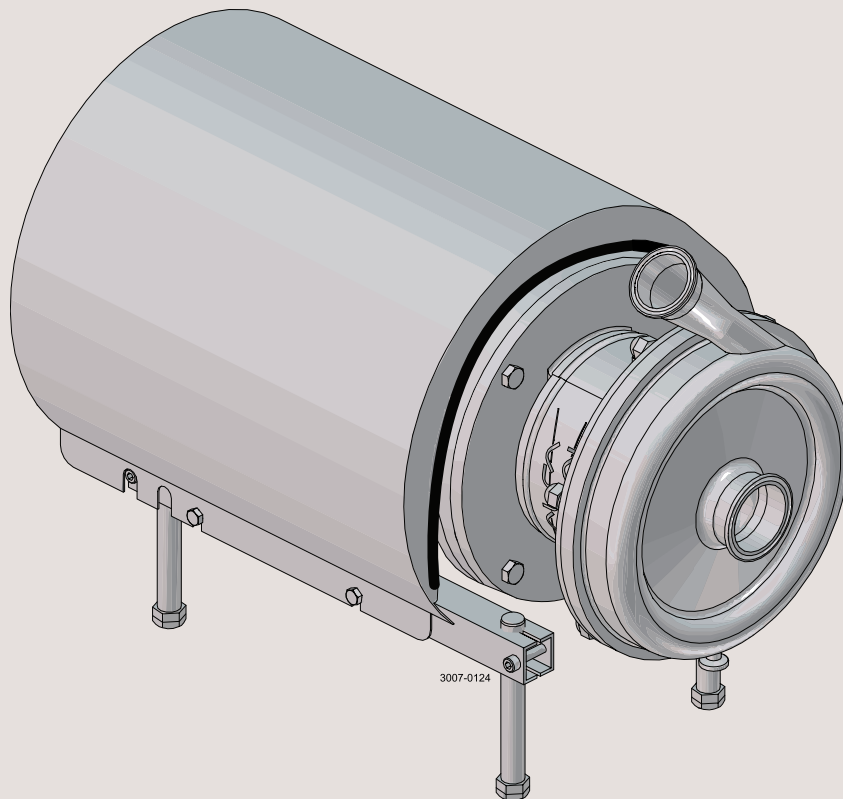




# Instruction Manual

## LKH UltraPure Centrifugal Pump



ESE01703-EN16 2022-10

Original manual



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

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# 1 Declarations of Conformity

## EU Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00

Company name, address and phone number

Hereby declare that

Pump

Designation

LKH UP-10, LKH UP-20, LKH UP-25, LKH UP-35, LKH UP-40, LKH UP-45, LKH UP-60, LKH UP-70

Type

Serial number from 10.000 to 1.000.000

is in conformity with the following directives with amendments:

- Machinery Directive 2006/42/EC
- RoHS EU Directive 2011/65/EU and amendments

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

Global Product Quality Manager

Title

Lars Kruse Andersen

Name

Kolding, Denmark

Place

2022-10-01

Date (YYYY-MM-DD)

Signature

This Declaration of Conformity replaces Declaration of Conformity dated 2013-12-03



# 1 Declarations of Conformity

## UK Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S, Albuen 31, DK-6000 Kolding, Denmark, +45 79 32 22 00

Company name, address and phone number

Hereby declare that

Pump

Designation

LKH UP-10, LKH UP-20, LKH UP-25, LKH UP-35, LKH UP-40, LKH UP-45, LKH UP-60, LKH UP-70

Type

Serial number from 10.000 to 1.000.000

is in conformity with the following directives with amendments:

- The Supply of Machinery (Safety) Regulations 2008
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Signed on behalf of: Alfa Laval Kolding A/S

Global Product Quality Manager

Title

Lars Kruse Andersen

Name

Kolding, Denmark

Place

2022-10-01

Date (YYYY-MM-DD)

Signature

DoC Revison\_01\_102022

**UK  
CA**



## 2 Safety

---

*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.

---

This Instruction manual is designed to provide the user with the information to perform tasks safely for all phases in the life time of the product supplied.

