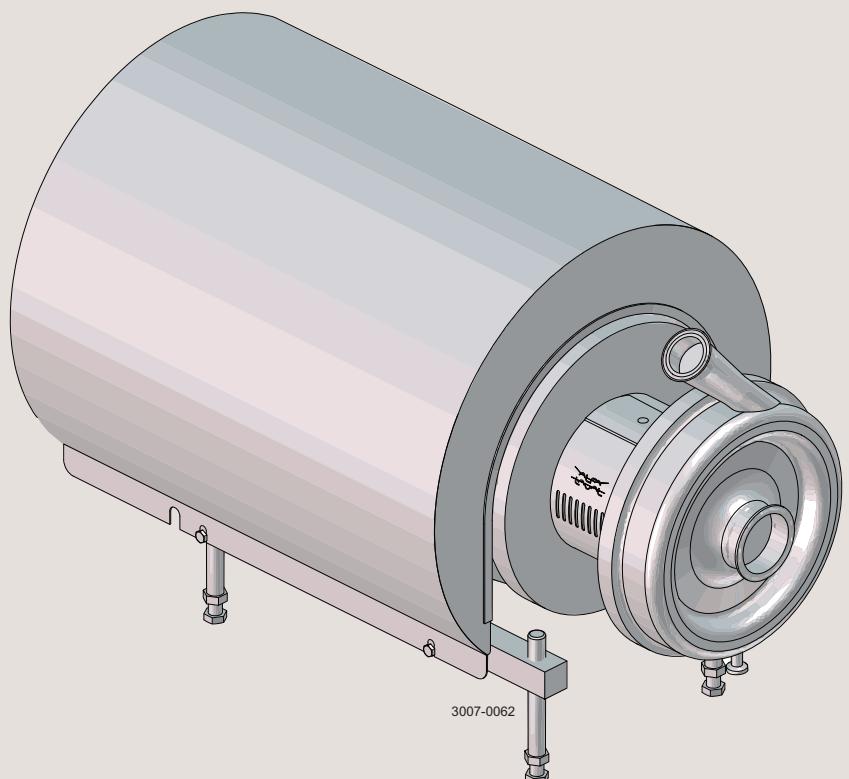




# Instruction Manual

## LKH UltraPure Centrifugal Pump



ESE01703-EN7 2015-03

Original manual



## Table of contents

The information herein is correct at the time of issue but may be subject to change without prior notice

<b>1. EC Declaration of Conformity .....</b>	<b>4</b>
<b>2. Safety .....</b>	<b>5</b>
2.1. Important information .....	5
2.2. Warning signs .....	5
2.3. Safety precautions .....	6
<b>3. Installation .....</b>	<b>7</b>
3.1. Unpacking/delivery .....	7
3.2. Installation .....	9
3.3. Pre-use check - pump with impeller screw .....	11
3.4. Recycling information .....	12
<b>4. Operation .....</b>	<b>13</b>
4.1. Operation/control .....	13
4.2. Trouble shooting .....	15
4.3. Recommended cleaning .....	16
<b>5. Maintenance .....</b>	<b>17</b>
5.1. General maintenance .....	17
5.2. Cleaning procedure .....	19
5.3. Dismantling of pump/shaft seals .....	20
5.4. Assembly of pump/single shaft seal .....	23
5.5. Assembly of pump/double mechanical shaft seal .....	25
5.6. Assembly of flushing set - if not supplied with pump .....	28
5.7. Adjustment of shaft .....	29
<b>6. Technical data .....</b>	<b>31</b>
6.1. Technical data .....	31
6.2. Relubrication intervals .....	32
6.3. Torque specifications .....	34
6.4. Weight (kg) .....	35
6.5. Noise emission .....	36
<b>7. Parts list and service kits .....</b>	<b>37</b>
7.1. LKH UltraPure -10, -20, -25, -35, -40 .....	37
7.2. LKH UltraPure - Product wetted parts .....	38
7.3. LKH UltraPure - Motor depended parts .....	40
7.4. LKH UltraPure - Single shaft seal .....	42

# 1 EC Declaration of Conformity

Revision of Declaration of Conformity 2009-12-29

The Designated Company

Alfa Laval Kolding A/S

Company Name

Albuen 31, DK-6000 Kolding, Denmark

Address

+45 79 32 22 00

Phone No.

hereby declare that

Pump

Designation

LKH Ultrapure-10, LKH Ultrapure-20, LKH Ultrapure-25, LKH Ultrapure-35, LKH Ultrapure-40

Type

From serial number 10.000 to 1.000.000

is in conformity with the following directive with amendments:

- Machinery Directive 2006/42/EC

The person authorised to compile the technical file is the signer of this document

QHSE Manager, Quality, Health and  
safety & Environment

Title

Annie Dahl

Name

Kolding

Place

2013-12-03

Date



Signature



*Unsafe practices and other important information are emphasised in this manual.  
Warnings are emphasised by means of special signs.  
Always read the manual before using the pump!*

---

### 2.1 Important information

---

**WARNING**

Indicates that special procedures must be followed to avoid serious personal injury.

**CAUTION**

Indicates that special procedures must be followed to avoid damage to the pump.

**NOTE**

Indicates important information to simplify or clarify procedures.

---

### 2.2 Warning signs

---



General warning:



Dangerous electrical voltage:



Caustic agents:

---

## 2 Safety

All warnings in the manual are summarised on this page.

Pay special attention to the instructions below so that severe personal injury and/or damage to the pump are avoided.

### 2.3 Safety precautions

#### Installation:

**Always** read the technical data thoroughly. (See chapter 6 Technical data)



**Always** use a lifting crane when handling the pump.

#### Pump without impeller screw:

**Always** remove the impeller before checking the direction of rotation.

**Never** start the pump if the impeller is fitted and the pump casing is removed.

#### Pump with Impeller screw:

**Never** start in the wrong direction of rotation with liquid in the pump.

**Always** have the pump electrically connected by authorised personnel. (See the motor instruction)



#### Operation:

**Always** read the technical data thoroughly. (See chapter 6 Technical data)



**Never** touch the pump or the pipelines when pumping hot liquids or when sterilising.

**Never** run the pump with both the suction side and the pressure side blocked.

**Never** run the pump when partially installed or not completely assembled

**Necessary** precautions must be taken if leakage occurs as this can lead to hazardous situations

**Always** handle lye and acid with great care.

**Never** use the pump for products not mentioned in Alfa Laval pump selection program



The Alfa Laval pump selection program can be acquired from your local Alfa Laval sales company

#### Maintenance:

**Always** read the technical data thoroughly. (See chapter 6 Technical data).



**Never** service the pump when it is hot.

**Never** service the pump if pressurised.

#### Motors with grease nipples:

Remember lubrication according to information plate/label on the motor.

**Always** disconnect the power supply when servicing the pump.

**Always** use Alfa Laval genuine spare parts.



#### Transportation:

##### Transportation of the pump or the pump unit:

**Never** lift or elevate in any way other than described in this manual

**Always** drain the pump head and accessories of any liquid

**Always** ensure that no leakage of lubricants can occur

**Always** transport the pump in its upright position

**Always** ensure that the unit is securely fixed during transportation

**Always** use original packaging or similar during transportation

#### 3.1 Unpacking/delivery

##### Step 1



Always use a lifting crane when handling the pump (see 6 Technical data).

##### Check the delivery for:

1. Complete pump.
2. Delivery note.
3. Motor instructions.
4. Instructions for flushing set, IF ORDERED!

##### CAUTION

Alfa Laval cannot be held responsible for incorrect unpacking.

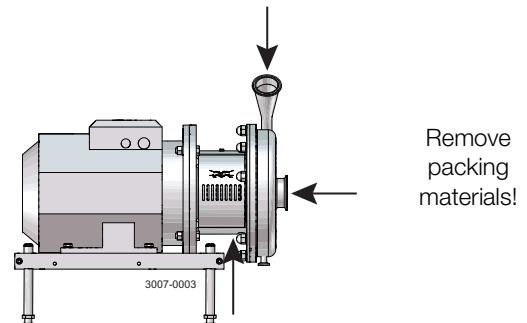
##### WARNING

Be aware that certain pump configurations can tilt, and therefore cause injuries to feet or fingers. The pump should be supported underneath the adaptor, when not installed in the process line.

##### Step 2

Remove any packing materials from the inlet and the outlet.

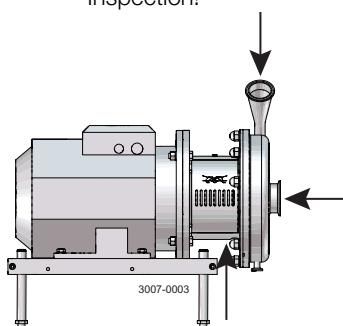
Avoid damaging the inlet and the outlet.



##### Step 3

Inspect the pump for visible transport damage.

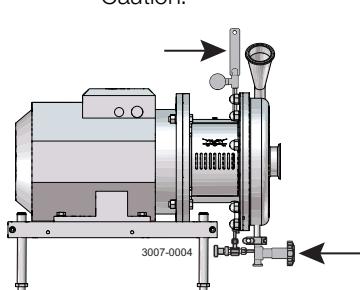
Inspection!



##### Step 4

Avoid damaging the flushing liquid connections, if supplied.

Caution!



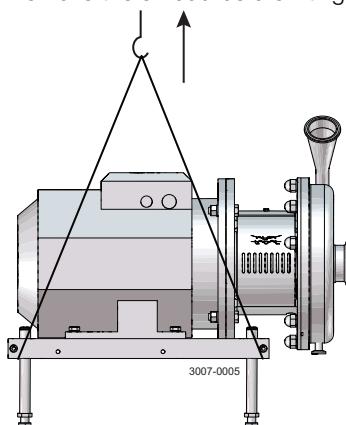
### 3 Installation

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#### Step 5

Always remove the shroud, if fitted, before lifting the pump.

