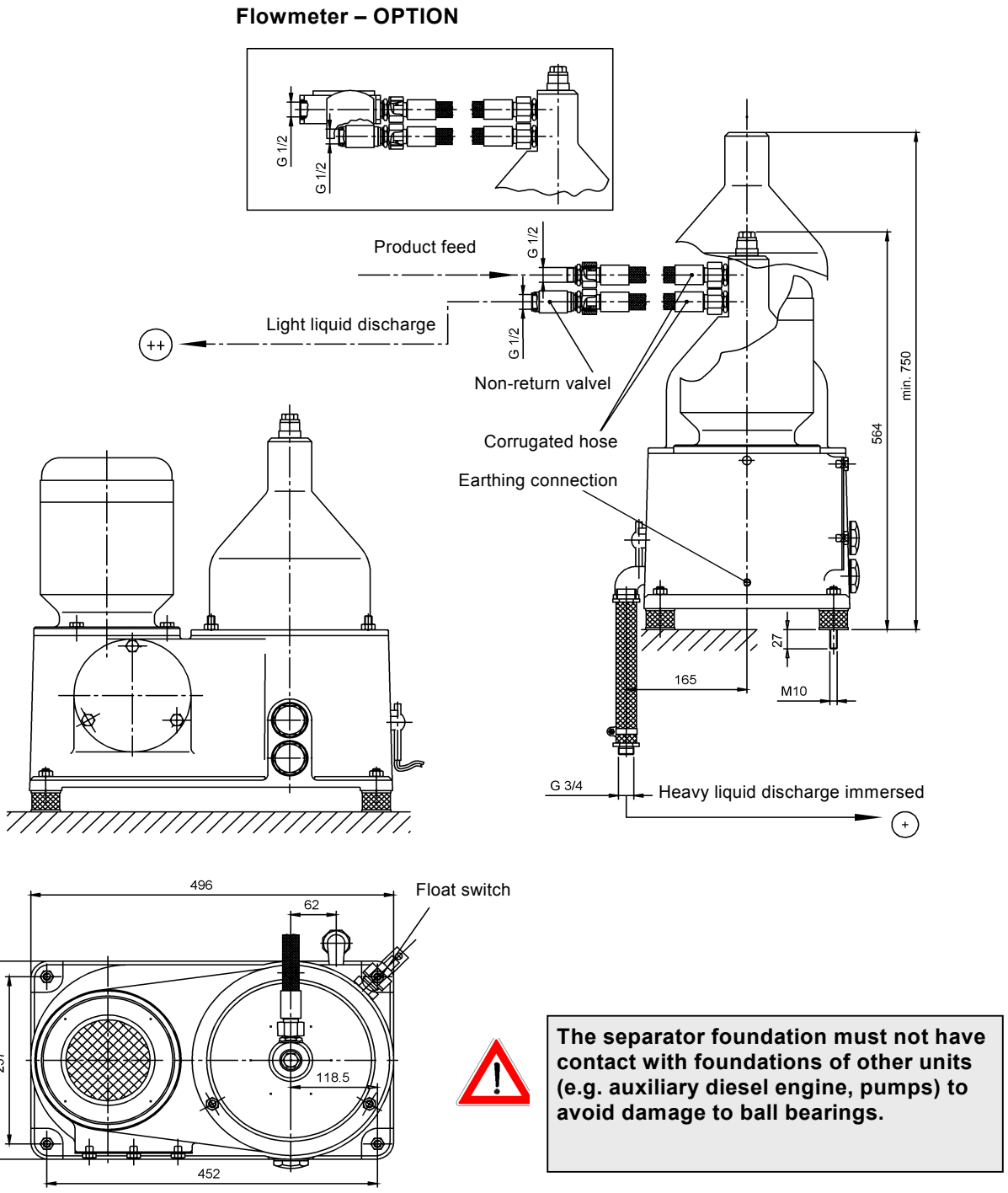
2.1 Dimensioned drawing of the separator OTC 3-02-137

- **See installation guidelines for further information.**



The separator foundation must not have contact with foundations of other units (e.g. auxiliary diesel engine, pumps) to avoid damage to ball bearings.

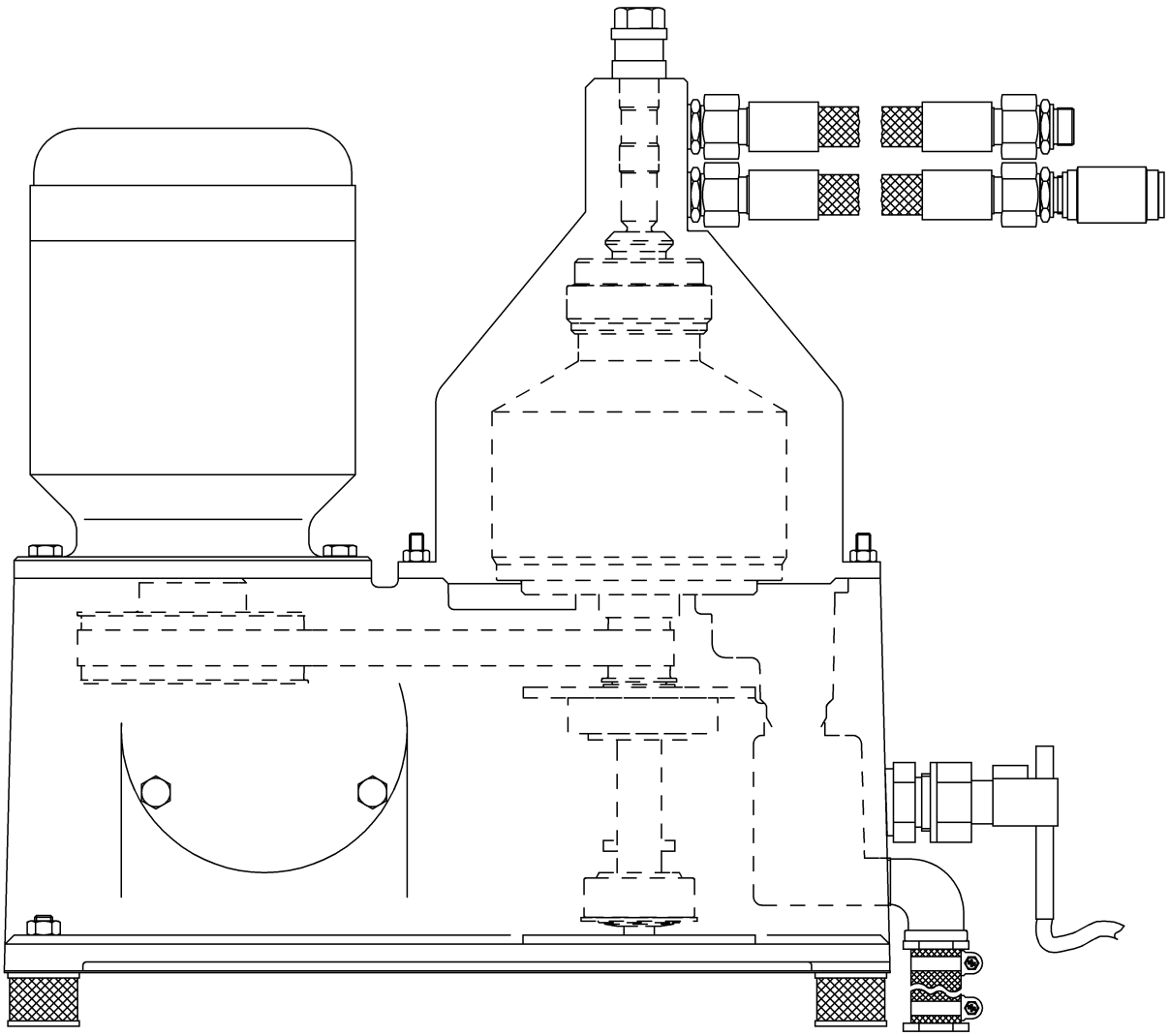
(+) Discharge by the centripetal pump built into the separator

(++) Do **not** discharge residuals into public waters!

2050-4100-000

Fig. 49 **Subject to modification!**

2.2 Section through separator OTC 3-02-137

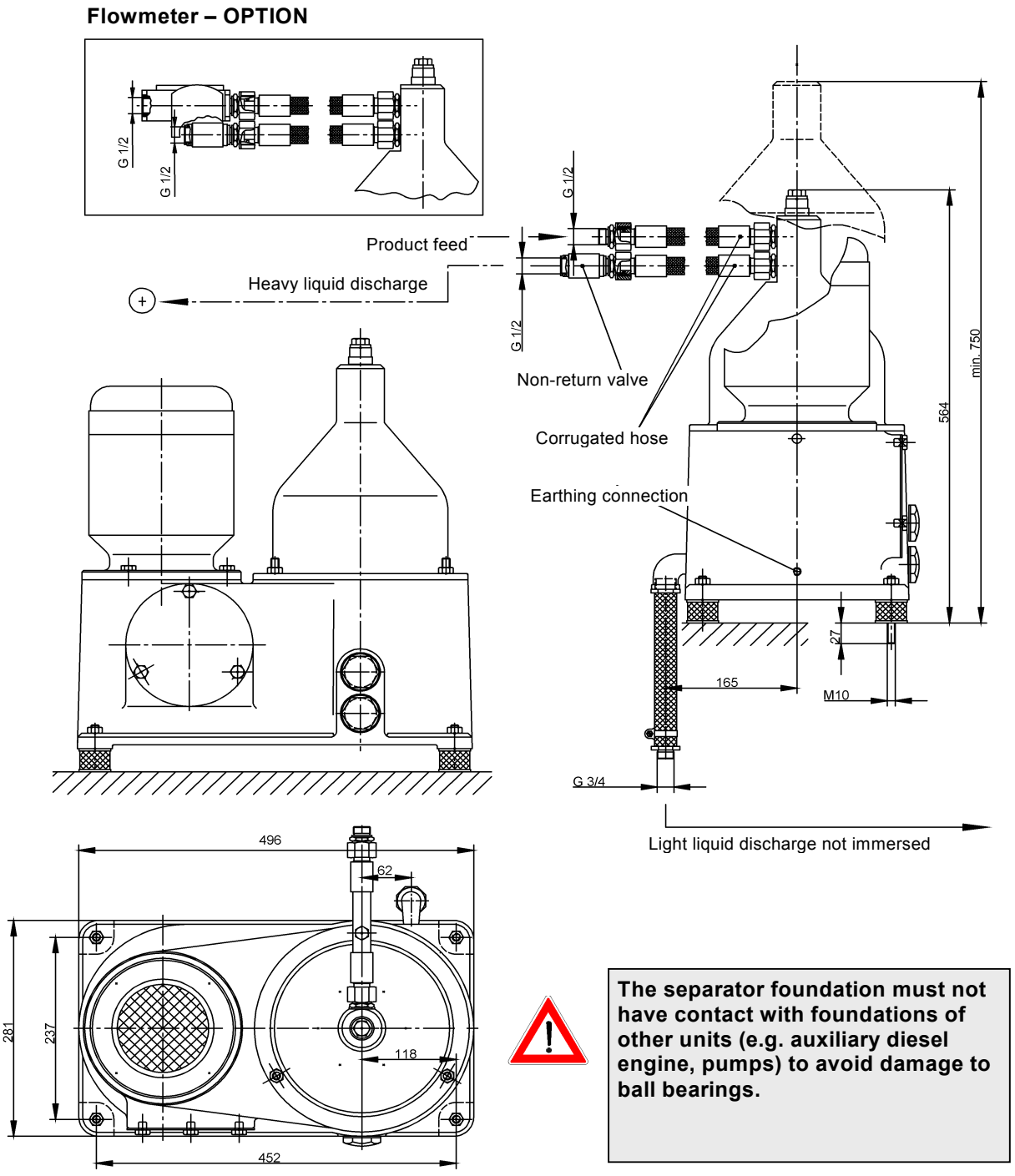


2050007

Fig. 50 **Subject to modification!**

2.3 Dimensioned drawing of the separator OTC 3-03-107

- **See installation guidelines for further information.**



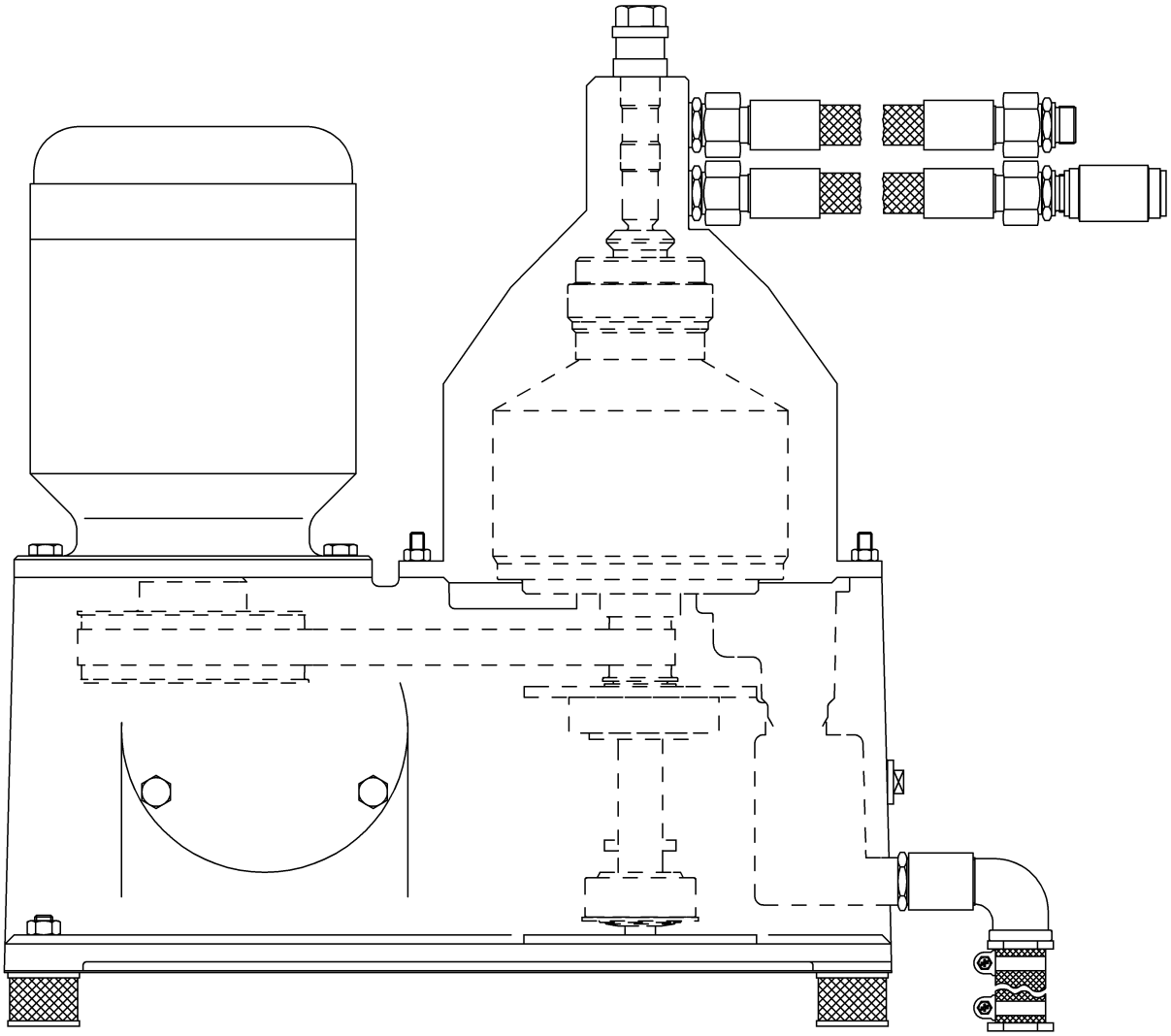
The separator foundation must not have contact with foundations of other units (e.g. auxiliary diesel engine, pumps) to avoid damage to ball bearings.

⊕ Discharge by the centripetal pump built into the separator.
Do **not** discharge residuals into public waters!

2050-4100-010

Fig. 51 **Subject to modification!**

2.4 Section through separator OTC 3-03-107



2050006

Fig. 52 **Subject to modification!**

2.5 General

The machine described in this manual is a high-speed centrifugal separator with a solid-wall disk-type bowl.

"Separation" means the separation of liquid mixtures which consist of two liquids, with simultaneous removal of the solids contained in the liquids.

"Clarification" is the removal of solids from a liquid.

Prerequisite for centrifugal treatment technology (separation) is that the components of the product

- can be separated mechanically,
- have different densities and
- do not emulsify.

2.6 OTC …-02-…

The separator OTC **…-02-…**

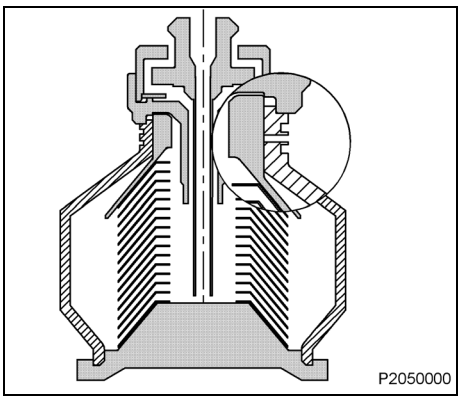
- is equipped with a solid-wall disk bowl,
- is used for the separation and clarification of liquids,
- operates with regulating rings (see section 2.9).

The most important part of the separator is the bowl.

The separator bowl

- can – depending on the application – be converted to operate as a purifier bowl or clarifier bowl,
- is configured as a purifier bowl at the factory.

Converting the purifier bowl to a clarifier bowl and vice versa is possible in just a few easy steps (see diagrams).



Purifier bowl OTC …-02-…

Fig. 53

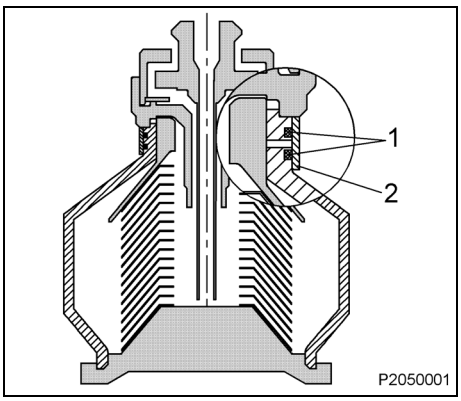


Fig. 54

Clarifier bowl OTC …-02-…

Conversion parts for clarifier operation

Pos.	Part Number	Qty.		Designation
1	see section *parts list*	2		Gasket
2		1		Lock ring

- Section *4.5.4* Refer to assembling the separator.

Water seal (only for OTC ...-02-... – purifier operating mode)

When the centrifuge is operated as a purifier, a water seal must be created and maintained during operation to prevent the light liquid from discharging at the water outlet. See section 3.2.

2.7 OTC …-03-…

The separator OTC **…-03-…**
- is equipped with a solid-wall disk bowl,
- is used for the separation of liquid mixtures,
- operates with regulating rings (see section 2.9).

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2.8 Main components of the separator

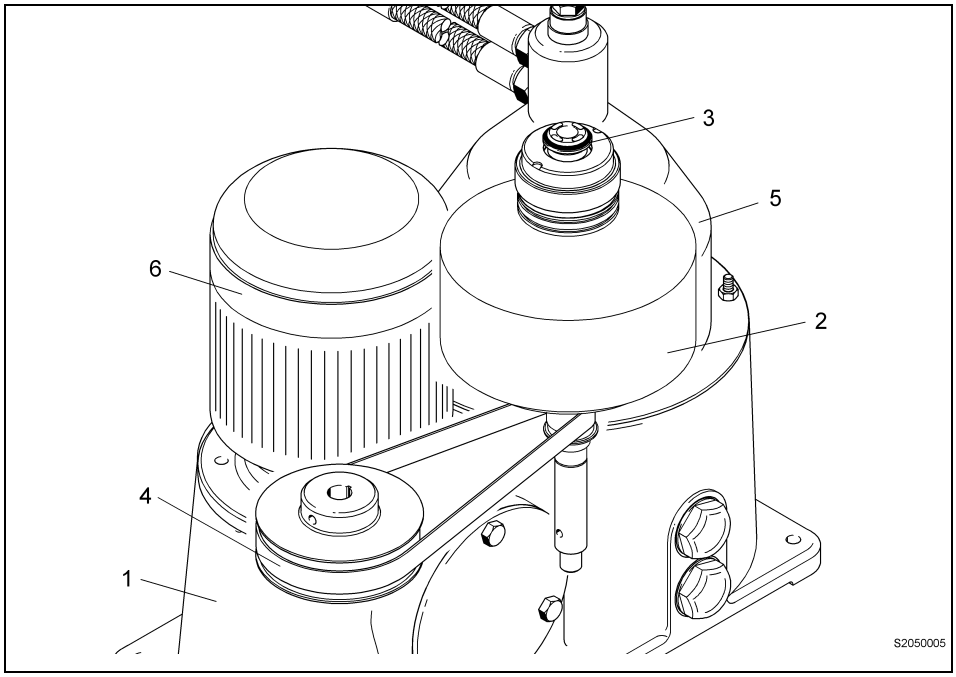

Fig. 55

Pos.	Designation	Function
1	Frame	• contains the drive parts. • supports motor, bowl and hood.
2	Bowl	See section 2.8.1
3	Centripetal pump	See section 2.8.2
4	Drive	See section 2.8.3
5	Hood	• covers the rotating bowl. • holds the feed and discharges.
6	Motor	• accelerates the separator to the required speed. • is protected against overload during operation.

2.8.1 Bowl

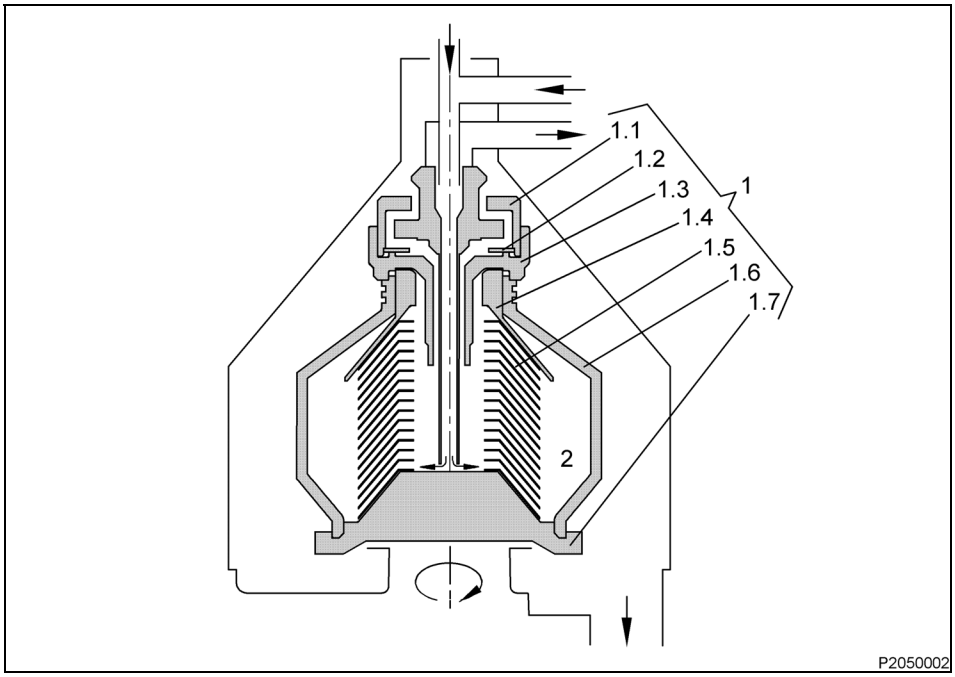

Fig. 56

Pos.	Designation	Function
1	Bowl	• produces high centrifugal forces through rotation making possible separation and clarification. • consists of: 1.1 Lock ring 1.2 Regulating ring (see section 2.9). 1.3 Threaded ring 1.4 Separating disk 1.5 Disk stack 1.6 Bowl shell 1.7 Bottom
1.5	Disk stack	• splits the liquid mixture consisting of a light and heavy phase, e.g. oil-water, into its components. • consists of a large number of conical disks positioned on top of one another. Each disk is provided with spacers so that precisely defined interspaces are formed between the individual disks. The smooth disk surfaces facilitate sliding of the solids and hence self-cleaning of the disks.
	Separation chamber	The separation space consists of a large number of parallel chambers of low height. This produces very small radial sedimentation paths for the product.

Pos.	Designation	Function
	Solids	collect on the upper wall of each disk interspace and slide down into the solids holding space.
1.6	Bowl shell	• forms the solids holding space together with the bottom.
1.7	Bottom	• is the connecting part between bowl shell and spindle (see 2.8.3).
2	Solids holding space	collects the solids separated in the disk stack.

2.8.2 Centripetal pump

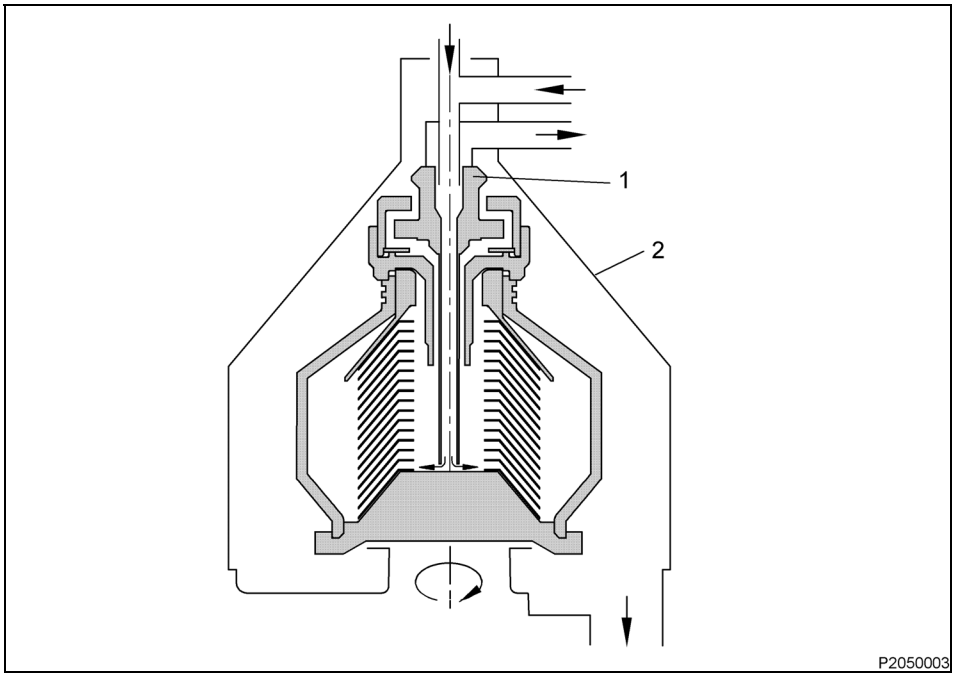

Fig. 57

Pos.	Designation	Function
1	Centripetal pump	• discharges the separated liquid under pressure. • is firmly connected to hood 2 of the separator.

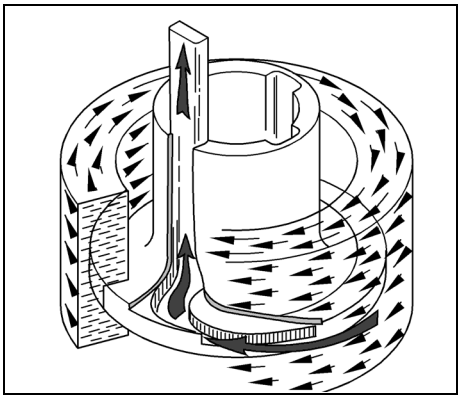

Fig. 58

- The disk provided with channels dips into the liquid rotating with the bowl.
- The liquid
  - is pared off by the centripetal pump and
  - flows through its spiral channels from the outside to the inside.

  By this means the kinetic energy is converted into pressure energy which makes possible discharging the liquid under pressure.

2.8.3 Drive

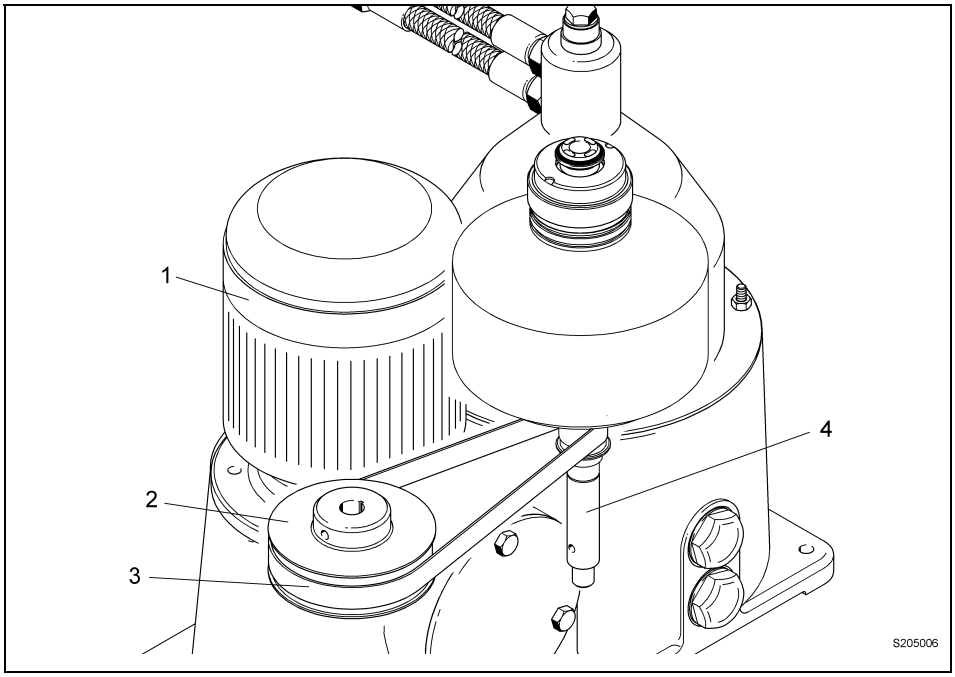

Fig. 59

Pos.	Designation	Function
1	Drive motor	drives the separator. Power transmission to the bowl spindle is via the belt pulley and via the drive belt.
2	Flat belt pulley	ensures power transmission between motor, drive belt and spindle.
3	Drive belt	transfers the drive power of the drive motor 1 to the bowl spindle 4. Regularly check the seat and condition of the drive belt. The inspection and replacement intervals are given in the maintenance schedule (see 4.3.1).
4	Bowl spindle	supports the bowl.

2.9 The regulating ring

Function of the regulating ring

Perfect separation of a liquid mixture is only possible when the bowl has been correctly adapted to the density difference between the light liquid (e.g. oil) and the heavy liquid (e.g. water).

To achieve this, select and fit the regulating ring from the set furnished (with different inner diameters) whose inner diameter corresponds to the difference in density between the two liquid components.

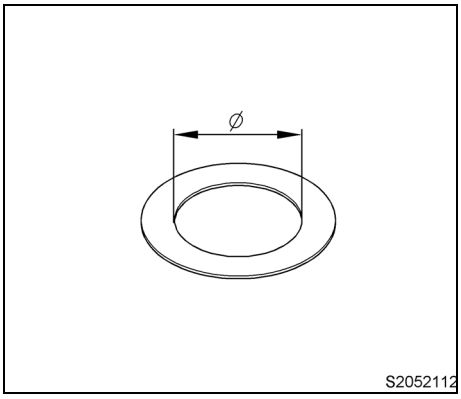

Fig. 60

Selecting the regulating ring

OTC …-02-…

Density of the light liquid, at 20 °C (68 °F) kg/dm³	Inner diameter of the regulating ring mm
0.80 to 0.84	36
0.84 to 0.90	41
0.90 to 0.93	44
Density difference of the liquids	
Min. density difference	0.07 kg/dm³
Max. density difference	0.20 kg/dm³
The max. density of the light liquid is 0.93 kg/dm³ with a density of the heavy liquid of 1.0 kg/dm³.	

If light liquid discharges through the heavy liquid discharge, the next largest regulating ring must be fitted.

OTC …-03-…

Density of the light liquid, at 20 °C (68 °F) kg/dm³	Inner diameter of the regulating ring mm
0.84 to 0.88	44
0.88 to 0.95	41
Density difference of the liquids	
Min. density difference	0.07 kg/dm³
Max. density difference	0.20 kg/dm³
The max. density of the light liquid is 0.95 kg/dm³ with a density of the heavy liquid of 1.0 kg/dm³.	

If heavy liquid discharges through the light liquid discharge, the next largest regulating ring must be fitted.

2.10 Technical data

Subject to modification!

The process data are in the sales documents.

Bowl	
Solids holding space	1.2 l
Total capacity	2.2 l
Speed – for densities of the product up to 1.05 kg/dm^3 (at 15 °C) and – for densities of the separated solids up to 2.0 kg/dm^3	10 000 min^{-1} (see nameplate)
Speed for higher densities	contact the factory
Starting time	20 - 25 secs
Run-down time (after switching off the motor)	10 min

Centripetal pump	
Output (depending on medium)	up to max. 1 740 l/h
Pressure head (depending on output)	up to max. 0.5 bar

Water seal (OTC …-02-… - purifier operation)	
Quantity	2 l
Standard water specifications	
Suspended matter	max. 10 mg/l
Particle size	max. 50 µm
Hardness: – up to 55 °C separating temperature – above 55 °C separating temperature	 < 12° dH < 6° dH
To convert the hardness values stated, use the following equation: 1° dH = 1.79° fH = 1.25° eH = 17.9 ppm $CaCO_3$	
Chlorine ions	< 100 mg/l
pH	6.5 – 7.5

Line connections	**OTC ...-02-...**	**OTC ...-03-...**
Product feed	G 1/2 in	G 1/2 in
Heavy liquid discharge	G 3/4 in	G 1/2 in
Light liquid discharge	G 1/2 in	G 3/4 in

Motor		
Power rating	50 Hz	1.1 kW
	60 Hz	1.3 kW
Speed	50 Hz	3 000 RPM
	60 Hz	3 600 RPM
Design		IM V1
Enclosure		IP 55

Drive	50/60 Hz
Oil filling	approx. 1.3 l
	Oil quality, see section 4.3.3

Max. separating temperature	100 °C / 212 °F

Weights	
Separator (with motor and bowl)	68 kg

Capacity (see sales documents)

The capacity of the separator depends on the
- viscosity,
- temperature,
- density,
- degree of contamination,
- water content and
- the desired degree of purity of the product.

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3 Operation

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3.5 Shutting down the separator 54
3.6 Trouble shooting 55
3.6.1 Trouble shooting 55

3.1 Technical information

Take note of the following sections:

3.1.1 Separation

The best separation efficiency is attained with a low viscosity of the product to be separated.

In the case of deviating products

- see sales documents or
- consult the factory.

Water seal (only for OTC …-02…)

- The water seal which prevents light phase from discharging through the water discharge must be maintained during separation. See section 3.2.

3.1.2 General information on cleaning the bowl

When must the bowl be cleaned?

The intervals at which the bowl must be cleaned depend on the solids content and nature of the product.

The time between the cleaning cycles (separating time) can be determined by experiment as follows:

Before beginning the test, the solids holding space of the bowl must be free from solids.

- Separator:
  - adjust to the desired throughput capacity and
  - feed a certain product volume for a certain time (3 or 5 hours – depending on the degree of contamination of the product).
- Shut down the separator (see section 3.5).
- Remove the bowl shell (see section 4.4).
- The intervals at which cleaning must take place can be determined by the volume of solids accumulated in the solids holding space. It must be taken into consideration that cleaning must take place before the solids holding space is filled to the brim as otherwise the separation efficiency will deteriorate.
- When product with a different solids content is to be separated, it is recommended to repeat the test after cleaning the bowl.
- Unusually long separating times are only possible when the solids content in the product is low.

3.1.3 Mathematical determination of the separating time

The determination of the separating time between the cleaning intervals is only possible when the solids content in the product fed to the separator remains constant.

Example for mathematical calculation of the separating time:

Given:	Trial separating time	t_V	=	2	hrs.
	Solids volume during the trial separating time	V_F	=	0.1	l
	Solids holding space volume	V	=	1.2	l
Wanted:	Max. separating time	t_{max}	=	**?**	hrs.

The maximum separating time is calculated as follows:

$$t_{max} = \frac{t_V \times V}{V_F}$$

$$= \frac{2 \times 1.2}{0.1}$$

$$= 24 \text{ hours}$$

Note:
In order to assure a uniform product quality, in this example a cleaning interval of **20 hours** must be observed.

3.2 Before start-up

Note:
- Safety precautions in chapter 1.
- Feed only product that conforms to the specifications on the nameplate.
- Process-related deviations are possible (refer to project-specific data!).

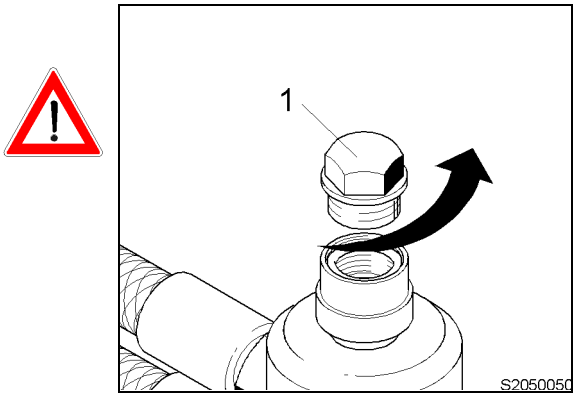


Fig. 61

Water seal (only for OTC ...-02-... – purifier operating mode)

The bowl must be filled with water (min. 2 litres). To do this:
- Unscrew screw plug 1 **(right-hand thread)**.
- Fill in min. 2 litres of water using the measuring cup.
- Screw the screw plug 1 back in.

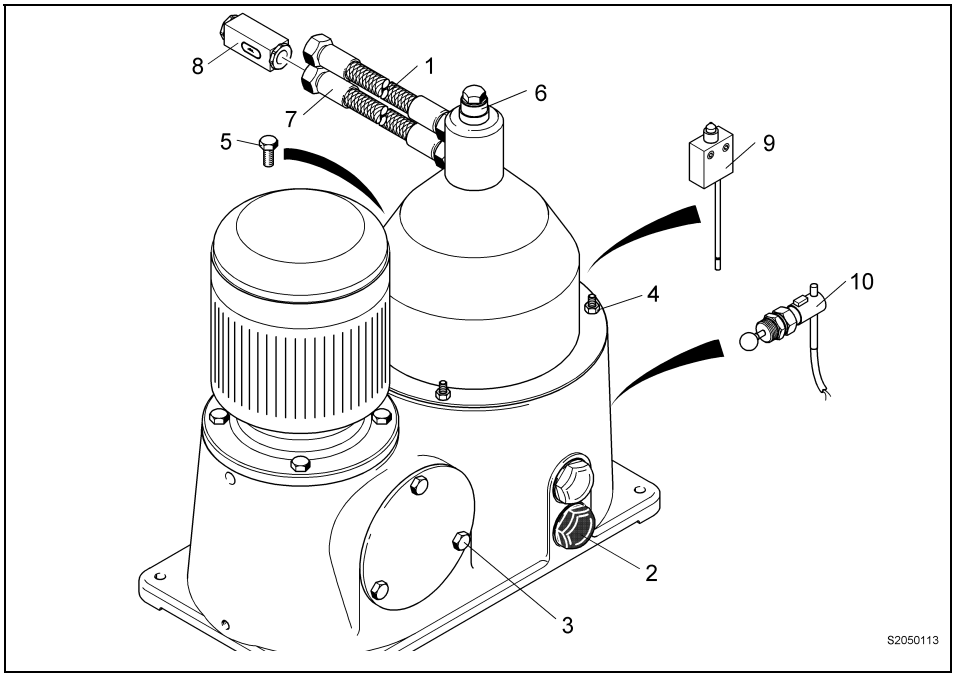


Fig. 62

Check that
- the machine is correctly assembled.
- the hoses and hose pipes 1 are undamaged and connected (see section **4.3.2**).
- the drive chamber 2 is filled with oil in accordance with section **4.3.3**.
- the hex head screws 3 on the cover on the lower section of frame are tight.

- the two hexagon nuts 4 and the hex head screw 5 of the hood are tight.
- the handle connection piece 6 is tightly bolted to the centripetal pump.
- the feed and discharge lines 7 are connected.
- the optional flow meter 8 is correctly connected.
- the hood limit switch 9 is connected and functional.
- the float switch 10 is connected and functional.

3.3 Starting the separator

- See section 3.2.
- Switch on motor.

Attention!
The motor must rotate in counterclockwise direction (observe through the motor housing). See also section 4.2.4.

- Open the discharge lines.
- Slowly open the product feed.

3.4 Monitoring of operation

- On your daily round, especially during the first 1500 operating hours, pay attention to the following:
  - Oil level
  - Temperatures
  - Pressures
  - Leakage
  - Vibrations
  - Current consumption
  - Starting time
  - Hoses and hose pipes
- *Keep to the maintenance schedule* (see 4.3.1)!
- Inspection
  We recommend having the separator checked regularly by our specialists. These checks help to
  - maintain the operating safety of the machine and
  - avoid unplanned downtime.