The User shall always read the safety section first. Hereafter the User can skip to the relevant section for the task to be carried out or for the information needed.

This is the complete manual for the supplied product.

#### **Skills for personal:**

##### **Operators:**

The operators shall read and understand the instruction manual for the supplied product

##### **Maintenance personnel:**

The maintenance personnel shall read and understand the instruction manual.

The maintenance personnel or technicians shall be skilled within the field required to carry out the maintenance work safely.

##### **Trainees:**

Trainees can perform tasks under the supervision of an experienced employee.

##### **People in general:**

The public shall not have access to the supplied product.

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#### **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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*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!***

---

### 2.2 Warning signs

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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

---

#### General

**Always** ensure that personnel must have experience with lifting operations.

**Always** ensure the lifting point to be in line with center of gravity. Adjust lifting point if necessary.

**Always** keep an eye on the load and stay clear during the lifting operation.

**Always** ensure that the lifting equipment is suitable for the specific pump.

**Always** use appropriate lifting equipment for heavy parts when relevant. Use lifting logs when applied.

To prevent unexpected start and contact with electrical live and moving parts.

**Always** disconnect the power supply safely:

- The power supply disconnecting device must be disconnected (in off position) and locked.

- In case the pump is capable of being plugged into an electrical supply, removal of the plug is sufficient, provided that the operator can check from any of the points to which he has access that the plug remains removed.

**Always** refer to the motor instruction manual for installation and maintenance of the motor.

**Never** touch the impeller through the inlet/outlet during start/stop as this can cause serious injury.

---

#### Installation:

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



#### 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 the 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.

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



#### Motors with grease nipples:

**Always** lubricate according to motor manufacturer's recommended procedures.

**Always** locate and remove grease vent plugs, if provided, prior to adding grease.

**Always** check motor nameplate for grease type and lubrication intervals.





*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.*

---

### **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 the original packaging or similar during transportation

**Always** use suitable transport device ie. forklift or pallet lifter

---

### **Storage:**

Ideally as a guide Alfa Laval would recommend:

- Store supplied product as supplied in original packaging
  - Port opening should be protected against any ingress
  - Bare steel (not stainless) should be lightly oiled/greased
  - Store in a clean, dry place without direct sunlight or UV light
  - Temperature range -5 to 40°C
  - Relative humidity less than 60%
  - No exposure to corrosive substances (also air contained)
-

## 3 Installation

### 3.1 Unpacking/delivery

#### Step 1



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

#### 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.

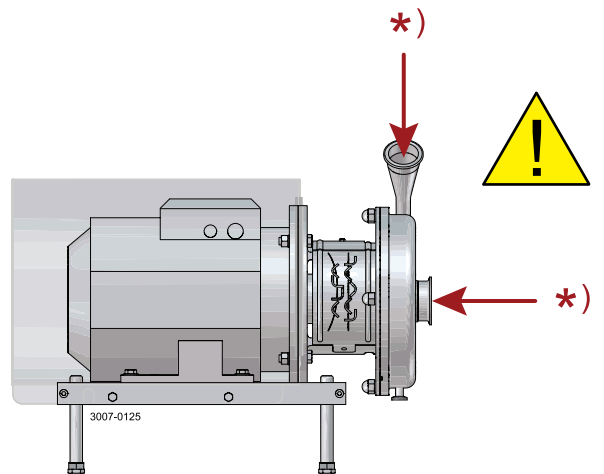
#### Check the delivery for:

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

#### Step 2

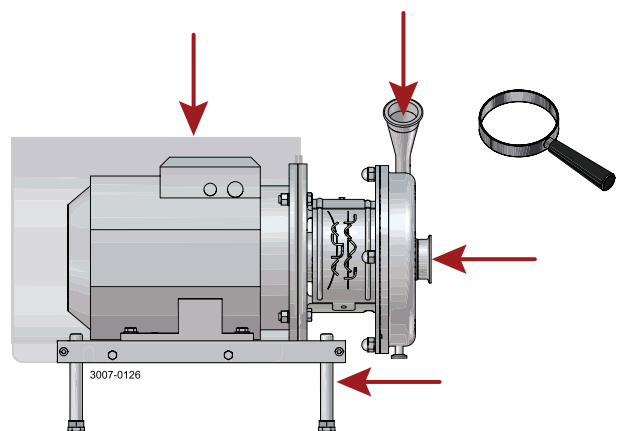
Remove any packing materials from the inlet and the outlet.  
Avoid damaging the inlet and the outlet.  
Avoid damaging the connections for flushing liquid, if supplied.