Remove the shroud before lifting!



Read the instructions carefully and pay special attention to the warnings! Always check the pump before operation.

- See pre-use check in section 3.3 Pre-use check - pump with impeller screw.

## 3.2 Installation

### Step 1



**Always** read the technical data thoroughly. (See chapter 6 Technical data)  
**Always** use a lifting crane when handling the pump.



**Always** have the pump electrically connected by authorised personnel. (see the motor instructions).

#### CAUTION

Alfa Laval cannot be held responsible for incorrect installation.

#### WARNING

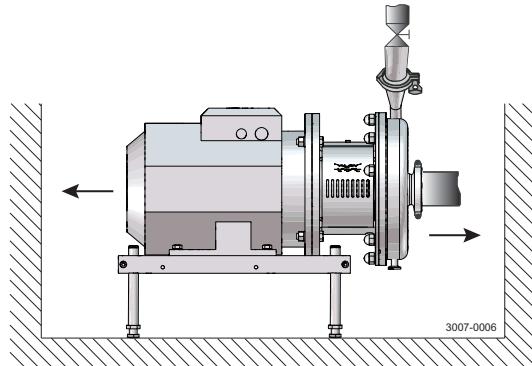
Alfa Laval recommends the installation of lockable repair breaker. If the repair breaker is to be used as an emergency stop, the colours of the repair breaker must be red and yellow.

#### CAUTION

The pump does not prevent back flow when intentionally or unintentionally stopped. If back flow can cause any hazardous situations precautions must be taken e.g. check valve to be installed in the system to prevent the problem described above.

### Step 2

Ensure at least 0.5m (1.6 ft) clearance around the pump.

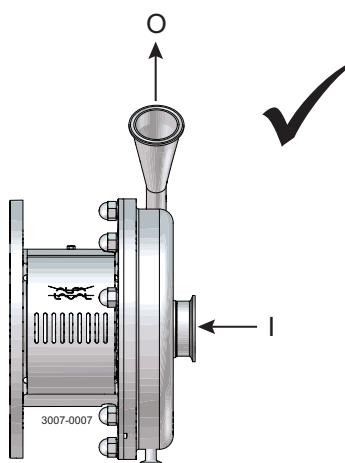


### Step 3

Check that the flow direction is correct.

O: Outlet

I: Inlet



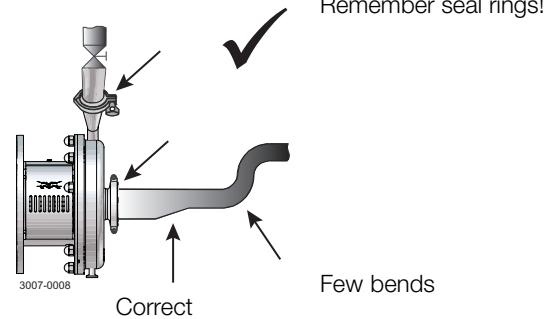
### 3 Installation

Read the instructions carefully and pay special attention to the warnings! Always check the pump before operation.

- See pre-use check in section 3.3 Pre-use check - pump with impeller screw.

#### Step 4

1. Ensure that the pipelines are routed correctly.
2. Ensure that the connections are tight.

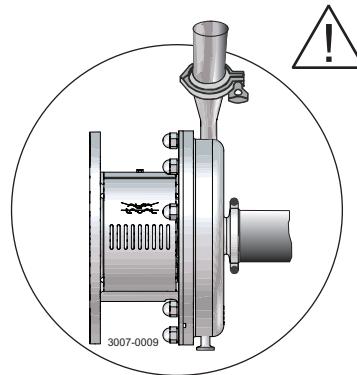


#### Step 5

Avoid stress on the pump.

Pay special attention to:

- Vibrations.
- Thermal expansion of the tubes.
- Excessive welding.
- Overloading of the pipelines.



#### Note

In case of shaft seal leakage, the media will drip from the slot in the bottom of the adaptor. In case of shaft seal leakage, Alfa laval recommends putting a drip tray underneath the slot for collecting the leakage.

Read the instructions carefully and pay special attention to the warnings!

LKH UltraPure is not supplied with an impeller screw as standard but can be supplied with one.

Check the direction of rotation of the impeller before operation.

- See the indication label on the pump.

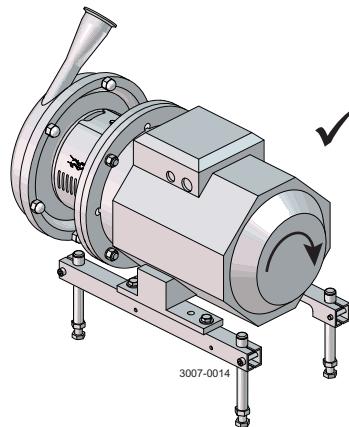
#### 3.3 Pre-use check - pump with impeller screw

##### Step 1



**Never** start in the wrong direction of rotation with liquid in the pump.

1. Start and stop the motor momentarily.
2. Ensure that the direction of rotation of the motor fan is **clockwise** as viewed from the rear end of the motor.



See the indication label!

View from rear end of motor

### **3 Installation**

---

#### **3.4 Recycling information**

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- **Unpacking**

- Packing material consists of wood, plastics, cardboard boxes and in some cases metal straps.
- Wood and cardboard boxes can be reused, recycled or used for energy recovery.
- Plastics should be recycled or burnt at a licensed waste incineration plant.
- Metal straps should be sent for material recycling.

- **Maintenance**

- During maintenance, oil and wear parts in the machine are replaced.
- All metal parts should be sent for material recycling.
- Worn out or defective electronic parts should be sent to a licensed handler for material recycling.
- Oil and all non-metal wear parts must be taken care of in accordance with local regulations.

- **Scraping**

- At end of use, the equipment must be recycled according to relevant, local regulations. Beside the equipment itself, any hazardous residues from the process liquid must be considered and dealt with in a proper manner. When in doubt, or in the absence of local regulations, please contact your local Alfa Laval sales company.
-

Read the instructions carefully and pay special attention to the warnings!

### 4.1 Operation/control

#### Step 1



**Always** read the technical data thoroughly. See chapter 6 Technical data

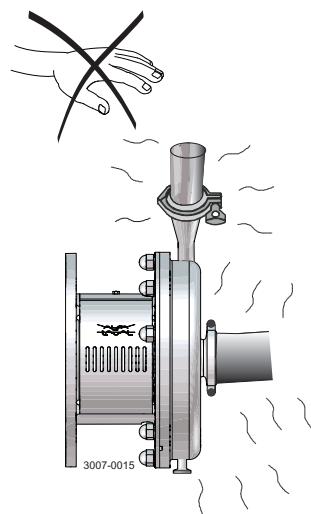
#### CAUTION

Alfa Laval cannot be held responsible for incorrect operation/control.

#### Step 2



**Never** touch the pump or the pipelines when pumping hot liquids or when sterilising.

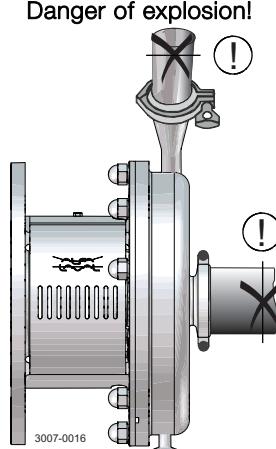


Danger of burns!

#### Step 3



**Never** run the pump with both the suction side and the pressure side blocked.



Danger of explosion!

See the warning label!

## 4 Operation

Read the instructions carefully and pay special attention to the warnings!

### Step 4

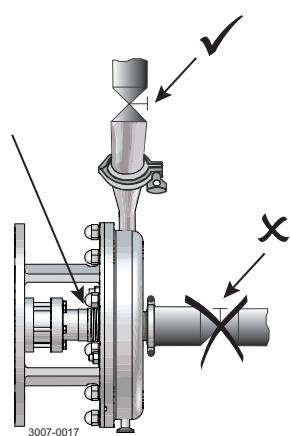
#### CAUTION

The shaft seal must not run dry.

#### CAUTION

Never throttle the inlet side.

Do not allow to  
run dry



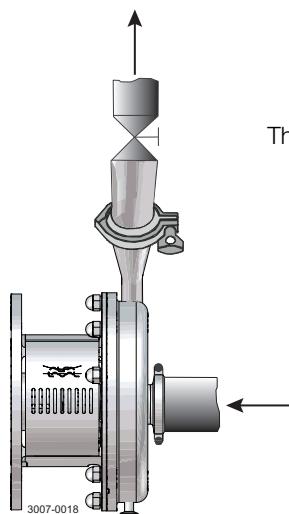
### Step 5

#### Control:

Reduce the capacity and the power consumption by means of:

- Throttling the pressure side of the pump.
- Reducing the impeller diameter.
- Reducing the speed of the motor.

Throttling!



*Pay attention to possible faults.  
Study the instructions carefully.*

### 4.2 Trouble shooting

#### NOTE!

Study the maintenance instructions carefully before replacing worn parts.

Problem	Cause/result	Remedy
Overloaded motor	<ul style="list-style-type: none"><li>- Pumping of viscous liquids</li><li>- Pumping of high density liquids</li><li>- Low outlet pressure (counter pressure)</li><li>- Lamination of precipitates from the liquid</li></ul>	<ul style="list-style-type: none"><li>- Larger motor or smaller impeller</li><li>- Higher counter pressure (throttling)</li><li>- Frequent cleaning</li></ul>
Cavitation: <ul style="list-style-type: none"><li>- Damage</li><li>- Pressure reduction (sometimes to zero)</li><li>- Increasing of the noise level</li></ul>	<ul style="list-style-type: none"><li>- Low inlet pressure</li><li>- High liquid temperature</li></ul>	<ul style="list-style-type: none"><li>- Increase the inlet pressure</li><li>- Reduce the liquid temperature</li><li>- Reduce the pressure drop before the pump</li><li>- Reduce speed</li></ul>
Leaking shaft seal	<ul style="list-style-type: none"><li>- Dry run</li><li>- Incorrect rubber grade</li><li>- Abrasive particles in the liquid</li></ul>	<p>Replace: All wearing parts</p> <p>If necessary:</p> <ul style="list-style-type: none"><li>- Change rubber grade</li><li>- Select stationary and rotating seal ring in silicon carbide/silicon carbide</li></ul>
Leaking O-ring seals	Incorrect rubber grade	Change rubber grade

## 4 Operation

The pump is designed for cleaning in place (CIP). CIP = Cleaning In Place.  
Study the instructions carefully and pay special attention to the warnings!  
NaOH = Caustic soda.  
HNO<sub>3</sub> = Nitric acid.