3.5 Shutting down the separator

- Close feed and discharge lines.
- Switch off the motor.

Danger to life through high-speed rotating separator parts!
- Do not loosen any part of the separator before the bowl has come to a standstill.
  The run-down time of the bowl is **10 minutes** after switching off the motor.
  Bowl standstill is indicated by standstill of the motor.

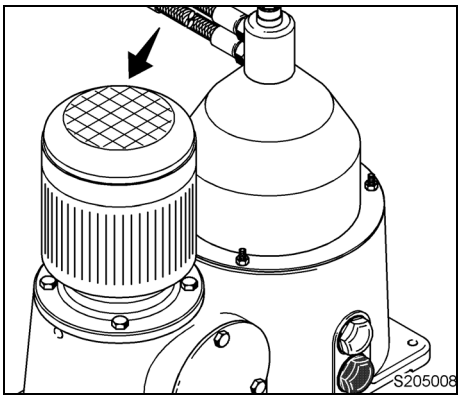


Fig. 63

Check motor standstill
- Shine a torch through the motor housing.
- Check that the fan wheel is no longer moving.

In the case of torn or defective drive belts or if the belts have come off:
- Do not loosen any part of the separator before the bowl has come to a standstill.
- **Be sure to observe** the run-down time of **10 minutes** until dismantling the separator!

- **Danger of injury through very hot separator parts!**
  When carrying out maintenance work, there is a danger of injury through hot separator parts (separating temperatures of 70 to 100 °C (158 – 212 °F).)

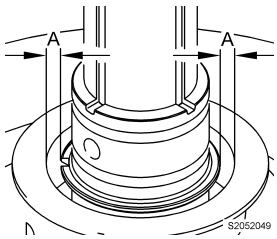
3.6 Trouble shooting

The following tables are an aid for locating and eliminating faults.

If assembly operations have to be carried out refer to the section "Maintenance and Repair".

3.6.1 Trouble shooting

Fault	Possible causes	Remedial action
The bowl does not come up to rated speed or takes too long to do so.	Product has dripped down the spindle onto the drive belt.	Clean drive belts, belt contact surfaces of the spindle and flat belt pulley. Replace drive belt when necessary.
	Motor is incorrectly connected.	Check connection.
	Drive belt has stretched and is slipping on the bowl spindle.	Replace drive belt.
	Drive belt has not been fitted correctly.	Check position of drive belt on flat belt pulley and spindle.
	Solids have collected in the hood and are braking the bowl.	Clean the separator.
The bowl speed drops during operation.	The motor speed drops during operation.	Check motor and line voltage.
Uneven run of the centrifuge.	Bowl is out of balance for the following reasons:	**For pos. 1 - 3:** • Shut down separator. • Close feed and discharge lines.
	1. The separated solids have deposited unevenly in the bowl.	Clean bowl.
	2. Bowl is not correctly assembled.	Assemble bowl properly.
	3. Bowl parts are damaged.	Send separator to factory for repair or order and replace new bowl parts.  **Do not carry out your own repairs to bowl parts!** **Do not weld or solder** as this would weaken the bowl **(danger to life)!**
	Ball bearings are worn.	Replace damaged bearings. **ATTENTION!** Use only the ball bearings specified in the parts list.

Fault	Possible causes	Remedial action
OTC …-02-…: The quality of the heavy liquid has deteriorated. **IMPORTANT:** Light liquid flows through the heavy liquid discharge. **OTC …-03-…:** The quality of the light liquid has deteriorated. **IMPORTANT:** Heavy liquid flows through the light liquid discharge.	**Water seal (only OTC …-02-… - purifier operation)**	
	The water seal is inadequate.	See section 3.2.
	Regulating ring	
	The regulating ring was not correctly selected.	See section 2.9.
	Gaskets – bowl and centripetal pump	
	Gaskets are damaged.	• Replace gaskets. Use set of spare parts “bowl/hood” (see section *Parts list*, page 171).
	Spindle	
	Incorrect positioning of the spindle	• Check centric position of the spindle.  Dimension A ≈ dimension A A tolerance of 0.5 mm is admissible. **If the A dimensions are unequal:** • Undo three hex head screws of the bearing cover. • Proceed as described in section 4.5.4, Fig. 212 to Fig. 216.

4 Installation - Maintenance - Repair

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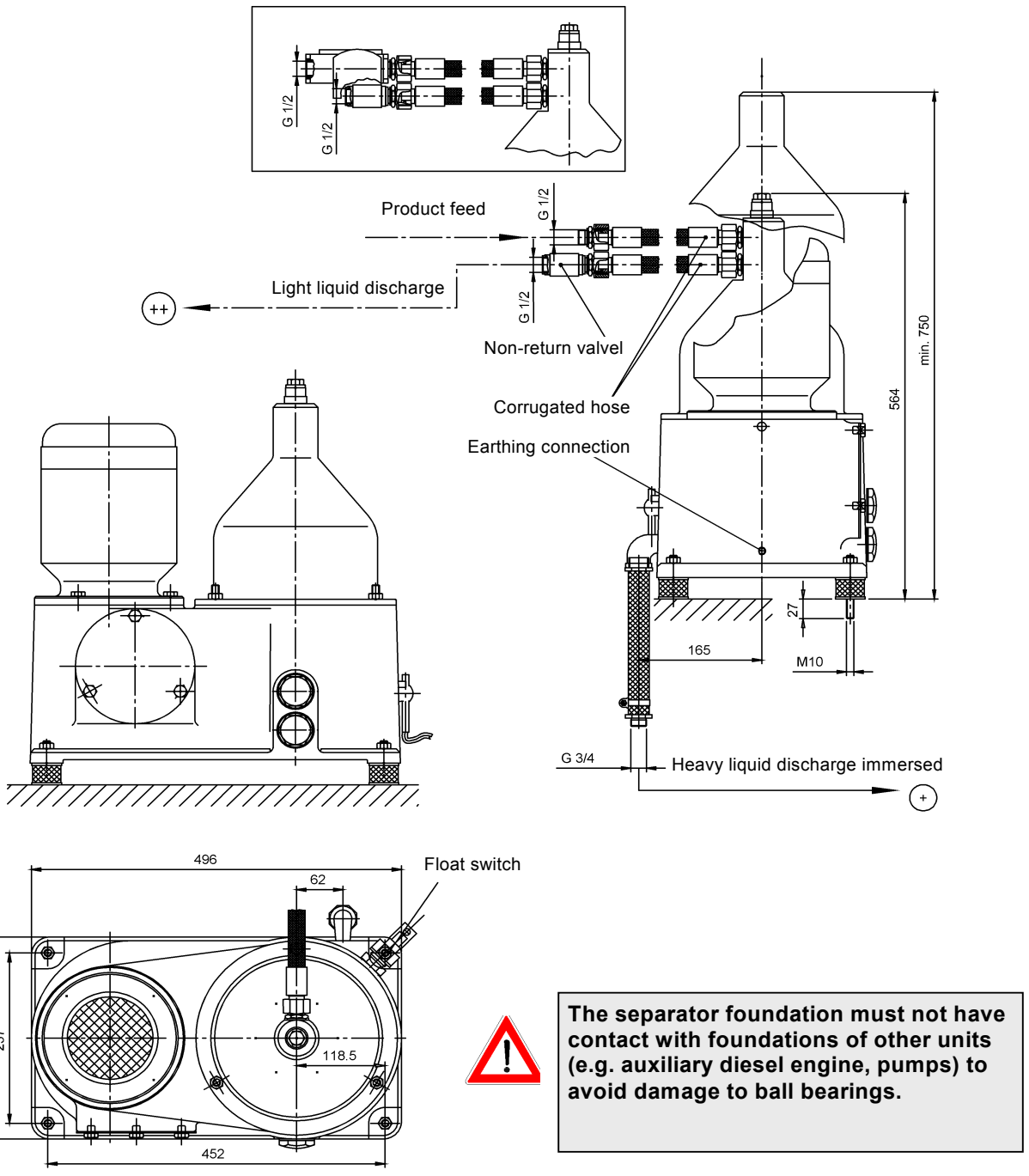
4.1 Installation of the separator OTC 3-02-137

- **See installation guidelines for further information.**

Flowmeter – OPTION



The separator foundation must not have contact with foundations of other units (e.g. auxiliary diesel engine, pumps) to avoid damage to ball bearings.

(+) Discharge by the centripetal pump built into the separator

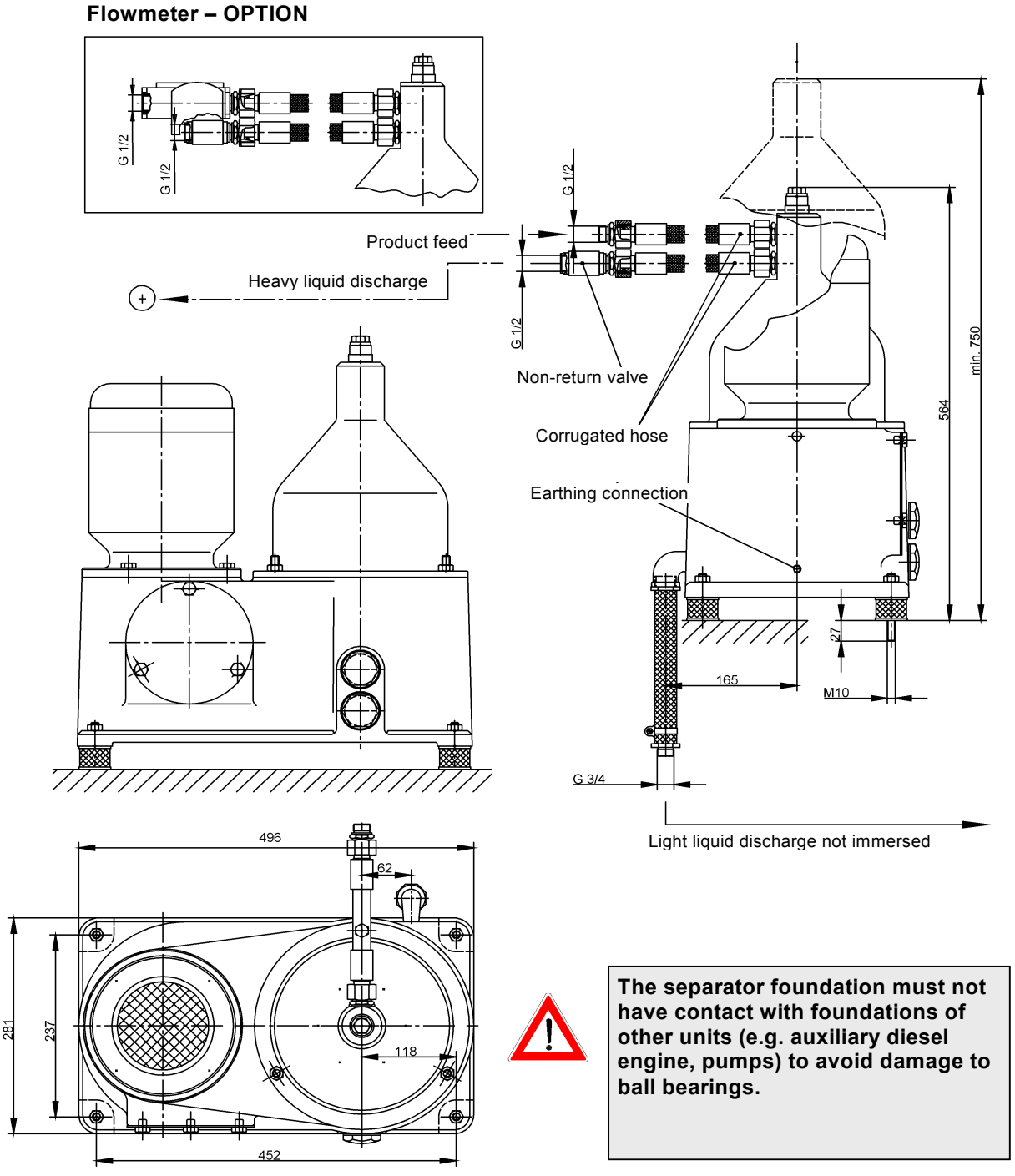
(++) Do **not** discharge residuals into public waters!

2050-4100-000

Fig. 64 **Subject to modification!**

4.2 Installation of the separator OTC 3-03-107

- **See installation guidelines for further information.**



The separator foundation must not have contact with foundations of other units (e.g. auxiliary diesel engine, pumps) to avoid damage to ball bearings.

⊕ Discharge by the centripetal pump built into the separator.
Do **not** discharge residuals into public waters!

2050-4100-010

Fig. 65 **Subject to modification!**

4.2.1 Transporting the separator

- **ATTENTION!**
  Prevent accidents by using suitably rated hoists for transport and installation.
- For special tools, see section *Parts list*.

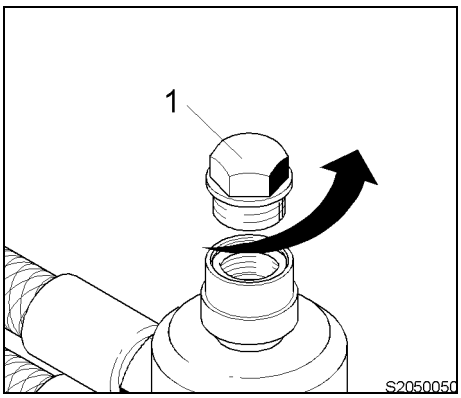


Fig. 66

- Unscrew screw plug 1 with fitted gasket **(right-hand thread)**.

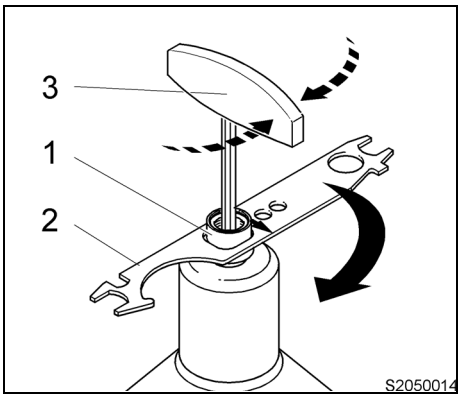


Fig. 67

- Undo handle connection piece 1
  – by turning hook wrench 2 **clockwise** and
  – holding T-hexagon wrench 3.

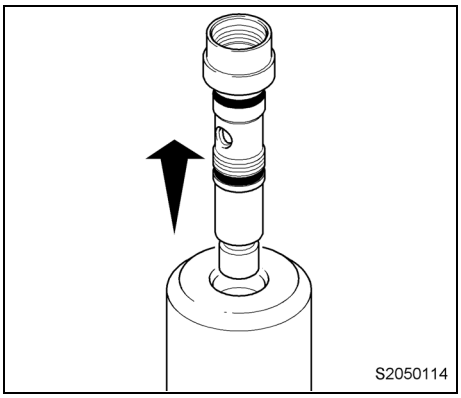


Fig. 68

- Remove handle connection piece.

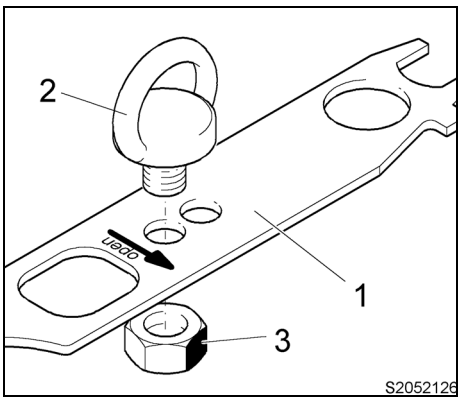


Fig. 69

- Provide hook wrench 1 – as illustrated – with eye bolt 2 and hexagon nut 3 and
- bolt **tight**.

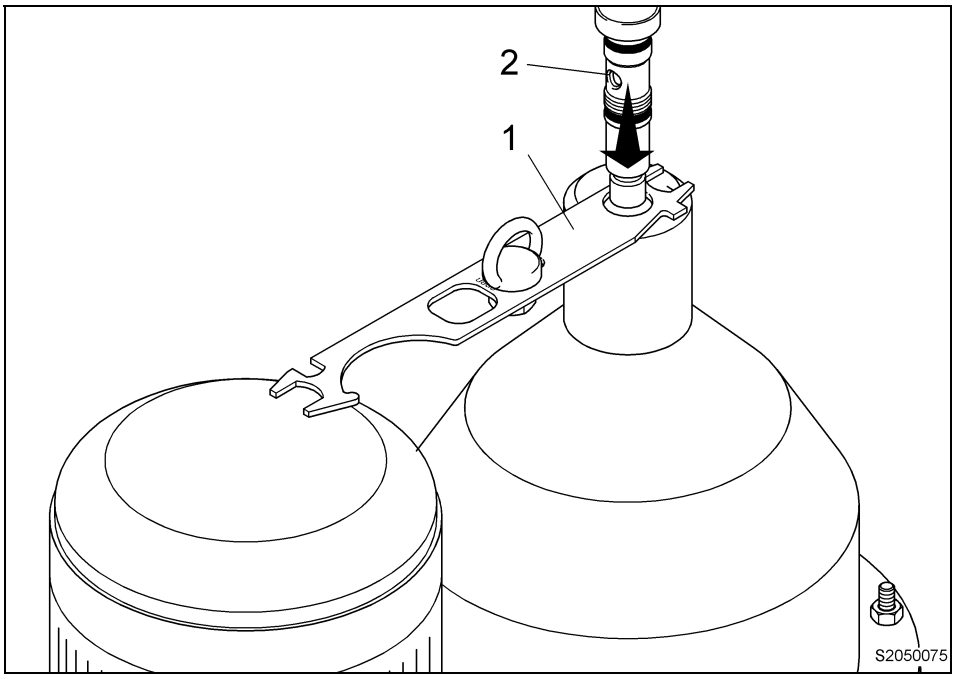


Fig. 70

- Place mounted hook wrench 1 – as shown – on the hood and
- Fit handle connection piece 2 in the hood.

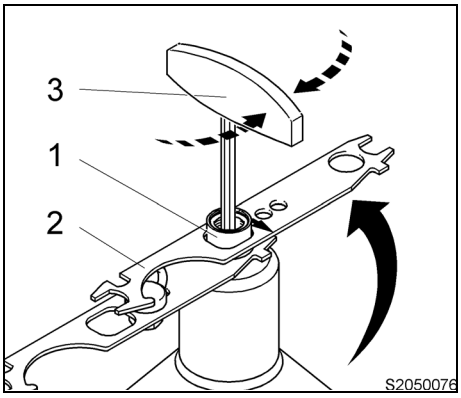


Fig. 71

- Tighten handle connection piece 1
  – by turning hook wrench 2 **counterclockwise** and
  – holding T-hexagon wrench 3.

Then:

- Remove T-hex head wrench 3 and remove hook wrench 2.

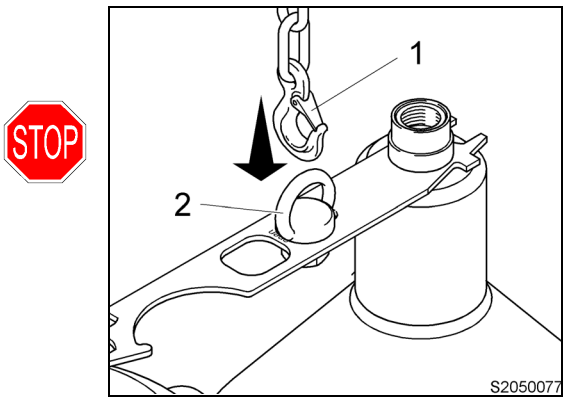


Fig. 72

- Hang load hook 1 of the hoist in eye bolt 2.
- **Do not use the eye bolt of the motor to suspend the separator.**
- Make sure the machine touches down gently.

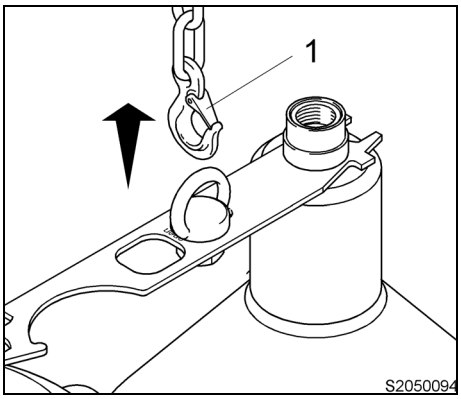


Fig. 73

After transporting the separator:

- Remove the hoist 1.

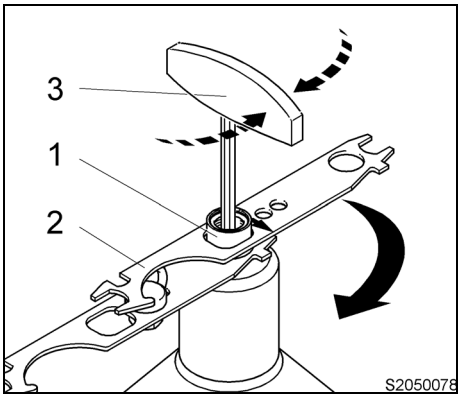


Fig. 74

- Undo handle connection piece 1
  – by turning hook wrench 2 **clockwise** and
  – holding T-hexagon wrench 3.

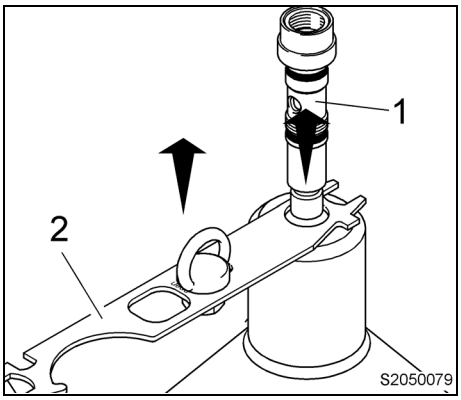


Fig. 75

- Remove handle connection piece 1,
- and remove hook wrench 2.

Note:
Remove the eye bolt and hexagon nut from hook wrench 2.

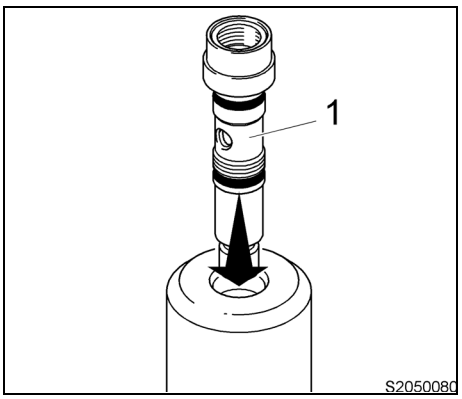


Fig. 76

- Fit handle connection piece 1 with fitted gaskets back into the hood.

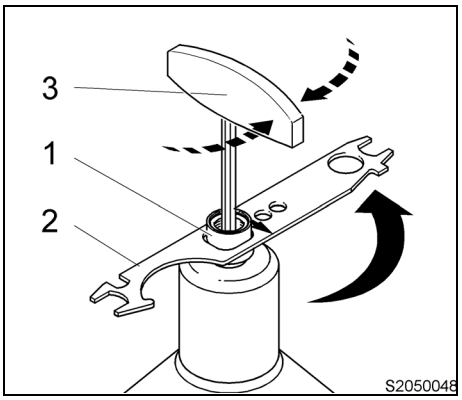


Fig. 77

- Tighten handle connection piece 1
  – by turning hook wrench 2 **counterclockwise** and
  – holding T-hexagon wrench 3.

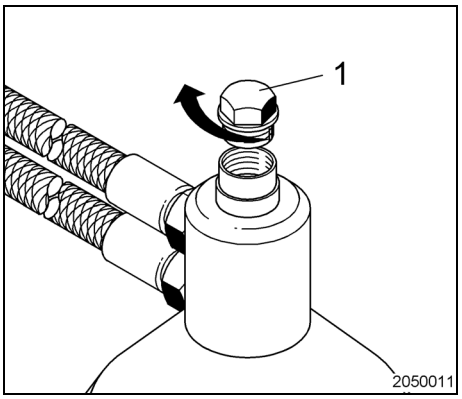


Fig. 78

- Screw in plug 1 with gasket.

4.2.2 Installing the separator

Before installing the separator make sure that

- sufficient space is available for operating and dismantling the machine.
- the foundation is not connected to foundations of other vibrating units to avoid the transfer of vibrations.

To avoid accidents, fit the guard (protection against contact with rotating drive parts) beneath the separator in accordance with the installation proposal!

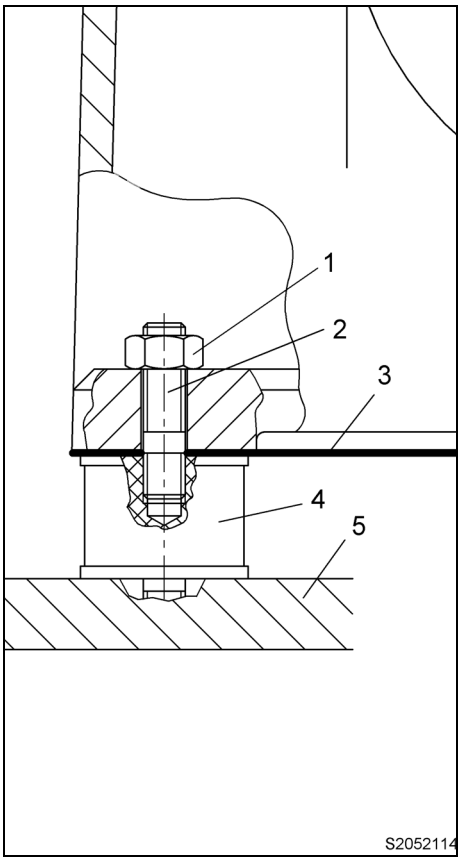


Fig. 79 Installation proposal

- Screw rubber-metal cushions 4 into foundation 5.
- Screw studs 2 into rubber-metal cushions 4.
- Place plate 3 over the studs.
- Place the separator on plate 3 and
- bolt **tight** with hexagon nuts 1.

4.2.3 Motor

The separator is driven by a three-phase AC motor.

Standard motor			
Rating	**Voltage**	**Frequency**	**Motor connection**
1.0 kW	220 V	60 Hz	delta
1.1 kW	220 - 240 V	50 Hz	delta
	380 - 420 V	50 Hz	star
1.3 kW	440 - 480 V	60 Hz	star
	460 V	60 Hz	star

Special motor			
Rating	**Voltage**	**Frequency**	**Motor connection**
1.1 kW	380 - 420 V	50 Hz	delta
	660 - 690 V	50 Hz	star
1.3 kW	440 - 480 V	60 Hz	delta

Protection to be provided by the customer
The motor must be protected by the customer by the measures specified in the electrical documentation.

Shipboard operation

- When operating the machine on board of ship, pay attention to the installation guidelines issued by the respective classification societies.
- When using ship wiring cables, cable entry must be by means of marine-type glands.

4.2.4 Direction of rotation of the bowl and motor

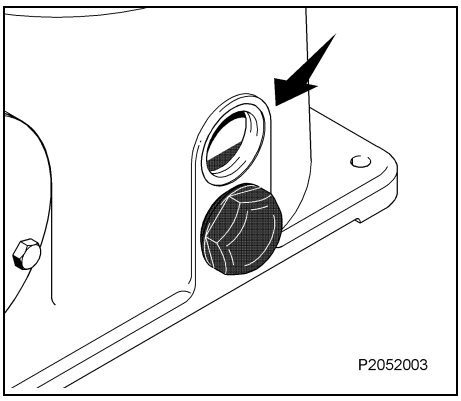


Fig. 80

- Fill the drive chamber with oil as described in 4.3.3.
- Switch on motor.

The bowl must rotate in clockwise direction when looked at from above.

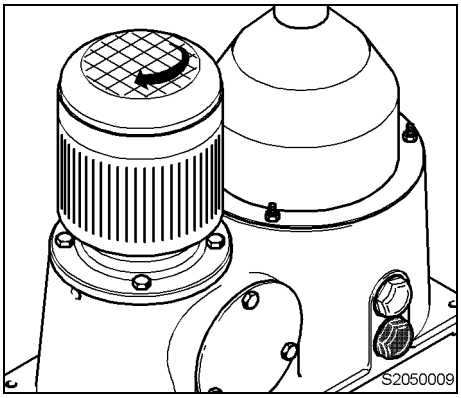


Fig. 81

The direction of rotation of the bowl is correct when the motor rotates clockwise (check through the motor housing).

When the direction of rotation is incorrect the motor connections must be reversed by an authorised specialist.

Check the direction of rotation of the motor whenever starting the separator:

- on mobile or not permanently installed separator installations which are connected to different electric power supplies and
- when using extension cables.

4.2.5 Speed and starting time of the bowl

Speed – for densities of the product up to max. 1.05 kg/dm^3 and – for densities of the separated solids up to max. 2.0 kg/dm^3	see nameplate
Starting time	20 - 25 secs

The bowl speed has been rated so as to ensure the operating safety of the separator.

If the densities exceed those stated above, check with the factory.

Danger to life as a result of an incorrect frequency!

- Check the separator and control for frequency consistency.

4.3 Maintenance and lubrication

- Special care must be taken when performing maintenance and lubrication operations. Conscientiously performed maintenance and lubrication operations improve the service life of the separator.
- In the case of accessories (motor, product pump, preheater, solenoid valve block etc.) the manufacturer's maintenance and lubrication instructions must be observed.

4.3.1 Maintenance schedule

	Operations	Remark
Maintenance[1]	**To assure correct functioning and operating safety:** • pay attention to the following points during servicing: – Oil level – Temperatures – Pressures – Leakage – Vibrations – Current consumption – Starting time – Hose and hose pipes (see 4.3.2). • Before assembling, grease the guide and contact surfaces of the main bowl components.[2]	

Legend:
(1) = The specified maintenance intervals are recommendations which apply only for normal conditions. Negative operating conditions (e.g. low-grade fuel, excessively high temperature, strong vibrations, frequent starting and stopping of the separator etc.) can necessitate shorter maintenance intervals.
(2) = see section 4.3.4 - Lubrication schedule

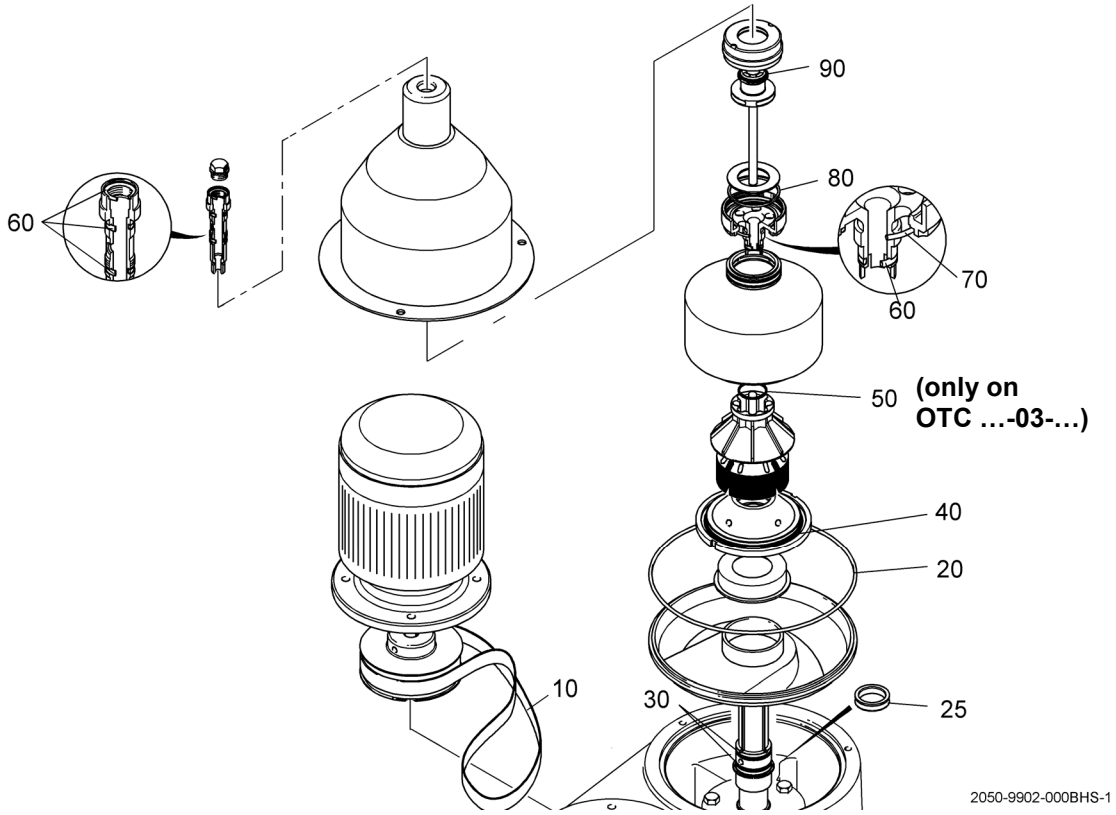


Fig. 82 *Set of spare parts "bowl/hood“ (operation: 1 year or 8,000 hours)*

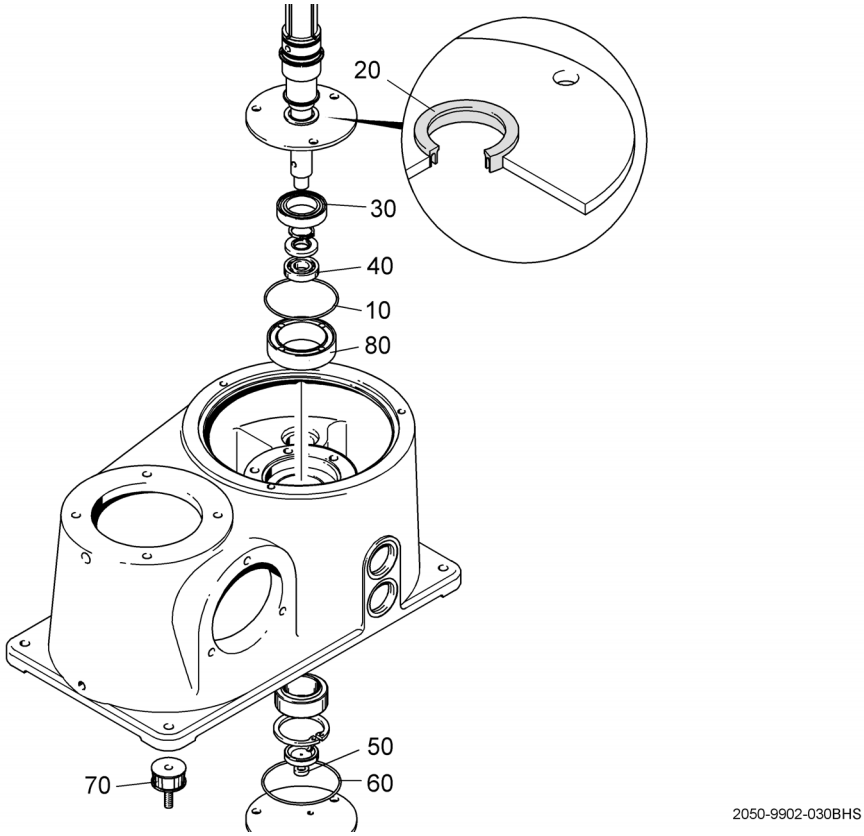


Fig. 83 *Set of spare parts "drive" (operation: 2 years or 16,000 hours).*

Maintenance[1] after operating hours	Maintenance[1] at the latest after	Operations	Remark
when required-product-dependent		Clean bowl parts.	• See section **4.5.1**, **4.4**, **4.4.2**. • Check the bowl and centripetal pump parts for corrosion and erosion.
4 000 12 000 20 000 28 000 36 000 44 000	6 months 1 1/2 years 2 1/2 years 3 1/2 years 4 1/2 years 5 1/2 years	Replace gaskets.	• Use set of spare parts "bowl/hood“ (operation: 1 year or 8000 hours). See Fig. 82 or section *Parts list*
		Re-lubricate motor bearings (if required)	• See instructions of motor manufacturer
		Check the hoses and hose pipes and replace when necessary.	
8 000 24 000 40 000	1 year 3 years 5 years	Replace gaskets.	• Use set of spare parts "bowl/hood“ (operation: 1 year or 8000 hours). See **Fig. 82** or section Parts list.
		Replace drive belt 10.	
		Check grooved ball bearings 30 and 40 and replace when necessary.	• Use set of spare parts "drive" (operation: 2 years or 16,000 hours). See **Fig. 83** or section Parts list.
		Re-lubricate motor bearings (if required)	• See instructions of motor manufacturer
		Oil change and thorough cleaning of the drive chamber	When using mineral oil [3]
		Check the hoses and hose pipes and replace when necessary.	
16 000 32 000 48 000	2 years 4 years 6 years	Replace gaskets.	• Use set of spare parts "bowl/hood“ (operation: 1 year or 8000 hours). See **Fig. 82** or section *Parts list*
		Replace drive belt 10.	
		Replace gaskets 10, 50, 60.	• Use set of spare parts "drive" (operation: 2 years or 16 000 hours). See **Fig. 83** or section *Parts list.*
		Replace radial packing ring 20.	
		Replace grooved ball bearings 30 and 40.	
		Replace rubber-metal cushions 70.	
		Replace rubber-metal cushion 80.	
		Re-lubricate motor bearings (if required)	• See instructions of motor manufacturer
		Oil change and thorough cleaning of the drive chamber	When using mineral oil [3]
			When using synthetic oil [3]
		Check the hoses and hose pipes and replace when necessary.	
48 000	6 years	**We recommend having the machines checked by a WS service engineer.**	

Legend:
(1) = The specified maintenance intervals are recommendations which apply only for normal conditions.
Negative operating conditions (e.g. low-grade fuel, excessively high temperature, strong vibrations, frequent starting and stopping of the separator etc.) can necessitate shorter maintenance intervals.
(2) = See section 4.3.4 - Lubrication schedule.
(3) = See section 4.3.3 - Oil quality and oil change.

4.3.2 Hoses and hose pipes

Replace hose pipes when an inspection reveals one or more of the following defects:

- Damage of the outer layer down to the fabric (e. g. chafe marks, cuts or cracks).
- Leaky spots.
- Damage to or deformation of the hose fittings.
  (Slight surface damage is not a reason for replacement.)
- The hose becomes dislodged from the fitting.
- Corrosion of the fitting diminishing function and strength.

4.3.3 Lubrication

The spindle bearings are splash-lubricated from a central oil bath.

MOTOR BEARINGS

For re-greasing the motor bearings, refer to the instructions of the motor manufacturer.

OIL QUALITY (mineral oil)

The mineral gear oil tested by Westfalia Separator with the designation "Separator lube oil CLP 100" meets the requirements and should preferably be used.

Designation according to DIN 51502	**CLP 100**
Designation as per ISO 3498	CC 100
Viscosity class	SAE 30
Viscosity (at 40 °C/104 °F)	100 ± 10 mm^2/s (cSt)
Part-No.	0015-0003-080 (2.5 litres)
Dispose of the oil as per instructions of the oil manufacturer.	

The viscosity class SAE 30 covers a larger viscosity range than specified here. However, only oils with the viscosity range specified here may be used.

Do not use mineral motor vehicle or engine oils.

OIL QUALITY (synthetic oil)

Use the synthetic lube oil tested by Westfalia Separator!

Designation according to ISO	Mobil SHC 626
Viscosity class (ISO)	VG 68
Viscosity - at 40 °C (104 °F)	65 mm^2/s
- at 100 °C (212 °F)	10.4 mm^2/s
Viscosity index (VI)	147
Density (at 15 °C/59 °F)	0.857 g/ml
based on	Polyalphaolefin
Part-No.	0015-0020-010 (1 litre)
Dispose of the oil as per instructions of the oil manufacturer.	

Do not use mineral motor vehicle or engine oils.

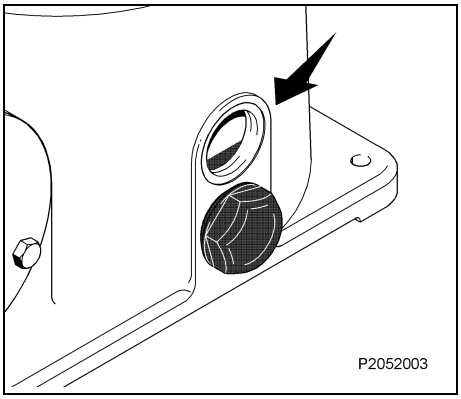


Fig. 84

FILLING OIL, OIL LEVEL

Before the first start-up of the separator:

- Fill the drive chamber with oil through the charge hole.

Filling capacity	approx. 1.3 l
Oil level - standstill	Lower edge of charge hole
Oil level - operation	Visible oil movement in the sight glass of the charge hole

OIL CHECK

- Check the oil level every week!
- From time to time undo the oil drain screw and check whether there is water in the oil bath. When the oil exhibits a milky colouring (emulsification), the oil must be changed immediately.

OIL CHANGE

- Change oil after about
  - 8000 operating hours or 1 year at the latest (mineral oil).
  - 16 000 operating hours or 2 years at the latest (synthetic oil).
- Clean the sight glass and screw it back on.