\* Remove packing materials!



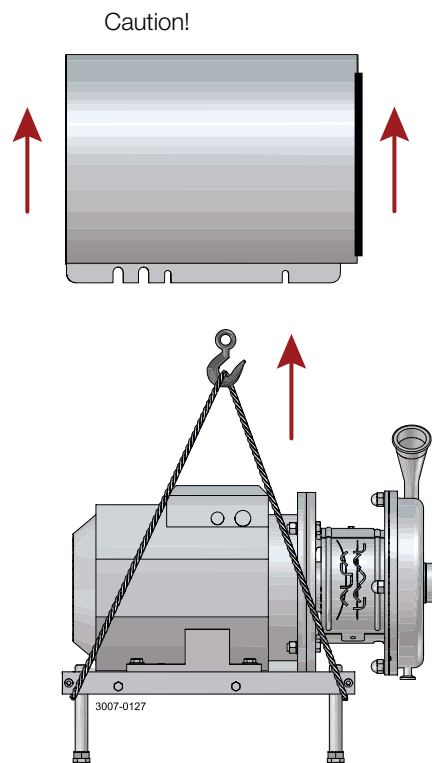
#### Step 3

Inspect the pump for visible transport damage.



#### Step 4

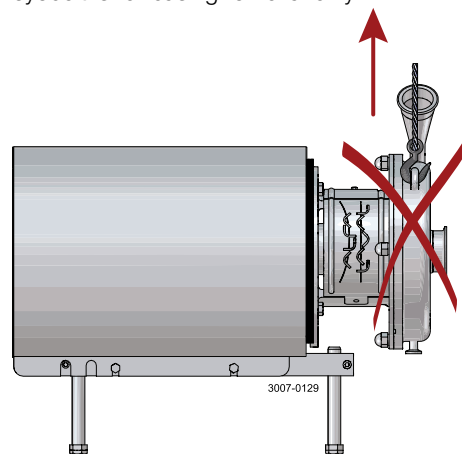
Always remove the shroud, if fitted, before lifting the pump.



#### Step 5

ONLY LKH UltraPure-60 and LKH UltraPure-70

Do **NOT** use eyebolt in casing to lift the pump. The eyebolt is for casing removal only.



## 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. The large pump sizes are very heavy. Alfa Laval therefore recommends the use of a lifting crane when handling the pump.

### 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.

#### 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 the valve to be installed in the system preventing hazardous situations from arising.

#### CAUTION

If the pump has been stored for longer period of time there is a risk that the seal faces may stick together and consequently cause damage to the seal at start-up. Please ensure that the pump shaft can be rotated by hand before start-up.

#### WARNING:

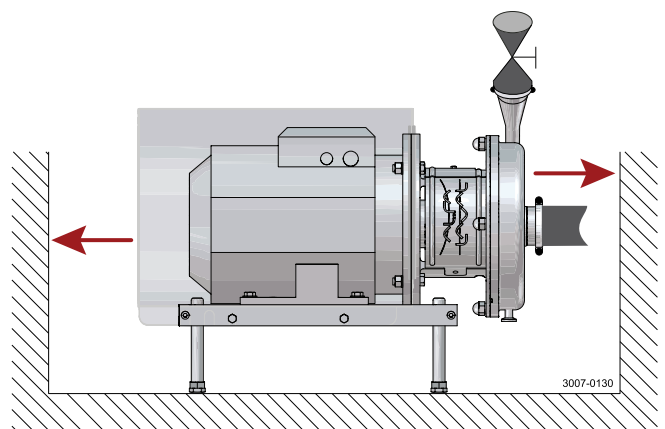
Alfa Laval recommends the supply disconnecting device shall be in accordance with EN60204-1. Always disconnect the supply disconnecting device safely after installation before continuing the installation.