### 4.3 Recommended cleaning

#### Step 1



**Always** handle lye and acid with great care.

Caustic danger!



Always use rubber gloves!



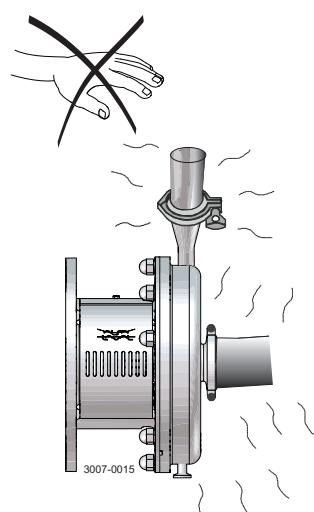
Always use protective goggles!

#### Step 2



**Never** touch the pump or the pipelines when sterilising.

Danger of burns!



#### Step 3

**Examples of cleaning agents:** Use clean water, free from chlorides.

1. 1% by weight NaOH at 70°C (158°F).

1 kg (2.2 lb) NaOH	+	100 l (26.4 gal) water	= Cleaning agent.
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2.2 l (0.6 gal) 33% NaOH	+	100 l (26.4 gal) water	= Cleaning agent.
-----------------------------	---	---------------------------	-------------------

2. 0.5% by weight HNO<sub>3</sub> at 70°C (158°F).

0.7 l (0.2 gal) 53% HNO <sub>3</sub>	+	100 l (26.4 gal) water	= Cleaning agent.
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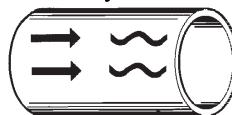
1. Avoid excessive concentration of the cleaning agent  
⇒ Dose gradually!
2. Adjust the cleaning flow to the process.  
Sterilisation of milk/viscous liquids  
⇒ Increase the cleaning flow!

#### Step 4



**Always** rinse well with clean water after using a cleaning agent.

Always rinse!



Water      Cleaning agent

**NOTE**

The cleaning agents must be stored/disposed of in accordance with current regulations/directives.

Maintain the pump carefully. Study the instructions carefully and pay special attention to the warnings!  
Always keep spare shaft seals and rubber seals in stock.  
See separate motor instructions.

### 5.1 General maintenance

#### Step 1



Always read the technical data thoroughly. (See chapter 6 Technical data)



Always disconnect the power supply when servicing the pump.

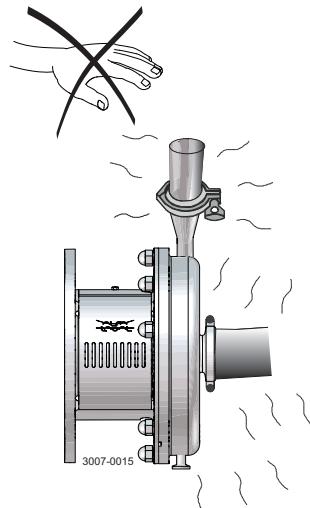
#### NOTE

All scrap must be stored/disposed of in accordance with current rules/directives.

#### Step 2



Never service the pump when it is hot.



Danger of burns!

#### Step 3

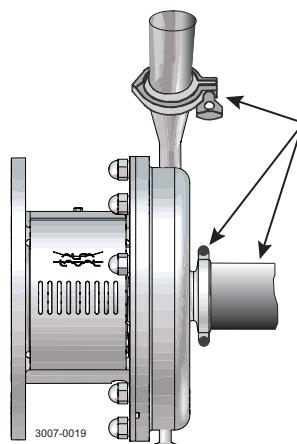


Never service the pump with pump and pipelines under pressure.

#### CAUTION

Fit the electrical connections correctly if they have been removed from the motor during service (See pre-use check in section 2.3 Safety precautions).

Pay special attention to the warnings!



Atmospheric pressure required!

#### Step 4

##### Recommended spare parts:

Order service kits from the service kits list  
(see chapter 7 Parts list and service kits).

##### Ordering spare parts

Contact your local Alfa Laval sales company.

##### Note:

If the pump is supplied with FEP O-rings. Alfa Laval recommends that the casing O-ring is replaced during pump maintenance.

## 5 Maintenance

Maintain the pump carefully. Study the instructions carefully and pay special attention to the warnings!  
Always keep spare shaft seals and rubber seals in stock.  
See separate motor instructions.

	Shaft seal	Rubber seals	Motor bearings
Preventive maintenance	<b>Replace after 12 months:</b> (one-shift) Complete shaft seal	Replace when replacing the shaft seal	
Maintenance after leakage (leakage normally starts slowly)	<b>Replace at the end of the day:</b> Complete shaft seal	Replace when replacing the shaft seal	
Planned maintenance	<ul style="list-style-type: none"><li>- Regular inspection for leakage and smooth operation</li><li>- Keep a record of the pump</li><li>- Use the statistics for planning of inspections</li></ul> <b>Replace after leakage:</b> Complete shaft seal	Replace when replacing the shaft seal	Yearly inspection is recommended <ul style="list-style-type: none"><li>- Replace complete bearing if worn</li><li>- Ensure that the bearing is axially locked (See motor instructions)</li></ul>
Lubrication	<b>Before fitting</b> Lubricate the Quad-/O-rings with silicone grease or silicone oil	<b>Before fitting</b> Silicone grease or silicone oil	See section 6.2 Relubrication intervals

### Pre-use check

#### CAUTION!

Fit the electrical connections correctly if they have been removed from the motor during service. (See 3.3 Pre-use check - pump with impeller screw).

#### Pay special attention to warnings!

1. Start and stop the motor momentarily.
2. Ensure that the pump operates smoothly.

### 5.2 Cleaning procedure

#### Cleaning procedure for soiled impeller screw tapped hole:

1. Remove stub shaft (7) per section 4 of Service manual.
2. Submerge and soak the stub shaft for 5 minutes in a COP tank with 2% caustic wash
3. Scrub the blind tapped impeller screw hole vigorously by plunging a clean 1/2" diameter sanitary bristle pipe brush in and out of the hole for two minutes while submerged.
4. Soak stub shaft (7) in acid sanitiser for 5 minutes, then scrub blind tapped hole as described in step 3 above.
5. Rinse well with clean water and blow-dry the blind tapped hole with clean air.
6. Swab test the inside of the tapped hole to determine cleanliness.
7. Should the swab test fail, repeat steps 2 to 6 above until swab test is passed.

Should swab testing continue to fail, or time is of the essence, install a new (spare) stub shaft (7).

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## 5 Maintenance

Read the instructions carefully. The items refer to the parts list and service kits section.

Handle scrap correctly.

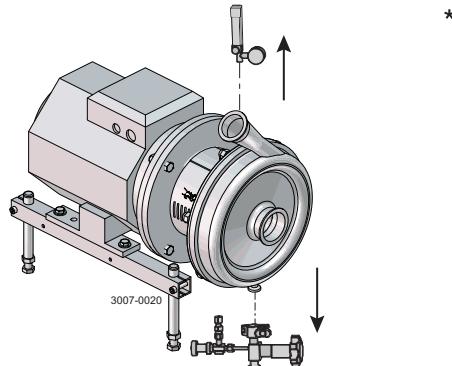
\* : Relates to the shaft seal.

### 5.3 Dismantling of pump/shaft seals

#### Step 1

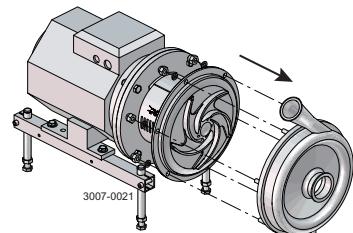
Flushing set for double mechanical shaft seal:

1. Remove flow meter and pressure gauge.
2. Remove flushing set (54) from pump casing (29) and lower tube.



#### Step 2

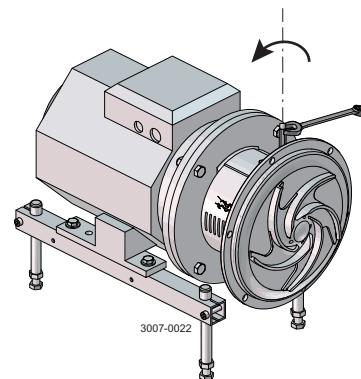
Unscrew cap nuts (24) and remove washers (24a) and pump casing (29).



#### Step 3

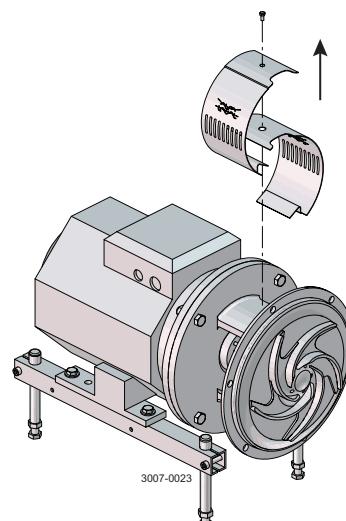
Double mechanical shaft seal:

Unscrew tubes (42) using a spanner.



#### Step 4

Remove screw (23) and safety guard (22).