4.3.4 Lubrication Chart

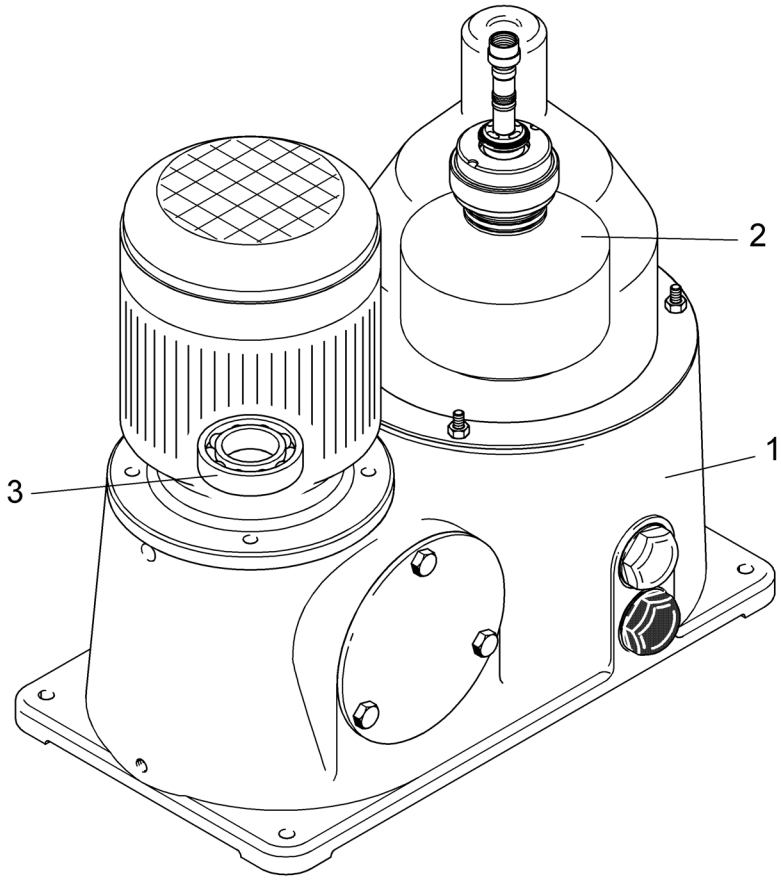


Fig. 85 Lubrication schedule

Lubricating point	Lubricant		Lubricating interval	Amount of lubricant	Lubrication point
	Designation	Designation			
1	Lube oil (mineral)	**CLP 100** DIN 51502	after 8 000 operating hours or after 1 year at the latest	1 300 cm^3	Drive chamber
		CC 100 ISO 3498			
	Lube oil (synthetic)	Mobil SHC 626 ISO VG 68	after 16 000 operating hours or after 2 years at the latest	1 300 cm^3	Drive chamber
2	Lubricating grease	see parts list	before assembly	apply sparingly	Gaskets, threads and sliding surfaces
3	according to instructions of motor manufacturer				Motor bearings

- Check oil level regularly through sight glass.
- Manual lubrication
- Refer to lubricating oil table in section 4.3.5!

4.3.5 Table of lubricating oils

Lubricating oil table for separators in onshore and shipboard operation

Separator		Lube oil			Lubricating oil sorts suggested by some firms		
Type	Oil filling	Symbol (Designation according to DIN 51502)	Viscosity: Kinematic viscosity at 40 °C (40.00 °C)	GENUINE PARTS ORIGINALTEILE from Westfalia Separator	Manufacturer	Designation	Viscosity at 40 °C (40.00 °C)
	l		mm²/s (cSt)				mm²/s (cSt)
BTC 3	1,3	CLP 100	90 to 110	0015-0003-080 (2.5 l)	Agip	BLASIA 100	100
CTC 1						RADULA 100	
CTC 3						DIESEL GAMMA 30	
MTC 3							
OTC 2					ARAL	ATLANTA MARINE 30	105
OTC 3						DISOLA M 3015	
WTC 2						MONTANOL HK 100	100
					bp	ENERGOL GR-XP 100	100
CSD 1	1,3					ENERGOL DL-MP 30	114
OSD 2							
SD 1							
					Castrol	HYSPIN AWS 100	100
						ALPHA ZN 100	
						MARINE HEAVY	99
					Chevron	GST OIL 100	100
						NL Gear Compound 100	
						Veritas Marine Oil R&O 30	108
						DELA 3000 Marine Oil 30	104
					elf	ATLANTA MARINE 30	105
						DISOLA M 3015	
						TURBINE T 100	95
					Esso	EXX-MAR XP	110
						NUTO H 100	100
						SPARTAN EP 100	
ESD 18	2,5				GULF	HARMONY 100	95
GSC 15						VERITAS 30	110
OSD 6							
OSD 18					INA	HIDRAOIL HD 70	95
WSD 18							
					Mobil	MOBILGARD 312	106
						GARDINIA OIL 30	104
GSC 25	3,7					ROTELLA MX SAE 30	105
OSD 20							
OSD 25							
OSD 30					STATOIL	HYDRA WAY HMA 100	100
OSD 35						LOAD WAY EP 100	
WSD 35							
					TEXACO	DORO AR SAE 30	119
						TARO XD SAE 30	105
OSD 50	5,0						
OSD 60							
SD 50							
WSD 60							

4.3.6 Comments on table of lubricating oils for separators from Westfalia Separator

Faultless functioning of separators very much depends on the proper type of lubricating oil used, since a high grade oil, selected to meet all service requirements, will minimize the wear, thus extending the service life and increasing the operating safety.

For the lubrication of our separators we recommend to use the oils specified by us since continuous quality checks are performed by Westfalia Separator. Oils proposed from some firms are not subjected to these tests.
Therefore, Westfalia Separator cannot give a performance guarantee for those oils.
Be sure to select only **high grade** solvent refined products.

The specified oil types meet the requirements according to DIN. Under unfavourable operating conditions, e.g. high temperatures, the quality of the oils may be insufficient so that more efficient oils, e.g. synthetic oils, must be used. If necessary, consult Westfalia Separator.

For the different separator types and oil types the viscosity ranges are specified in the table of lubricating oils.

The operating temperature of the separator exceeds normally 80 °C (176 °F). At those temperatures some oils age quickly, so that they have to be changed prematurely.

Be sure not to use lubricating oils with viscosities lower than those specified in the table. Due to the possibility of the oil film breaking down, oil of too low a viscosity will give insufficient lubrication, resulting in increased wear. However, oils with a slightly higher viscosity than specified may be used.

Bear in mind that the viscosity groups SAE 30, 40 and 50 (SAE = **S**ociety of **A**utomotive **E**ngineers) cover larger viscosity ranges and be sure to select lubricating oils with viscosities not lower than the minimum values of the viscosity ranges restricted for the different separator types.

4.4 Cleaning the solids holding space (bowl shell)

- The bowl must be cleaned:
  - after each standstill and
  - as soon as the solids holding space is filled with solids.

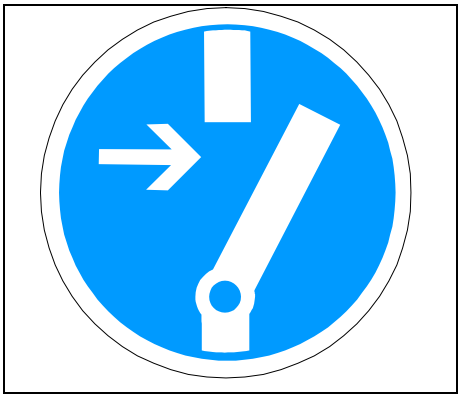


Fig. 86

- Switch off the main switch and lock it.

Danger to life through high-speed rotating separator parts!

- Do not loosen any part of the separator before the bowl has come to a standstill.
  The run-down time of the bowl is **10 minutes** after switching off the motor.

- **Danger of injury through very hot separator parts!**
  When carrying out maintenance work, there is a danger of injury through hot separator parts (separating temperatures of 70 to 100 °C (158 – 212 °F).)
- Use only a cleaning agent that is approved for the field of application!

- **Do not use acid or chloric cleaning agents.**
  Chlorine attacks stainless steel parts.
- Dissolve dried scale with citric acid.

- **For cleaning the individual disks and bowl parts**
  Do not use metal scrapers and metal brushes!
- This applies to all separator parts:
  - Treat them gently.
  - Always set them down on a rubber mat or a wooden pallet.
- Apply a **thin** coat of grease to the guide surfaces and threads of the bowl parts after drying (see 4.3.4 Lubrication schedule).
- For special tools, see section *Parts list*.

- **Reassemble the bowl immediately after cleaning in reverse order.**

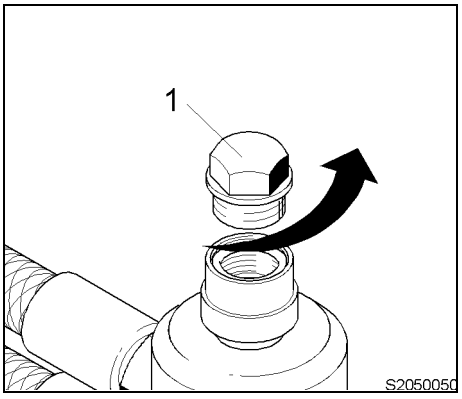


Fig. 87

- Unscrew screw plug 1 with fitted gasket **(right-hand thread)**.

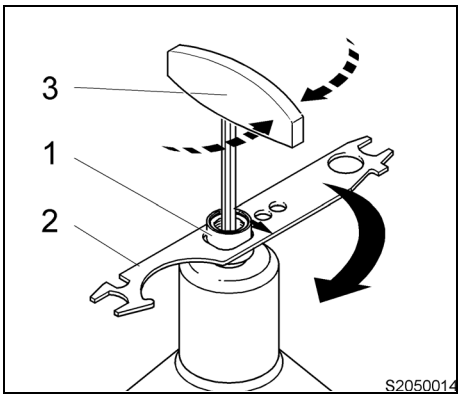


Fig. 88

- Undo handle connection piece 1
  – by turning hook wrench 2 **clock-wise** and
  – holding with wrench 3.

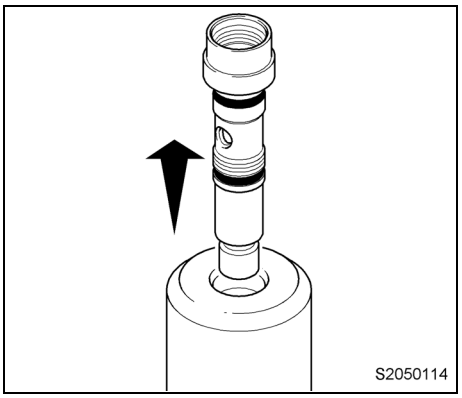


Fig. 89

- Remove handle connection piece 1.

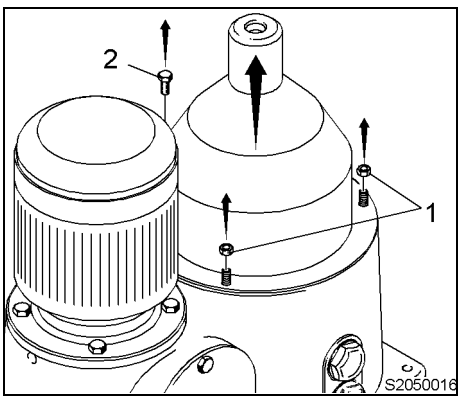


Fig. 90

- Unscrew two hexagon nuts 1 and the hex head screw 2.
- Lift off the hood.

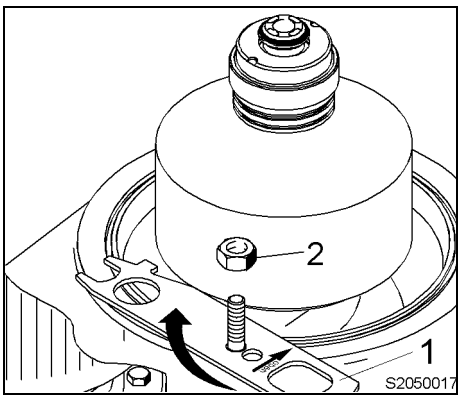


Fig. 91

- Fasten the bottom with hook wrench 1 and hexagon nut 2.
  To do this:
  – Slip hook wrench 1 over a stud of the lower section of frame and
  – let it register in a groove of the bottom.

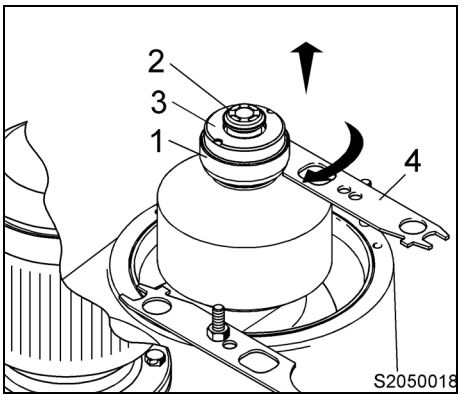


Fig. 92

- Loosen threaded ring 1 **(left-hand thread)** together with gaskets, regulating ring, fitted centripetal pump 2 and centripetal pump chamber cover 3 with hook wrench 4 and
- screw on by hand by one turn.

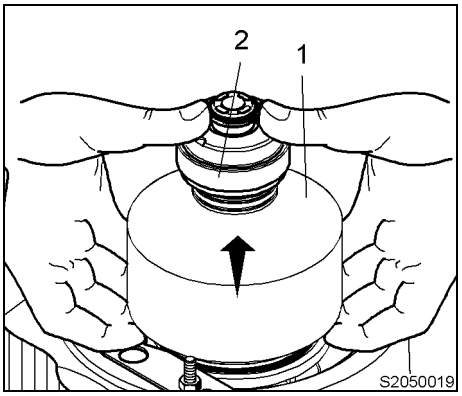


Fig. 93

- Press bowl shell 1 against threaded ring 2.
  The liquid content of the bowl will run into the discharge channel.

CAUTION!
Parts and liquid can be hot!

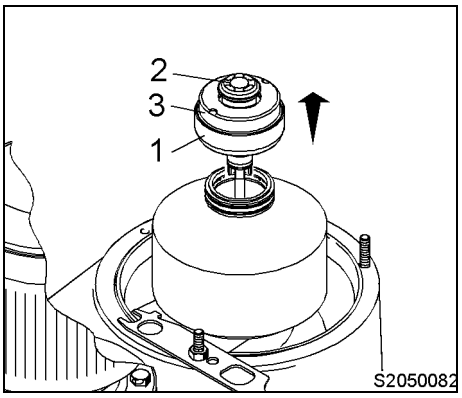


Fig. 94

- Unscrew threaded ring 1 together with gaskets, regulating ring, built-in centripetal pump 2 and centripetal pump chamber cover 3.

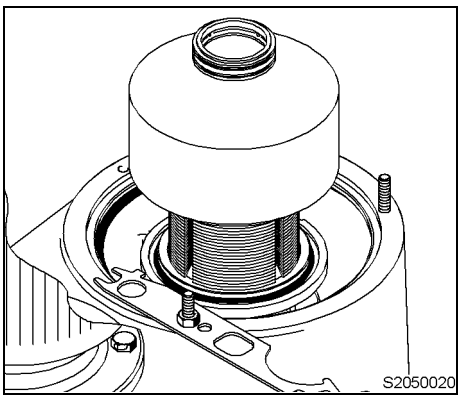


Fig. 95

- Lift off the bowl shell together with the bowl shell insert.

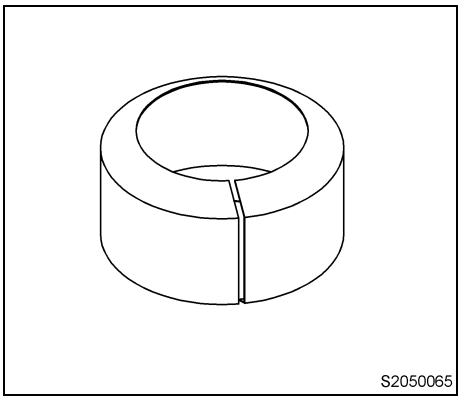


Fig. 96

- Dismantle the bowl insert as described in section 4.6.1.

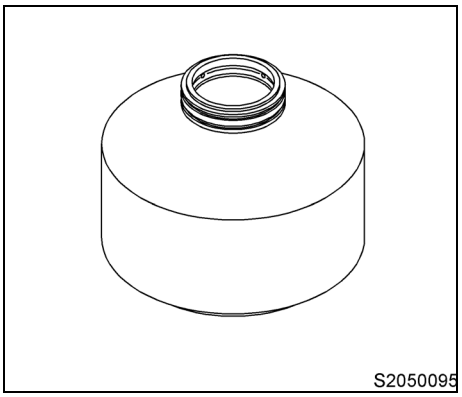


Fig. 97

- Carefully clean the bowl shell using a wooden, plastic or copper scraper.

4.4.1 Cleaning the disk stack

- **Pay special attention to section 4.4!**

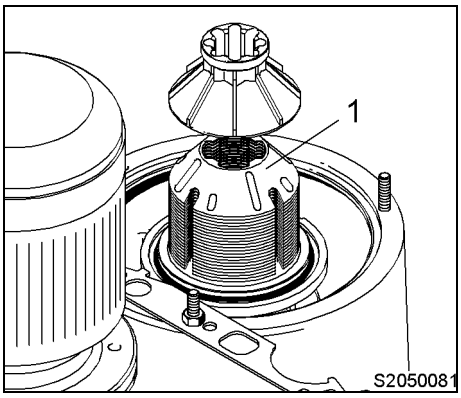


Fig. 98

In the case of sticking, heavy and glutinous soiling of the disk stack:

- Carefully clean disk stack 1.

Note:
In the case of loose soiling, the self-cleaning effect of the disk stack is triggered by starting the separator.

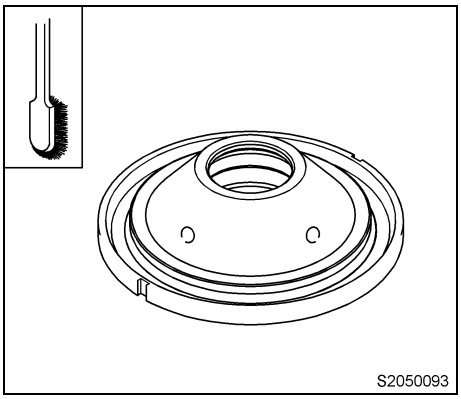


Fig. 99

- Clean the small holes at the bottom with **extra special care** to ensure trouble-free operation.
  To do this:
  – Dismantle the bottom (see Fig. 145 and Fig. 146).

4.4.2 Cleaning the spindle inlet holes

Clean the inlet holes of the spindle from time to time. For this reason:

- Dismantle and clean the separator as described in 4.4 and 4.4.1

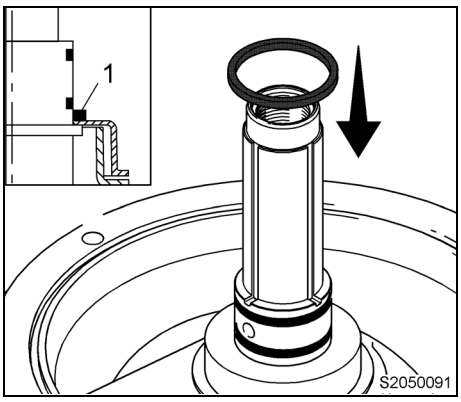


Fig. 100

- Position the gasket 1 on the spindle cap 2 and press on **firmly**
  so that no cleaning liquid can penetrate into the drive and ruin the lube oil.

- Thoroughly clean the inlet bores of the spindle with a suitable cleaning agent and brushes.

- **Do not use acid or chloric cleaning agents.**
  Chlorine attacks stainless steel parts.
- Dissolve dried scale with citric acid.

- **After cleaning, immediately remove gasket 1.**

4.4.3 Assembling the bowl after cleaning

- **Pay special attention to section 4.5.3.**

After cleaning the spindle inlet holes:

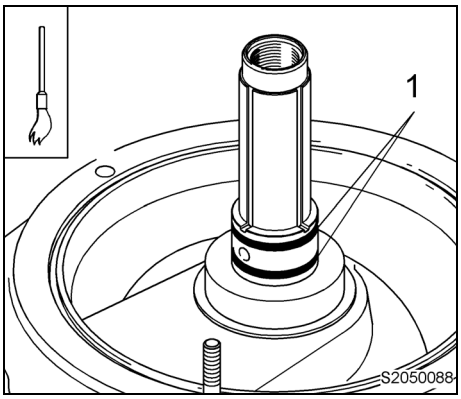


Fig. 101

- Insert two gaskets in the grooves of the spindle.
- Grease the gaskets and guide surfaces in accordance with the lubrication schedule.

After cleaning the disk stack and the bottom:

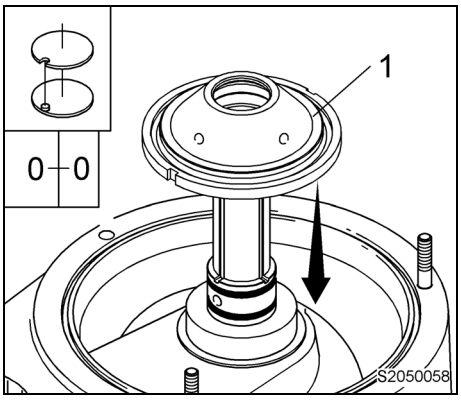


Fig. 102

- Place bottom 1 on the spindle.
- Pay attention to correct positioning!
- The “O” marks on the bottom and the spindle must be aligned.

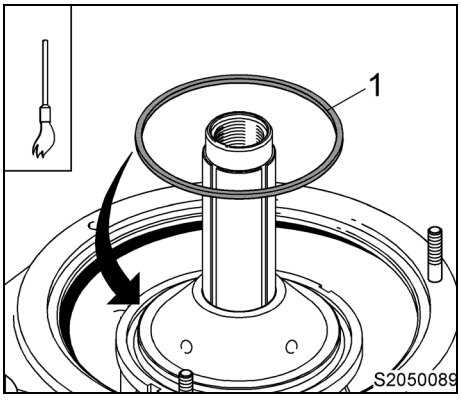


Fig. 103

- Insert gasket 1 in the groove of the bottom.
- Grease the gasket in accordance with the lubrication schedule.

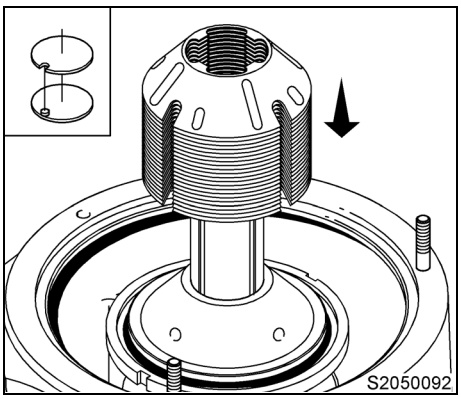


Fig. 104

- Place the disk stack on the spindle.
- Pay attention to correct positioning!

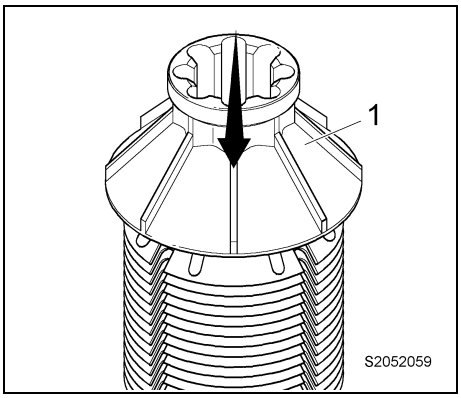


Fig. 105

OTC …-02… :

- Place separating disk 1 on the disk stack.

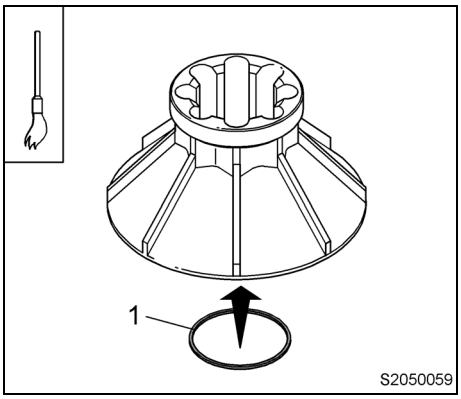


Fig. 106

OTC …-03-…:

- Insert gasket 1 in the groove of the separating disk.
- Grease gasket as per lubrication schedule.

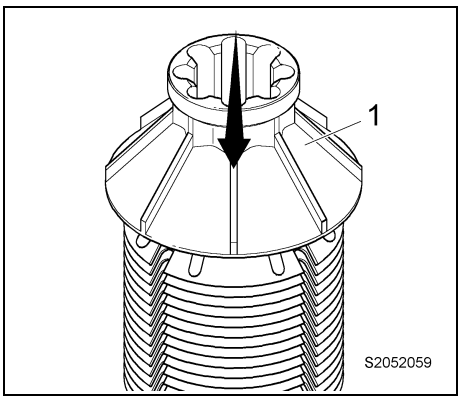


Fig. 107

OTC …-03-…:

- Place the separating disk 1 with inserted gasket on the disk stack.

After cleaning the sludge space (bowl shell)

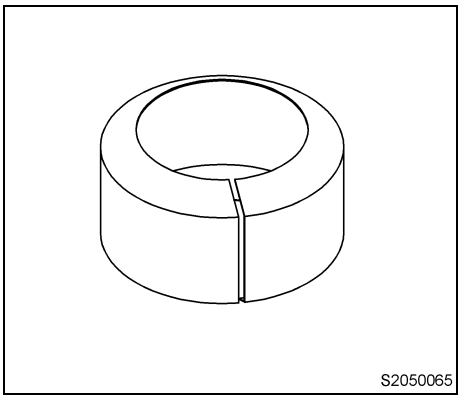


Fig. 108

- Fit the bowl insert as described in section 4.6.2.

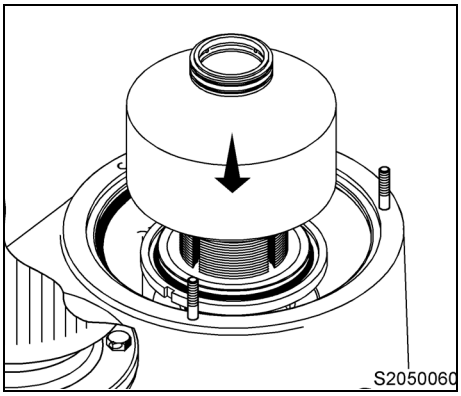


Fig. 109

- Fit the bowl shell together with the bowl shell insert.

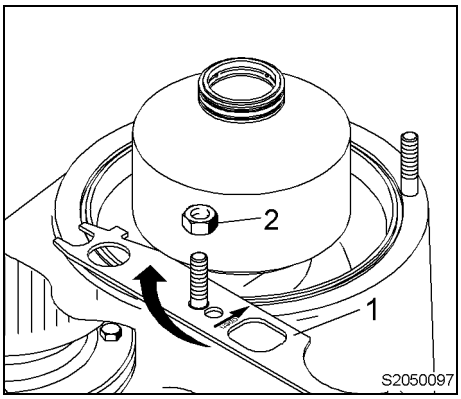


Fig. 110

- Fasten the bottom with hook wrench 1 and hexagon nut 2.
  To do this:
  – Slip hook wrench 1 over a stud of the lower section of frame and
  – let it register in a groove of the bottom.

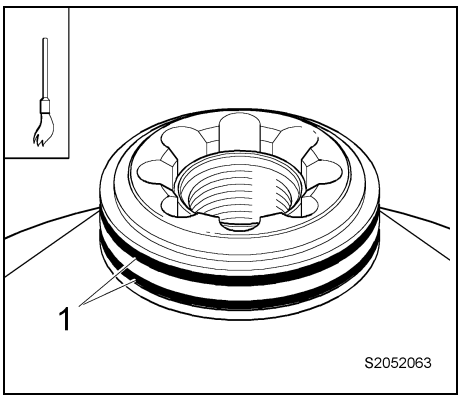


Fig. 111

OTC ...-02-... as clarifier or
OTC …-03-…

If necessary:

- Insert gaskets 1 in the grooves of the bowl shell.
- Grease gaskets and guide surfaces as per lubrication schedule.

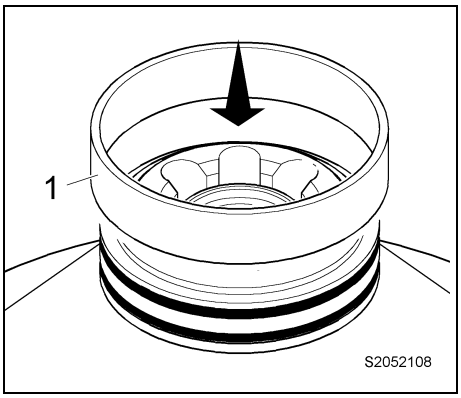


Fig. 112

OTC ...-02-... as clarifier or
OTC …-03-…

If necessary:

- Fit the lock ring 1.

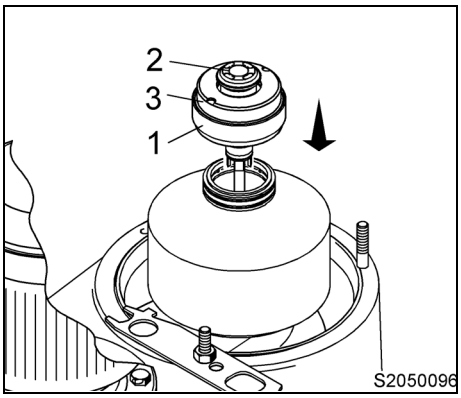


Fig. 113

- Screw in threaded ring 1 together with gaskets, regulating ring, built-in centripetal pump 2 and centripetal pump chamber cover 3.

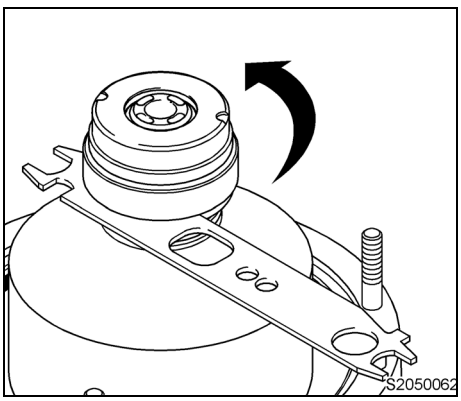


Fig. 114

- Bolt tight using the hook wrench **(left-hand thread)**.

CAUTION:
A loose threaded ring can endanger life!

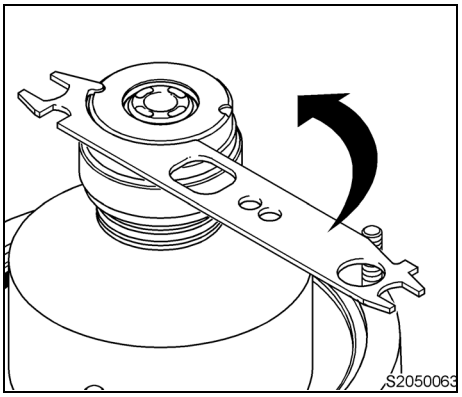


Fig. 115

- Bolt **tight** the centripetal pump chamber cover using the hook wrench **(left-hand thread)**.

CAUTION:
A loose centripetal pump chamber cover can endanger life!

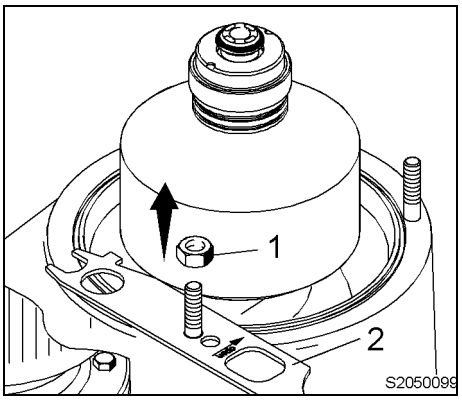


Fig. 116

- Remove hexagon nut 1 and hook wrench 2.

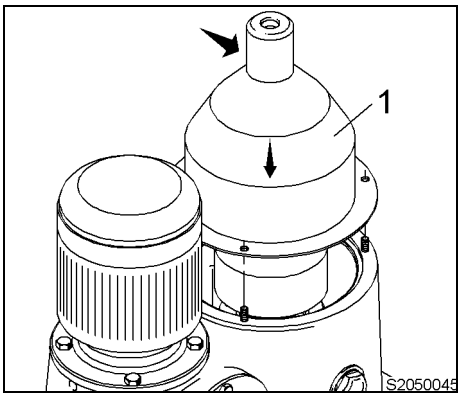


Fig. 117

- Mount hood 1.
  IMPORTANT:
  Do not damage the two studs!
  The connection threads of the corrugated hoses point towards the rear.

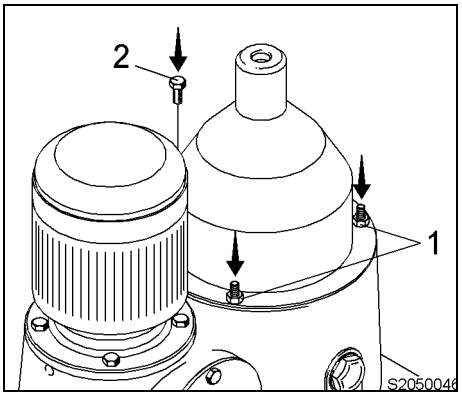


Fig. 118

- Bolt tight the hood by means of two hexagon nuts 1 and hex head screw 2.

  OTC ...-02-... – Silumin hood:
  Hex head screw 2 = M 10 x 30

  OTC …-03… – hood of stainless steel:
  Hex head screw 2 = M 10 x 25

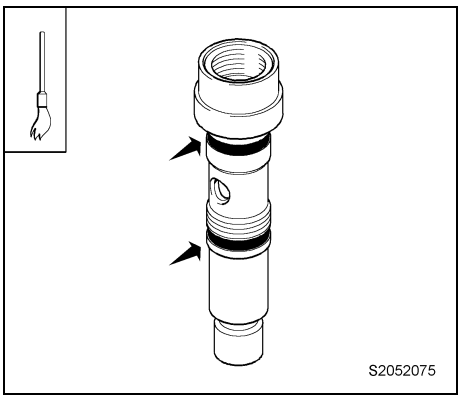


Fig. 119

- Fit two gaskets in the grooves of the handle connection piece.
- Grease the gaskets, guide surfaces and threads as per lubrication schedule.

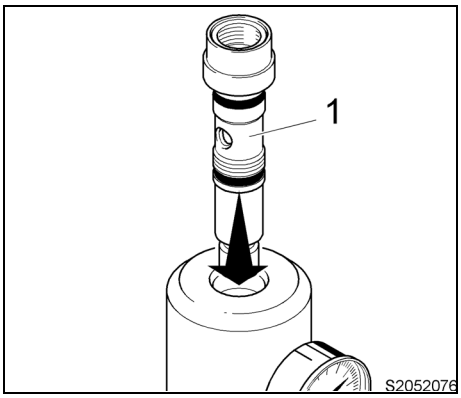


Fig. 120

- Fit handle connection piece 1 with fitted gaskets into the hood.

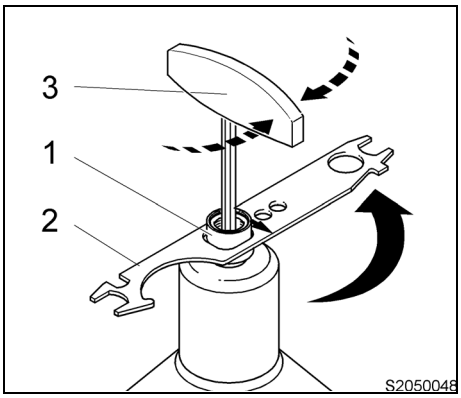


Fig. 121

- Tighten handle connection piece 1
  – by turning hook wrench 2 **counterclockwise** and
  – holding T-hexagon wrench 3.

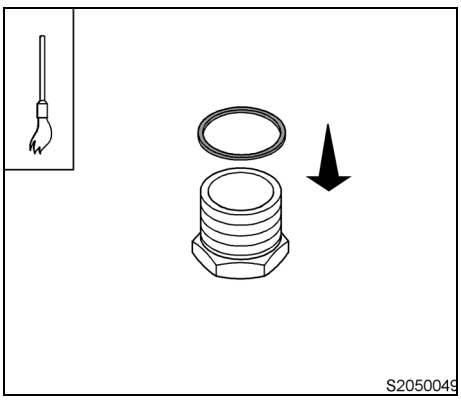


Fig. 122

- Insert the gasket in the groove of the screw plug.
- Grease gasket and threads as per lubrication schedule.

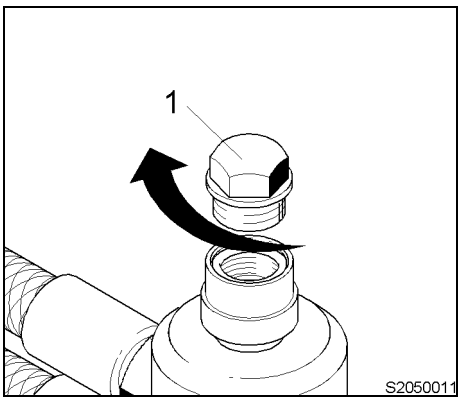


Fig. 123

- Screw screw plug 1 with fitted gasket into the hood **(right-hand thread)**.

4.5 Dismantling the separator

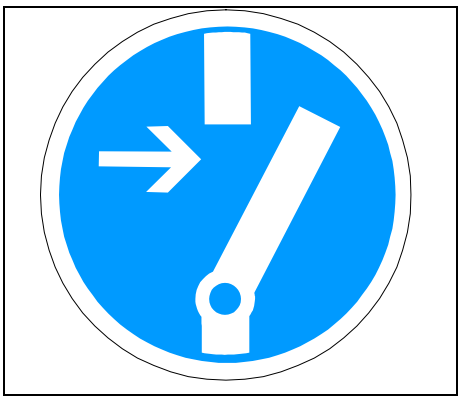


Fig. 124

- Switch off the main switch and lock it.

Danger to life through high-speed rotating separator parts!

- Do not loosen any part of the separator before the bowl has come to a standstill.
  The run-down time of the bowl is **10 minutes** after switching off the motor.
  Bowl standstill is indicated by standstill of the motor.

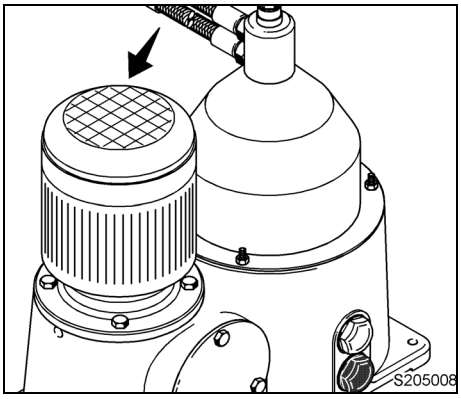


Fig. 125

Check motor standstill

- Shine a torch through the motor housing.
- Check that the fan wheel is no longer moving.

In the case of torn or defective drive belts or if the belts have come off:

- Do not loosen any part of the separator before the bowl has come to a standstill.
- **Be sure to observe** the run-down time of **10 minutes** until dismantling the separator!

- **Danger of injury through very hot separator parts!**
  When carrying out maintenance work, there is a danger of injury through hot separator parts (separating temperatures of 70 to 100 °C (158 – 212 °F).)

CAUTION: Danger to life and limb through electric current!
There might be residual voltage!

Prior to working on the motor:

- refer to the motor instruction manual
- take adequate preventive measures according to the rules and regulations of the VDE (Verein Deutscher Elektriker) or EVU (Europäische Vereinigung für Unfallforschung und Unfallanalyse) institutions.
- **Any work on the motor may be carried out by an authorized electrician only.**

- Avoid damage to separator parts when fitting and removing by
  – precise positioning,
  – no diagonal pull!
- Do not use force when removing or fitting parts.
- This applies to all separator parts:
  – Treat gently.
  – Always set them down on a rubber mat or a wooden pallet.

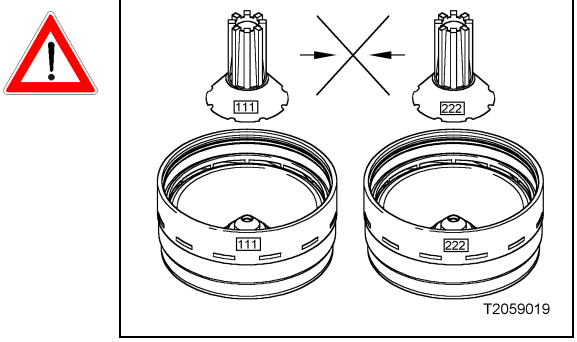


Fig. 126

If an installation is equipped with several separators:

- Do not interchange parts from different separators **(danger of imbalance).**
  Some separator parts are marked with the serial number of the machine or the last three digits of the serial number.

- For special tools, see section *Parts list*.
- For standard tools, see section 4.8.