#### Step 2

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

Ensure the floor/frame is able to support the weight of the pump.  
See Technical data and other environment requirements in section 6.

Ensure the pump is supported by all four feet equally.



## 3 Installation

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

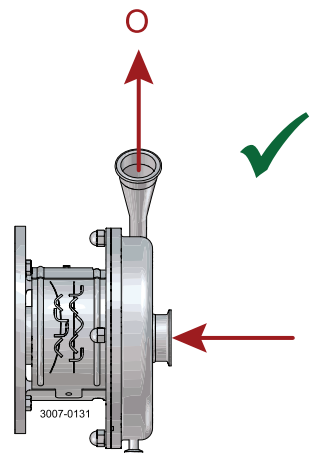
- See pre-use check in section 3.3 Pre-use check. The large pump sizes are very heavy. Alfa Laval therefore recommends the use of a lifting crane when handling the pump.

### Step 3

Check that the flow direction is correct.

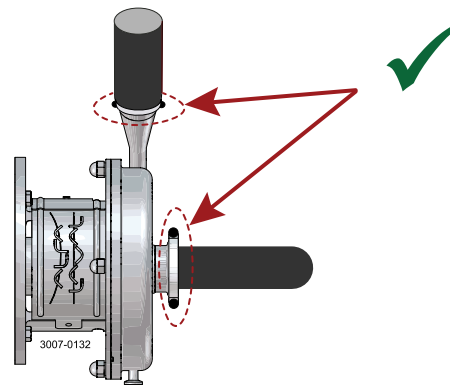
O: Outlet

I: Inlet



### Step 4

1. Ensure that the pipelines are routed correctly.
2. Ensure that the connections are tight.
3. Remember seal rings!

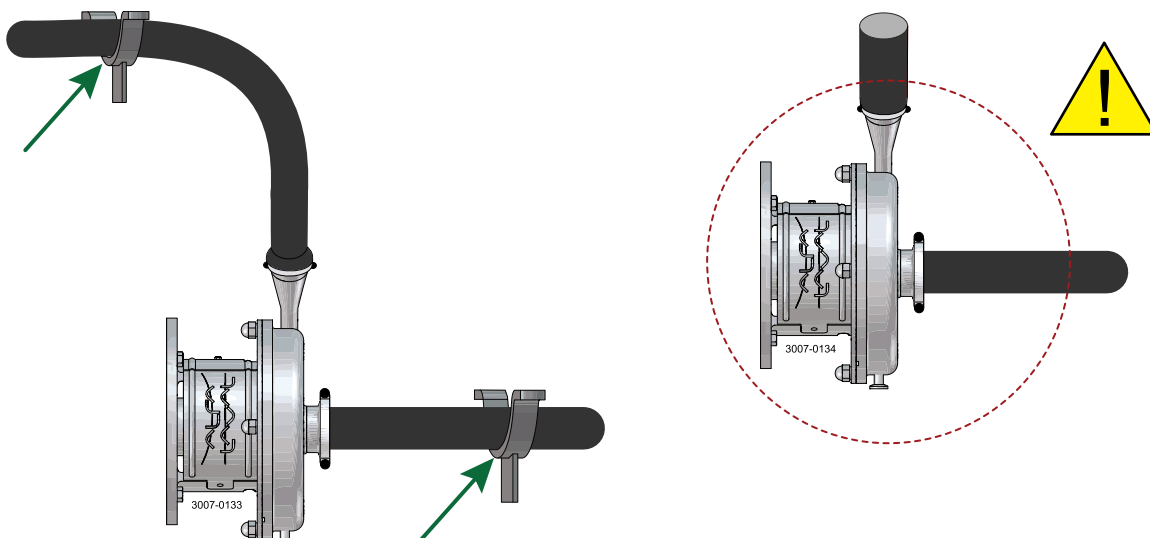


### Step 5

Avoid stress on the pump.