## 5 Maintenance

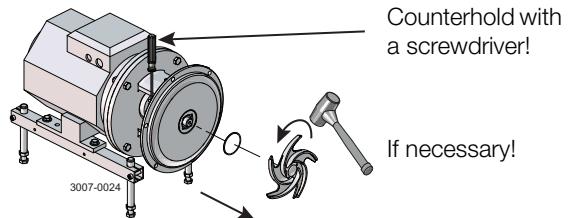
Read the instructions carefully. The items refer to the parts list and service kits section.

Handle scrap correctly.

\* : Relates to the shaft seal.

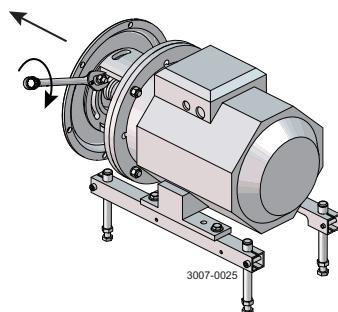
### Step 5

1. Remove impeller screw (36).
2. Remove impeller (37). If necessary, loosen the impeller by tapping gently on the impeller vanes.
3. Remove the O-ring (38) from the impeller.



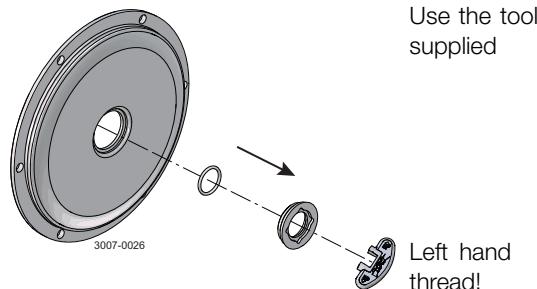
### Step 6

1. Pull off the O-ring (26) from back plate (25).
2. Unscrew nuts (20) and remove washers (21) and the back plate.



### Step 7

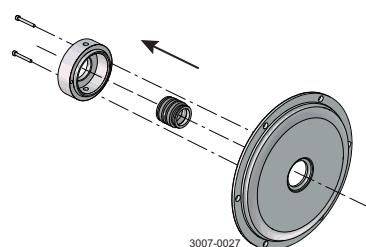
1. Remove the stationary seal ring (11).
2. Remove the O-ring (12) from back plate (25).



### Step 8

#### Double mechanical shaft seal:

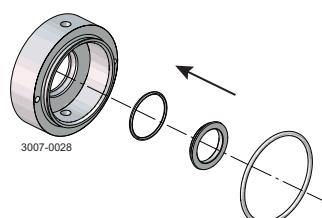
1. Remove screws (41) and seal housing (40a).
2. Remove rotating seal rings (14) and drive ring (52) from spring (13).
3. Remove O-rings (15) from rotating seal rings (14).



### Step 9

#### Double mechanical shaft seal:

1. Remove stationary seal ring (51) from seal housing (40a/40b).
2. Remove O-ring (50) from stationary seal ring (51).
3. Remove O-ring (44) from seal housing (40a/40b).



## 5 Maintenance

Read the instructions carefully. The items refer to the parts list and service kits section.

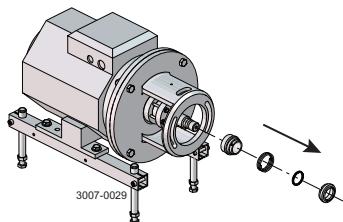
Handle scrap correctly.

\* : Relates to the shaft seal.

### Step 10

#### Single shaft seal:

1. Remove the complete shaft seal from stub shaft (7).
2. Remove spring (13) and rotating seal ring (14) from the drive ring (10).



Read the instructions carefully. The items refer to the parts list and service kits section.

Handle scrap correctly.

\* : Relates to the shaft seal.

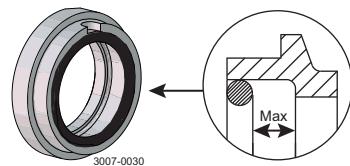
### 5.4 Assembly of pump/single shaft seal

#### Step 1

1. Remove spring (13).

#### NOTE!

Make sure that O-ring (15) has max. clearance from the sealing surface.

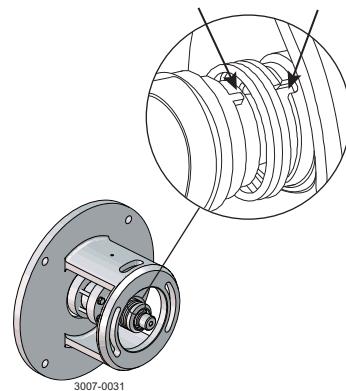


#### Step 2

1. Refit spring (13) on rotating seal ring (14).
2. Fit the spring and the rotating seal ring on drive ring (10).

#### CAUTION

Ensure that the driver on the drive ring enters the notch in the rotating seal ring.

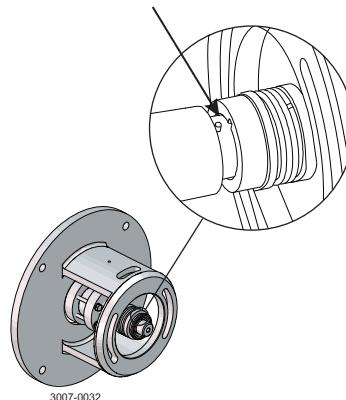


#### Step 3

Fit the complete shaft seal on stub shaft (7).

#### CAUTION!

Make sure that connex pin (8) on the stub shaft enters the notch in drive ring (10).



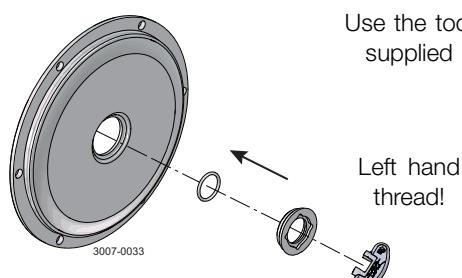
#### Step 4

1. Fit O-ring (12) on stationary seal ring (11) and lubricate.
2. Screw the stationary seal ring into back plate (25).

#### CAUTION

Must be tightened by hand to avoid deforming the stationary seal ring. (Max. 7Nm/5 lbf-ft)

Use the tool supplied



\*

\*

\*

\*

## 5 Maintenance

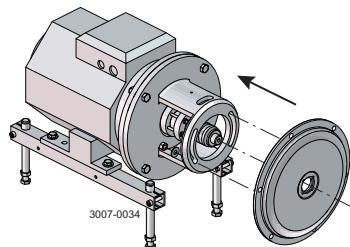
Read the instructions carefully. The items refer to the parts list and service kits section.

Handle scrap correctly.

\* : Relates to the shaft seal.

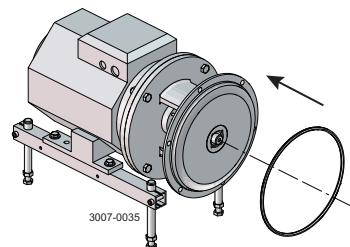
### Step 5

1. Clean the sealing surfaces with contact cleaner before fitting back plate (25).
2. Carefully guide the back plate onto adaptor (16).
3. Fit washers (21) and nuts (20).



### Step 6

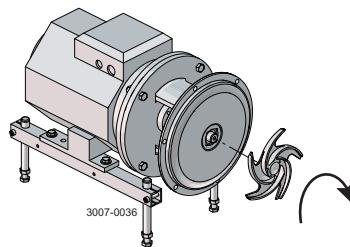
Lubricate O-ring (26) and slide it onto back plate (25).



### Step 7

1. Lubricate O-ring (38) and fit it in impeller (37).
2. Lubricate impeller hub with silicone grease or oil.
3. Screw the impeller onto stub shaft (7).
4. Fit impeller screw (39) and tighten.

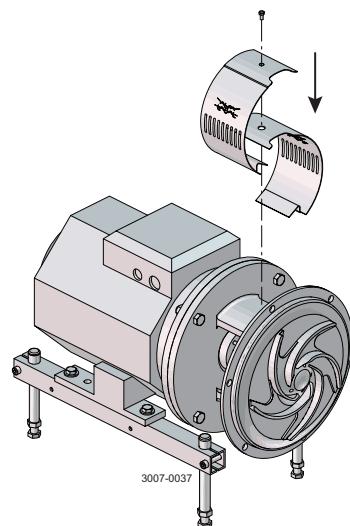
Torque - 20 Nm (15 lbf-ft)



### Step 8

Fit safety guards (22) and screw (23) and tighten.

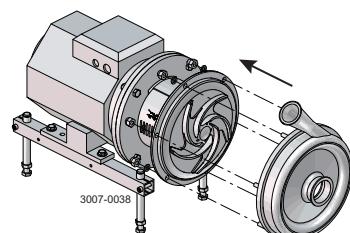
If pump is not supplied with flush connections, the holes in the adaptor must be covered by the guard.



### Step 9

1. Fit pump casing (29), washers (24a) and cap nuts (24).
2. Adjust pump casing to the right position.
3. Tighten nuts (20) for back plate (25) and tighten cap nuts (24).

Note: Cap nuts must be tightened according to the torque values in chapter 6 Technical data.



Read the instructions carefully. The items refer to the parts list and service kits section.

Lubricate the rubber seals before fitting them.

\* : Relates to the shaft seal.

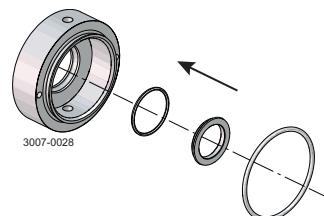
### 5.5 Assembly of pump/double mechanical shaft seal

#### Step 1

1. Fit O-rings (15) in rotating seal rings (14).
2. Fit spring (13) on one of the rotating seal rings (14) and place the drive ring (52) in between.
3. Fit the second rotating seal ring (14) on the other end of the spring.
- Note:** Ensure that both drive pins on the drive ring enter the notches in rotating seal rings.
4. Place the parts on the stationary seal ring fitted in back plate (25).