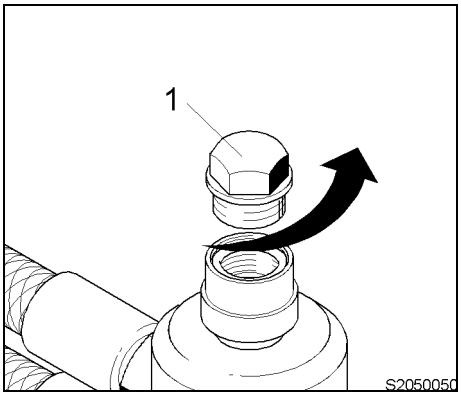


Fig. 127

- Unscrew screw plug 1 with fitted gasket **(right-hand thread)**.

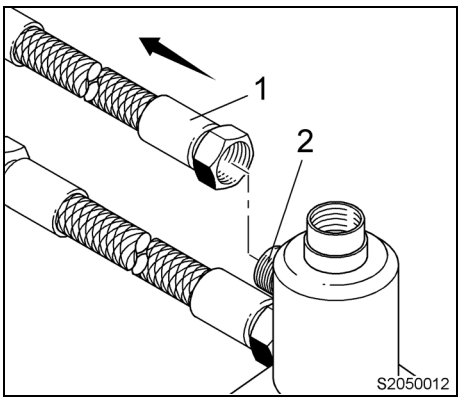


Fig. 128

If necessary:

- Undo product feed line:
  – Unscrew coupling nut 1.

Note:
The connector 2 must be glied in with Loctite 245.

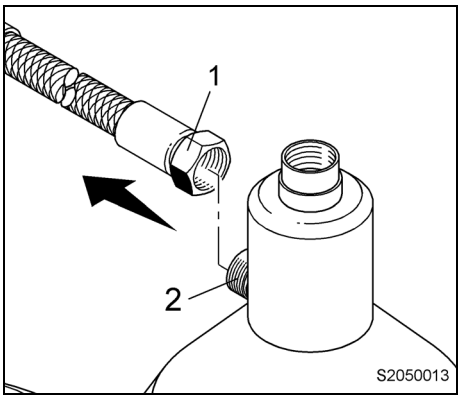


Fig. 129

If necessary:

OTC …-02-…

- Undo discharge line for light liquid.
  – Unscrew coupling nut 1.

OTC …-03-…

- Disconnect discharge line for heavy liquid.
  – Unscrew coupling nut 1.

Note:
The connector 2 must be glued in with Loctite 245.

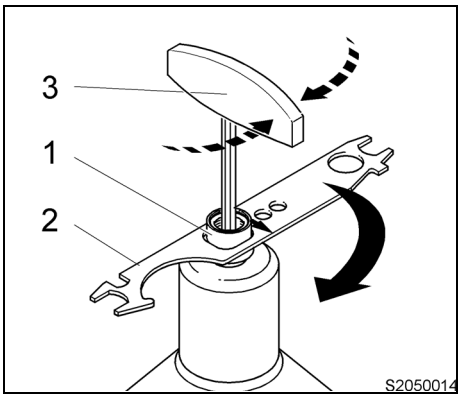


Fig. 130

- Undo handle connection piece 1
  – by turning hook wrench 2 **clockwise** and
  – holding T-hexagon wrench 3.

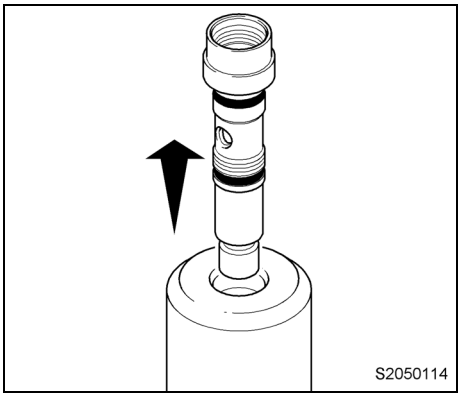


Fig. 131

- Undo the handle connection piece with fitted gaskets.

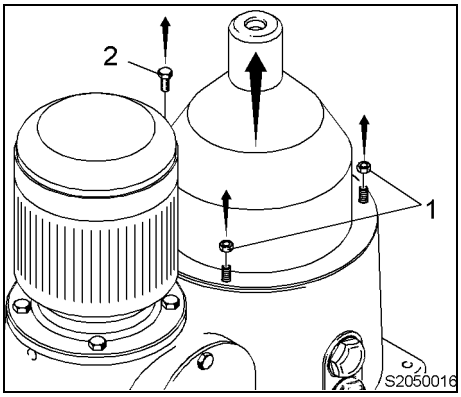


Fig. 132

- Unscrew two hexagon nuts 1 and the hex head screw 2.
- Lift off the hood.

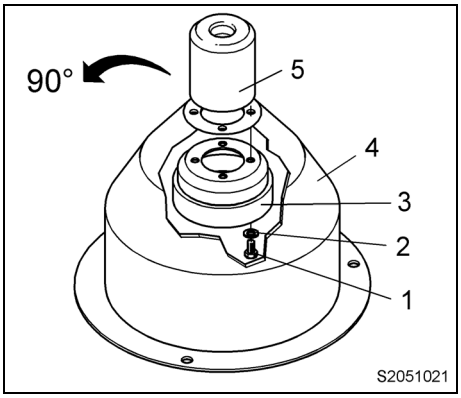


Fig. 133

OTC …-03… – hood of stainless steel

If necessary:

- Turn bowl through 90°.
- Unscrew four hex head screws 1 and lock washers 2 which connect cap 3 with hood 4 and connection piece 5.

  Note:

  Hex head screws 1 and lock washers 2 are sealed with Loctite 275.
- Separate cap 3 and connection piece 5 with fitted gasket from the hood.

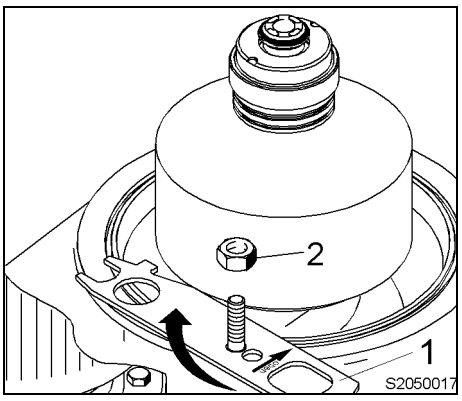


Fig. 134

- Fasten the bottom with hook wrench 1 and hexagon nut 2.
  To do this:
  – Slip hook wrench 1 over a stud of the lower section of frame and
  – let it register in a groove of the bottom.

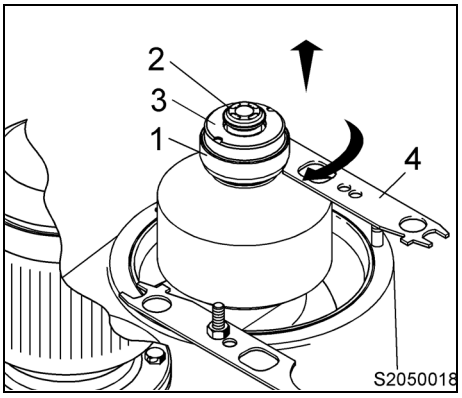


Fig. 135

- Loosen threaded ring 1 **(left-hand thread)** together with gaskets, regulating ring, fitted centripetal pump 2 and centripetal pump chamber cover 3 with hook wrench 4 and
- screw on by hand by one turn.

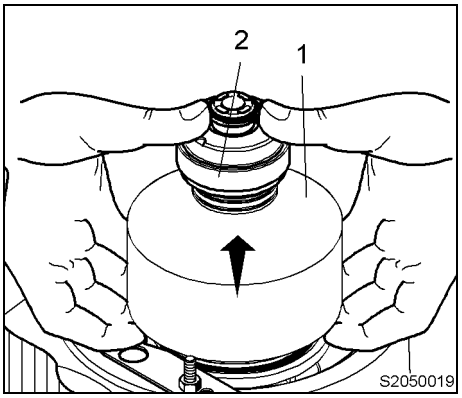


Fig. 136

- Press bowl shell 1 against threaded ring 2.
  The liquid content of the bowl will run into the discharge channel.

CAUTION!
Parts and liquid can be hot!

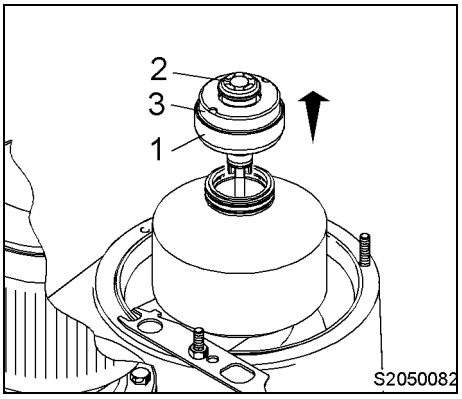


Fig. 137

- Unscrew threaded ring 1 together with gaskets, regulating ring, built-in centripetal pump 2 and centripetal pump chamber cover 3.

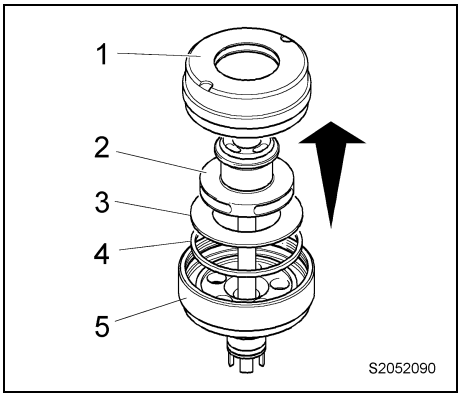


Fig. 138

- **If necessary:**
  Dismantle the following parts:
  – centripetal pump chamber cover 1,
  – centripetal pump 2 with inserted gasket,
  – regulating ring 3,
  – Gasket 4
  – threaded ring 5 with fitted gaskets.

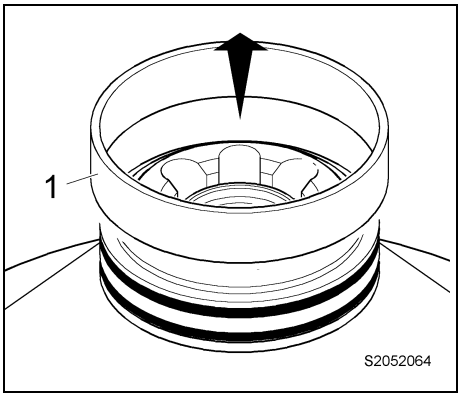


Fig. 139

OTC ...-02-... as clarifier or
OTC …-03-…

If necessary:
- Remove the lock ring 1.

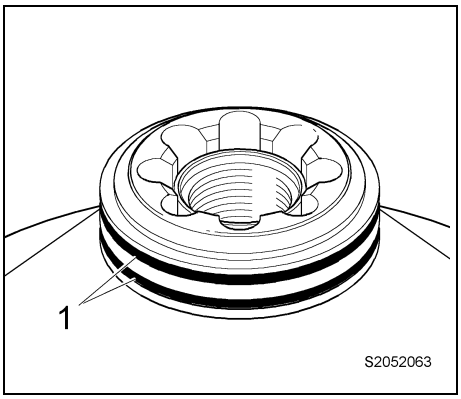


Fig. 140

OTC ...-02-... as clarifier or
OTC …-03-…

If necessary:
- Remove gasket 1.

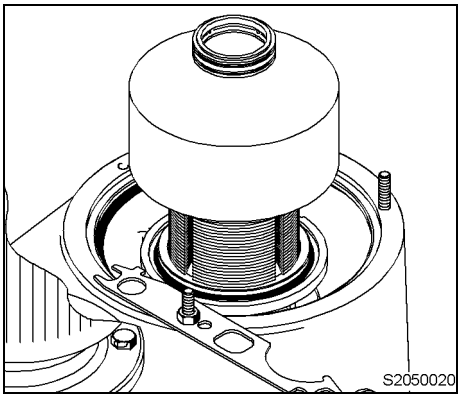


Fig. 141

- Remove the bowl shell together with the bowl shell insert.

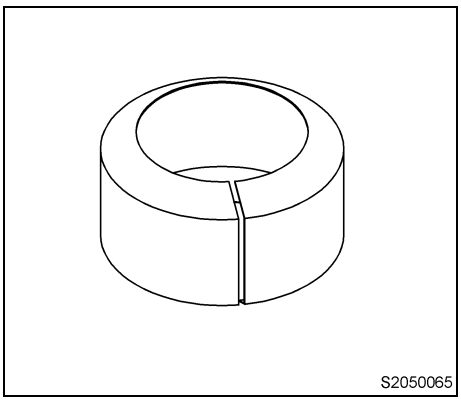


Fig. 142

- Dismantle the bowl insert as described in section 4.6.1.

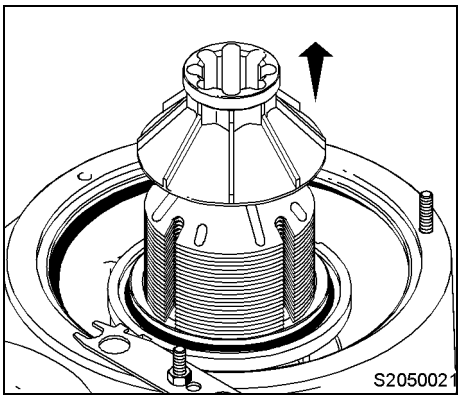


Fig. 143

OTC …-02-…:
- Remove separating disk.

OTC …-03-…:
- Remove separating disk with fitted gasket.

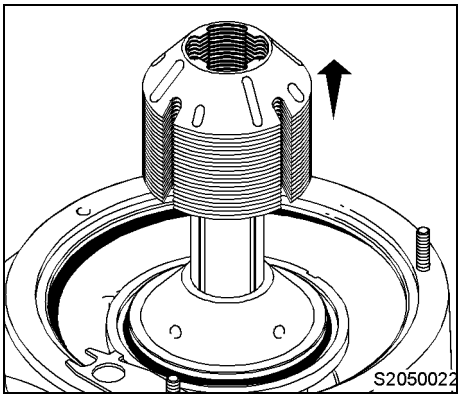


Fig. 144

- Remove the disk stack.

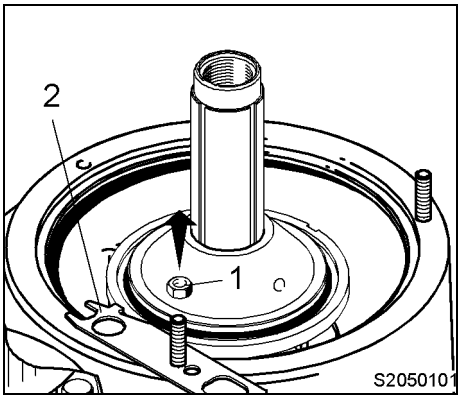


Fig. 145

- Remove hexagon nut 1 and hook wrench 2.

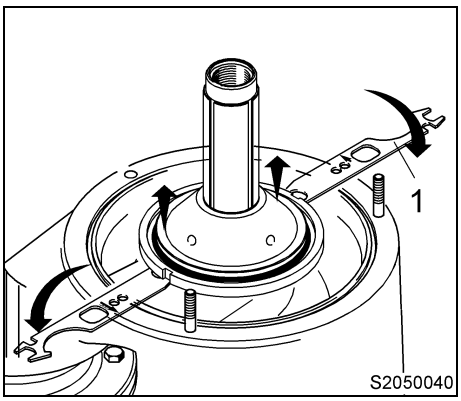


Fig. 146

- Force off and remove the bottom (with fitted gasket) with the aid of two hook wrenches 1.

  Apply the two hook wrenches 1 to the edge of the bottom!

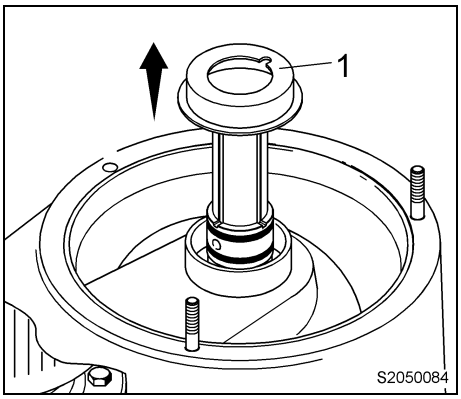


Fig. 147

- Remove spindle cap 1.

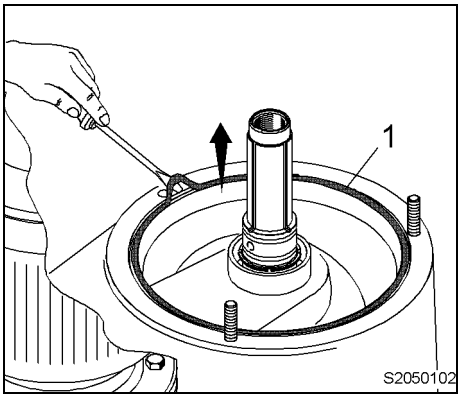


Fig. 148

- Take out gasket 1.

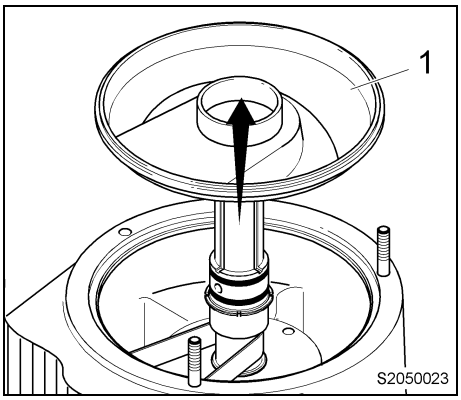


Fig. 149

- Take out discharge channel 1.

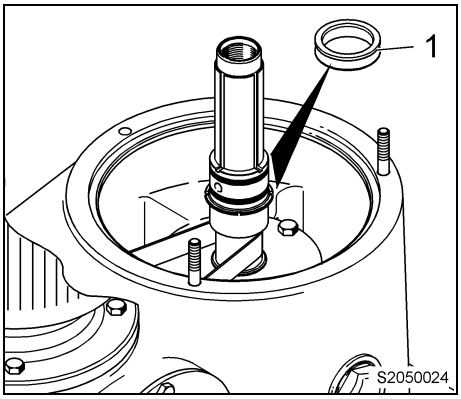


Fig. 150

- Remove gasket 1 from the bore.

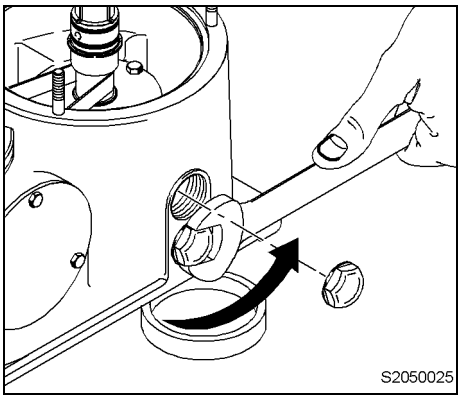


Fig. 151

- loosen the sight glasses and
- drain the oil into an oil pan (approx. 1.3 l).

Note:
Observe the local regulations on disposal of the lubricating oil.

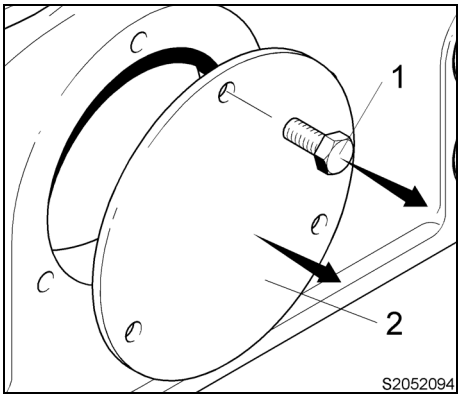


Fig. 152

- Undo three hex head screws 1.
- Remove cover plate 2.

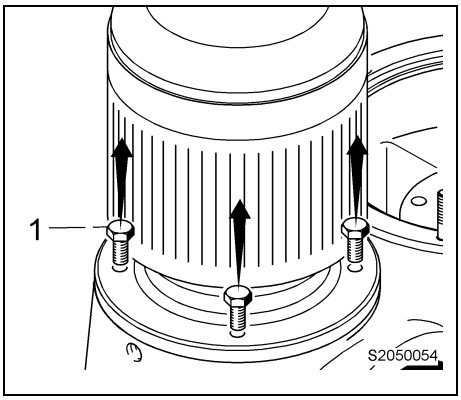


Fig. 153

- Unscrew four hex head screws 1.

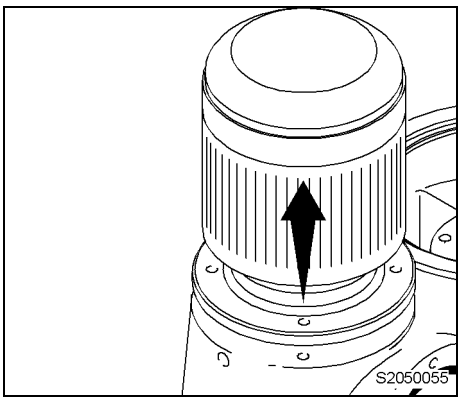


Fig. 154

- Lift the motor with flat belt pulley **slightly** – approx. 10 mm - out of the lower section of frame.
  (drive belt is slackened!)
- Pull the drive belt off the flat belt pulley downwards.

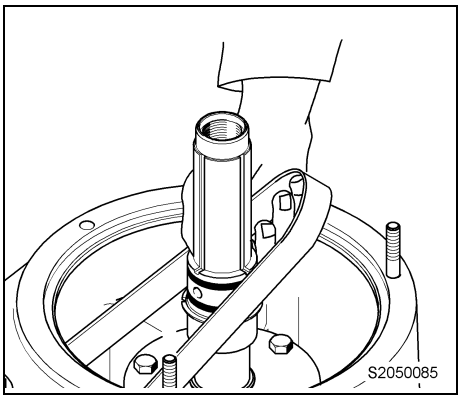


Fig. 155

- Take the drive belt out of the lower section of frame.

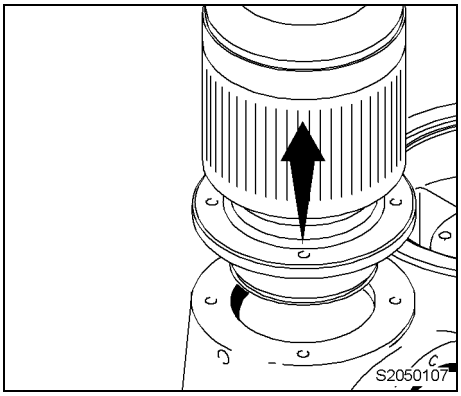


Fig. 156

- Lift the motor with flat belt pulley out of the lower section of frame.

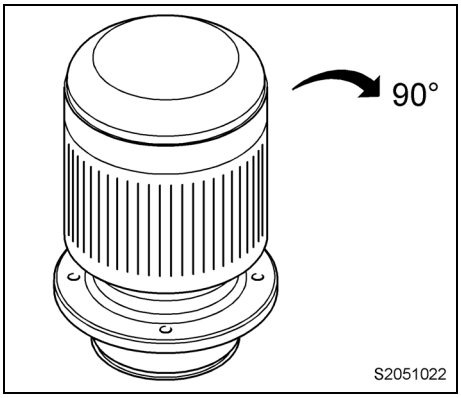


Fig. 157

If necessary (see section 4.3.1):

- Turn motor with flat belt pulley through 90° (upside down).
- Prevent part from overturning and rolling away.

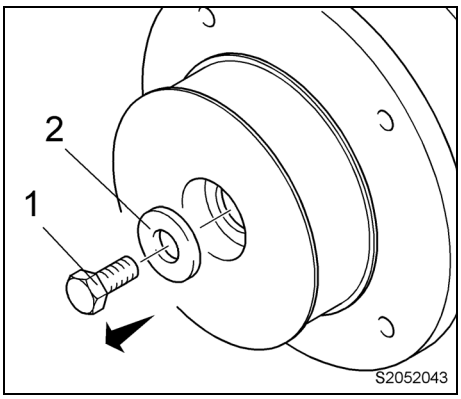


Fig. 158

If necessary (see section 4.3.1):

- Unscrew hex head screw 1 from the motor shaft end and
- take off washer 2.

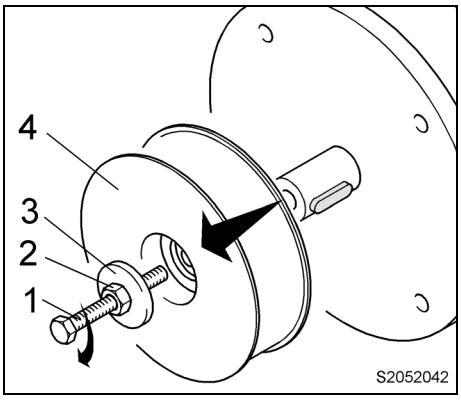


Fig. 159

If necessary (see section 4.3.1):

For protecting the motor shaft end:

- Screw the hex head screw 1 (M8 x 100) with nut 2 and washer 3 in the thread of the motor shaft end.
- Force the flat belt pulley 4 off the motor shaft end by turning the hex head screw **clockwise**.

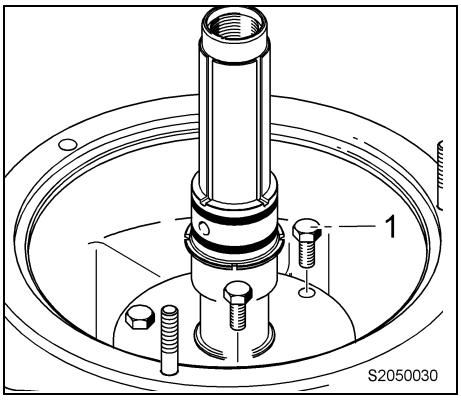


Fig. 160

- Undo three hex head screws 1.

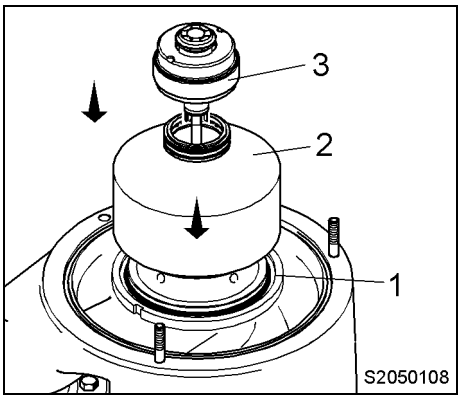


Fig. 161

To facilitate removal of the spindle, proceed according to Fig. 161 to Fig. 164.

- Place bottom 1 on the spindle.
- Pay attention to correct positioning!
- Fit the bowl shell 2.
- Screw in threaded ring 3 together with gaskets, regulating ring, built-in centripetal pump and centripetal pump chamber cover and

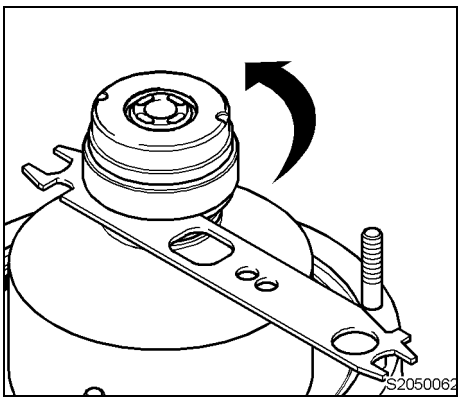


Fig. 162

- Bolt tight using the hook wrench **(left-hand thread)**.

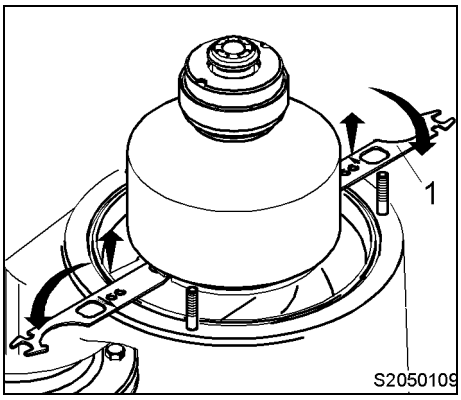


Fig. 163

- Force off the spindle assembly using two hook wrenches 1.
- and remove it from the lower section of the frame.

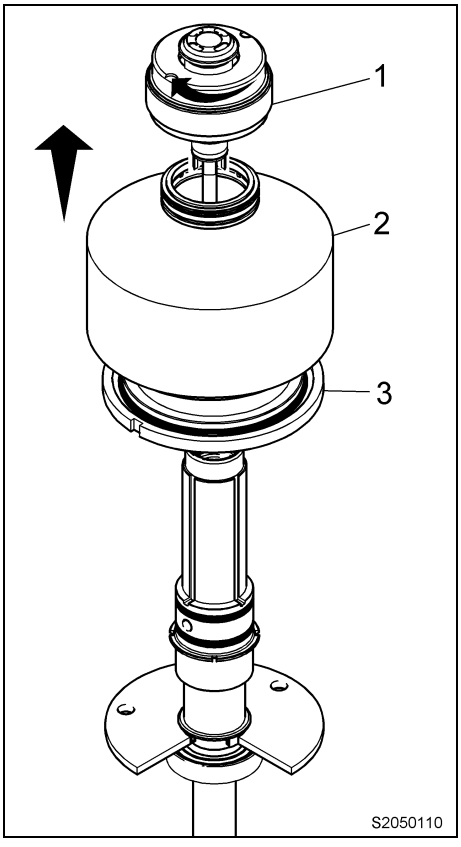


Fig. 164

- Remove threaded ring 1, bowl shell 2 and bottom 3 from the spindle assembly.

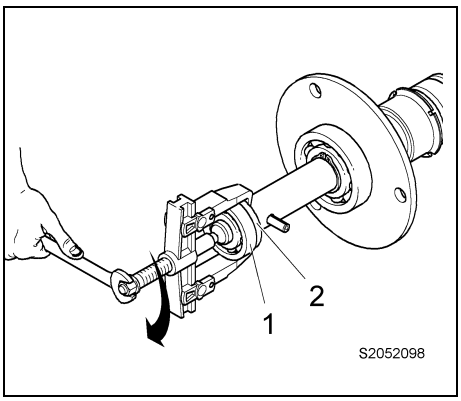


Fig. 165

- Pull off from the spindle:
  – grooved ball bearing 1,
  – ball bearing protection ring 2.

Tools:
commercially available pulling device
Vice

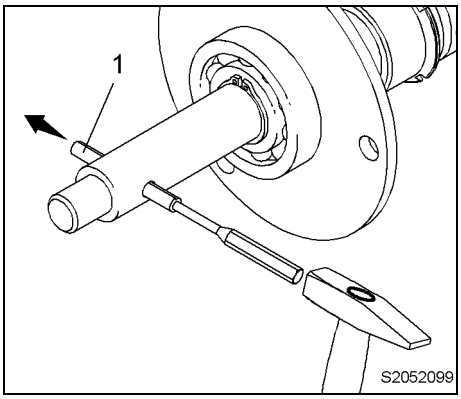


Fig. 166

- Drive the dowel pin 1 out of the spindle by means of light hammer blows.
- Be careful not to damage the spindle.

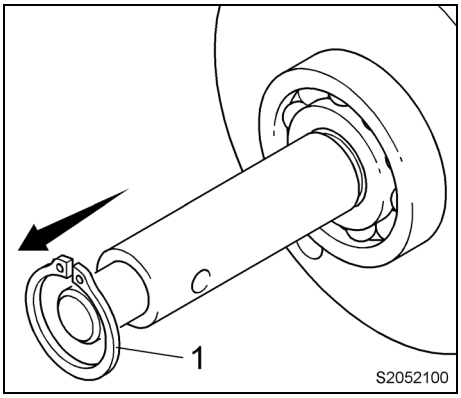


Fig. 167

- Use pliers to remove the retaining ring.

Tool:
commercially available outer snap pliers

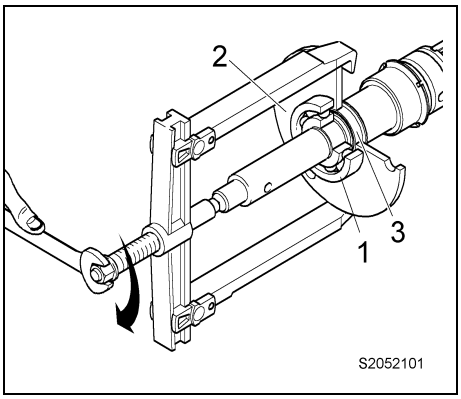


Fig. 168

- Pull off from the spindle:
  – grooved ball bearing 1,
  – Bearing cover 2 with radial packing ring 3.

Tool:
commercially available pulling device

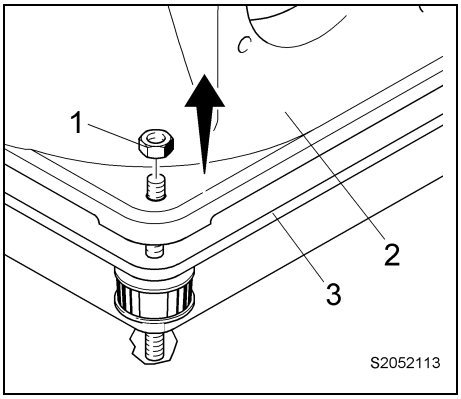


Fig. 169

- Unscrew four hexagon nuts 1.
- Remover lower section of frame 2 and guard plate 3.

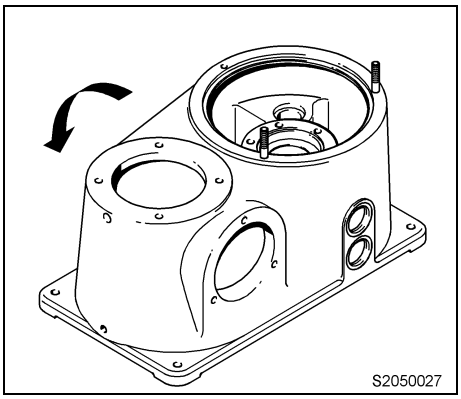


Fig. 170

- Turn lower section of frame through 90°.

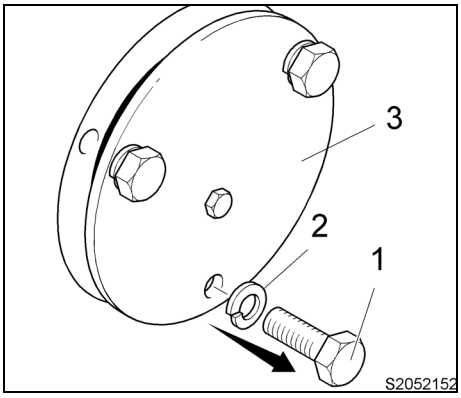


Fig. 171

- Unscrew the three hex head screws 1 with lock washers 2.
- take the bearing cover 3 out of the lower section of frame.

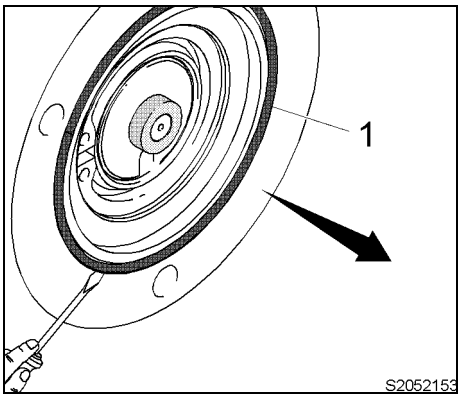


Fig. 172

- Take out gasket 1.

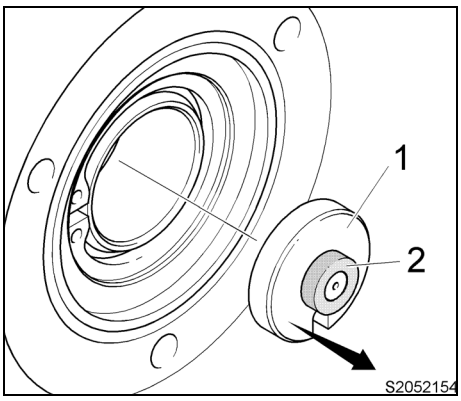


Fig. 173

- Take out bottom bearing pressure piece 1 with fitted gasket 2.

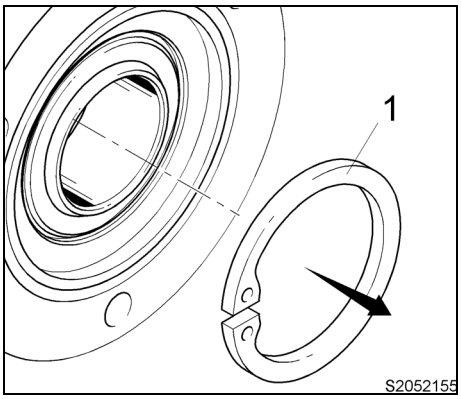


Fig. 174

If necessary:

- Take retaining ring 1 out of the pivoting bearing groove.

Tool:
commercially available inner snap pliers with offset jaws

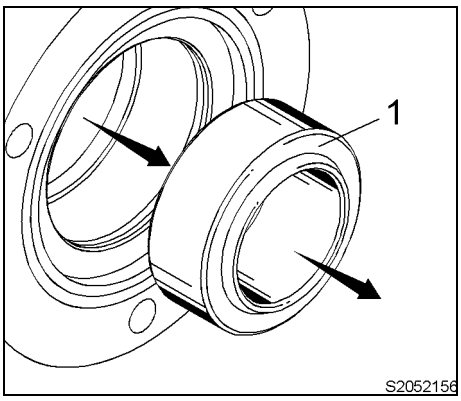


Fig. 175

If necessary:

- Drive pivoting bearing 1 out of its seat through the opening in the upper section of the frame.

Tools:
Mallet
Plastic mandrel
(Ø 43 -45 mm, 300 mm long)

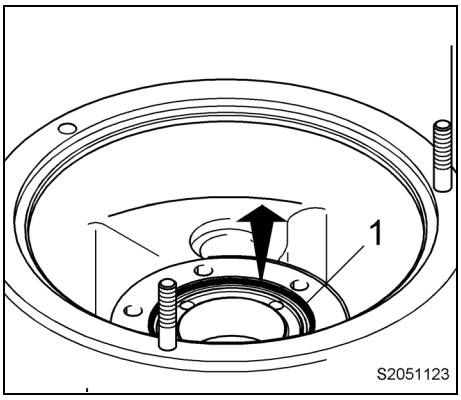


Fig. 176

- Take gasket 1 out of the groove.

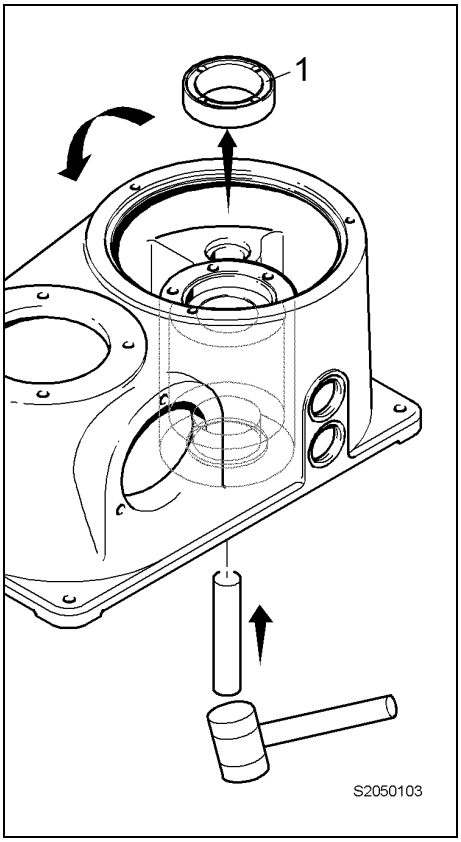


Fig. 177

- Drive rubber-metal cushion 1 out of the lower section of the frame by means of light hammer blows.

Tools:
Mallet
Plastic mandrel
(Ø 53 -55 mm, 300 mm long)

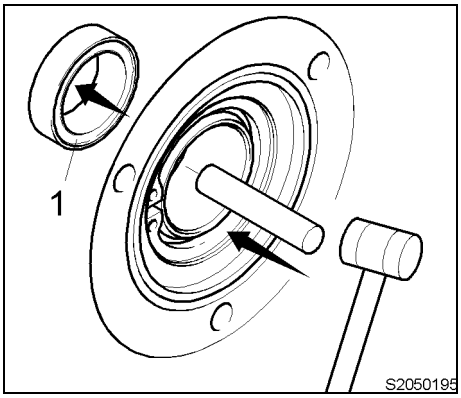


Fig. 178

Note:
The rubber-metal bush 1 can also be driven out of the lower section of the frame through the pivoting bearing.

Tools:
Mallet
Plastic mandrel
(Ø 53 -55 mm, 300 mm long)

4.5.1 Cleaning the separator

- Use only a cleaning agent that is approved for the field of application!

- **Do not use acid or chloric cleaning agents.**
  Chlorine attacks stainless steel parts.

- Dissolve dried scale with citric acid.

- **For cleaning the individual disks and bowl parts**
  Do not use metal scrapers and metal brushes!

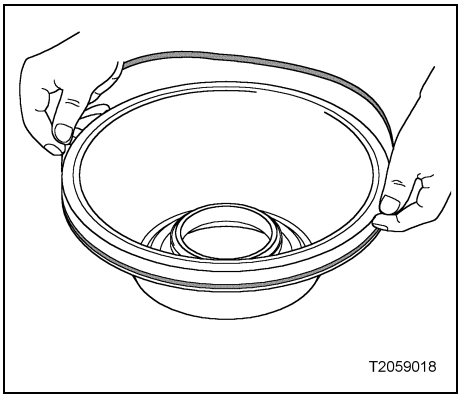


Fig. 179

- Take the gaskets out of the separator parts.
- Clean the grooves and gaskets to avoid corrosion in the grooves.
- Replace damaged, very swollen, hardened or brittle gaskets **immediately**.