Pay special attention to:

- Vibrations.
- Thermal expansion of the tubes.
- Excessive welding.
- Overloading of the pipelines.
- Piping system must be self-supported.



### 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. The large pump sizes are very heavy. Alfa Laval therefore recommends the use of a lifting crane when handling the pump.

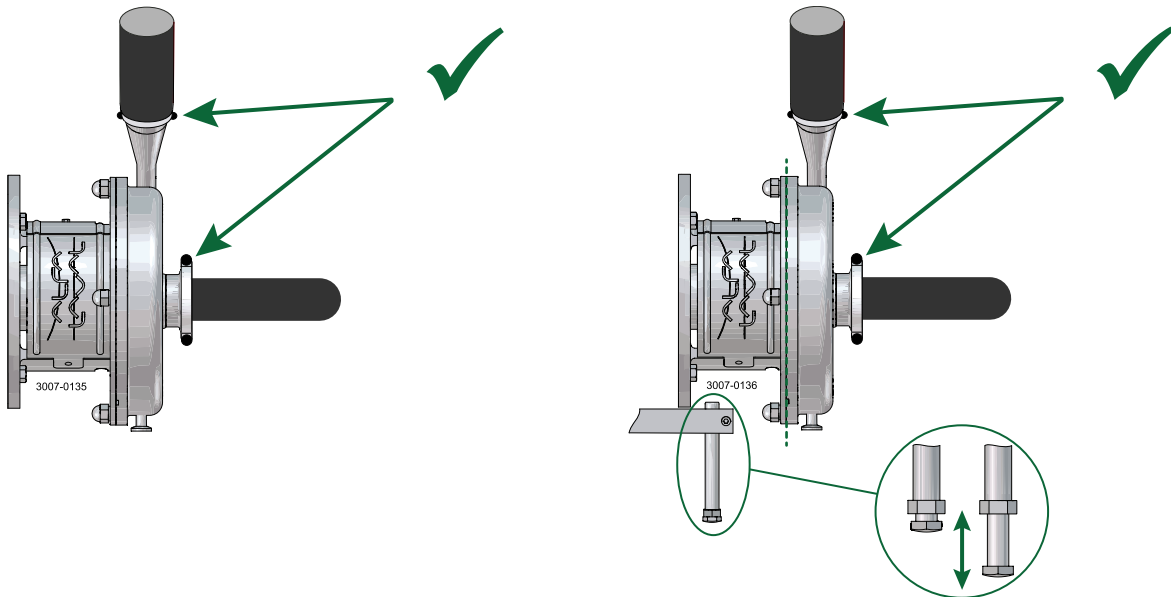
#### Note

In the event of leakage at the shaft seal, the medium will drip from the slot into the bottom of the adapter. In the instance, Alfa Laval recommends placing a drip tray underneath the slot to collect the liquid.

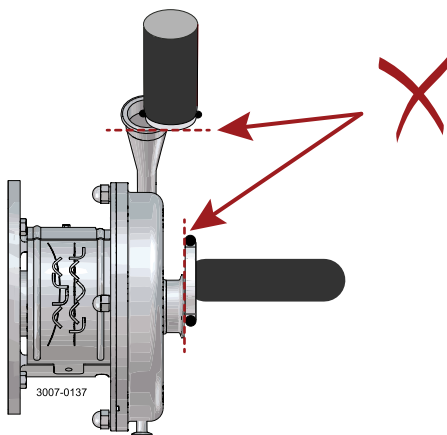
#### Step 6

Ensure correct alignment of pump inlet and outlet with piping system.

Alignment can be done by adjusting the pump legs.