#### Step 2

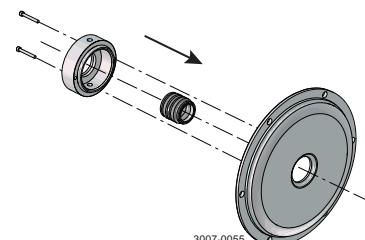
1. Lubricate O-ring (44) and slide onto seal housing (40a).
2. Lubricate O-ring (50) and fit on stationary seal ring (51) and fit this in the seal housing.



\*

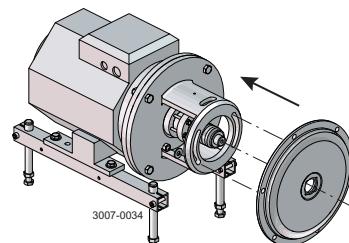
#### Step 3

1. Clean the sealing surfaces with contact cleaner.
2. Fit seal housing (40a) on the back plate (25) and tighten screws (41).



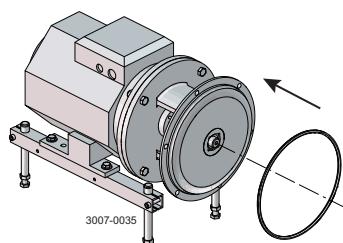
#### Step 4

1. To enable fitting of the back plate (25) with the shaft seal, remove connex pin (8) from stub shaft (7) (if fitted).
2. Carefully guide back plate (25) onto adaptor (16).
3. Fit washers (21) and nuts (20).



#### Step 5

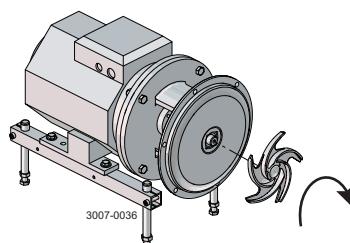
Lubricate O-ring (26) and slide it onto back plate (25).



#### Step 6

1. Lubricate O-ring (38) and fit it in impeller (37).
2. Lubricate the impeller hub with silicone grease or oil.
3. Screw impeller (27) onto stub shaft (7).
4. Fit impeller screw (36) and tighten.

Torque - 20 Nm (15 lbf-ft)



\*

## 5 Maintenance

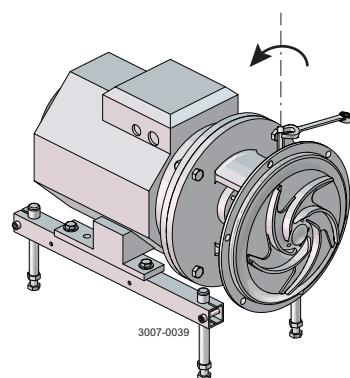
Read the instructions carefully. The items refer to the parts list and service kits section.

Lubricate the rubber seals before fitting them.

\* : Relates to the shaft seal.

### Step 7

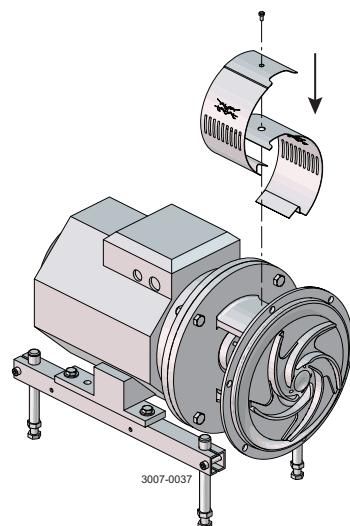
1. Wind Teflon tape on the thread end of tubes (42).
2. Screw tube ends into seal housing (40a).
3. Tighten using a spanner.



### Step 8

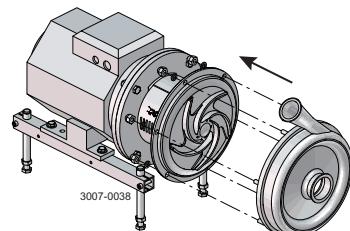
Fit safety guard (22) and screw (23) and tighten.

If the pump is not supplied with flush connections, the holes in the adaptor must be covered by the guard.



### Step 9

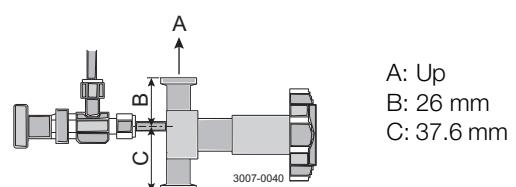
1. Fit pump casing (29), washers (24a) and cap nuts (24).
2. Tighten nuts (20) for back plate (25).
3. Tighten nuts (20) for back plate (25) and tighten cap nuts (24).



### Step 10

Flushing set for double mechanical shaft seal:

1. Fit membrane valve on drain on pump casing. Ensure the bypass tube is in the right position (see drawing).
2. Fit lower tube to the needle valve.
3. Fit pressure gauge to upper tube.
4. Fit flow meter.



Read the instructions carefully. The items refer to the parts list and service kits section.

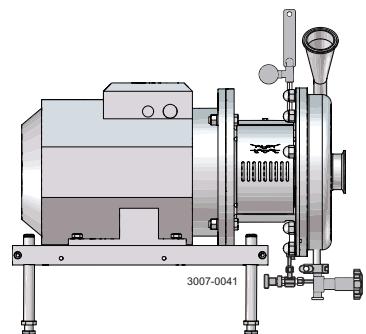
Lubricate the rubber seals before fitting them.

\* : Relates to the shaft seal.

### Step 11

#### Adjustment of flushing set:

1. Drain valve is used for draining the pump.
2. Before adjusting the flow, the valve in the flow meter has to be completely opened. Flushing water is then adjusted by the needle valve until the flow meter reads between 15 and 30 (0.25 - 0.5 l/min) (0.066 - 0.132 gpm)
3. The non-return valve in the flow meter prevents flushing water from returning into the flushing housing.
4. The pressure gauge is for monitoring water pressure in the flushing housing. Max. water pressure is 5 bar (72.5 psi).



\*

## 5 Maintenance

Study the instructions carefully. The items refer to the parts list and service kits section.

Lubricate the rubber seals before fitting them.

\* : Relates to the shaft seal.

### 5.6 Assembly of flushing set - if not supplied with pump

#### Step 1

If the pump has a single shaft seal, rebuild it to a double mechanical shaft seal (see section 5.5 Assembly of pump/double mechanical shaft seal)

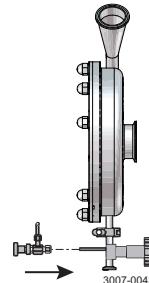
#### Step 2

1. Fit membrane valve on pump casing drain.
2. Ensure the bypass tube is in the right position (see section 5.5 Assembly of pump/double mechanical shaft seal, step 10).



#### Step 3

1. Fit needle valve to bypass tube from membrane valve.
2. Adjust the length of the bypass tube to ensure the outlet of needle valve is aligned with the inlet in the bottom of the flushing house.



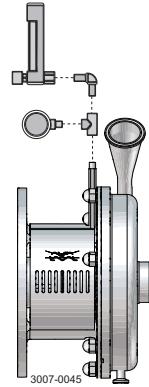
#### Step 4

1. Fit Hex tube (65mm) to bottom hole in flush housing.
2. Fit 6mm connection to Hex tube.
3. Cut and fit 6mm tube in between needle valve and 6mm connection.



#### Step 5

1. Fit Hex tube (140mm) to top hole of flush housing.
2. Fit 6mm connection to HEX tube.
3. Cut and fit 6mm tube supplied in between 6mm connection and tee.
4. Fit pressure gauge to tee.
5. Cut and fit 6mm tube supplied in between 6mm connection and elbow.
6. Fit flow meter to elbow.
7. Threaded outlet from flow meter to be connected to on-site flush water installation.



Study the instructions carefully. The items refer to the parts list and service kits section.

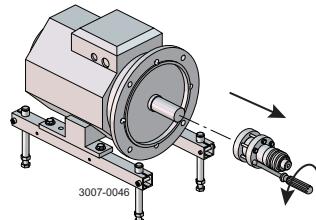
Lubricate the rubber seals before fitting them.

\* : Relates to the shaft seal.

### 5.7 Adjustment of shaft

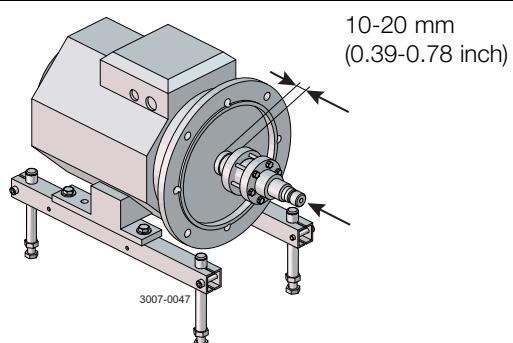
#### Step 1

1. Loosen screws (6).
2. Pull off stub shaft (7) together with compression rings (5a, 5b).



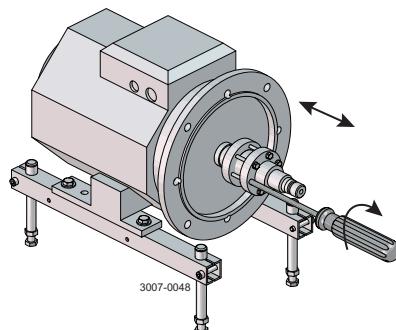
#### Step 2

1. Push stub shaft (7) together with compression rings (5a, 5b) onto the motor shaft.
2. Check that the clearance between the end of the stub shaft and the motor flange is 10-20 mm (0.39-0.78 inch).