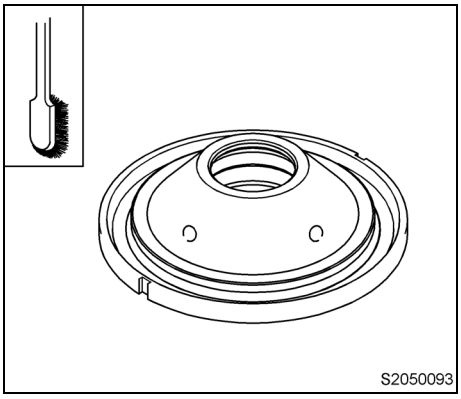


Fig. 180

- Clean the small holes at the bottom with **extra special care** to ensure trouble-free operation.

- Thoroughly clean the inlet bores of the spindle with a suitable cleaning agent and brushes.
- Apply a **thin** coat of grease to the guide surfaces and threads of the separator parts after drying (see 4.3.4 Lubrication schedule).

4.5.2 Cleaning the frame

Danger to life through electrical components!

- Never rinse off the motor with a direct water jet.
- Use only a cleaning agent that is approved for the field of application!

- **Do not use acid or chloric cleaning agents.**
  Chlorine attacks stainless steel parts.
- Dissolve dried scale with citric acid.

4.5.3 Important instructions

CAUTION: Danger of imbalance!
When the bowl has not been correctly assembled or is inadequately cleaned, forces can be produced in the high-speed rotating bowl which endanger the operating safety of the separator!
Therefore, the cleaning instructions (section 4.5.1) and assembling instructions (section 4.5.4) must be exactly followed.

Pay particular attention to the following:

- Before assembling the separator, check to be sure that the guide and contact surfaces of the separator are clean.
- Grease the guide surfaces as specified in the lubrication schedule (see 4.3.4).

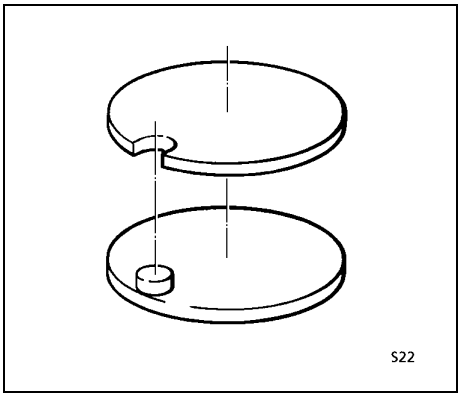


Fig. 181

- Some bowl parts have to be arranged in fixed positions relative to one another.
- Locking devices and alignment marks must be in perfect condition. The separator must not be operated if these locking devices and alignment marks are not in perfect condition.

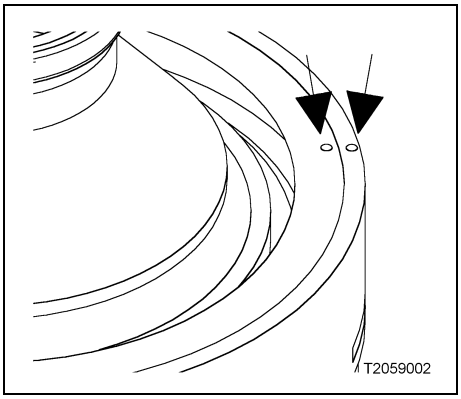


Fig. 182

- When fitting the separator parts, make sure that the "O" marks on all parts are aligned.
  (Only then will the parts fit correctly over arresting pins and guide ribs).
- Avoid damage to separator parts when fitting and removing by
  – precise positioning,
  – no diagonal pull!
- Do not use force when removing or fitting parts.
- This applies to all separator parts:
  – Treat gently.
  – Always set them down on a rubber mat or a wooden pallet.

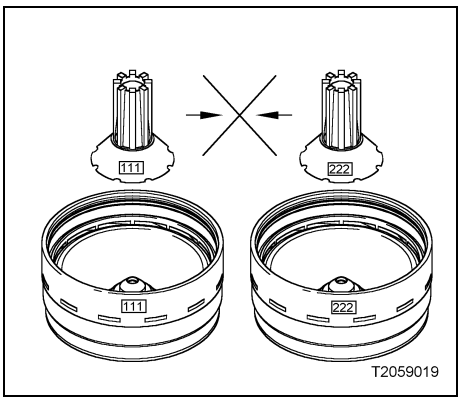


Fig. 183

- If the plant has several separators, be sure not to interchange parts of different separators **(danger of imbalance).**

  Some parts are marked
  – with the serial number or
  – the last three digits of the serial number.

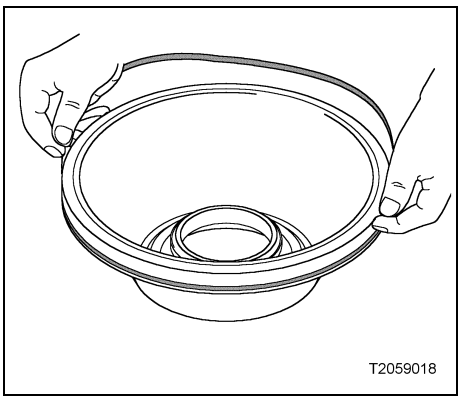


Fig. 184

- Thoroughly clean the gasket grooves of the individual separator parts and apply a **thin** coat of grease.
- After fitting check that
  – the gaskets are not twisted,
  – the gaskets are evenly positioned in the groove.

- **Before fitting the drive parts**
  – Thoroughly clean and dry the drive chamber.
    Use only a cleaning agent that is approved for the field of application!
  – Check spindle ball bearings.
    Use only the ball bearings specified in the parts list!

- For special tools, see section *Parts list*.
- For standard tools, see section 4.8.

4.5.4 Assembling the separator

- **Pay special attention to sections 4.5.1 and 4.5.1**

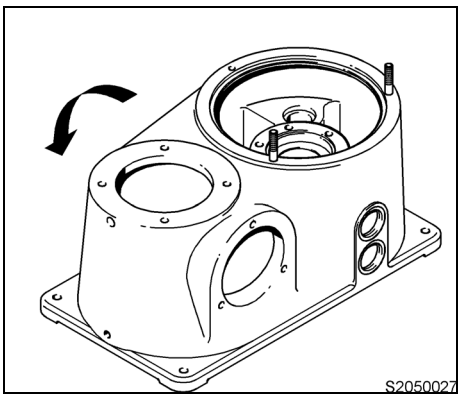


Fig. 185

- Turn lower section of frame through 90°.

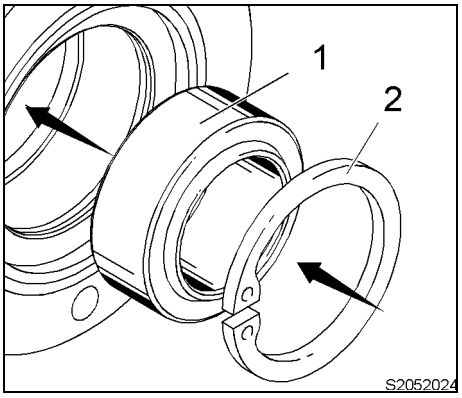


Fig. 186

- Fit pivoting bearing 1 and retaining ring 2.

Tools:
Mallet
commercially available inner snap pliers with offset jaws

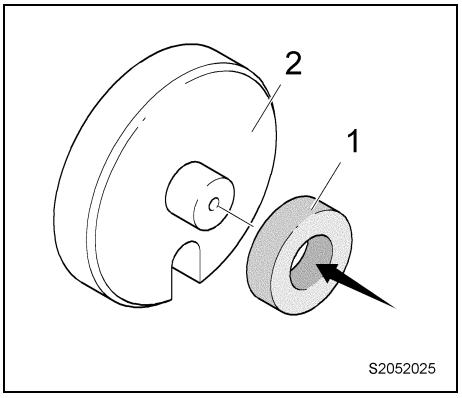


Fig. 187

- Position gasket 1 on the shoulder of bottom bearing pressure piece 2.

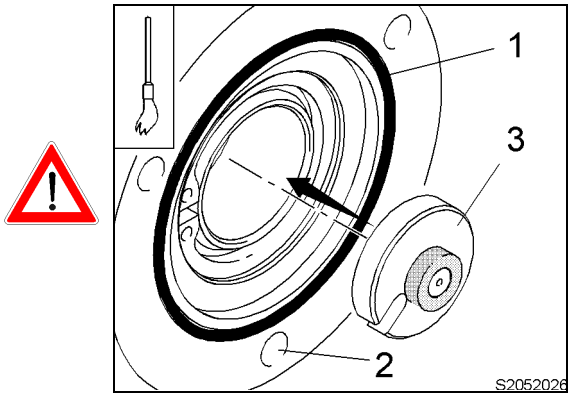


Fig. 188

- Insert gasket 1 in the groove.
- Fit bottom bearing pressure piece 3 with fitted gasket in the pivoting bearing.

  The recess in the bottom bearing pressure piece 3 must point to bore 2.
- Grease gasket 1 as per lubrication schedule .

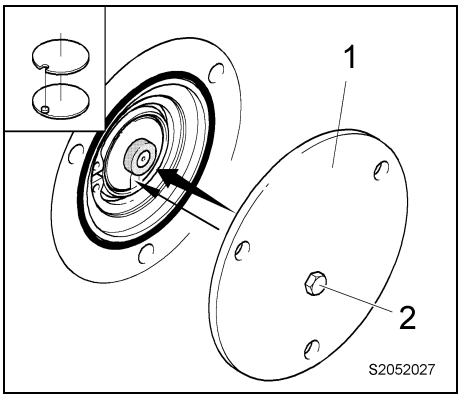


Fig. 189

- Mount bearing cover 1.
- Pay attention to correct positioning!

Note:
The hex head screw 2 is glued in with Loctite 275.

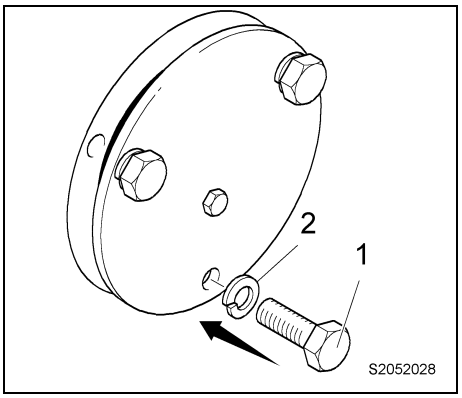


Fig. 190

- Screw the three hex head screws 1 (M 10 x 20) with lock washers 2 into the bearing cover.

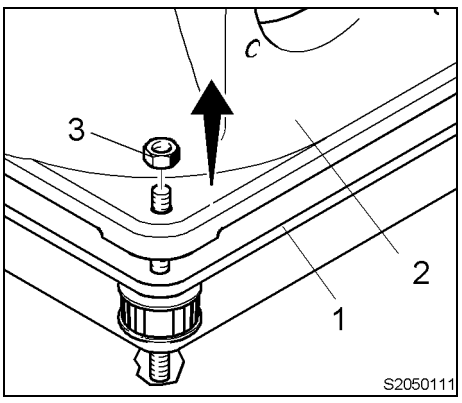


Fig. 191

To avoid accidents:

- **Fit guard 1 (protection against contacting rotating drive parts) beneath the separator as described in section 4.2.2**

- Place the lower section of the frame on wear insert 1 and
- bolt **tight** with four hexagon nuts 3.

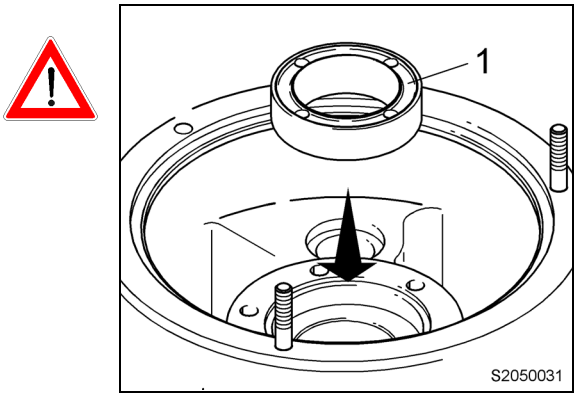


Fig. 192

- Carefully fit rubber-metal cushion 1.
  The inner, protruding pipe collar must point downwards!
- Lightly hammer the rubber-metal cushion evenly into its seat with a mallet.

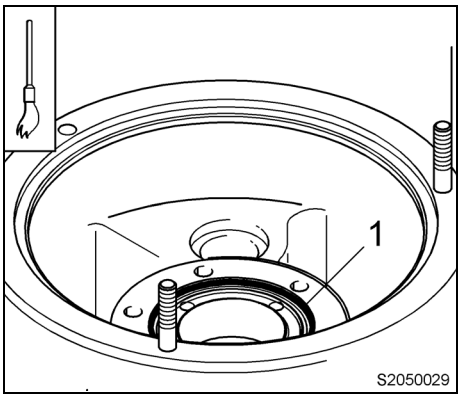


Fig. 193

- Insert gasket 1 in the groove.
- Grease the gasket and guide surfaces of the rubber-metal cushion as specified in the lubrication schedule.

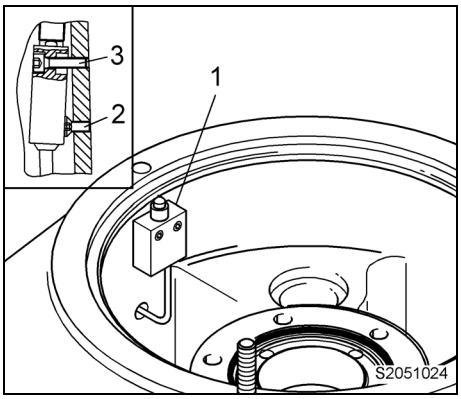


Fig. 194

- Connect the hood limit switch 1 and check that it is functional (see section 5.4)

Note:
Countersunk screw 2 and Allen screws 3 of the hood limit switch are glued in with Loctite 245.

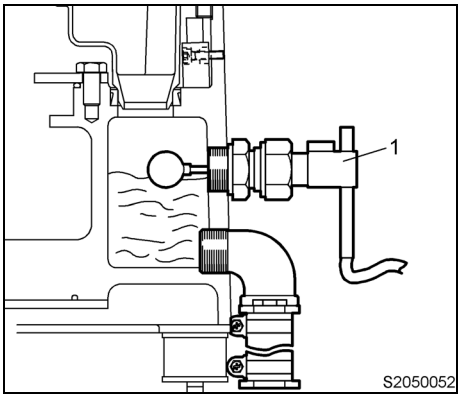


Fig. 195

OTC ...-02-...

- Check float switch 1 for damage and function.
- Pay attention to the correct fitting position of the float switch 1 (see section 5.3.1)!

Note:
The thread is glued in with Loctite 245.

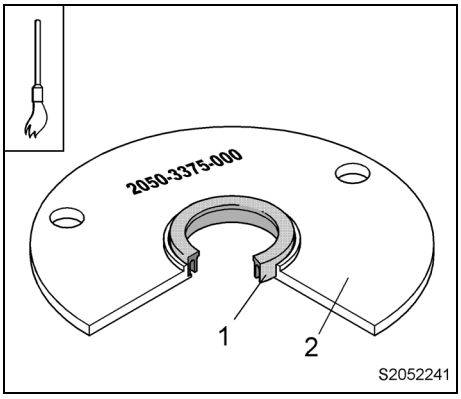


Fig. 196

- Grease radial packing ring 1 as per lubrication schedule .
- Fit radial packing ring 1 in bearing cover 2.
  The part-no. of the bearing cover must face upwards!
- Drive radial packing ring 1 evenly into bearing cover 2 by lightly hammering with a mallet.

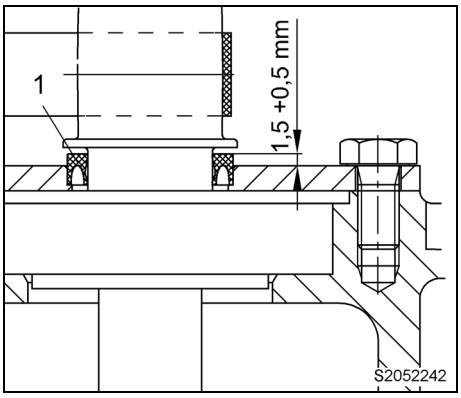


Fig. 197

- The fitted radial packing ring 1 must protrude above the surface of the bearing cover by **1.5** +0.5 mm**.**

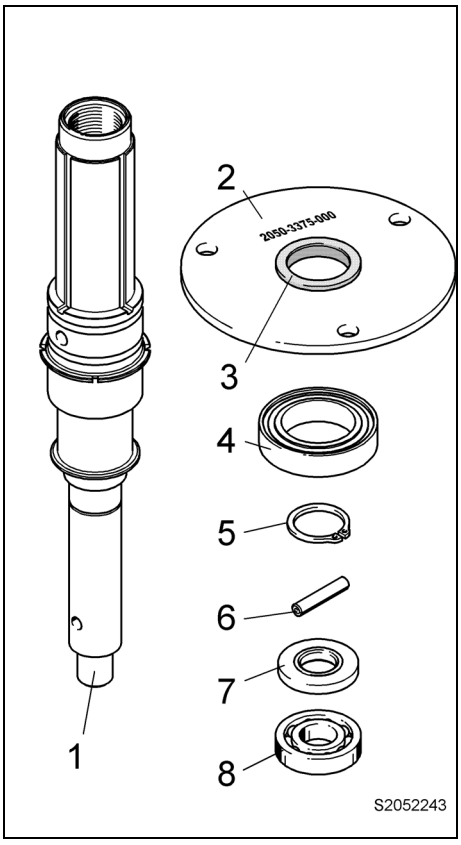


Fig. 198

- Assemble spindle 1:
  – Bearing cover 2 with radial packing ring 3
  – Grooved ball bearing 4
  – Retaining ring 5
  – Dowel pin 6
  – ball bearing protection ring 7
  – Grooved ball bearing 8

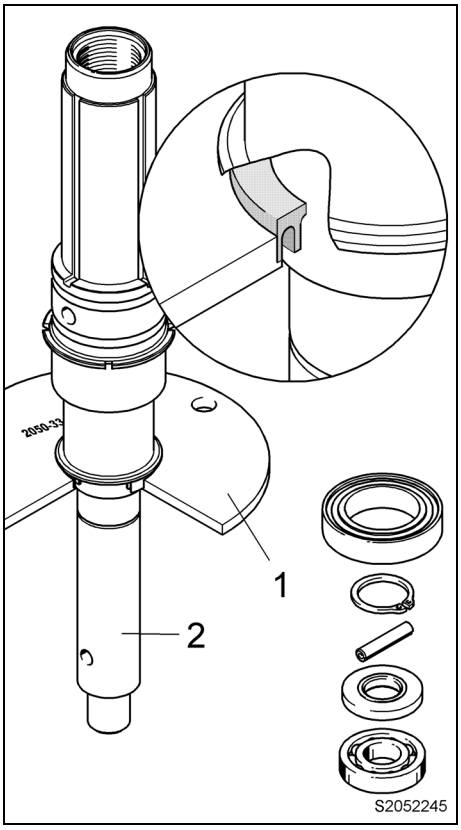


Fig. 199

- Place bearing cover 1 with fitted radial packing ring on spindle 2.
- The protruding radial packing ring must point to the centre of the spindle (see detail).

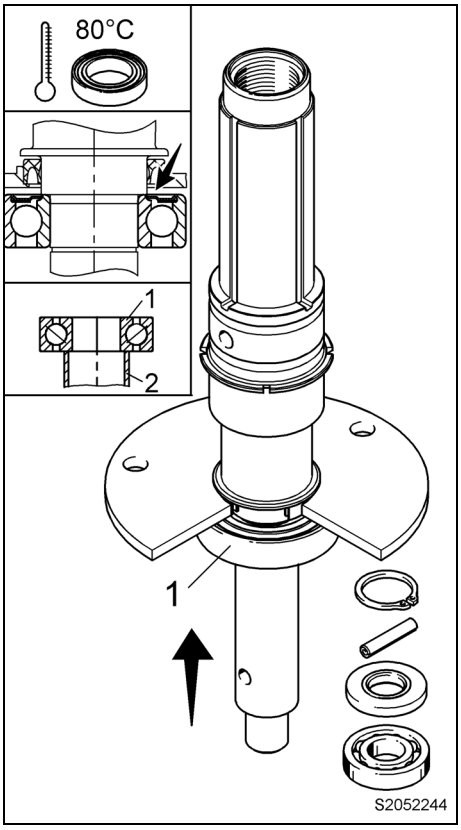


Fig. 200

- Grooved ball bearing 1
  – Heat in oil to 80 °C (176 °F) and
  – slide onto the spindle,
  Pay attention to the correct fitting position of the cylindrical roller bearing!
  The cover of grooved ball bearing 1 must face **upwards** to the bearing cover!
  – and **carefully** drive in up to the bearing cover with a suitable pipe 2.
  Pipe 2 may only contact the inner ring of grooved ball bearing 1 (see detail).

Tools:
Pipe (Ø 26 mm)
Hammer

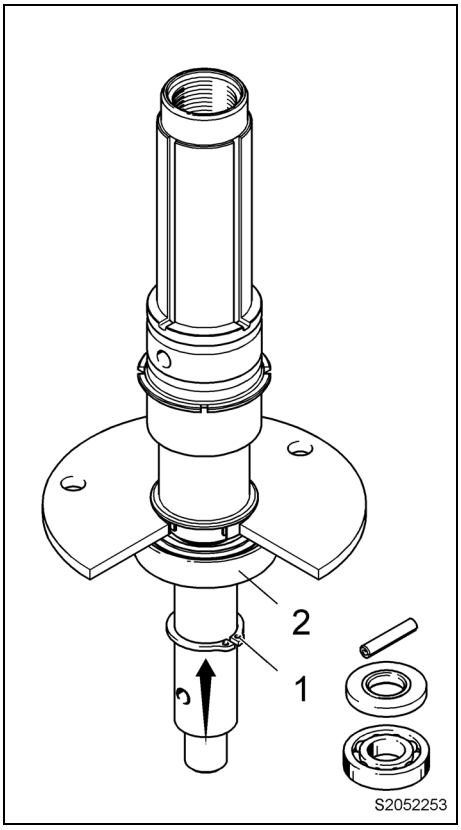


Fig. 201

- Fit retaining ring 1 and
- secure grooved ball bearing 2 with retaining ring 1.

Tool:
Pliers with outer snap jaws

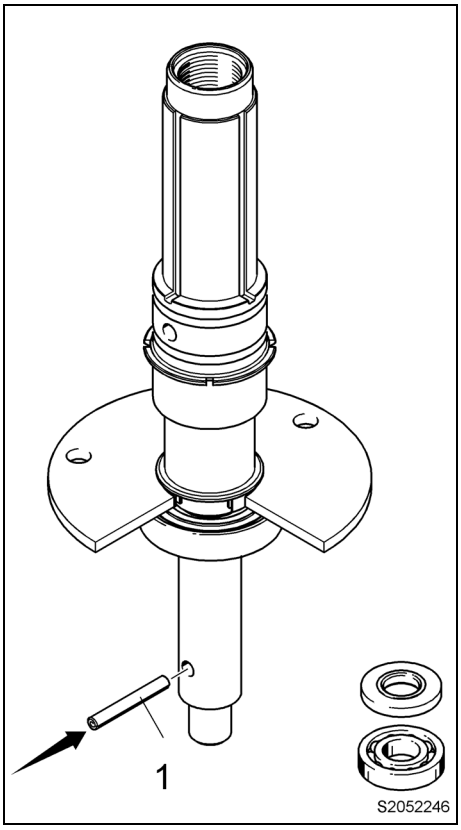


Fig. 202

- Install dowel pin 1 **dead centre**.

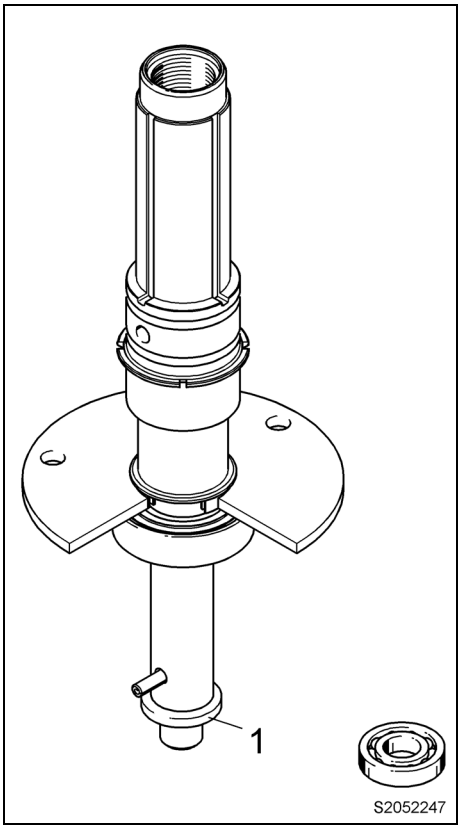


Fig. 203

- Fit ball bearing protection ring 1.

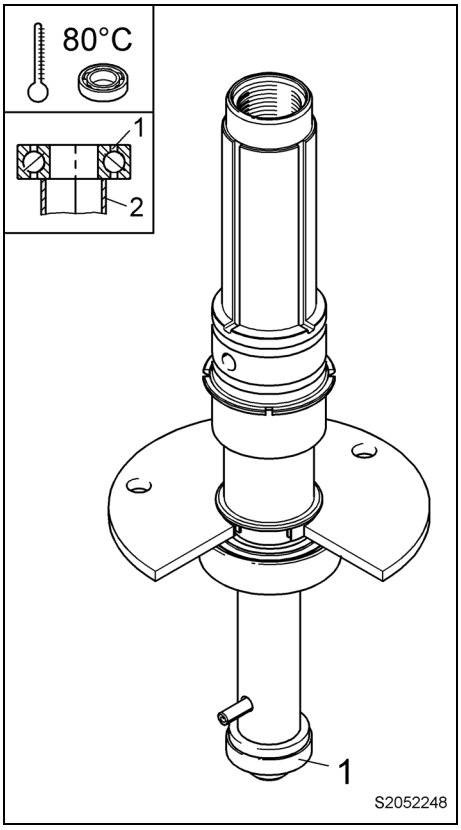


Fig. 204

- Grooved ball bearing 1
  – Heat in oil to 80 °C (176 °F) and
  – slide onto the spindle,
  – and **carefully** drive in up to the bearing cover with a suitable pipe 2.

  Pipe 2 may only contact the inner ring of grooved ball bearing 1 (see detail).

Tools:
Pipe (Ø 18 mm)
Hammer

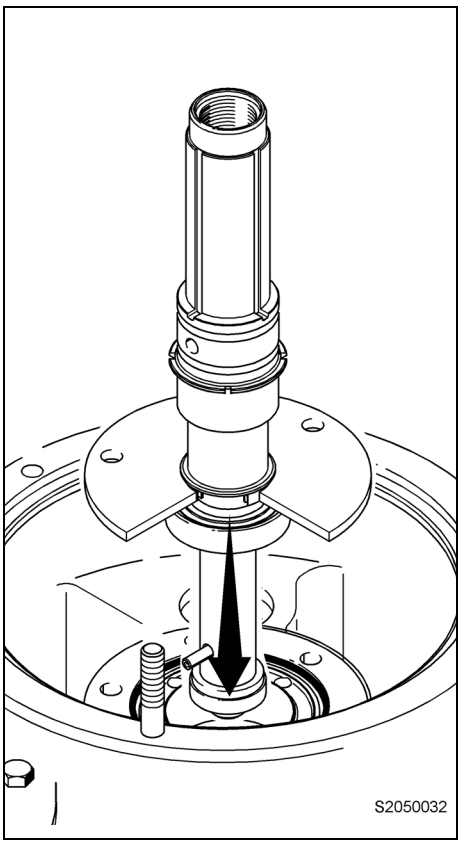


Fig. 205

- Fit mounted spindle carefully into the pivoting bearing and fit in rubber-metal cushion.

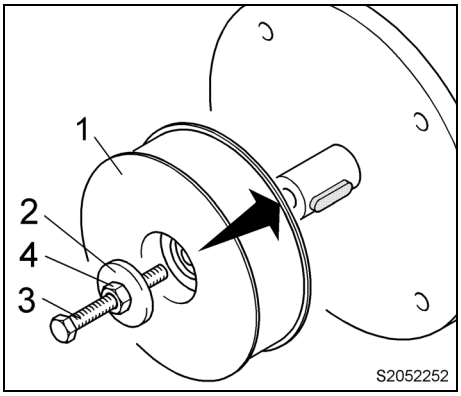


Fig. 206

If the flat belt pulley has been removed to keep to the service intervals:

- Turn motor through 90°.
- Prevent part from overturning and rolling away.
- Fit flat belt pulley 1 and disk 2 with hex head screw 3 (M 8 x 100) and nut 4 on the motor shaft.
- Pay attention to the feather key groove.

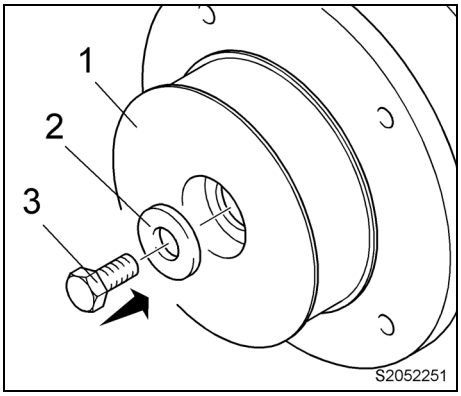


Fig. 207

If the flat belt pulley has been removed to keep to the service intervals:

- Screw tight flat belt pulley 1 with washer 2 and hex head screw 3 (M 8 x 20).

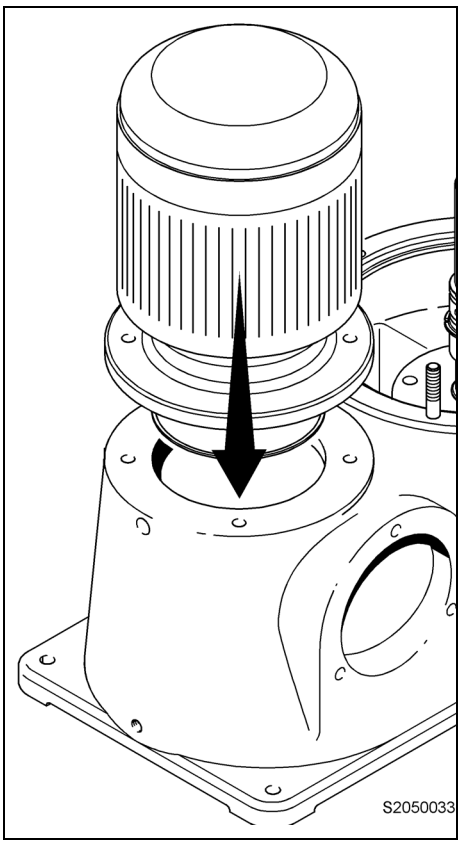


Fig. 208

- Remove the grease from the belt surfaces of the flat belt pulley.
- **Carefully** place motor with fitted flat belt pulley on the lower section of the frame.
- Do not yet let the motor flange lock into the opening in the lower section of the frame.

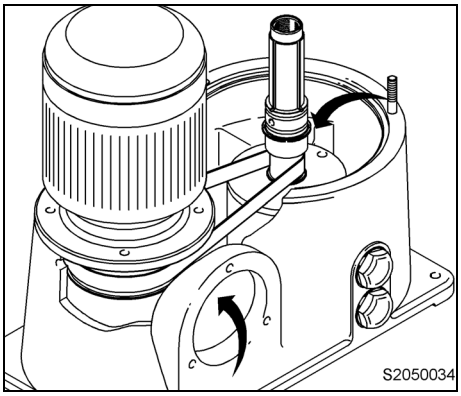


Fig. 209

- Remove the grease from the belt surfaces of the spindle.
- Place drive belts on the spindle through the openings in the lower section of frame and mount the flat belt pulley.

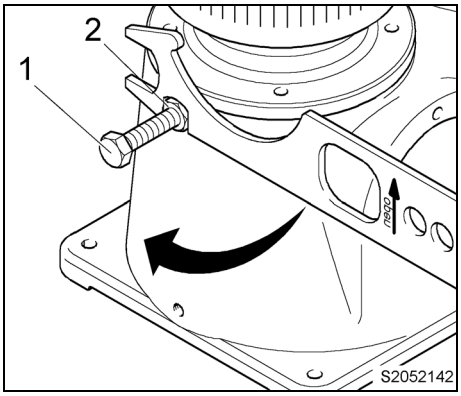


Fig. 210

- Screw hex head screw 1 (M 8 x 100) with hexagon nut 2 through the frame bore into the taphole of the flat belt pulley.
- Tension the drive belt by turning hexagon nut 2 **clockwise** until the motor flange locks into the opening in the lower section of the frame.

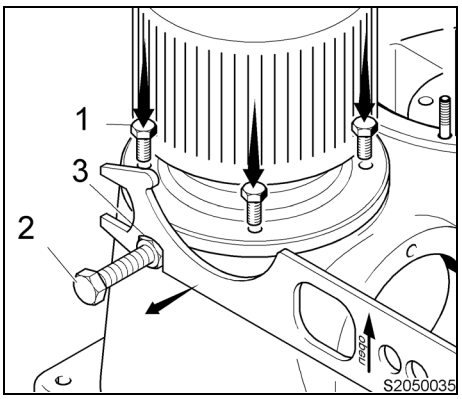


Fig. 211

- Fasten the motor with four hex head screws 1 (M 10 x 20).
- Unscrew hex head screw 2 with hexagon nut 3 from the flat belt pulley.

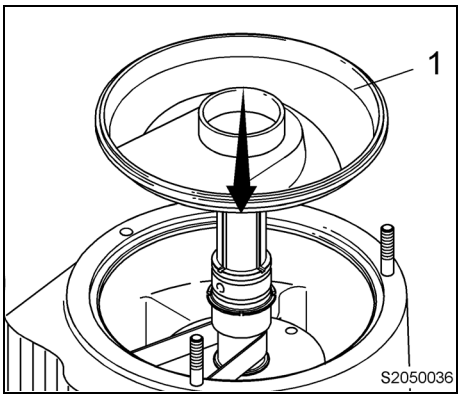


Fig. 212

- Place the discharge channel 1 in the lower section of frame and

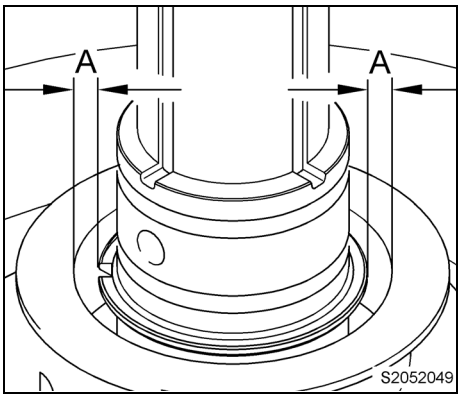


Fig. 213

- check that the spindle is centric (dimension A ≈ dimension A).
  A tolerance of 0.5 mm is admissible.

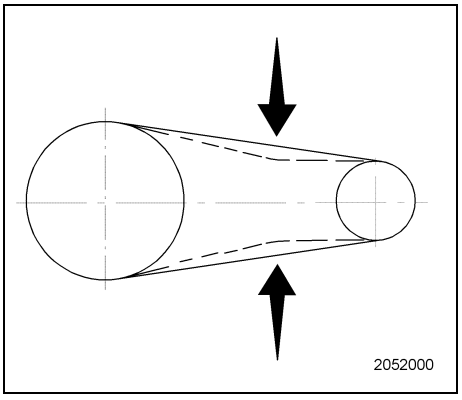


Fig. 214

If the spindle is inclined towards the motor,

- stretch the drive belt by pressing it together a number of times.
  or
- Check the rubber-metal cushion for one-sided deformation and replace if necessary.

If the spindle slants away from the motor,

- Replace the drive belt.

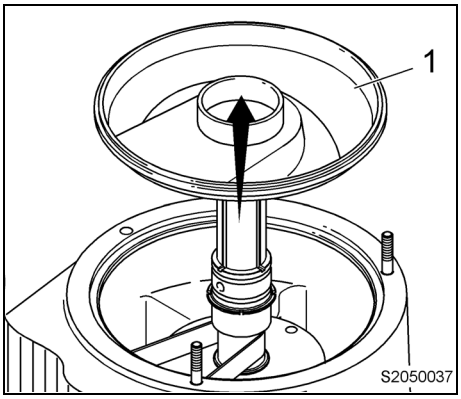


Fig. 215

- Take out discharge channel 1.

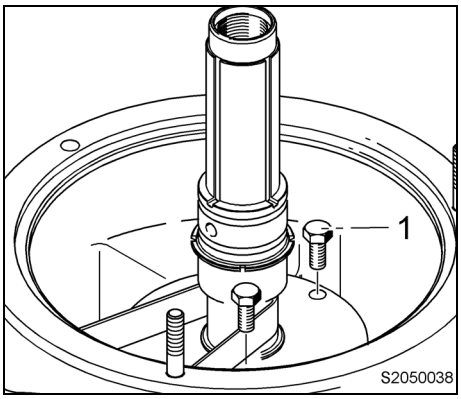


Fig. 216

- Fasten bearing cover with three hex head screws 1 (M 8 x 20).
- Check that the spindle can be turned **easily**.

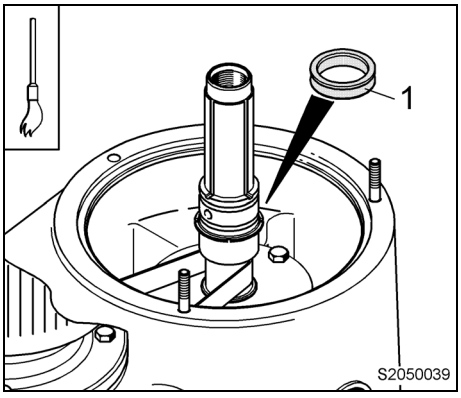


Fig. 217

- Insert gasket 1 in the bore.
- Grease gasket as per lubrication schedule.

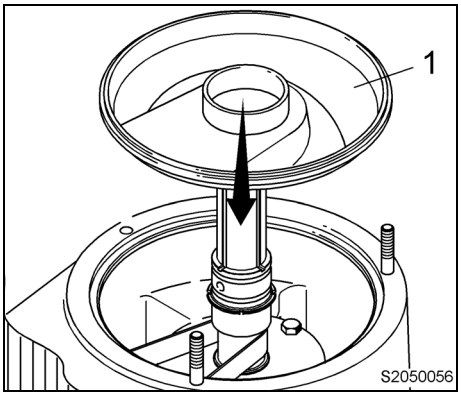


Fig. 218

- Fit the discharge channel 1 in the opening in the lower part of the frame.

  Make sure that the discharge connection registers in the bore.

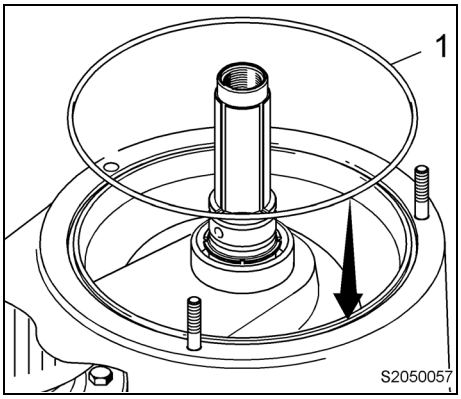


Fig. 219

- Insert gasket 1 in the groove of the discharge channel.

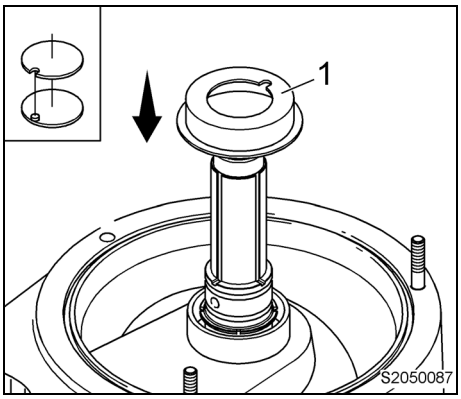


Fig. 220

- Fit the spindle cap 1.
- Pay attention to correct positioning!

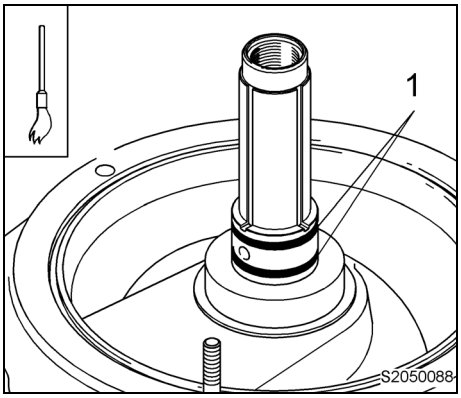


Fig. 221

- Fit two gaskets 1 in the grooves of the spindle.
- Grease gaskets and guide surfaces as per lubrication schedule.