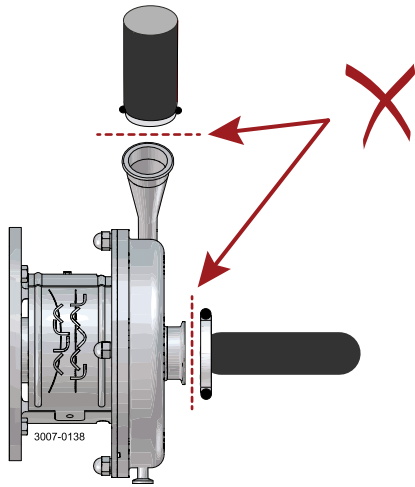
Centre of inlet and outlet to be aligned with centre of piping system.



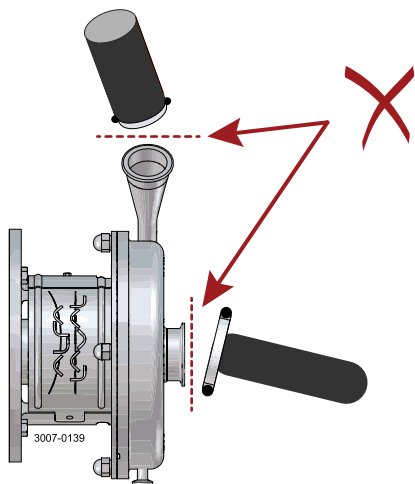
No gaps between connections on pump inlet and inlet pipe, and pump outlet and outlet pipe.

### 3 Installation

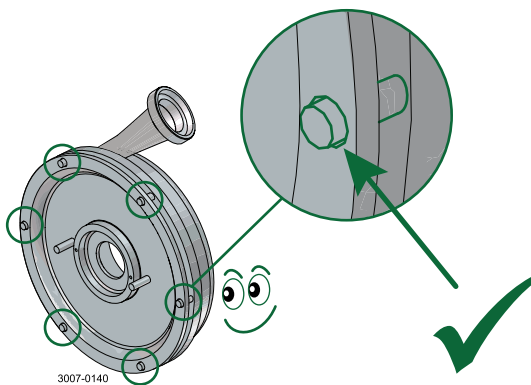
Read the instructions carefully and pay special attention to the warnings! Always check the pump before operation.  
- See pre-use check in section 3.3 Pre-use check. The large pump sizes are very heavy. Alfa Laval therefore recommends the use of a lifting crane when handling the pump.



Angle between connections on pump inler and inlet pipe, pump outlet and outlet pipe not allowed.



Ensure correct alignment of pump casing and pump backplate. Angle not allowed. Alignment can be done by adjusting the pmp legs.

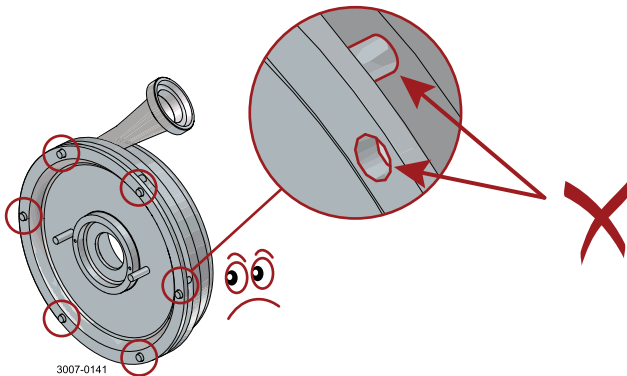


Ensure stud bolts in casing are aligned with holes in backplate.

### 3 Installation

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

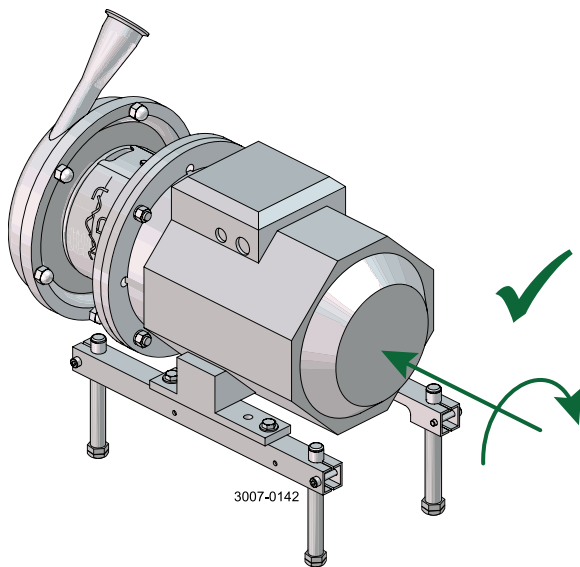
- See pre-use check in section 3.3 Pre-use check. The large pump sizes are very heavy. Alfa Laval therefore recommends the use of a lifting crane when handling the pump.