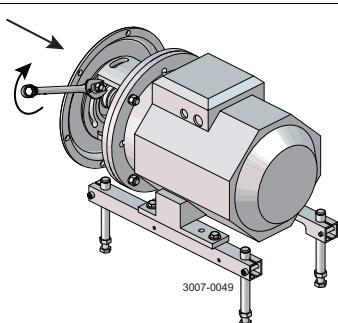
#### Step 3

1. Tighten screws (6) lightly and evenly.
2. Ensure that stub shaft (7) can be moved on the motor shaft.



#### Step 4

1. For double mechanical shaft seal: Fit drive ring (52) on stub shaft (7).
2. Fit back plate (25), washers (21) and nuts (20) and tighten.



\*

## 5 Maintenance

Study the instructions carefully. The items refer to the parts list and service kits section.

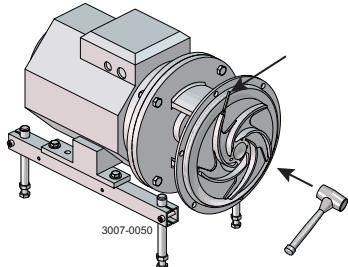
Lubricate the rubber seals before fitting them.

\* : Relates to the shaft seal.

### Step 5

1. Fit impeller (37) on stub shaft (7).
2. Ensure that the clearance between the impeller and back plate (25) is correct: 0.5 mm (0.02 inch).
3. Tighten screws (6) evenly until the stub shaft (7) cannot move on the motor shaft.

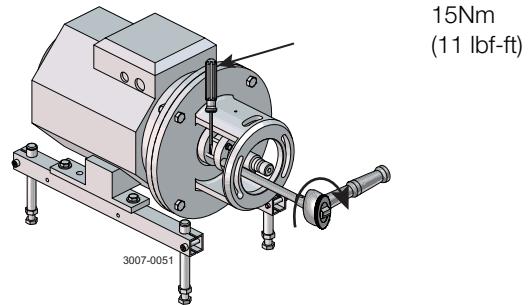
Distance = 0.5 mm (0.02 inch)



### Step 6

1. Remove impeller (37), back plate (25) and drive ring (52).
2. Tighten screws (6) evenly to 15 Nm (11 lbf-ft).

Counterhold with a screwdriver



## 6 Technical data

*It is important to observe the technical data during installation, operation and maintenance.  
Inform personnel about the technical data.*

### 6.1 Technical data

The LKH UltraPure pump is a highly efficient and economical centrifugal pump, which meets the requirements of the pharmaceutical industries. It provides gentle product treatment and is chemically resistant. LKH UltraPure is available in the following sizes, LKH UltraPure-10 , -20, -25, -35 and -40. The instruction manual is part of the delivery. Study the instructions carefully.

Data						
Max. system pressure	1000 kPa	(10 bar)	(145 psi)			
Temperature range						
Max. speed	-10°C to +140°C	(EPDM)	(14°F to 284°F)			
4000 rpm						
Materials						
Product wetted steel parts	AISI 316L					
Other steel parts	Stainless steel					
Finish	Polished					
Product wetted seals	EPDM (standard)					
Other O-rings	EPDM (standard)					
Alternative seals	FPM and FEP					
Shaft seal						
Seal types	External single or double mechanical seal					
Max. temperature flush media	70°C					
Max. water pressure (double mechanical seal)	Normally atmospheric	(max. 5 bar)	(max. 72.5 psi)			
Water consumption (double mechanical seal)	0.25 - 0.5 l/min.	(0.006 - 0.13 gpm)				
Material, stationary seal ring	Acid-resistant steel with sealing surface of silicon carbide					
Material, rotating seal ring	Silicon carbide					
Material, O-rings	EPDM (standard)					
Alternative material, O-rings	FPM and FEP					
Motor						
Foot-flanged motor acc. to IEC metric standard 2 poles = 3000/3600 rpm. at 50/60 Hz IP55 (drain hole with labyrinth plug), insulation class F						
Motor sizes (kW), 50 Hz	1.5 - 22 kW					
Motor sizes (kW), 60 Hz	1.75 - 25 kW					
Motor sizes (Hp), 50 Hz	2.0 - 29.5 Hp					
Motor sizes (Hp), 60 Hz	2.4 - 33.5 Hp					

For further information - see PD sheet.

## 6 Technical data

*It is important to observe the technical data during installation, operation and maintenance.  
Inform personnel about the technical data.*

### 6.2 Relubrication intervals

The table is for an internal bearing temperature of 100°C. An increase in temperature of 15°C (ambient or internal in bearings), will reduce the greasing interval and bearing lifetime by 50%. The lubrication interval for vertically mounted pumps is half the value stated in the table.

ABB IEC motors, IE3

Motor power (kW)	LKH5 -90 LKH10 -60* LKH-110* LKHPF LKH UltraPure 50/60 Hz	LKHPF-10 -60 LKH-10 -60 LKH-110 3300 Bearing 50/60 Hz	LKHPF-70 LKH-120 7200 Bearing 50/60 Hz	LKH-85 7300 Bearing 50/60 Hz
0.75	Permanently lubricated			
1.1	Permanently lubricated			
1.5	Permanently lubricated	Not available		
2.2	Permanently lubricated	Permanently lubricated		
3.0	Permanently lubricated	Not available		
4.0	Permanently lubricated	Permanently lubricated		
5.5	Permanently lubricated	3600h/3000h - DE/NDE:15g*		
7.5	Permanently lubricated	3600h/3000h - DE/NDE:15g*		
11	Permanently lubricated	3100h/2300h - DE/NDE:25g		
15	Permanently lubricated	3100h/2300h - DE/NDE:25g		
18.5	Permanently lubricated	3100h/2300h - DE/NDE:25g		
22	Permanently lubricated	2600h/2000h - DE/NDE:42g	4000h/2200h - DE/NDE:42g	
30	Permanently lubricated		4000h/2800h - DE/NDE:55g	8000h/ - - DE/NDE:40g
37	Permanently lubricated		4000h/2800h - DE/NDE:55g	8000h/ - - DE/NDE:40g
45	Permanently lubricated		2500h/1000h - DE/NDE:55g	8000h/ - - DE/NDE:40g
55	Permanently lubricated		2500h/1000h - DE/NDE:73g	8000h/3000h - DE/NDE:60g
75	Permanently lubricated		1500h/500h - DE/NDE:73g	4000h/1500h - DE/NDE:60g
90				4000h/2800h - DE/NDE:45g
110				4000h/2800h - DE/NDE:45g

\* inlet pressure less than 10 bar (145 psi)

#### Recommended grease types:

##### LKHPF-10/-70 – LKH-110 – LKH-120:

Esso: Unirex N2 or N3 (Lithium complex base)  
Mobil: Mobilith SHC 100 (Lithium complex base)  
Shell: Shell Gadus S5 V100 2 (Lithium complex base)  
Klüber: Klüberplex BEM 41-132 (Special Lithium base)  
FAG: Arcanol TEMP110 (Lithium complex base)  
Lubcon: Turmogrease L 802 EP PLUS (Lithium complex base)

##### \*LKHPF-10/-60 – LKH-110

Klüber: Klüber Asonic HQ72-102 (Polyurea base)

##### LKH-85:

Klüber: Klüberplex Quiet BQH 72-102 (Polyurea base)  
Lubcon: Turmogrease PU703 (Polyurea base)

**WARNING:** Polyurea-based grease must not be mixed with Lithium complex base grease and vice versa.

## 6 Technical data

*It is important to observe the technical data during installation, operation and maintenance.  
Inform personnel about the technical data.*

WEG IEC Motors, IE3

Motor power (kW)	LKH-5 -70 LKHI-10 -60* LKH-110* LKHSP, LKH Evap LKH UltraPure 50/60 HZ
0.75	Permanently lubricated
1.1	Permanently lubricated
1.5	Permanently lubricated
2.2	Permanently lubricated
3.0	Permanently lubricated
4.0	Permanently lubricated
5.5	Permanently lubricated
7.5	Permanently lubricated
11	Permanently lubricated
15	Permanently lubricated
18.5	Permanently lubricated
22	10000/10000h - DE/NDE: 18g
30	10000/10000h - DE/NDE: 21g
37	10000/10000h - DE/NDE: 21g
45	Not available
55	5000/5000h - DE/NDE: 27g
75	5000/5000h - DE/NDE: 27g

\* inlet pressure < 10 bar (145 psi)

**Recommended grease types:**

Mobil

POLYREX EM 103

## 6 Technical data

*It is important to observe the technical data during installation, operation and maintenance.  
Inform personnel about the technical data.*

**Table 1. Sterling Nema motors**

Motor RPM	Frame VS. HP	Type of service Standard 8 hrs/day	Heavy duty 24 hrs/day
3600	143T - 286TS 1.5 - 30	*	*
	324TS - 455TS 40 - 150	6 Months	2 Months
1800	143T - 256T 1 - 20	*	*
	284T - 326T 25 - 50	4 Months	18 Months
	364T - 445T 60 - 150	9 Months	3 Months
1200	143T - 256T 0.75 - 10	*	*
	284T - 326T 15 - 30	4 Years	16 Years
	364T - 445T 40 - 125	1 Year	4 Months

\* Motors of this size normally do not have bearings that can be re-lubricated.

These bearings should be replaced at least every 5 years for 8 hr/day service, or every 2 years for 24 hr/day service.

**Warning: Bearing grease is Klüber NBU-15 - DO NOT SUBSTITUTE!**

### 6.3 Torque specifications

The table below specifies the tightening torques for the screws, bolts and nuts in this pump.  
Always use the following torques if no other values are stated. This can be a matter of personal safety.

Size	Tightening torque	
	Nm	lbf-ft
M8	20	14.8
M10	40	29.5
M12	67	49.0
M14	110	81.0

## 6 Technical data

*It is important to observe the technical data during installation, operation and maintenance.  
Inform personnel about the technical data.*

### 6.4 Weight (kg)

Pump Type: LKH UltraPure

Size	90		100		112		132		160		180	
	1.5kW	2.2kW	3kW	4kW	5.5kW	7.5kW	11kW	15kW	18.5kW	22kW		
10	53	55	70	75								
20	55	57	72	77	94	108						
25				81	98	112	171	185				
35				81	98	112	171	185				
40					115	174	188	206		225		

Weight can vary depending of configuration. Weight is only to be seen as a reference value during handling, transporting and packaging.