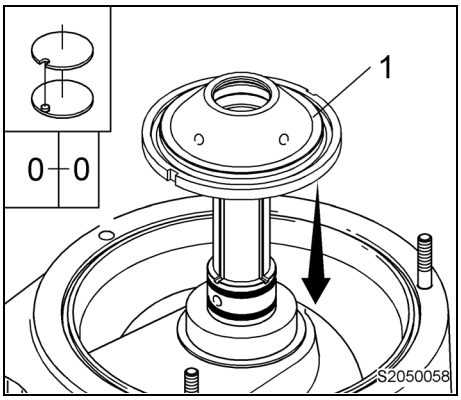


Fig. 222

- Place bottom 1 on the spindle.
- Pay attention to correct positioning!
- The ”O” marks on the bottom and spindle must be aligned.

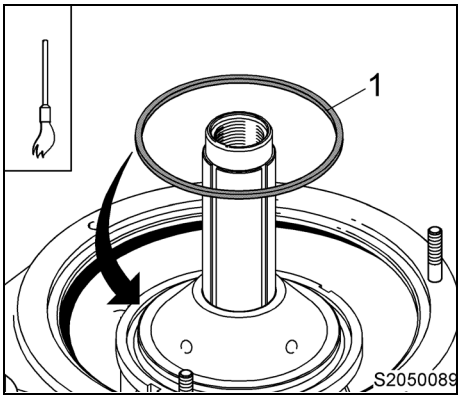


Fig. 223

- Insert gasket 1 in the groove of the bottom.
- Grease gasket as per lubrication schedule.

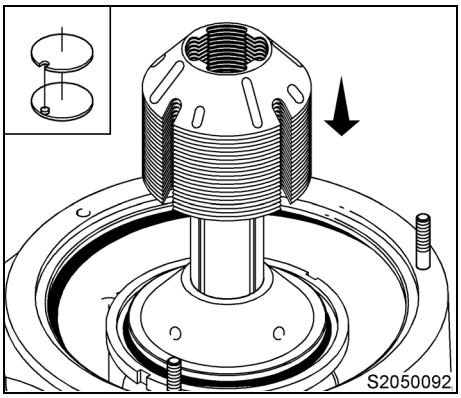


Fig. 224

- Place the disk stack on the spindle.
- Pay attention to correct positioning!

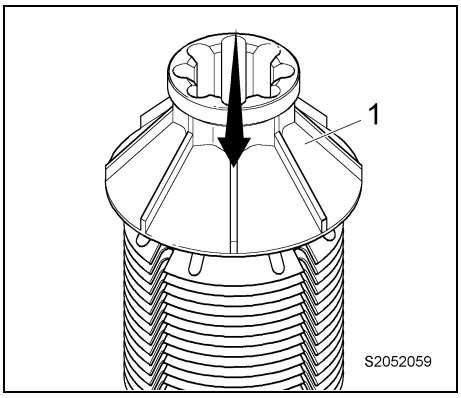


Fig. 225

OTC …-02… :

- Place separating disk 1 on the disk stack.

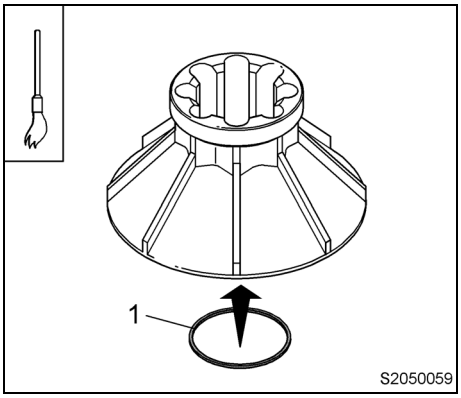


Fig. 226

OTC …-03-…:

- Insert gasket 1 in the groove of the separating disk.
- Grease gasket as per lubrication schedule.

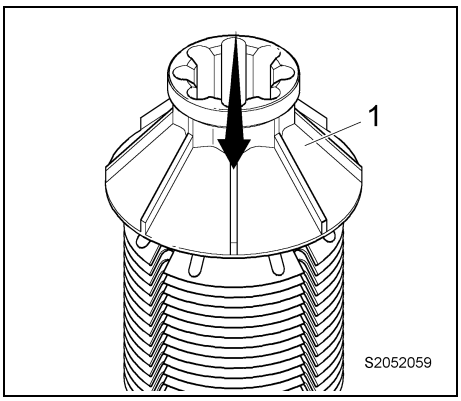


Fig. 227

OTC …-03-…:

- Place the separating disk 1 with inserted gasket on the disk stack.

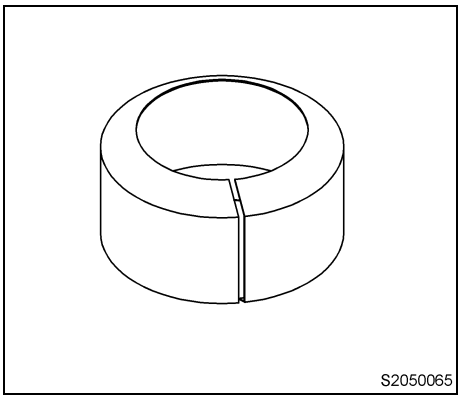


Fig. 228

- Fit the bowl insert as described in section 4.6.2.

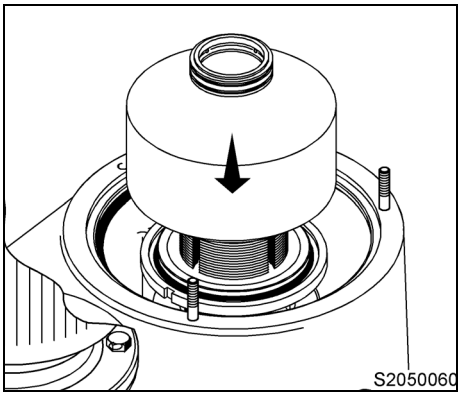


Fig. 229

- Fit the bowl shell with fitted bowl shell insert.

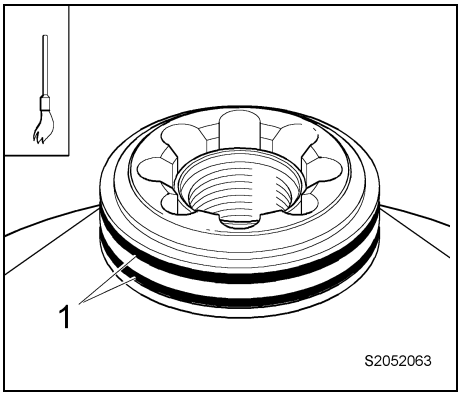


Fig. 230

OTC ...-02-... as clarifier or
OTC …-03-…

If necessary:

- Insert gaskets 1 in the grooves of the bowl shell.
- Grease gaskets and guide surfaces as per lubrication schedule.

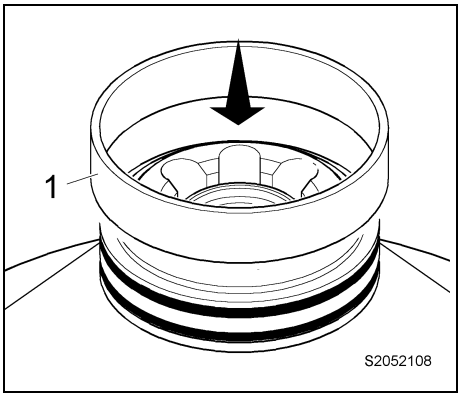


Fig. 231

OTC ...-02-... as clarifier or
OTC …-03-…

If necessary:

- Fit the lock ring 1.

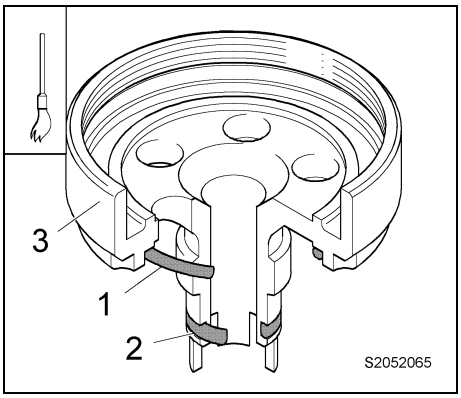


Fig. 232

- Insert gaskets 1 and 2 in the grooves of the threaded ring 3.
- Grease the gaskets, guide surfaces and threads as per lubrication schedule.

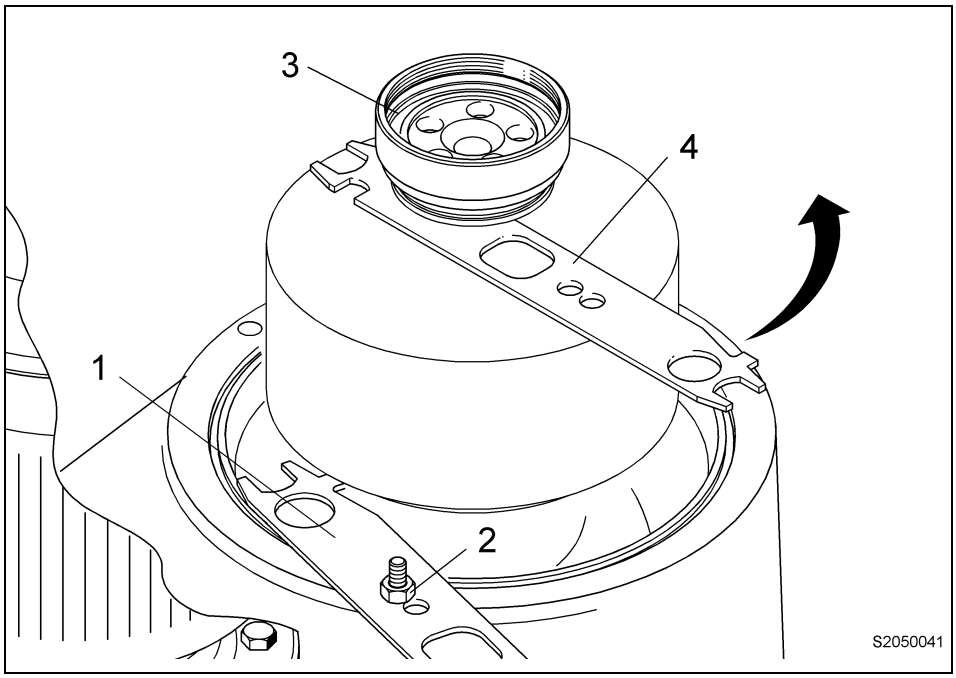


Fig. 233

- Fasten the bottom with hook wrench 1 and hexagon nut 2.
- Screw in threaded ring 3 using hook wrench 4 **(left-hand thread)**.

CAUTION:
A loose threaded ring can endanger life!

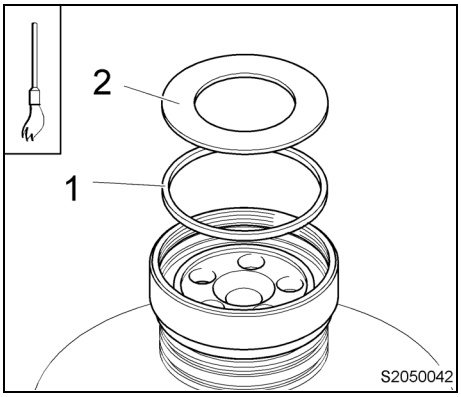


Fig. 234

- Insert gasket 1 in the groove of the threaded ring.
- Grease gasket and threads as per lubrication schedule.
- Mount the regulating ring 2 selected from the set of regulating rings (see section 2.9)

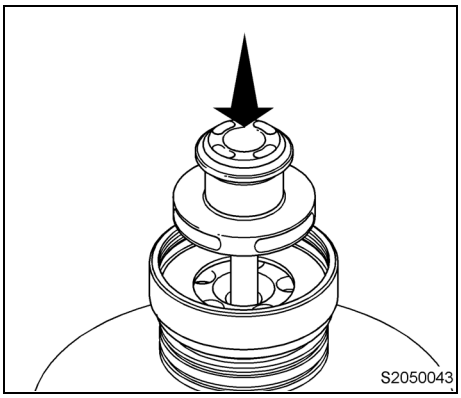


Fig. 235

- Install centripetal pump 1.

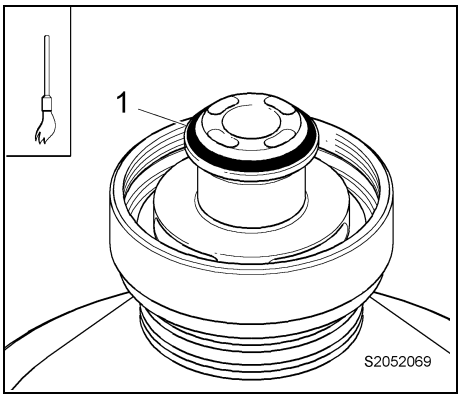


Fig. 236

- Insert gasket 1 in the groove of the centripetal pump.
- Grease gasket as per lubrication schedule.

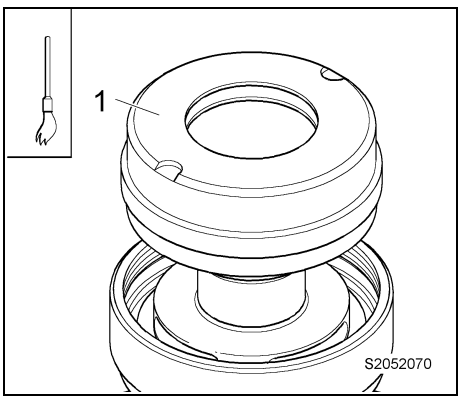


Fig. 237

- Grease threads and guide surfaces as per lubrication schedule.
- Mount centripetal pump chamber cover 1.

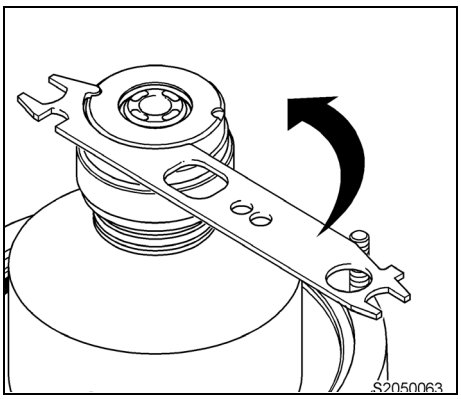


Fig. 238

- Bolt tight the centripetal pump chamber cover using the hook wrench **(left-hand thread)**.

CAUTION:
A loose centripetal pump chamber cover can endanger life!

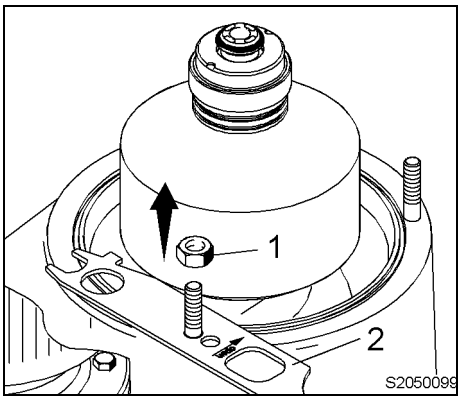


Fig. 239

- Remove hexagon nut 1 and hook wrench 2.

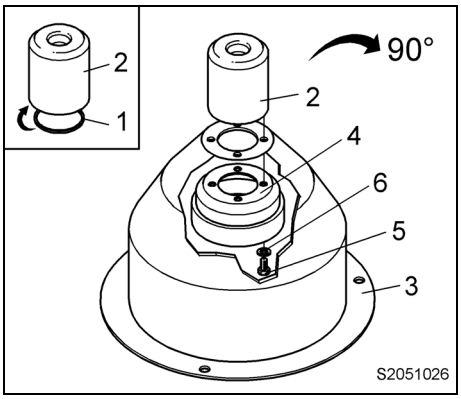


Fig. 240

OTC …-03… – hood of stainless steel

If the hood has been dismantled:

- Insert gasket 1 in the groove of the connection piece 2.
- Turn bowl through 90°.
- **Firmly** bolt tight hood 3, connection piece 2 and cap 4 with 5 hex head screws 4 and lock washers 6.
- Secure hex head screws 5 with Loctite 275.

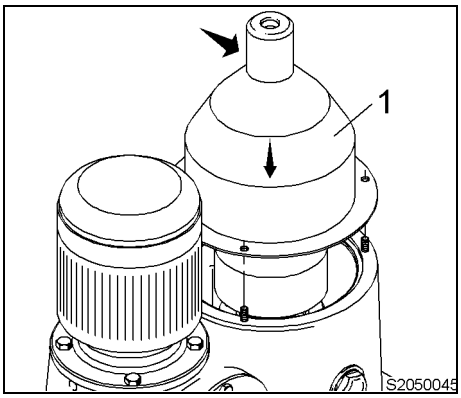


Fig. 241

- Mount hood 1.

  IMPORTANT:
  Do not damage the two studs!

  The connection threads of the corrugated hoses point towards the rear.

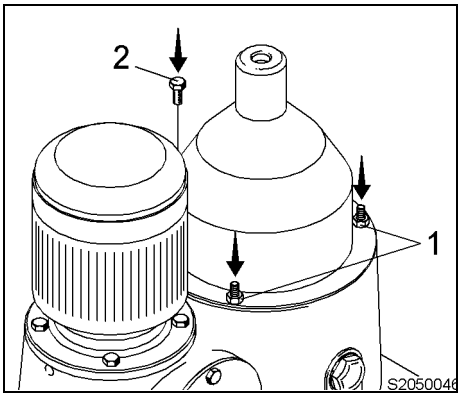


Fig. 242

- Bolt tight the hood by means of two hexagon nuts 1 and hex head screw 2.

OTC ...-02-... – Silumin hood:
Hex head screw 2 = M 10 x 30

OTC …-03… – hood of stainless steel:
Hex head screw 2 = M 10 x 25

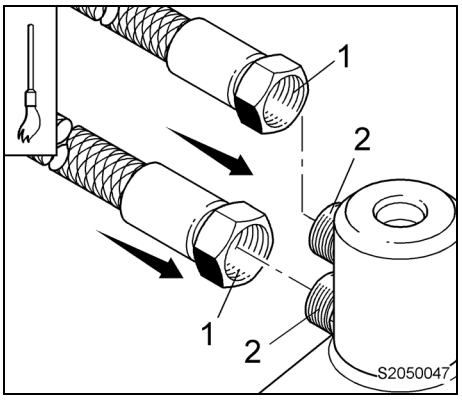


Fig. 243

If the corrugated hoses were dismantled:

- Grease threads as per lubrication schedule .
- Connect corrugated hoses 1.

Note:
The connectors 2 must be glued in with Loctite 245.

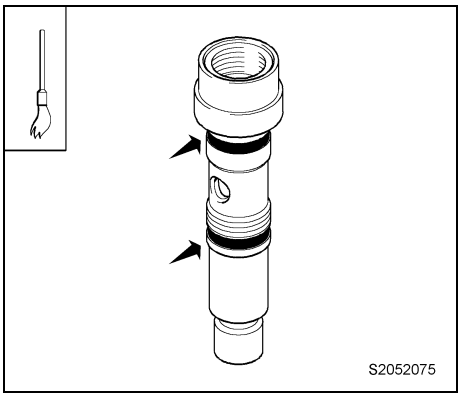


Fig. 244

- Fit two gaskets in the grooves of the handle connection piece.
- Grease the gaskets, guide surfaces and threads as per lubrication schedule.

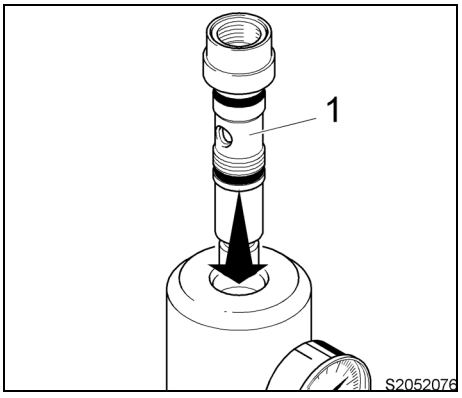


Fig. 245

- Fit handle connection piece 1 with fitted gaskets into the hood.

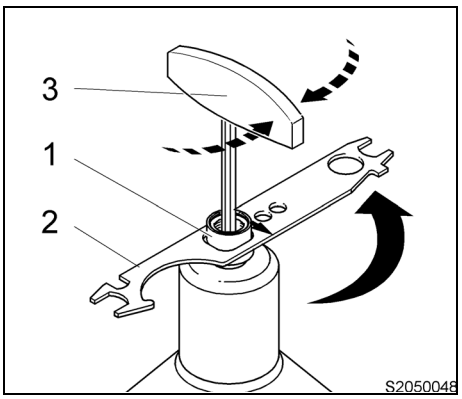


Fig. 246

- Tighten handle connection piece 1
  – by turning hook wrench 2 **counterclockwise** and
  – holding T-hexagon wrench 3.

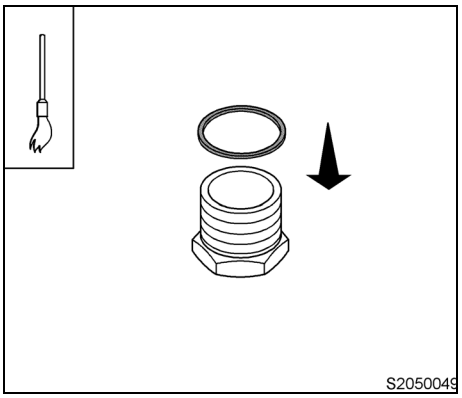


Fig. 247

- Insert the gasket in the groove of the screw plug.
- Grease gasket and threads as per lubrication schedule.

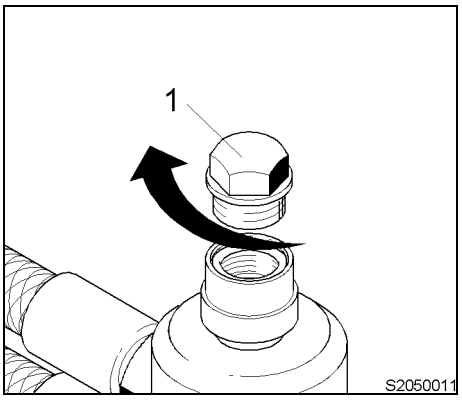


Fig. 248

- Screw plug 1 with fitted gasket into the hood **(right-hand thread)**.

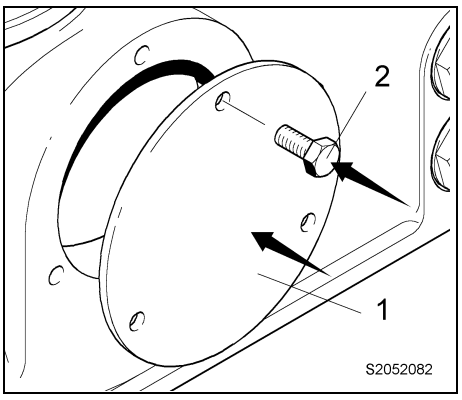


Fig. 249

- Fasten cover plate 1 with the three hex head screws 2 (M 10 x 20).

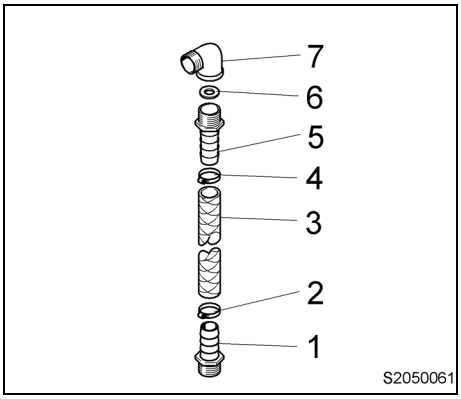


Fig. 250

OTC ...-02-...

- **Assemble the discharge line:**
  - Fit washer 6 on hose outlet 5 and screw into elbow 7.
  - Fit hose 3 on hose outlet 5 and tighten with hose clip 4.
  - Fit hose outlet 1 into hose 3 and tighten with hose clip 2.
- Seal all threads with Loctite 245.

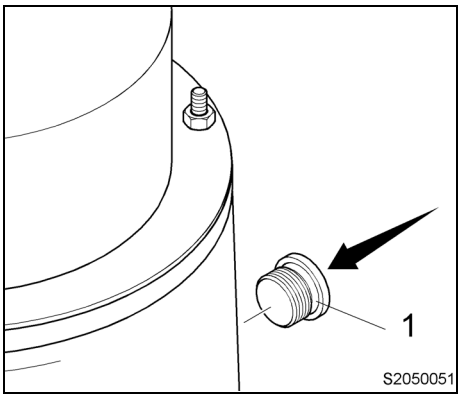


Fig. 251

OTC ...-03-...

Note:
The plug 1 is glued in with Loctite 245.

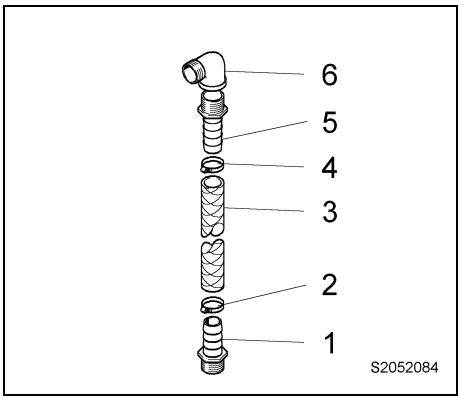


Fig. 252

OTC ...-03-...

- **Assemble the discharge line:**
  - Screw hose outlet 5 into elbow 6.
  - Fit hose 3 on hose outlet 5 and tighten with hose clip 4.
  - Fit hose outlet 1 into hose 3 and tighten with hose clip 2.
- Seal all threads with Loctite 245.

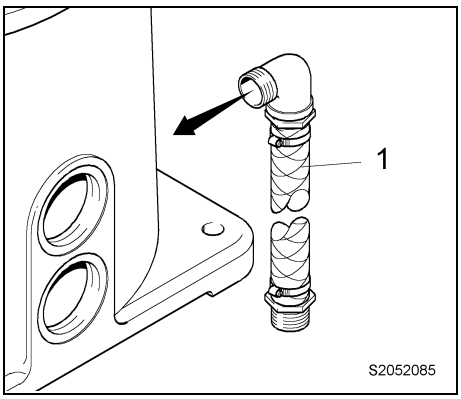


Fig. 253

- Connect discharge line 1.

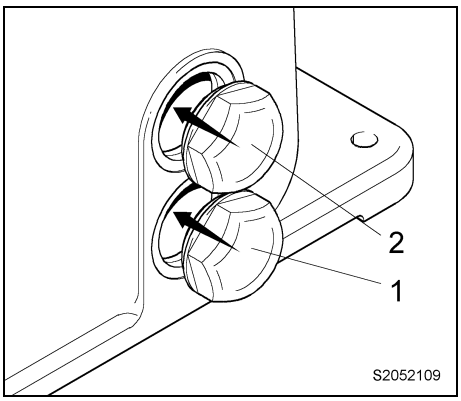


Fig. 254

- Screw in the sight glass 1.
- Fill in oil as described in section 4.3.3 and
- Screw in the sight glass 2.

Danger to life and limb through electric current!

- Have the motor connected by an authorized electrician!

4.6 Bowl shell insert

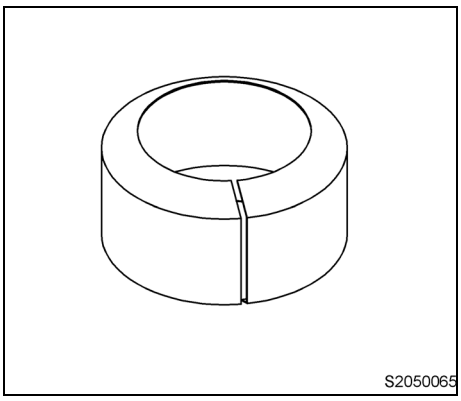


Fig. 255

The plastic insert has been adapted to the bowl shell both in terms of function and shape.

Note:
Each insert is designed for only one separating space.

Part Number	Qty.	Designation
see Parts List	1	Set of inserts (5 x)

4.6.1 Removing the insert

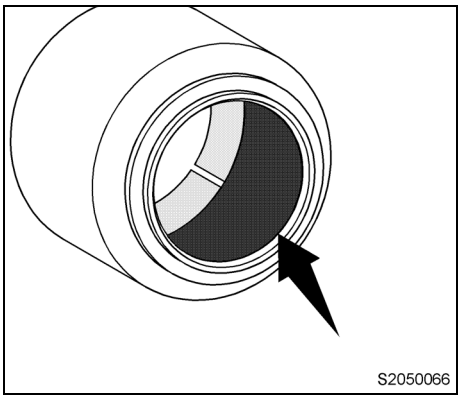


Fig. 256

Insert filled with solids

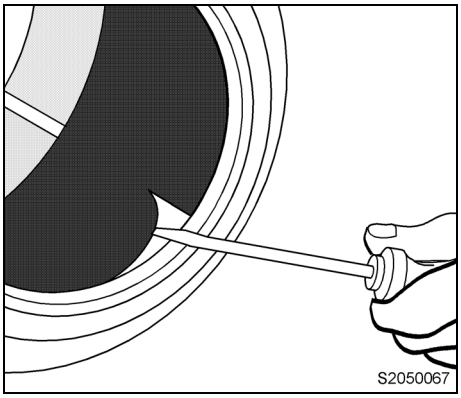


Fig. 257

- Raise one of the slotted edges of the insert with a screwdriver.

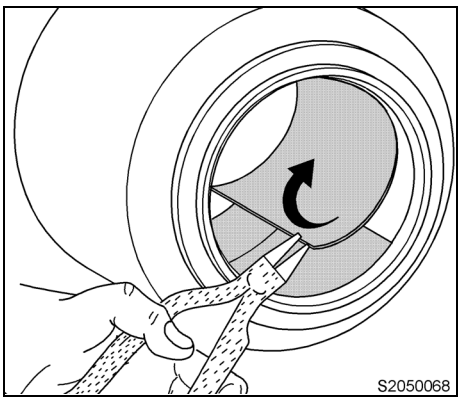


Fig. 258

- Clamp pliers to the insert and
- turn it in slightly.

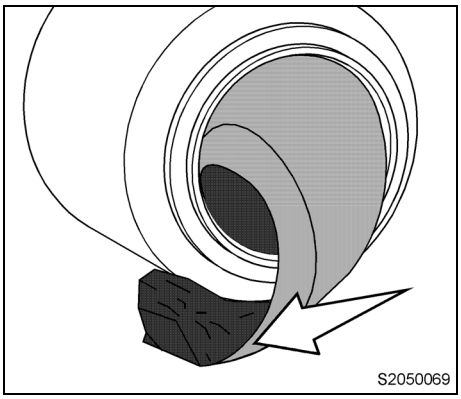


Fig. 259

- Pull out the insert.

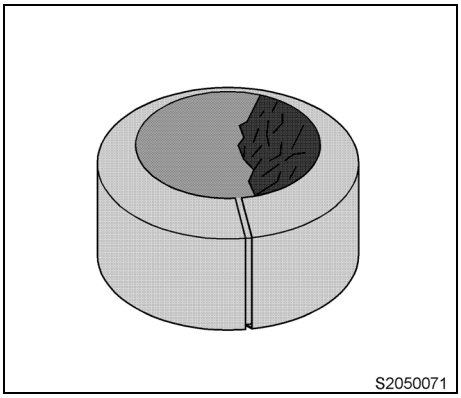


Fig. 260

- Dispose of the used insert and solids in accordance with the local disposal regulations.
- Replace the used insert with a new insert!

4.6.2 Fitting the insert

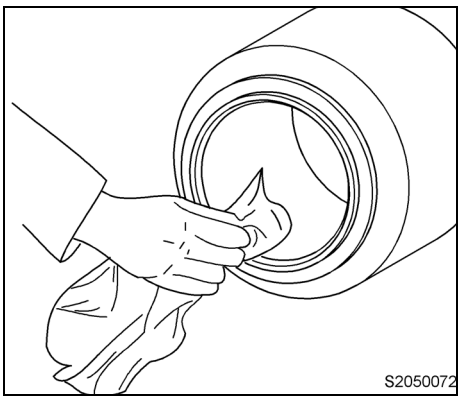


Fig. 261

- Thoroughly clean the bowl shell (see (4.5.1).

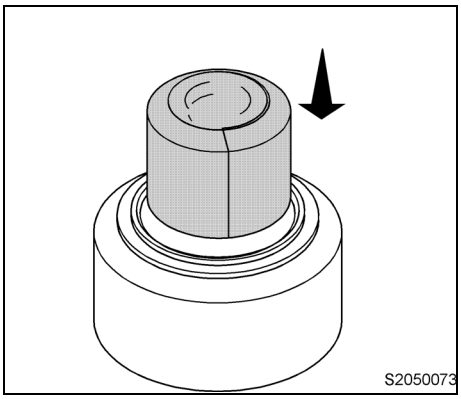


Fig. 262

- Roll around the insert and
- fit it in the bowl shell.

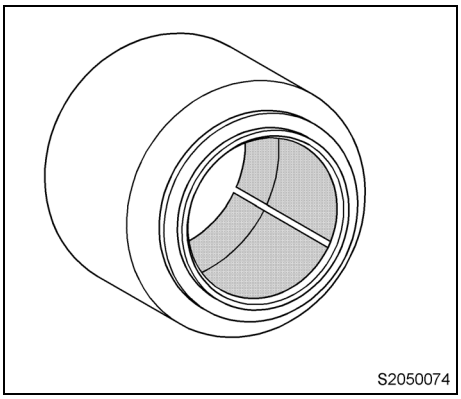


Fig. 263

- Make sure that
  - the insert is fitted evenly,
  - the insert rests against the inner surface of the bowl shell.

4.7 Before a long-term shut-down of the separator

- Thoroughly clean the separator and store in a dry place until it is put into operation again.
- Dry and grease the clean bowl parts and all unvarnished machine parts to avoid corrosion damage.
- Store the clean, greased bowl in a dry place until reuse.
- Store the gaskets in a cool, dry, dust-free dark room to prevent them from becoming brittle.
- Take off the drive belt.

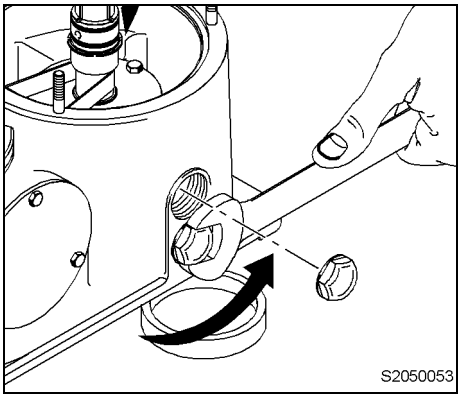


Fig. 264

Preserving the separator:

- Drain the lube oil. To do this:
  – loosen the sight glasses and
  – drain the oil into an oil pan (approx. 1.3 l).
- Screw back in the lower sight glass.

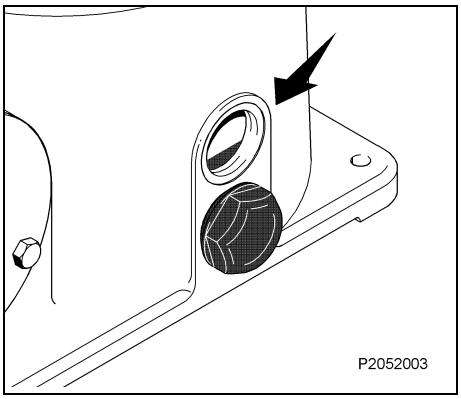


Fig. 265

- Fill the drive chamber with a slushing oil, e.g. Shell oil S.7294 (SAE 30/SAE 50), to the lower edge of the charge hole.
- Screw back in the upper sight glass.
- Let the separator run **without bowl** for approx. 1 minute to make sure that all drive parts are coated with slushing oil.

Note:
Observe the local regulations on disposal of the lubricating oil.

4.7.1 Before restarting

- Drain the slushing oil.
  Observe the local regulations on disposal of the slushing oil.

- Check gaskets.
  Replace damaged, very swollen, hardened or brittle gaskets **immediately**.

- Check spindle ball bearings.
  When damaged, replace the ball bearings **immediately** !
- Fit drive belt.
- Assemble the separator **correctly**.
- **OTC …-02-…:** Connect the float switch and check its function.
- Connect the hood limit switch and check that it is functional (see section 5.4).
- Fill the drive chamber with the specified lube oil as specified in section 4.3.3.

4.8 Standard tools

are commercially available tools to be supplied by the customer.

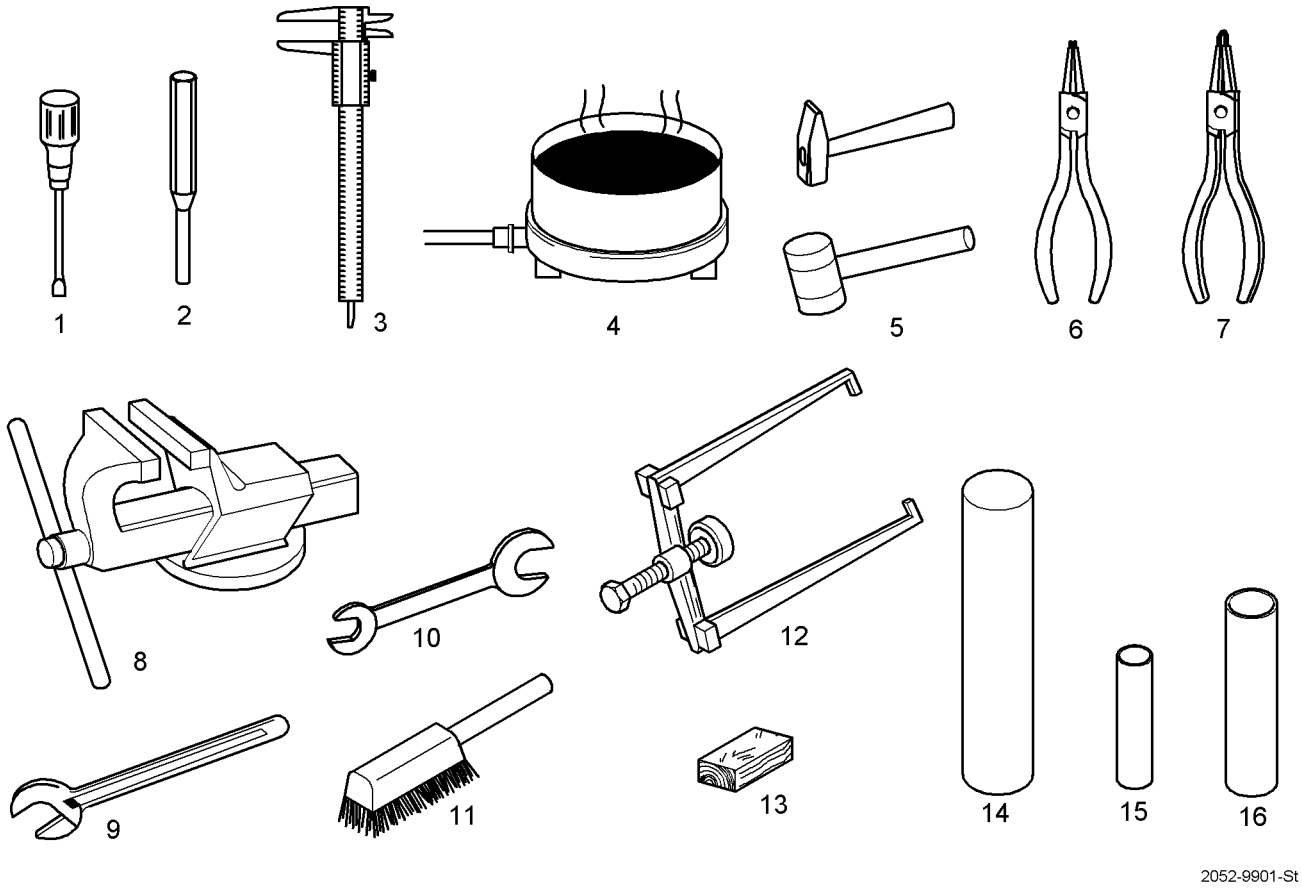


Fig. 266

Pos.	Designation
1	Screwdriver
2	Pin punch (Ø 5.5 mm)
3	Calliper gauge
4	Electric oil heater for ball bearings
5	Standard hammer and mallet
6	Pliers with inner, inclined snap jaws
7	Pliers with outer snap jaws
8	Vice
9	Wrench, adjustable
10	Open-ended wrench (various sizes)
11	Brushes
12	Pulling device
13	Wooden blocks
14	Plastic mandrel (Ø 43 - 45 mm, 300 mm long) Plastic mandrel (Ø 53 - 55 mm, 300 mm long)
15	Pipe (Ø 18 mm, 100 mm long)
16	Pipe (Ø 26 mm, 150 mm long)

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5 Accessories

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5.1 Starter box

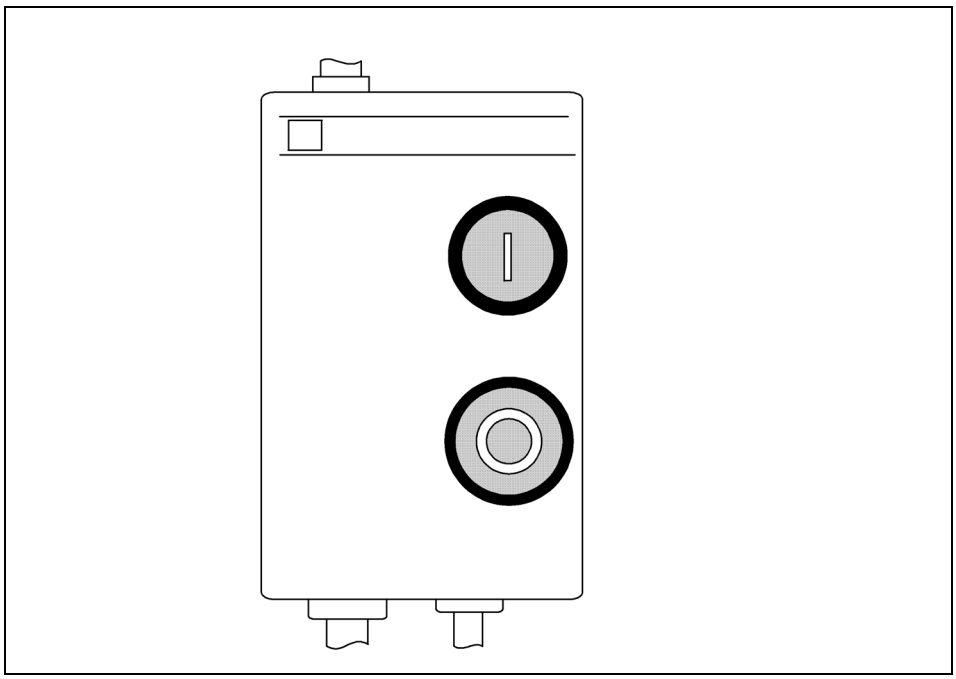


Fig. 267 Outer view of the starter box

I Button ON

O Button OFF

The starter box
- must be installed in the vicinity of the machine and
- in accordance with the following instructions and switching proposals.