#### 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 to collect the leakage.

Always ensure the adaptor shield and motor fan guard are present and mounted correctly and allow no access to rotating parts before installing and starting the pump.





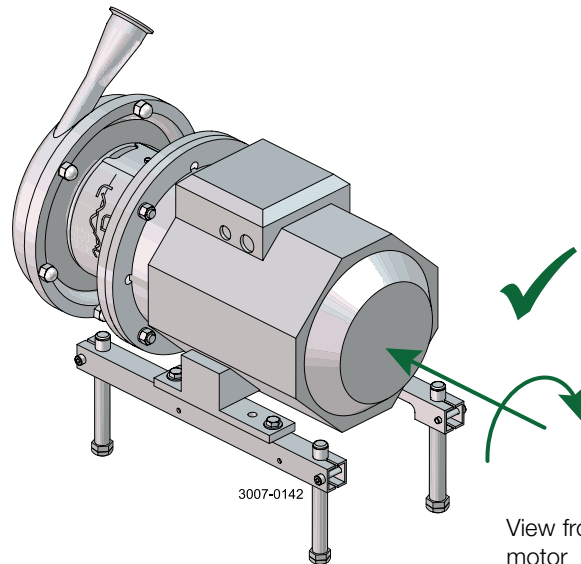
Read the instructions carefully and pay special attention to the warnings!  
LKH UltraPure is not supplied with an impeller screw as standard but can be supplied with one.  
Check the direction of rotation of the impeller before operation.  
- See the indication label on the pump.

### 3.3 Pre-use check



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

1. Connect power supply
2. Start and stop the motor momentarily.
3. Ensure that the direction of rotation of the motor fan is **clockwise** as viewed from the rear end of the motor.
4. Disconnect power supply safely.



See the indication label!

View from rear end of motor

## 3 Installation

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### 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.

- **Scrapping**

- 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

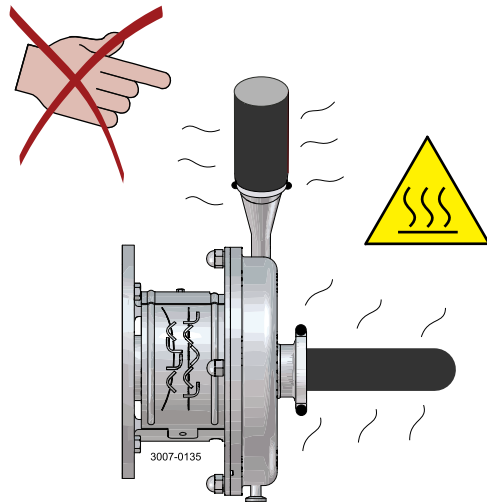
Alfa Laval cannot be held responsible for incorrect operation/control.