## 6 Technical data

*It is important to observe the technical data during installation, operation and maintenance.  
Inform personnel about the technical data.*

### 6.5 Noise emission

Pump Type	Sound pressure level (dBA)
LKH-5	60
LKH-10	69
LKH-15	72
LKH-20	70
LKH-25	74
LKH-35	71
LKH-40	75
LKH-45	70
LKH-50	75
LKH-60	77
LKH-70	88
LKH-75	79
LKH-85	86
LKH-90	75
LKH-112	70
LKH-113	69
LKH-114	68
LKH-122	75
LKH-123	77
LKH-124	80
SolidC-1	68
SolidC-2	72
SolidC-3	73
SolidC-4	72
MR-166	76
MR-185	82
MR-200	81
MR-300	82
GM	54
FM-OS	61

The above LKH noise levels are the same for LKHPF, LKHI, LKH UltraPure, LKH Evap and LKHex.  
The above SolidC noise levels are the same for SolidC UltraPure.

The noise measurements have been carried out on the original motor and shroud, at the approximate Best Efficiency Point (BEP) with water at ambient temperature and at 50 Hz.

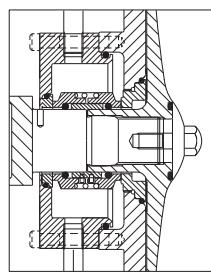
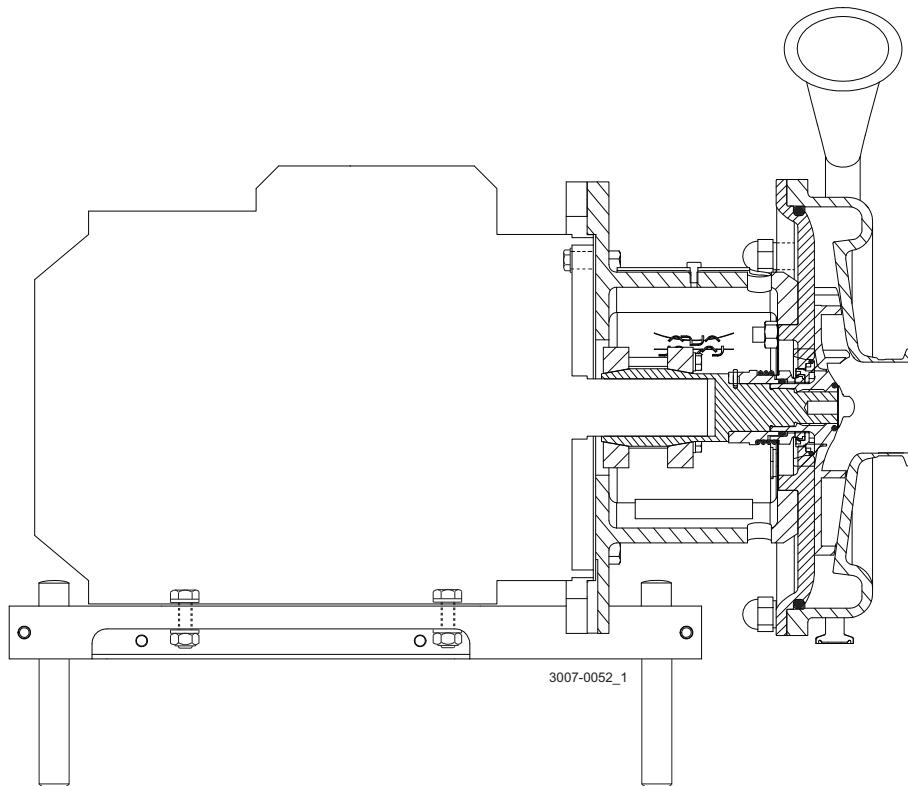
Very often the noise level generated by the flow through the process system (e.g. valves, pipes, tanks etc.) is much higher than that generated by the pump itself. Therefore, it is important to consider the noise level from the total system and take the necessary precautions with regard to personal safety if required.

## 7 Parts list and service kits

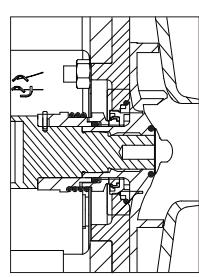
The drawing shows the LKH UltraPure pump, sanitary version.

The items refer to the parts lists in the following sections 7.2 LKH UltraPure - Product wetted parts

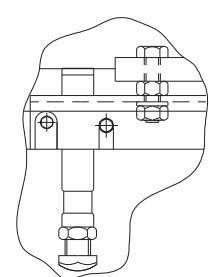
### 7.1 LKH UltraPure -10, -20, -25, -35, -40



Double mechanical shaft seal



Single shaft seal



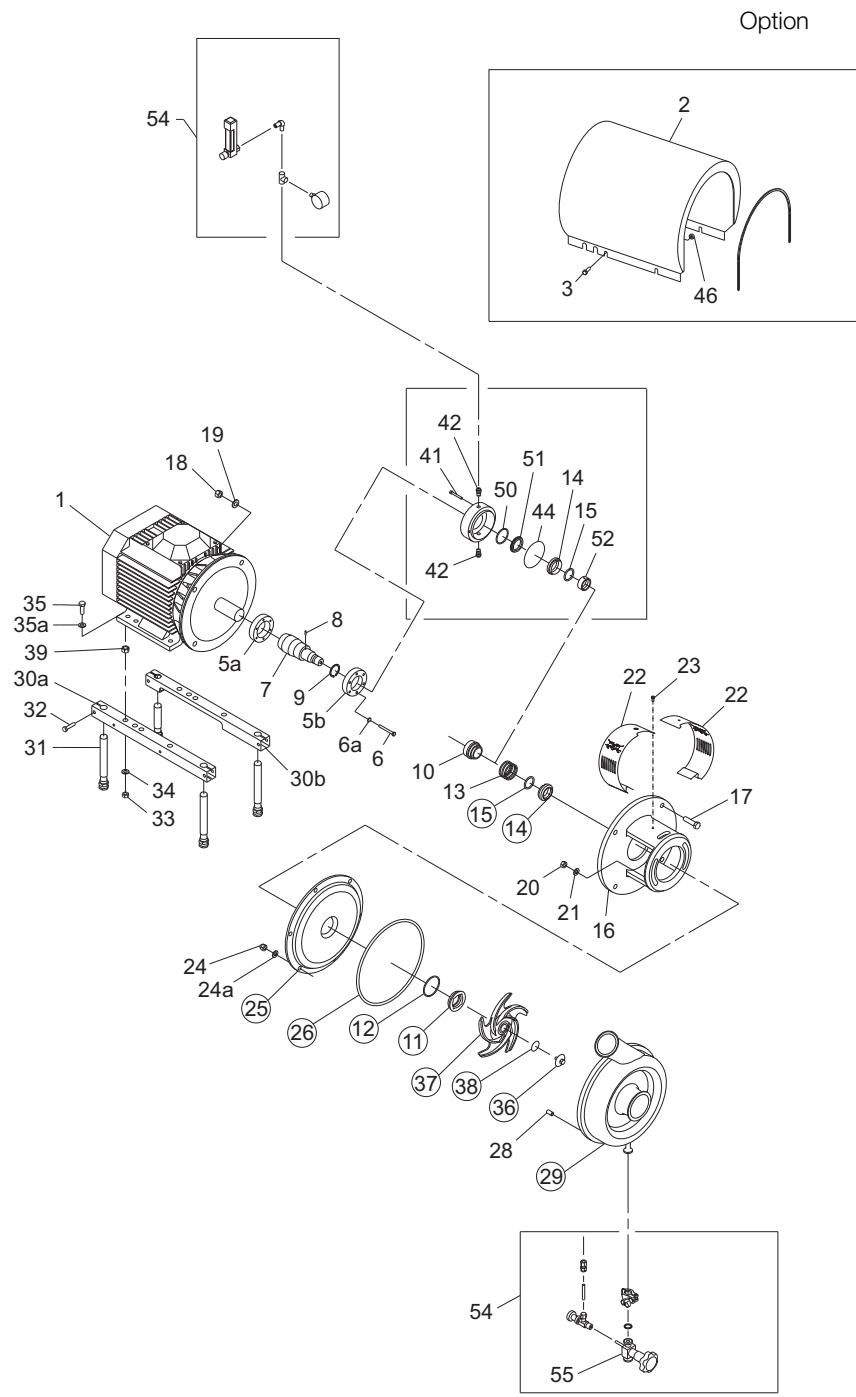
Only used for 3 kW  
Fitting of legs

## 7 Parts list and service kits

The drawing shows the LKH UltraPure pump, sanitary version.

The items refer to the parts lists in the following sections 7.2 LKH UltraPure - Product wetted parts

### 7.2 LKH UltraPure - Product wetted parts



Product wetted part

## 7 Parts list and service kits

The drawing shows the LKH UltraPure pump, sanitary version.