Protection to be provided by the customer
The motor must be protected by the customer by implementing the measures specified in the electrical documentation.

5.1.1 Electrical connection

Open the starter box only when no voltage is carried.

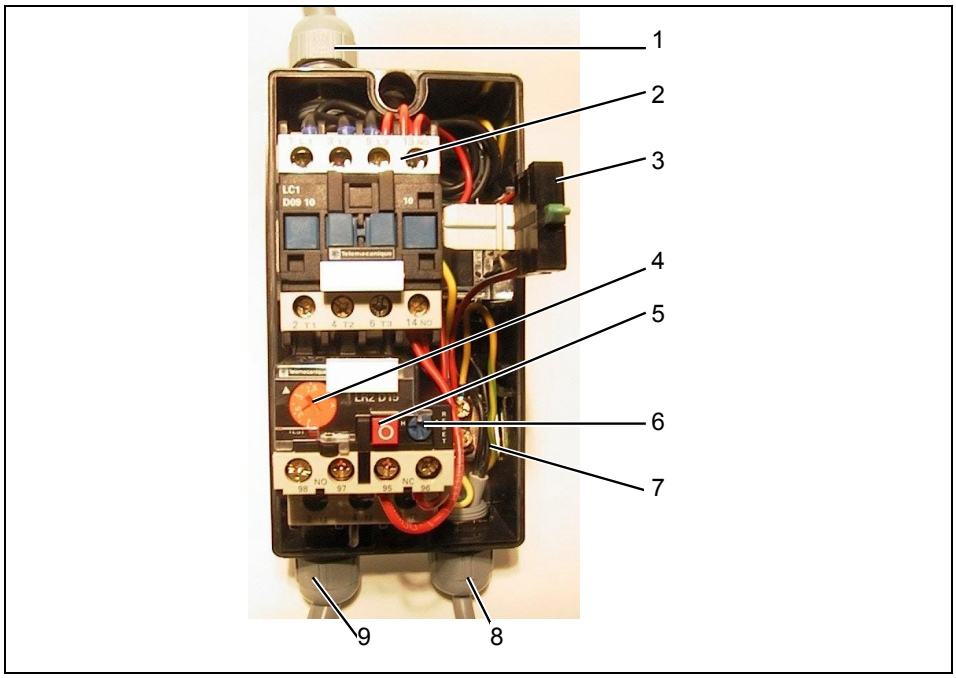


Fig. 268 Inner view of the starter box

1 4-lead feeder-in cable
2 Power contactor KM1
3 ON-switch block
4 Bimetal release F1 (set adjusting wheel to rated current)
Pay special attention to the electrical documentation!
5 Emergency-OFF device
6 Preselection for manual or automatic reset (set to A)
7 PE earthing connection
8 Optional cable connection for hood limit switch or
external Emergency-Off device (loop in between KM1 – terminal 14 – and F1 – terminal 96)
See order-specific electrical documentation.
9 4-lead motor connection cable

- Loosen the cover of the starter box.
- Lead the dead feed cable with at least 4 x 1.5 mm^2 Cu (for shipboard operation 3 x 1.5 mm^2 Cu) through the cable gland into the starter box and
- connect the corresponding leads in accordance with the following switching proposal:

L1	to terminal 1 of contactor KM1
L2	to terminal 3 of contactor KM1
L3	to terminal 5 of contactor KM1
PEN	to earthing terminal

- Lead the motor connecting cable with at least 4 x 1.5 mm^2 Cu (for shipboard operation 3 x 1.5 mm^2) through the cable gland into the starter box and
- connect the corresponding leads as follows:

L1	to terminal 2 of the bimetal relay F1
L2	to terminal 4 of the bimetal relay F1
L3	to terminal 6 of the bimetal relay F1
PEN	to earthing terminal

- Check the setting of the motor rated current at the bimetal relay F1. If necessary, correct the setting as per table (see section 4.2.3).
- Screw the cover on to the starter box.
- Check the function of the ON and OFF buttons.

Motor wiring diagrams

The operating voltage of the local network determines the type of connection of the motor.
The switching mode is stated on the motor nameplate.

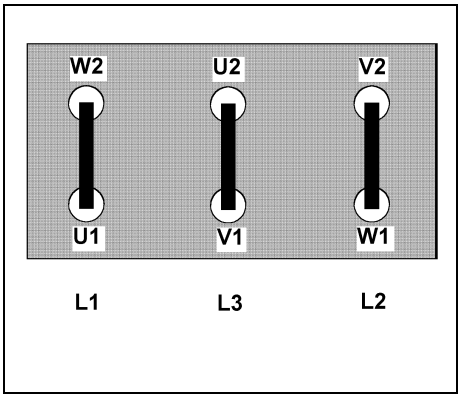


Fig. 269

Delta connection (counterclockwise rotating field)

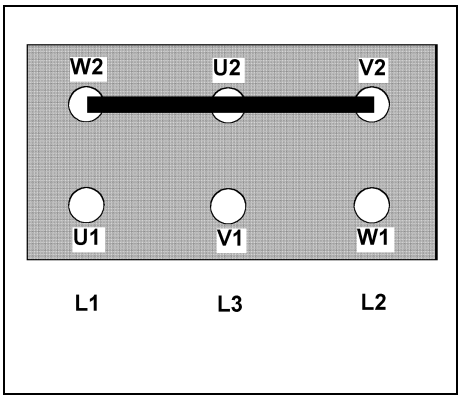


Fig. 270

Star connection (counterclockwise rotating field)

- Remove the cover of the terminal box.

- Connect the motor cable as follows:
  L1 to terminal U1 of the motor
  L2 to terminal W1 of the motor
  L3 to terminal V1 of the motor
  PEN to the earthing terminal of the motor

- Check the position of the studs in the terminal box (delta or star connection).

- Screw the cover onto the terminal box.
- Release the supply voltage to the starter box.
- Actuate the ON and OFF buttons on the starter box successively.

- Check the direction of rotation of the motor by means of the direction of rotation arrow.
  If necessary, **two** phases of the motor lead-in cable must be interchanged.

5.2 Evaluating unit

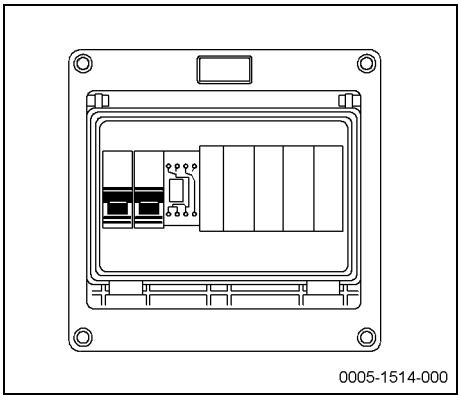


Fig. 271

The evaluating unit
– is used only on the separator version OTC **…-02-…** .
– serves to evaluate the alarm of the float switch.
– is connected in accordance with the furnished circuit diagram (see electrical diagram).

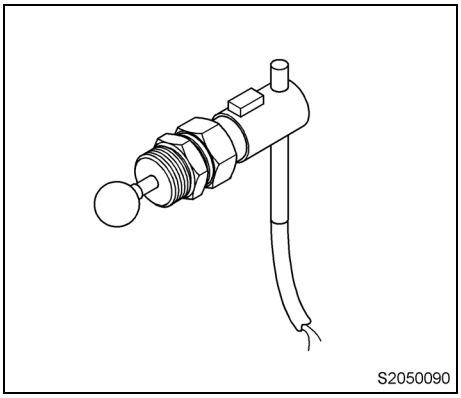
Part-No. see parts list

5.3 Flow detector

The flow detector consists of the main components

- float switch and
- orifice plate
  (built into the heavy liquid discharge line (OTC **…02-…**).

5.3.1 Float switch



Float switches with reed contact

Fig. 272

Technical data

Part-No.	0005-4112-600
Material	CuZn-PVDF
Design	type tested
Float	PVDF ball
Fitting position	horizontal
Minimum density	0.78 kg/dm³

Electrical connection

- **Pay special attention to the electrical documentation!**

Caution: Danger to life through electrical voltage!

- Disconnect the power supply to the electrical installation before connecting the strands of the connecting line.

  brown-blue = connections for the reed contact

  The reed contact double (protection class II) is integrated in a plastic sleeve.

IMPORTANT:
The maximum electrical contact rating stated on the nameplate may under no circumstances be exceeded as otherwise the reed contact integrated in the switch unit will get damaged.

In the case of inductive loads, the switching capacity is reduced. Information on reverse voltage dividers can be obtained from Westfalia Separator Mineraloil Systems GmbH.

Fitting instructions

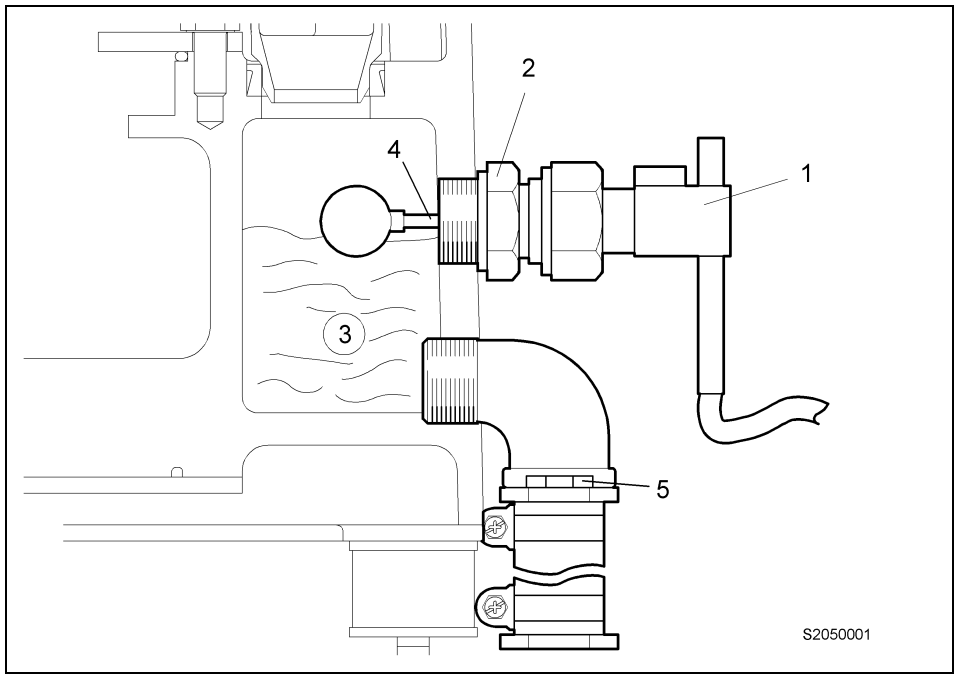


Fig. 273

1 Float switch

2 Coupling nut

3 Medium

4 Rocker rod

5 Orifice plate (8.5 x 20 x 2)

- Fit float switch in accordance with Fig. 273.
- Make sure that
  - the rocker rod 4 can move freely with the float.
  - orifice plate 5 is fitted.
    (The orifice plate is used to set a level in the case of oil carry-over to the water side.)
- Check that the float switch is fitted **vertically**.

  For possible alignment of the float switch
  - lossen coupling nut (SW 32),
  - align the float switch (see Fig. 274) and
  - re-tighten the coupling nut.
    Torque: **max. 30 Nm**

IMPORTANT:
There may be no external magnetic fields in the direct vicinity of the float switch which impair the function of the device.

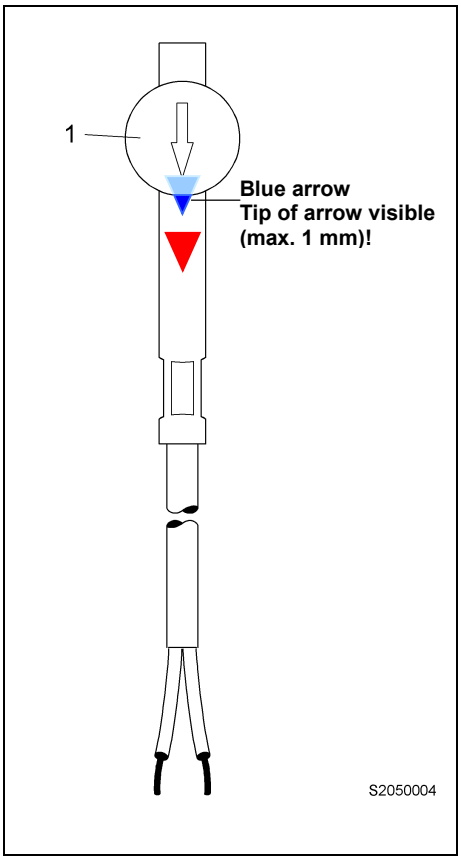


Fig. 274

Basic setting:

Switching contact NC (blue arrow)

- To adjust the switch unit, undo the arresting screw 1 (hexagon socket jaw span 1.5).
- Displace the switch unit until the **blue tip of the arrow is max. 1 mm** visible at the inlet of the guide of the desired switching contact NC (see Fig. 274).
- After adjustment, re-tighten arresting screw 1.

5.4 Hood limit switch

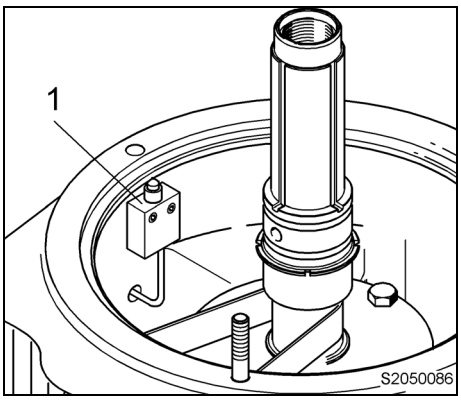


Fig. 275

The hood limit switch 1

- **must** be installed for safety reasons.
- prevents the motor from being switched on when the hood is open.

Technical data

Part-No.		0005-4416-280
Rated insulation voltage U_i		500 V
Conventional thermal current I_{th}		10 A
Ambient temperature		-35 °C to +85 °C (-31 – 185 °F)
Connecting cable (2 m)		V5F-5 x 0.75 mm² (18 AWG)
	brown-blue	NO contact
	black-black	NC contact
	yellow/green	PE
Enclosure		IP 67

Important instructions

In this version, the coil voltage of the power contactor is connected to the voltage between two external conductors of the three-phase network.

When installing a hood limit switch or an external emergency-off device, they must be looped in at the connection points F1 (terminal 96) and contactor KM1 (terminal 14) (see section 5.1.1).

CAUTION: Danger to life through electrical voltage!

- Disconnect the power supply to the electrical installation before connecting the strands of the connecting line.

  brown-blue = NO contact

The reset device following response of the motor protection can optionally be set to

- H = manual reset, i.e. the button must be pressed prior to the re-start.
- A = automatic reset, i.e. the motor can be directly started by means of the ON button.

When the bimetal release responds, the power contactor KM1 switches off the motor.

Check the motor for overload or check the rated current setting at the bimetal release F1.

5.5 Flowmeter

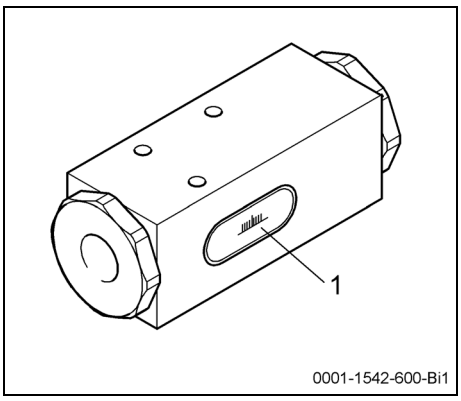


Fig. 276

The flowmeter
- is equipped with a display 1 at the side,
- is fitted **horizontally**.

  IMPORTANT:
  The fitting position influences the adjusting range!
- is maintenance-free!

In case of electrical faults

- Switch off main switch.

Technical data

Part-No.	0001-1542-600
Nominal width	DN 15 – G 1/2
Adjusting range (horizontal)	2 – 30 l/min – 20 cSt
Tolerance	±5 % from final value
Media temperature	max. 120 °C (120.00 °C)
Material	CuZn
Weight	1.1 kg

6 Parts list

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Guide to ordering spare parts

A rapid and correct supply of spare parts can only be guaranteed if your order includes the following details:

- Separator model — see nameplate
  e.g. OTC 3-02-137
- Serial-No. — see nameplate
  e.g. 9000-223
- Designation — see parts list
  e.g. frame
- Part-No. — see parts list
  e.g. 2050-1100-020
  The part number is also marked on almost all the individual parts.

Only when ordering spare parts for bowls:

- Bowl S/N — see bowl lock ring, bowl bottom or bowl shell
  if different from the machine serial number.

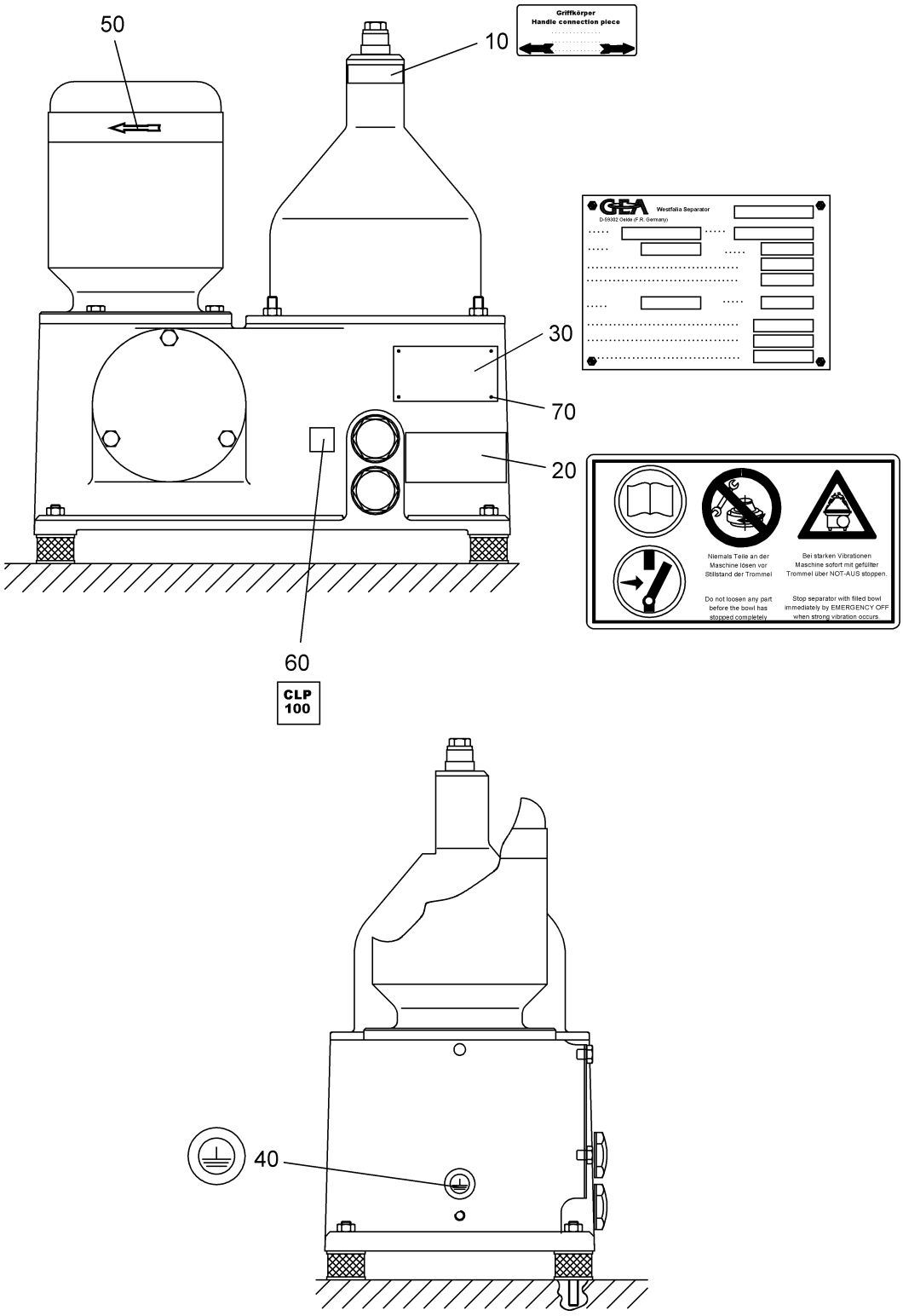
Only required when ordering pare parts for pump and pump connection parts:

- Model and number of pump — see pump nameplate

The details **must** be complete when the part number ends with a letter (e.g. 2050-6600-L), since this indicates that the parts are available in different designs.

Fig. 277

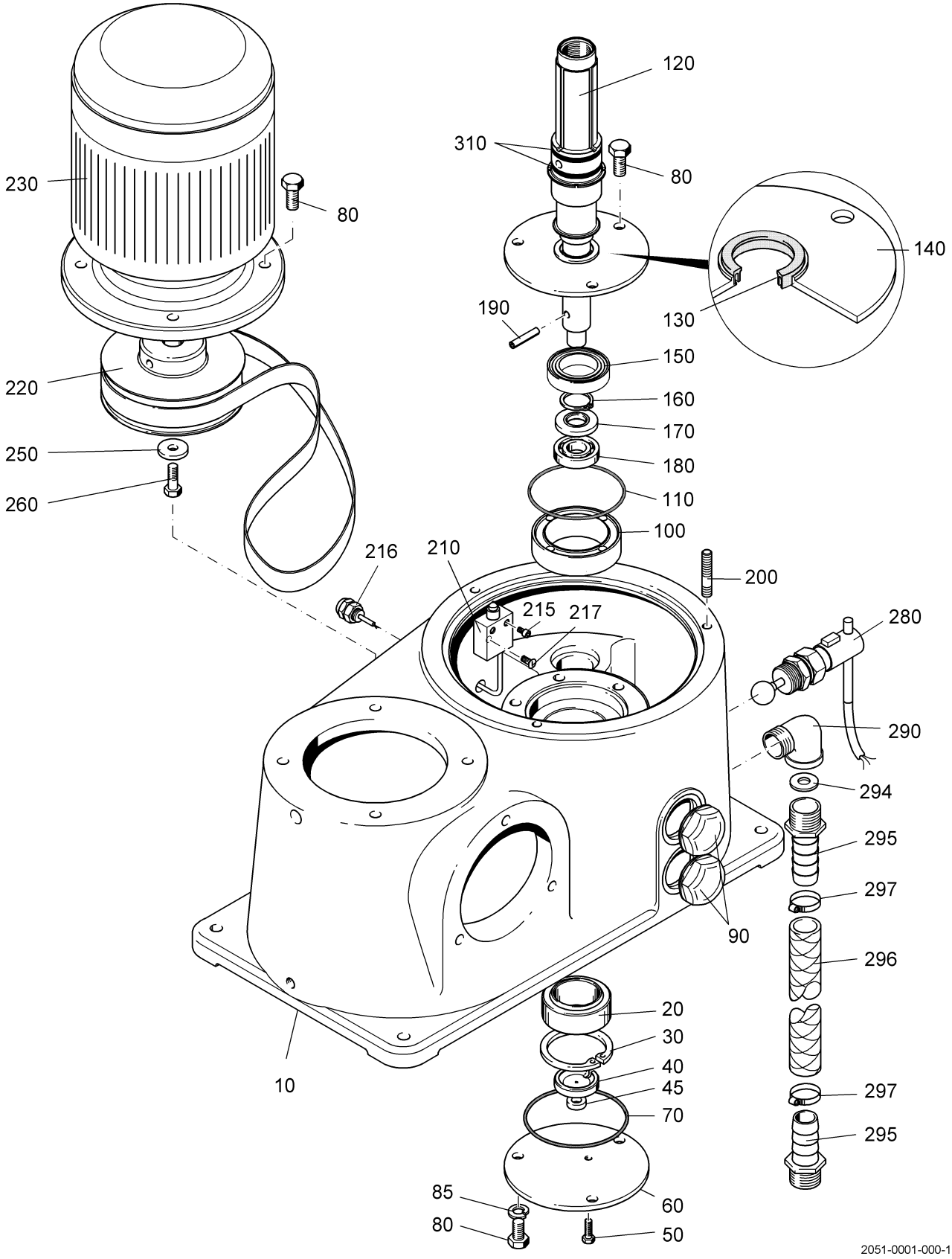
- **Use only genuine spare parts from Westfalia Separator.**
  The use of non-genuine parts leads to:
  – safety risks,
  – less durability and availability,
  – increased service requirement.
  If a safety risk occurs, this may have legal consequences for the responsible persons. In such cases, Westfalia Separator accepts no liability or warranty claims.



0024-4290-000

Fig. 278

Pos.	Part Number	Qty.		Designation
-	**0024-4290-010**	**1**		**Set of plates**
10	0024-6327-000	1		Adhesive plate
20	0024-6426-000	1		Plate
30	0024-3413-010	1		Nameplate
40	0024-5380-000	1		Plate
50	0024-5220-000	1		Decal "arrow"
60	0024-5049-000	1		Adhesive plate
70	0026-1571-300	4		Grooved drive stud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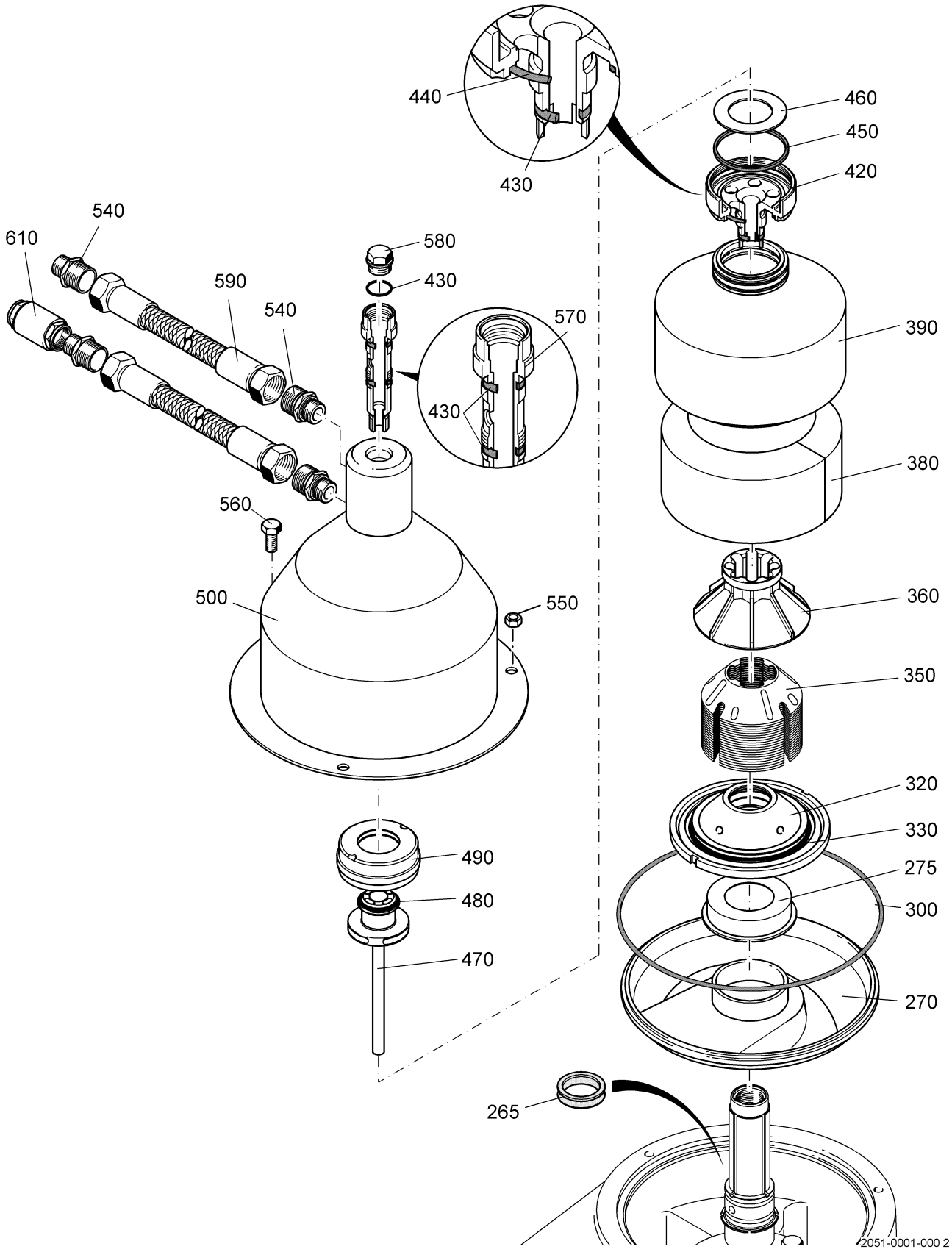
2051-0001-000-1

Fig. 279

Pos.	Part Number	Qty.		Designation
-	**2051-0001-000**	**1**		**Separator complete (OTC 3-02-137)**
10	2050-1001-010	1		Lower section of frame
20	0011-8040-000	1		Pivoting bearing, complete
30	0026-5849-170	1		Retaining ring
40	0010-4001-010	1		Bottom bearing pressure piece
45	0007-2070-830	1		Gasket
50	0019-6841-400	1		Hex head screw
60	2050-3375-010	1		Bearing cover
70	0007-2608-750	1		Gasket
80	0019-6933-400	13		Hex head screw
85	0026-1337-300	3		Lock washer
90	0001-0926-800	2		Sight glass
100	0008-2533-010	1		Rubber-metal cushion
110	0007-2608-750	1		Gasket
120	2050-3410-000	1		Spindle
130	0004-1949-830	1		Radial packing ring
140	2050-3375-000	1		Bearing cover
150	0011-6205-040	1		Grooved ball bearing
160	0026-5861-170	1		Retaining ring
170	0008-1708-010	1		Ball bearing protection ring
180	0011-6203-040	1		Grooved ball bearing
190	0026-0310-170	1		Dowel pin
200	0019-7640-400	2		Stud
210	0005-4416-280	1		Limit switch
215	0019-6094-300	2		Allen screw
216	0005-4486-900	1		Cable gland
217	0019-9389-400	1		Countersunk screw
220	see page 163	1		Set of drive parts
230	as per order	1		Motor
250	0026-2417-400	1		Washer
260	0019-6903-300	1		Hex head screw
280	0005-4112-600	1		Float switch
290	0018-0022-260	1		Angle
294	0026-1875-300	1		Washer
295	0018-1797-600	2		Hose outlet
296	0018-2793-758	0.200 m		Hose
297	0018-5318-310	2		Hose clip
310	0007-2925-750	2		Gasket
600	2050-1120-000	1		Cover plate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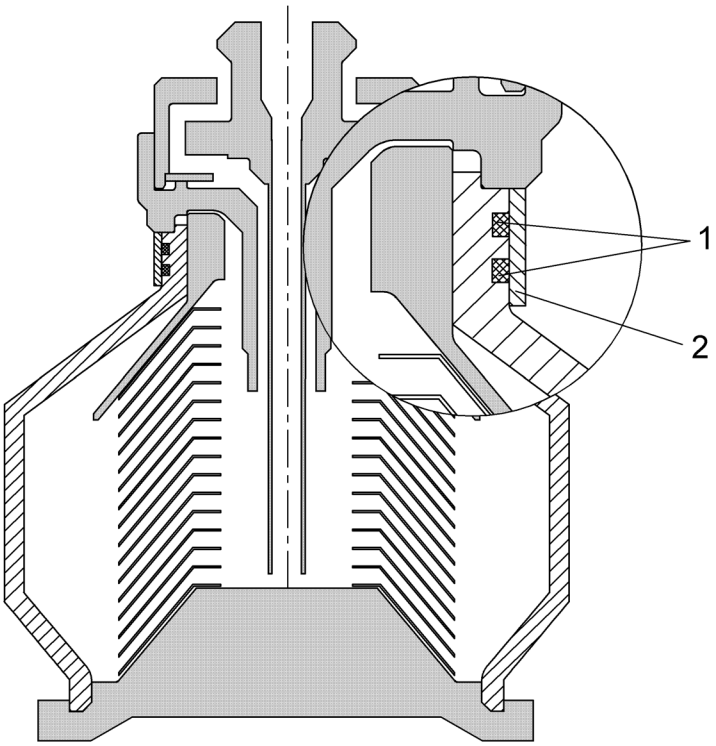
2051-0001-000 2

Fig. 280

Pos.	Part Number	Qty.		Designation
265	0007-2387-750	1		Gasket
270	2050-1268-020	1		Discharge channel
275	2050-1467-010	1		Cap
300	0007-2706-750	1		Gasket
320	2051-6699-000	1		Bottom, compl.
330	0007-2581-750	1		Gasket
350	2051-6663-000	60		Disks, complete
360	2051-6652-000	1		Separating disk
380	2051-6696-000	1		Insert
390	2051-6489-000	1		Bowl shell
420	2051-6464-000	1		Threaded ring
430	0007-2983-750	4		Gasket
440	0007-2534-750	1		Gasket
450	0007-1735-750	1		Gasket
460	2050-6691-000	1		Set of regulating rings
470	2051-2213-000	1		Centripetal pump, compl.
480	0007-1936-750	1		Gasket
490	2050-6642-010	1		Centripetal pump chamber cover
500	2050-8808-010	1		Hood
540	0018-6676-030	4		Connector
550	0013-0279-300	2		Hexagon nut
560	0019-6937-400	1		Hex head screw
570	2050-2191-000	1		Handle connection piece
580	0019-8907-300	1		Screw plug
590	see page 165	2		Corrugated hose, compl.
610	0018-6282-600	1		Non-return valve, compl.



P2050001

Fig. 281

Pos.	Part-No.	Qty.		Designation
				Conversion parts for clarifier operation (OTC …-02-…)
1	0007-2539-750	2		Gasket
2	2051-6631-000	1		Lock ring

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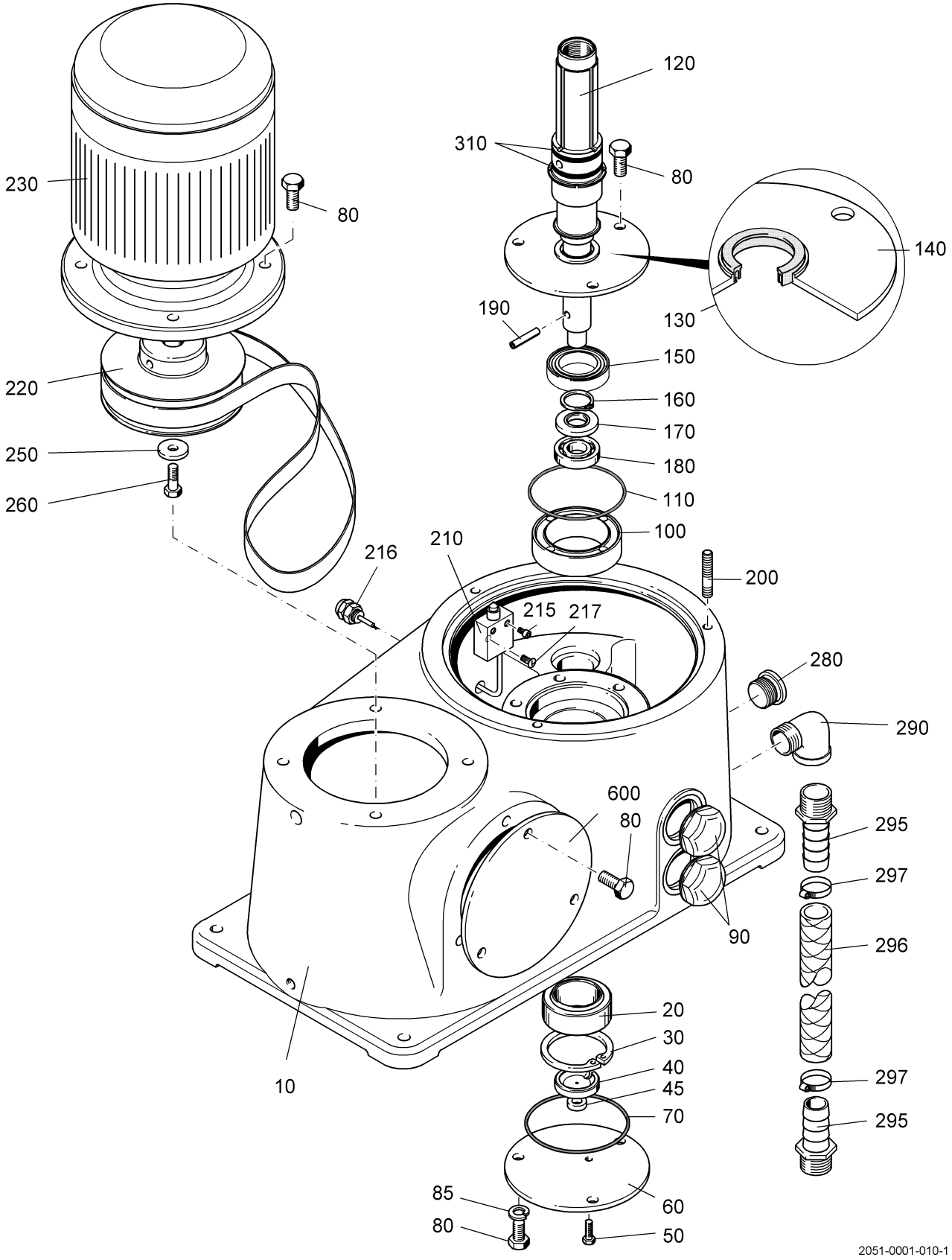
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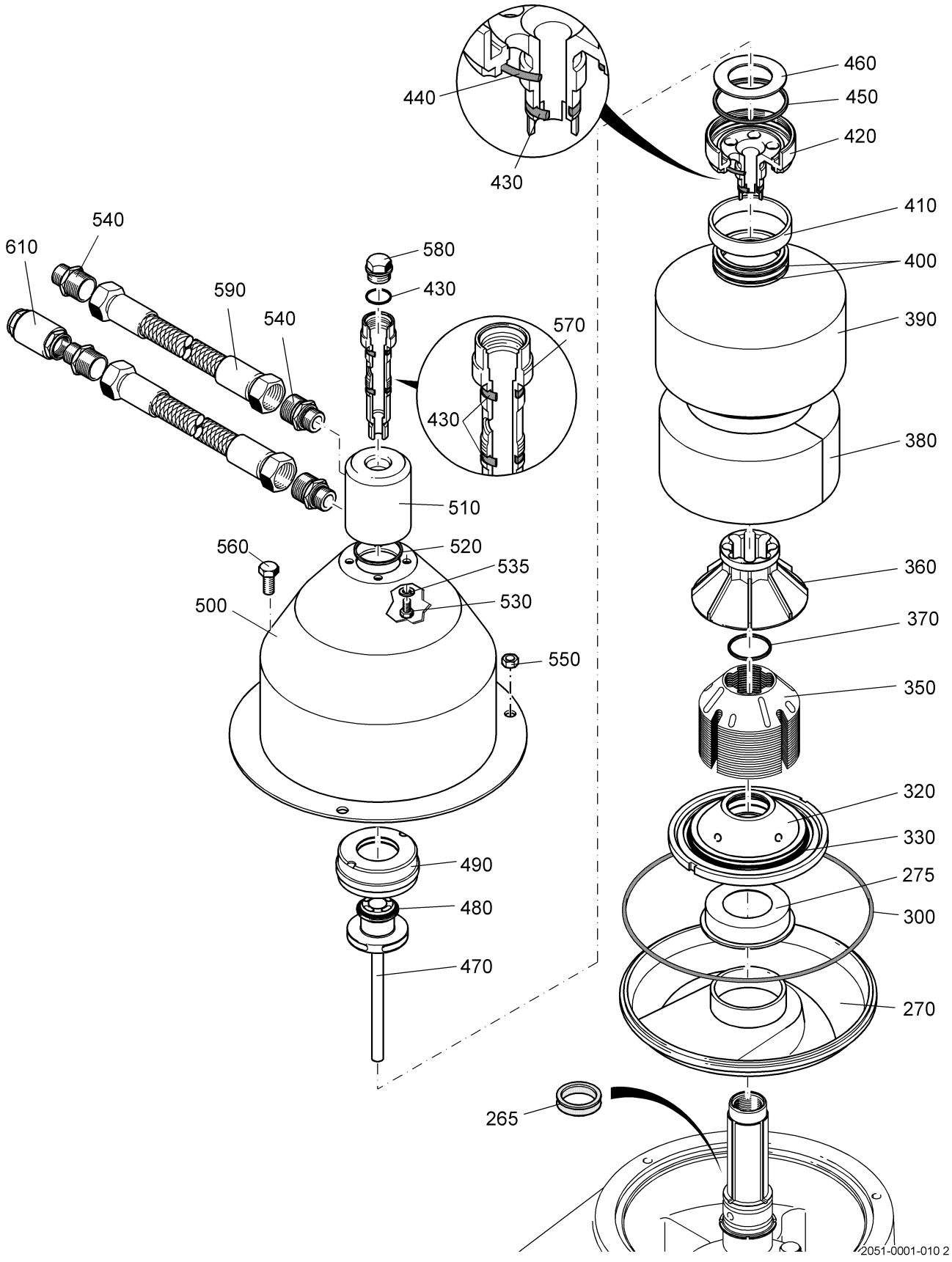
2051-0001-010-1

Fig. 282

Pos.	Part Number	Qty.		Designation
-	**2051-0001-010**	**1**		**Separator complete (OTC 3-03-107)**
10	2050-1001-010	1		Lower section of frame
20	0011-8040-000	1		Pivoting bearing, complete
30	0026-5849-170	1		Retaining ring
40	0010-4001-010	1		Bottom bearing pressure piece
45	0007-2070-830	1		Gasket
50	0019-6841-400	1		Hex head screw
60	2050-3375-010	1		Bearing cover
70	0007-2608-750	1		Gasket
80	0019-6933-400	13		Hex head screw
85	0026-1337-300	3		Lock washer
90	0001-0926-800	2		Sight glass
100	0008-2533-010	1		Rubber-metal cushion
110	0007-2608-750	1		Gasket
120	2050-3410-000	1		Spindle
130	0004-1949-830	1		Radial packing ring
140	2050-3375-000	1		Bearing cover
150	0011-6205-040	1		Grooved ball bearing
160	0026-5861-170	1		Retaining ring
170	0008-1708-010	1		Ball bearing protection ring
180	0011-6203-000	1		Grooved ball bearing
190	0026-0310-170	1		Dowel pin
200	0019-7640-400	2		Stud
210	0005-4416-280	1		Limit switch
215	0019-6094-300	2		Allen screw
216	0005-4486-900	1		Cable gland
217	0019-9389-400	1		Countersunk screw
220	see page 163	1		Set of drive parts
230	as per order	1		Motor
250	0026-2417-400	1		Washer
260	0019-6903-300	1		Hex head screw
280	0018-0991-260	1		Plug
290	0018-0022-260	1		Angle
295	0018-1797-600	2		Hose outlet
296	0018-2793-758	0.200 m		Hose
297	0018-5318-310	2		Hose clip
310	0007-2925-750	2		Gasket
600	2050-1120-000	1		Cover plate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2051-0001-010 2

Fig. 283

Pos.	Part Number	Qty.		Designation
265	0007-2387-750	1		Gasket
270	2050-1268-020	1		Discharge channel
275	2050-1467-010	1		Cap
300	0007-2706-750	1		Gasket
320	2051-6699-010	1		Bottom, compl.
330	0007-2581-750	1		Gasket
350	2051-6663-020	60		Disks, complete
360	2051-6652-010	1		Separating disk
370	0007-1943-750	1		Gasket
380	2051-6696-000	1		Insert
390	2051-6489-000	1		Bowl shell
400	0007-2539-750	2		Gasket
410	2051-6631-000	1		Lock ring
420	2051-6464-000	1		Threaded ring
430	0007-2983-750	4		Gasket
440	0007-2534-750	1		Gasket
450	0007-1735-750	1		Gasket
460	2050-6691-000	1		Set of regulating rings
470	2051-2252-000	1		Centripetal pump, compl.
480	0007-1936-750	1		Gasket
490	2050-6642-010	1		Centripetal pump chamber cover
500	2050-7765-000	1		Hood
510	2050-7095-000	1		Connection piece
520	0007-1914-750	1		Gasket
530	0019-6840-400	4		Hex head screw
535	0026-1324-300	4		Lock washer
540	0018-6676-030	4		Connector
550	0013-0279-300	2		Hexagon nut
560	0019-6935-400	1		Hex head screw
570	2050-2191-000	1		Handle connection piece
580	0019-8907-300	1		Screw plug
590	see page 165	2		Corrugated hose, compl.
610	0018-6282-600	1		Non-return valve, compl.

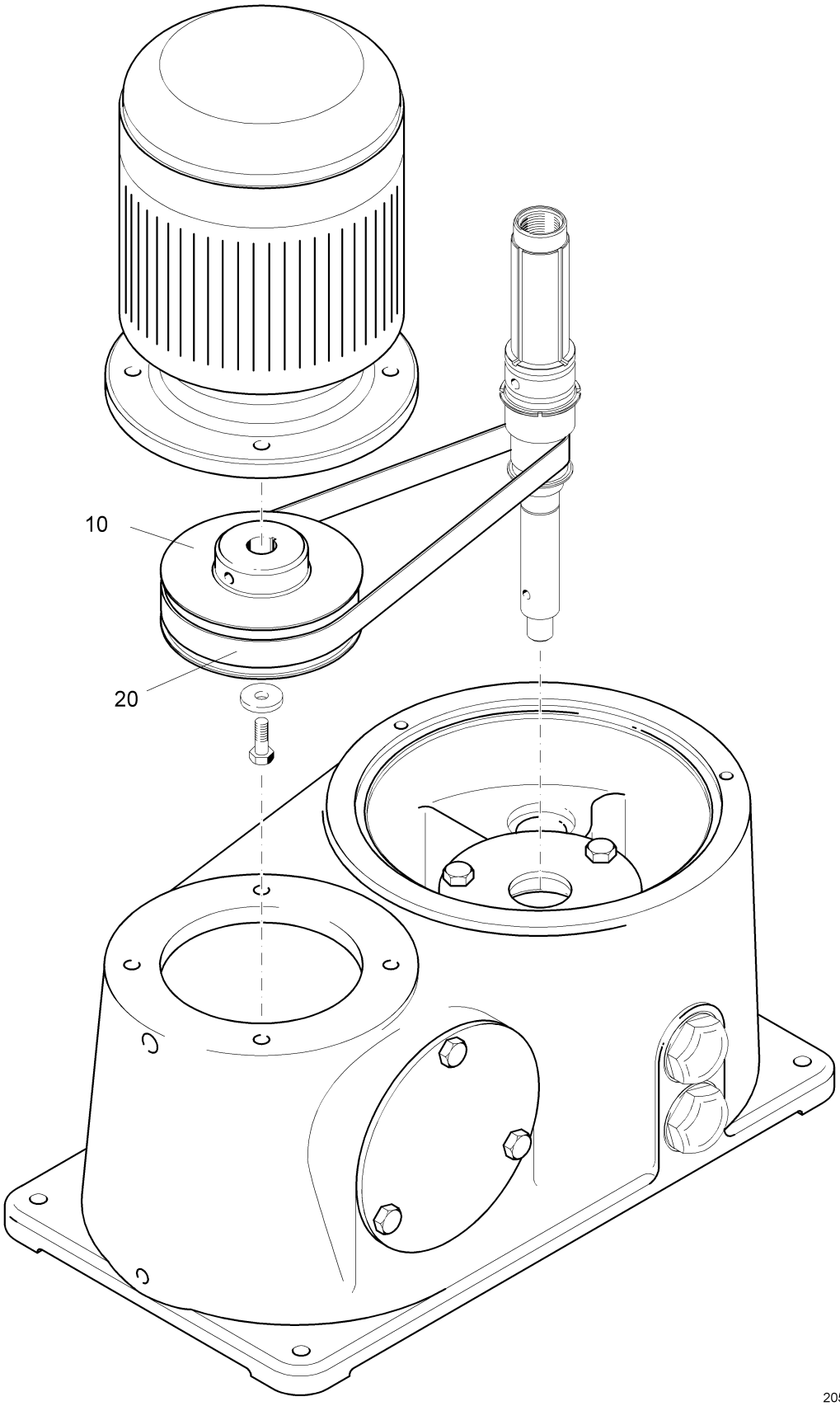

Fig. 284

Pos.	Part-No.	Qty.		Designation
-	**2050-3050-000**	**1**		**Set of drive parts – 50 Hz**
10	2050-3474-000	1		Flat belt pulley
20	0021-3214-900	1		Drive belt

Pos.	Part-No.	Qty.		Designation
-	**2050-3060-000**	**1**		**Set of drive parts – 60 Hz**
10	2050-3474-010	1		Flat belt pulley
20	0021-3212-900	1		Drive belt

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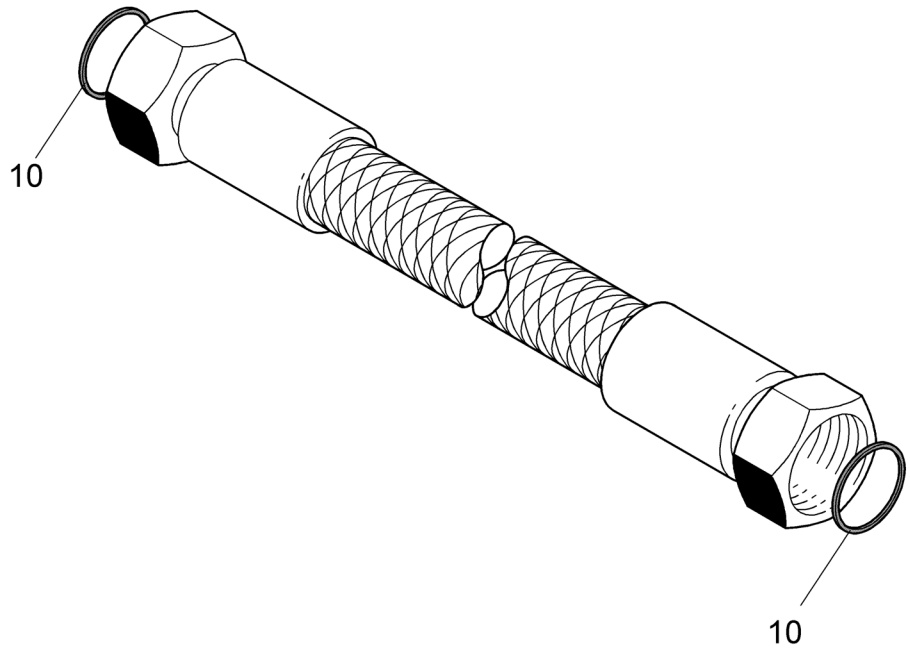
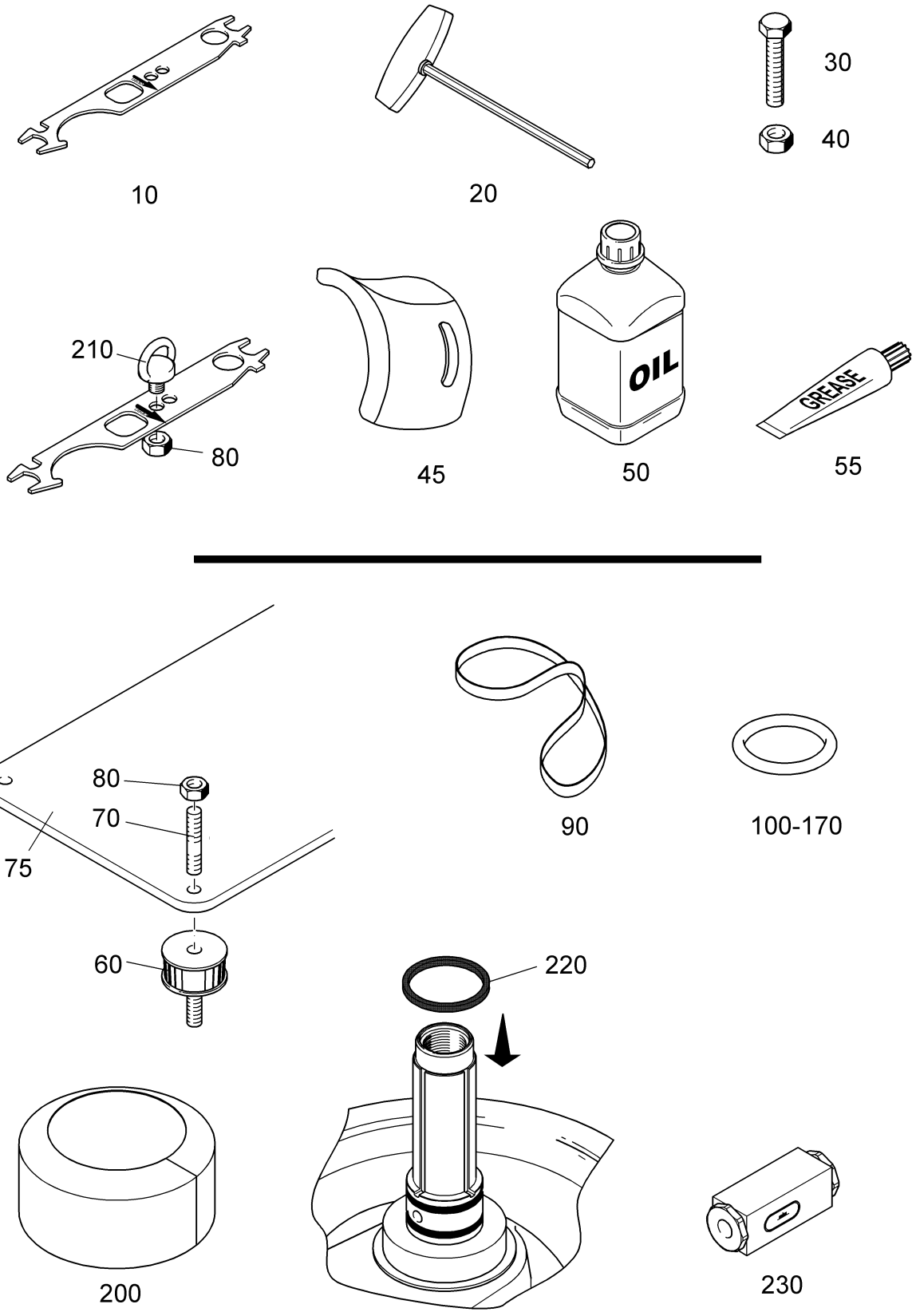


0018-6820-100

Fig. 285

Pos.	Part Number	Qty.		Designation
-	**0018-6820-100**	**1**		**Corrugated hose, compl.**
10	0007-2871-830	2		Gasket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OIL
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GREASE
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100-170
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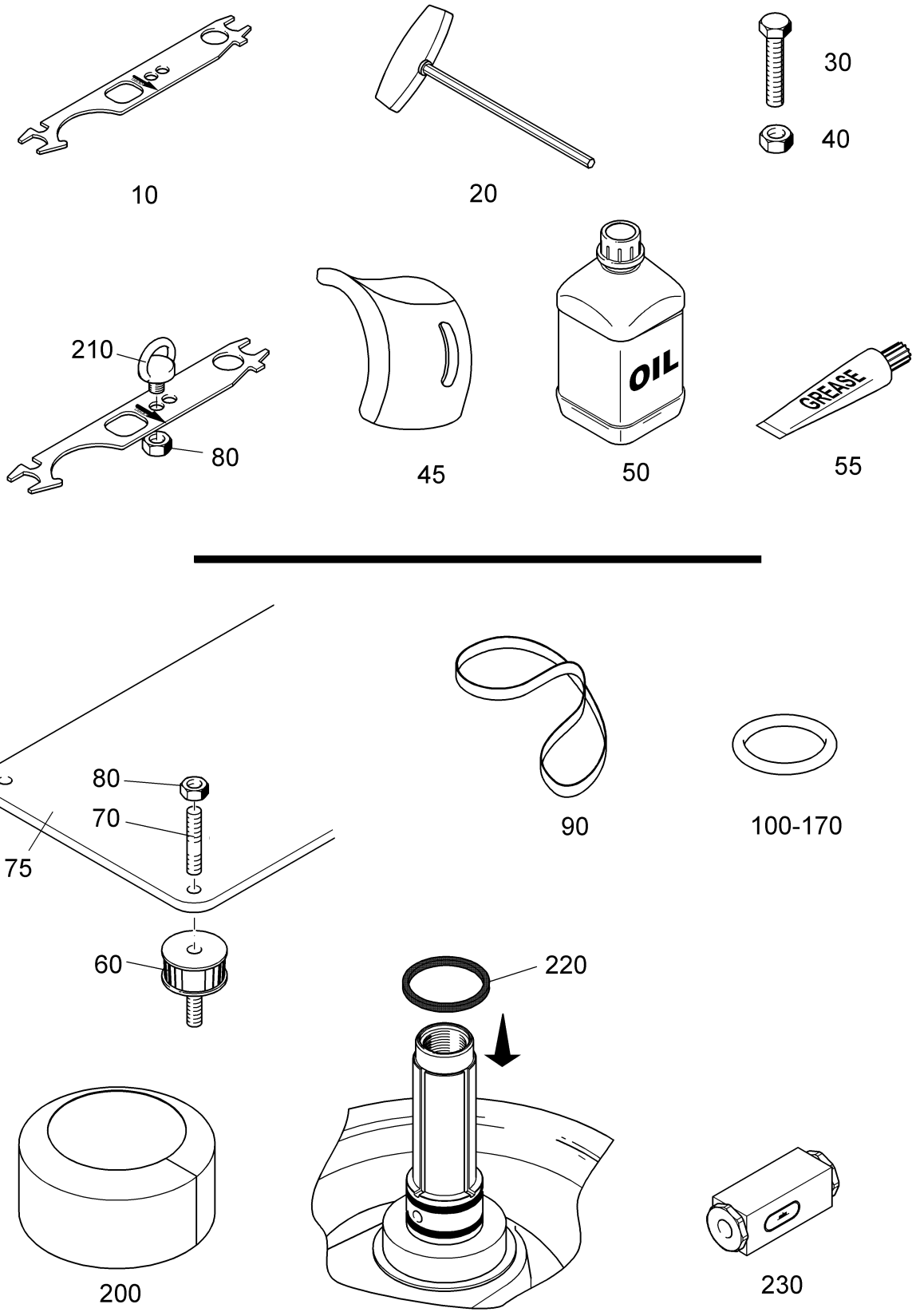
200
230
2051-9901-000-010

Fig. 286

The tools delivered are stated in the packing list.

Pos.	Part Number	Qty.		Designation
-	**2051-9901-000**	**1**		**Set of tools and accessories. (for maintenance and commissioning) – 50 Hz**
10	2050-9856-010	2		Hook wrench
20	2050-9894-010	1		Hexagon socket wrench
30	0019-6918-300	1		Hex head screw
40	0013-0278-300	1		Hexagon nut
45	0003-0588-890	1		Measuring cup, 2 l
50	0015-0003-080	2.5 l		Lube oil CLP 100
55	0015-0082-000	1		Lubricating grease (100 g)
60	0021-3147-750	4		Rubber-metal cushion
70	0019-7640-400	4		Stud
75	2050-1191-000	1		Wear insert
80	0013-0279-300	5		Hexagon nut
90	0021-3214-900	1		Drive belt
100	0007-2925-750	1		Gasket
110	0007-2581-750	1		Gasket
120	0007-1943-750	1	(1)	Gasket
130	0007-2539-750	2	(2)	Gasket
140	0007-2983-750	1		Gasket
150	0007-2534-750	1		Gasket
160	0007-1735-750	1		Gasket
170	0007-1936-750	1		Gasket
200	2051-6696-010	1		Set of bowl shell inserts (5 inserts)
210	0019-5382-050	1		Eye bolt
220	0007-2105-750	1		Gasket (cleaning the spindle inlet holes)
230	0001-1542-600	1		Flowmeter

(1) Only for separator OTC **…-03-…**
(2) Only for OTC **...-03-...** or OTC **...-02-...** as clarifier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OIL
GREASE
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75
60
90
100-170
220
200
230
2051-9901-000-010

Fig. 287

The tools delivered are stated in the packing list.

Pos.	Part Number	Qty.		Designation
-	**2051-9901-010**	**1**		**Set of tools and accessories.** **(for maintenance and commissioning) – 60 Hz**
10	2050-9856-010	2		Hook wrench
20	2050-9894-010	1		Hexagon socket wrench
30	0019-6918-300	1		Hex head screw
40	0013-0278-300	1		Hexagon nut
45	0003-0588-890	1		Measuring cup, 2 l
50	0015-0003-080	2.5 l		Lube oil CLP 100
55	0015-0082-000	1		Lubricating grease (100 g)
60	0021-3147-750	4		Rubber-metal cushion
70	0019-7640-400	4		Stud
75	2050-1191-000	1		Wear insert
80	0013-0279-300	5		Hexagon nut
90	0021-3212-900	1		Drive belt
100	0007-2925-750	1		Gasket
110	0007-2581-750	1		Gasket
120	0007-1943-750	1	(1)	Gasket
130	0007-2539-750	2	(2)	Gasket
140	0007-2983-750	1		Gasket
150	0007-2534-750	1		Gasket
160	0007-1735-750	1		Gasket
170	0007-1936-750	1		Gasket
200	2051-6696-010	1		Set of bowl shell inserts (5 inserts)
210	0019-5382-050	1		Eye bolt
220	0007-2105-750	1		Gasket (cleaning the spindle inlet holes)
230	0001-1542-600	1		Flowmeter

(1) Only for separator OTC **…-03-…**

(2) Only for OTC **...-03-...** or OTC **...-02-...** as clarifier

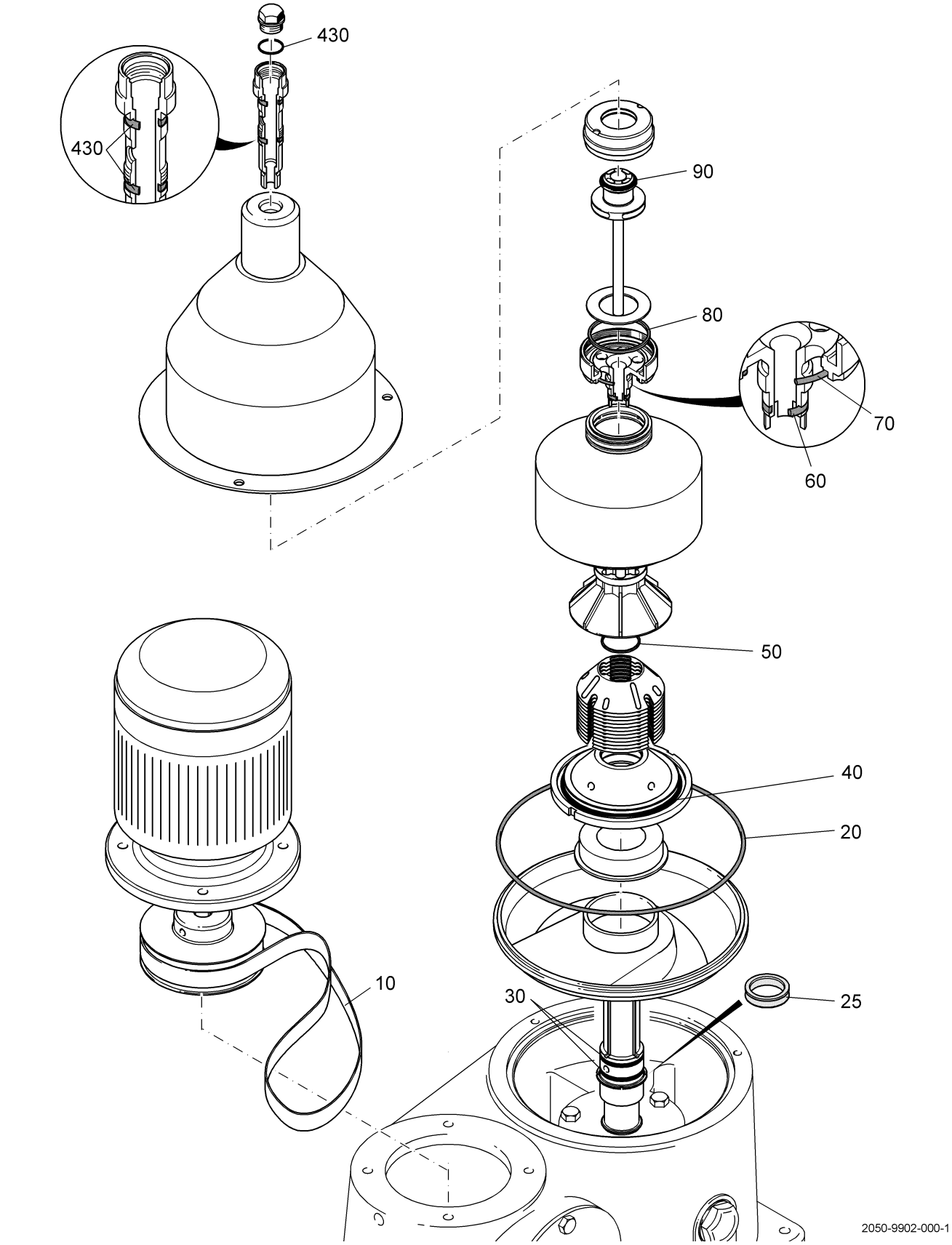


Fig. 288

Pos.	Part Number	Qty.		Designation
-	**2051-9902-000**	1		**Set of spare parts "bowl/hood" - 50 Hz (Operation: 1 year or 8,000 hours)**
10	0021-3214-900	1		Drive belt
20	0007-2706-750	1		Gasket
25	0007-2387-750	1		Gasket
30	0007-2925-750	4		Gasket
40	0007-2581-750	2		Gasket
50	0007-1943-750	2	(1)	Gasket
60	0007-2983-750	8		Gasket
70	0007-2534-750	2		Gasket
80	0007-1735-750	2		Gasket
90	0007-1936-750	2		Gasket
-	0015-0082-000	1		Lubricating grease (100 g)

Pos.	Part Number	Qty.		Designation
-	**2051-9902-010**	1		**Set of spare parts "bowl/hood" - 60 Hz (Operation: 1 year or 8,000 hours)**
10	0021-3212-900	1		Drive belt
20	0007-2706-750	1		Gasket
25	0007-2387-750	1		Gasket
30	0007-2925-750	4		Gasket
40	0007-2581-750	2		Gasket
50	0007-1943-750	2	(1)	Gasket
60	0007-2983-750	8		Gasket
70	0007-2534-750	2		Gasket
80	0007-1735-750	2		Gasket
90	0007-1936-750	2		Gasket
-	0015-0082-000	1		Lubricating grease (100 g)

(1) Only for separator OTC **…-03-…**

IMPORTANT:
The specified number of gaskets has been adapted to take account of the respective maintenance intervals (see maintenance schedule).
Only one gasket may be inserted per groove!

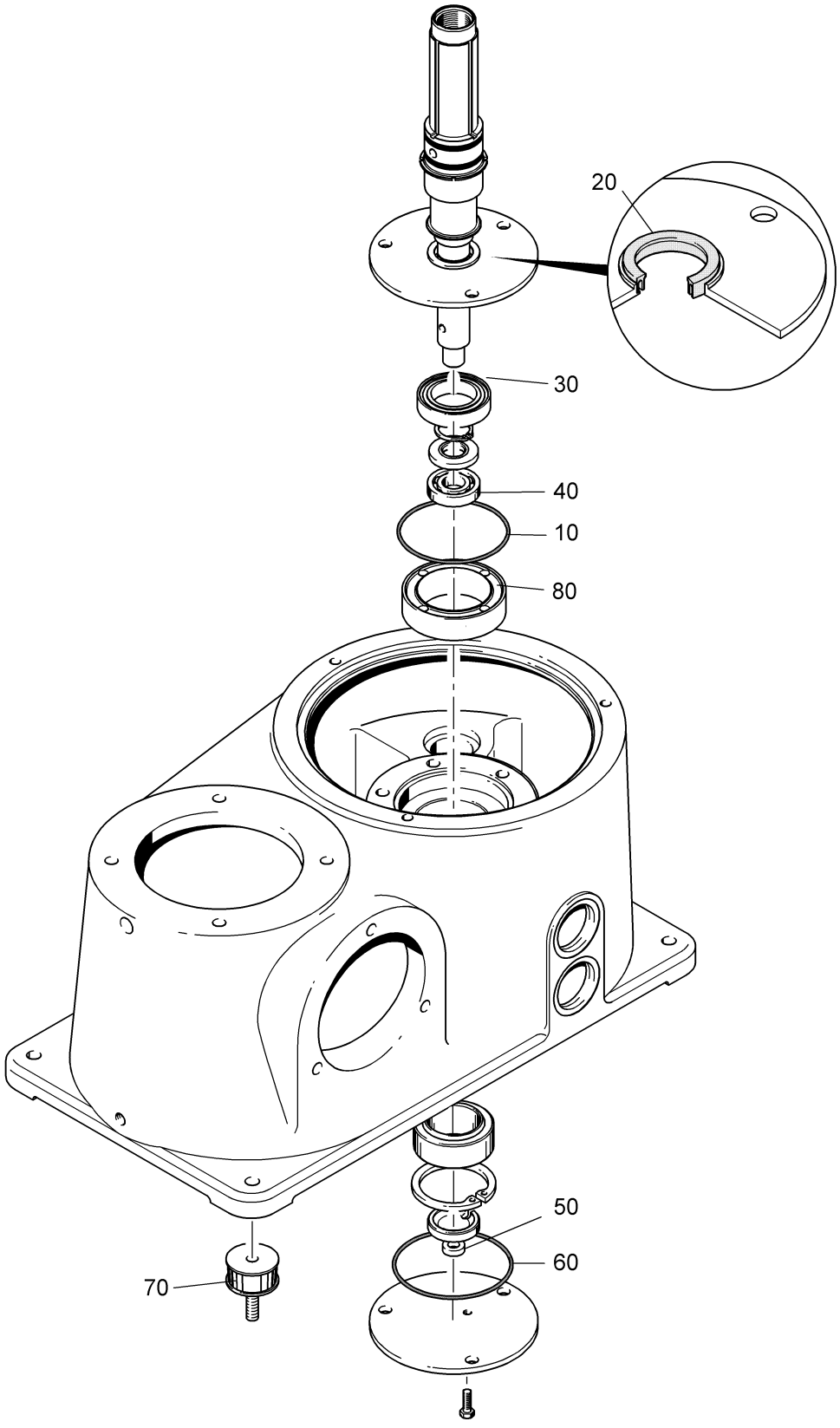


Fig. 289

Pos.	Part Number	Qty.		Designation
-	**2050-9902-080**	**1**		**Set of spare parts "drive" (operation: 2 years or 16,000 hours).**
10	0007-2608-750	1		Gasket
20	0004-1949-830	1		Radial packing ring
30	0011-6205-040	1		Grooved ball bearing
40	0011-6203-000	1		Grooved ball bearing
50	0007-2070-830	1		Gasket
60	0007-2608-750	1		Gasket
70	0021-3147-750	4		Rubber-metal cushion
80	0008-2533-010	1		Rubber-metal cushion

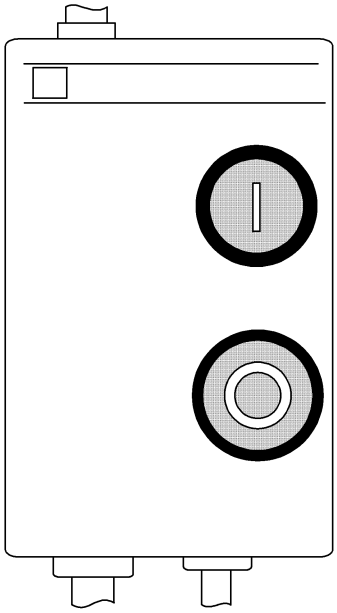


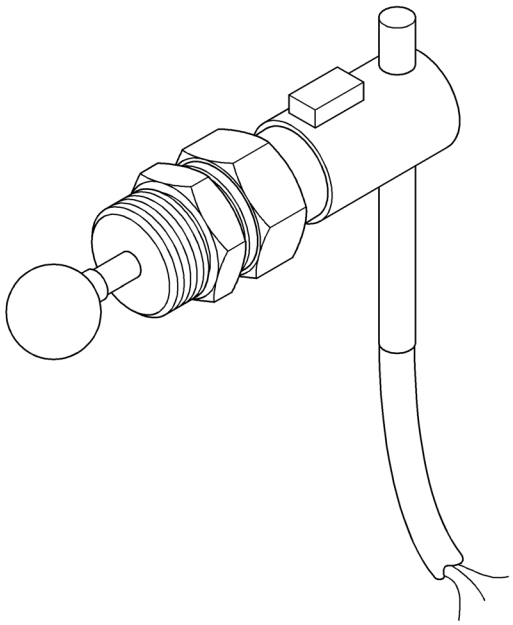
Fig. 290

Pos.	Part-No.	Qty.		Designation
-	**0005-4420-000**	**1**		**Starter box (motor) 220/230 V, 4 – 6 A, IP 55**

Pos.	Part-No.	Qty.		Designation
-	**0005-4420-010**	**1**		**Starter box (motor) 380/400 V, 2,5 – 4 A, IP 55**

Pos.	Part-No.	Qty.		Designation
-	**0005-4420-020**	**1**		**Starter box (motor) 440 V, 2,5 – 4 A, IP 55**

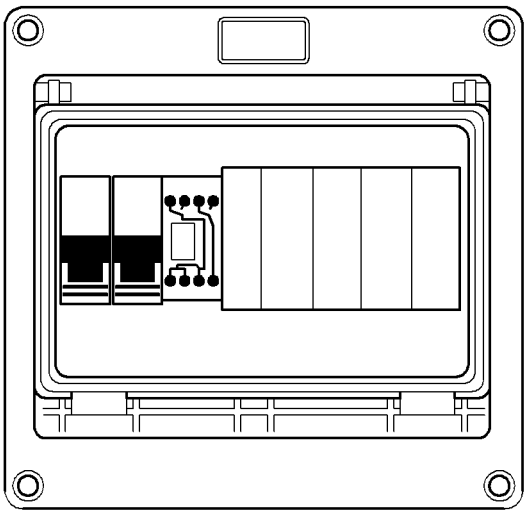
Pos.	Part-No.	Qty.		Designation
-	**0005-4420-030**	**1**		**Starter box (motor) 660/690 V, IP 55**



0005-4112-600

Fig. 291

Pos.	Part Number	Qty.		Designation
-	**0005-4112-600**	**1**		**Float switch**



0005-1514-000

Fig. 292

Pos.	Part Number	Qty.		Designation
-	**0005-1514-000**	**1**		**Evaluating unit (220/230 V – 50/60 Hz)**

Pos.	Part Number	Qty.		Designation
-	**0005-1514-010**	**1**		**Evaluating unit (110/115 V – 50/60 Hz)**

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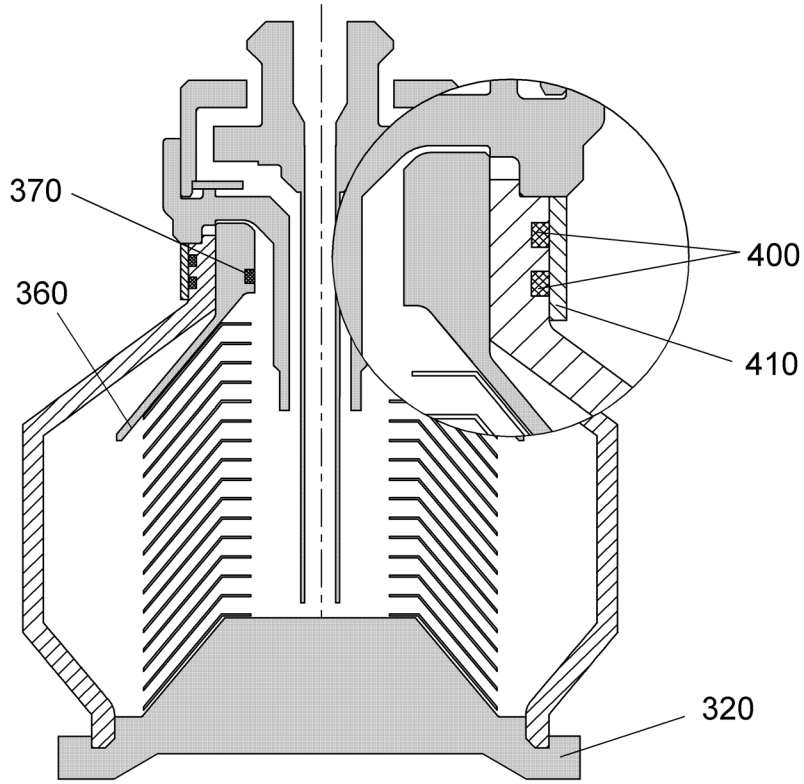

Fig. 293

We offer the following conversion kit for individual conversion of the separator:

Pos.	Part Number	Qty.		Designation
				Conversion kit „OTC …-02-… in OTC …-03-…“ (bowl parts)
320	2051-6699-010	1		Bottom, compl.
360	2051-6652-010	1		Separating disk
370	0007-1943-750	1		Gasket
400	0007-2539-750	2		Gasket
410	2051-6631-000	1		Lock ring

IMPORTANT:
When converting separator OTC **…-02-…** to OTC **…-03-…** light phase discharge must not be immersed. See *dimensioned drawing of separator OTC 3-03-107*, page 34.

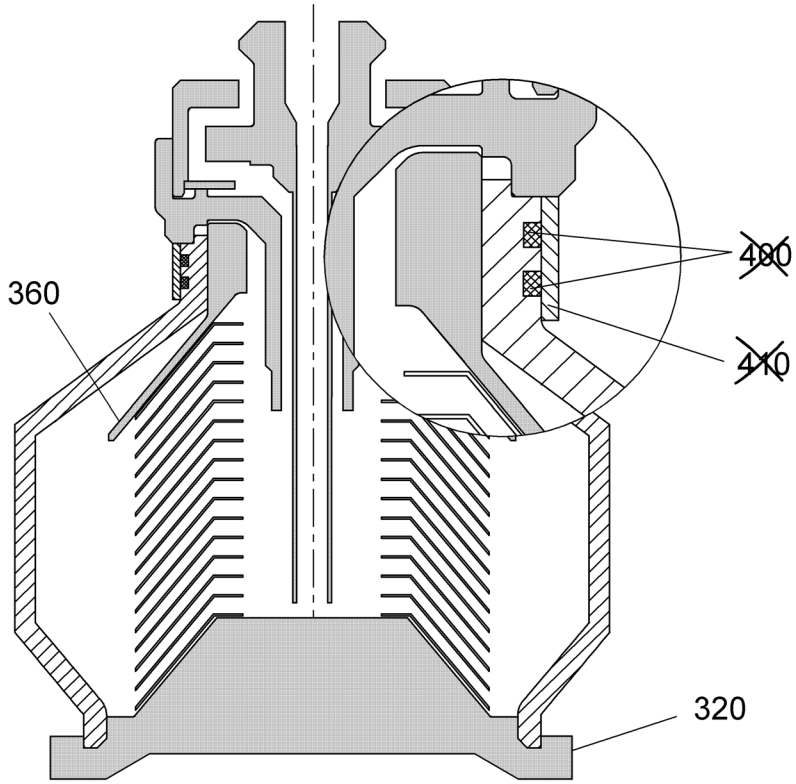

Fig. 294

We offer the following conversion kit for individual conversion of the separator:

Pos.	Part Number	Qty.		Designation
				Conversion kit „OTC …-03-… to OTC …-02-...“ (bowl parts)
320	2051-6699-000	1		Bottom, compl.
360	2051-6652-000	1		Separating disk
400	0007-2539-750	2		Gasket (not needed)
410	2051-6631-000	1		Lock ring (not needed)

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http://www.westfalia-separator.com/ • mailto:info@gea-westfalia.de