The items refer to the parts lists in the following sections 7.2 LKH UltraPure - Product wetted parts

### Parts list

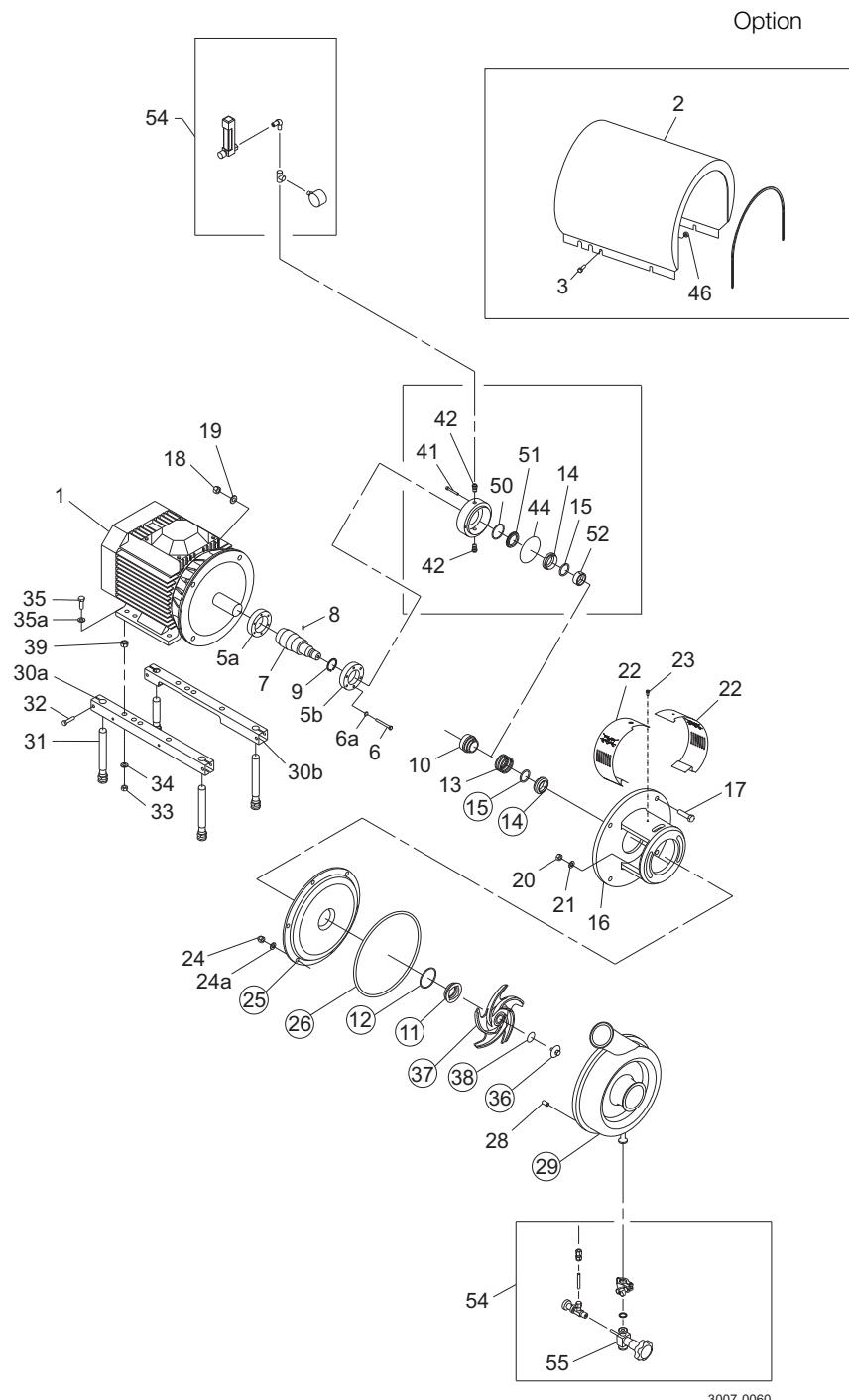
Pos.	Qty	Denomination
20	2	Nut
21	2	Washer
24	6	Cap nut
24a	6	Washer
25	1	Backplate compl Ra 0.8
	1	Backplate compl Ra 0.5
	1	Backplate compl Ra 0.5 electropolished
26	1	Pump casing O-ring EPDM
□♦	1	Pump casing O-ring FPM
□♦	1	Pump casing O-ring FEP
28	6	Bolt
29	1	Casing compl. Tri-clamp
	1	Casing compl. ISO2037
	1	Casing compl. ISO1127
36	1	Impeller screw Ra 0.8
	1	Impeller screw Ra 0.5
	1	Impeller screw Ra 0.5 electropolished
37	1	Impeller Ra 0.8
	1	Impeller Ra 0.5
	1	Impeller Ra 0.5 electropolished
	1	Impeller low ferrit 5% Ra 0.8
	1	Impeller low ferrit 5% Ra 0.5
	1	Impeller low ferrit 5% Ra 0.5 electropolished
38	1	O-ring impeller screw EPDM
□♦	1	O-ring impeller screw FPM
□♦	1	O-ring impeller screw FEP

## 7 Parts list and service kits

The drawing shows the LKH UltraPure pump, sanitary version.

The items refer to the parts lists in the following sections 7.2 LKH UltraPure - Product wetted parts

### 7.3 LKH UltraPure - Motor depended parts



Product wetted part

## 7 Parts list and service kits

The drawing shows the LKH UltraPure pump, sanitary version.

The items refer to the parts lists in the following sections 7.2 LKH UltraPure - Product wetted parts

### Parts list

Pos.	Qty	Denomination
1	1	Tool complete
2	1	Motor
3	1	Shroud
3	4	Screw
5a	1	Compression ring with thread
5b	1	Compression ring without thread
6	6	Screw
6a	6	Washer
7	1	Shaft
8	1	Connex pin
9	1	Retaining ring
16	1	Adaptor
17	4	Screw for adaptor
18	4	Nut for adaptor
19	4	Washer for adaptor
22	1	Safety guard set
23	1	Screw for safety guard
30a	1	Support bar, right
30b	1	Support bar, left
31	4	Leg
32	4	Screw
33	4	Nut
34	4	Spring washer
35	4	Screw
35a	4	Washer
39	4	Nut
46	4	Distance sleeve

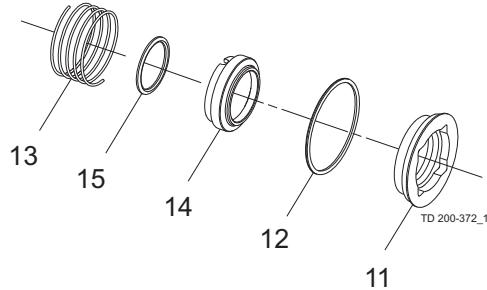
## 7 Parts list and service kits

The drawing shows the LKH UltraPure pump, sanitary version.

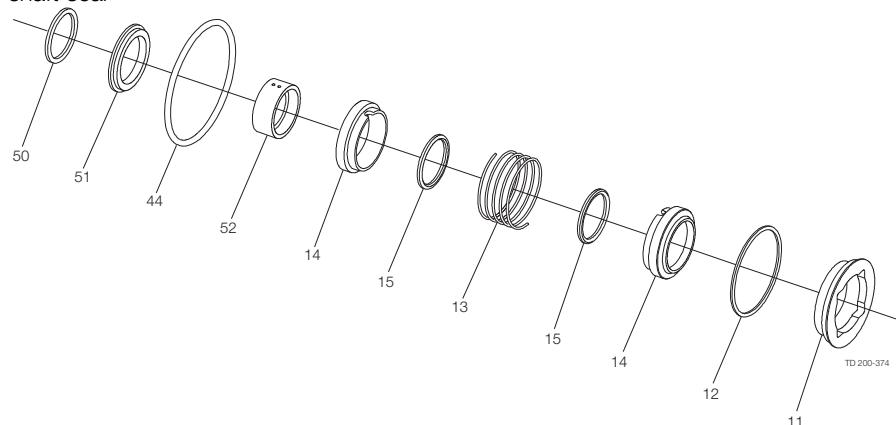
The items refer to the parts lists in the following sections 7.2 LKH UltraPure - Product wetted parts

### 7.4 LKH UltraPure - Single shaft seal

Single shaft seal.



Double mechanical shaft seal



## 7 Parts list and service kits

The drawing shows the LKH UltraPure pump, sanitary version.

The items refer to the parts lists in the following sections 7.2 LKH UltraPure - Product wetted parts

### Parts list

Pos.	Qty	Denomination
□		Complete single shaft seal, SiC/SiC
◆		Complete double mechanical shaft seal, SiC/SiC
10	1	Alfa Laval Q-doc service kit
11	1	Drive ring, Single shaft seal steel
11 □	1	Stationary seal ring, SiC
11 ◆	1	Stationary seal ring, SiC
12 □	1	O-ring
12 ◆	1	O-ring
13 □	1	Spring
13 ◆	1	Spring
14 □	1	Rotating seal ring, SiC
14 ◆	2	Rotating seal ring, SiC
15 □	1	O-ring
15 ◆	2	O-ring
40a	1	Seal housing
41	2	Screw for seal housing
42	2	Fittings
44 ◆	1	O-ring for seal housing
50 ◆	1	O-ring
51 ◆	1	Sec. stationary seal ring
52 ◆	1	Drive ring
54	1	Basic 1/2"
55	1	Diaphragm EPDM for Diaphragm valve from 2014 -

### Service kits

Denomination	EPDM	FPM	FEP
<b>Service kit for single shaft seal</b>			
□ Service kit LKHUP-10 .....	9611922339	9611922338	9611922340
□ Service kit LKHUP-20 .....	9611922357	9611922356	9611922358
□ Service kit LKHUP-25/35 .....	9611922375	9611922374	9611922376
□ Service kit LKHUP-40 .....	9611922393	9611922392	9611922394

### Service kit for double mechanical shaft

◆ Service kit LKHUP-10 .....	9611922345	9611922344	9611922346
◆ Service kit LKHUP-20 .....	9611922363	9611922362	9611922364
◆ Service kit LKHUP-25/35 .....	9611922381	9611922380	9611922382
◆ Service kit LKHUP-40 .....	9611922399	9611922398	9611922400

Parts marked with □◆ are included in the service kits.

Recommended spare parts: Service kits.

Conversion kit single to double mechanical shaft seal : Please order Double mechanical service kit + pos. 40a + 41 + 42 (900065/13)

**How to contact Alfa Laval**

Contact details for all countries are continually updated on our website.

Please visit [www.alfalaval.com](http://www.alfalaval.com) to access the information directly.

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