### Step 2



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

**Danger of burns!**

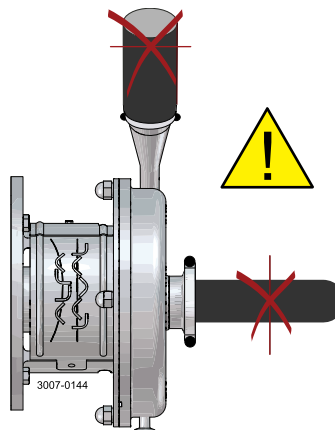


### Step 3



**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

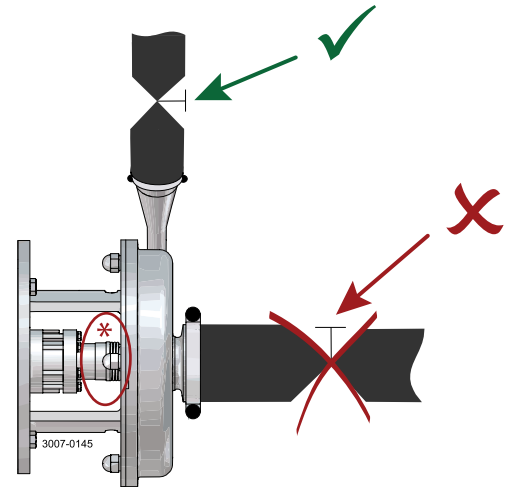
#### CAUTION

The shaft seal must not run dry.

#### CAUTION

Never throttle the inlet side.

\* Do not allow to run dry



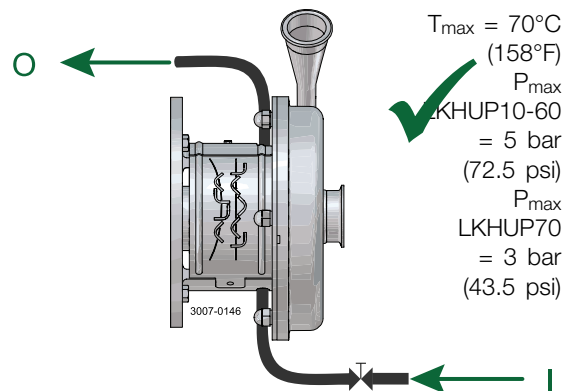
### Step 5

#### Double mechanical shaft seal:

1. Connect the inlet of the flushing liquid correctly.
2. Regulate the water supply correctly.

O: Outlet

I: Inlet



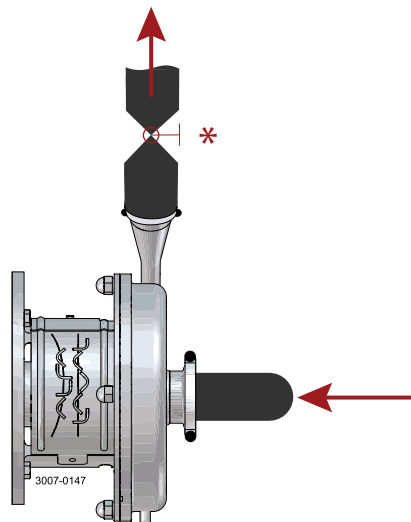
### Step 6

#### 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>	Replace: All wearing parts  If necessary: <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.  
**Always** follow the instructions in the safety data sheet for the cleaning agent.

Caustic danger!



Always use rubber gloves!



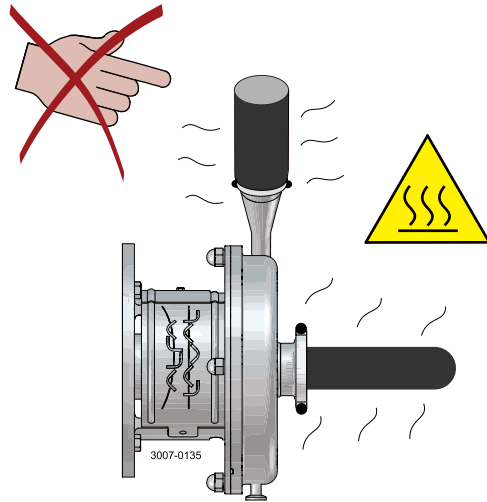
Always use protective goggles!

#### 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.
-----------------------	---	---------------------------	-------------------

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

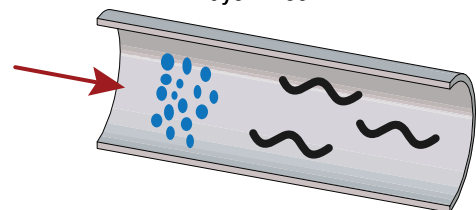


**Always** rinse well with clean water after using a cleaning agent.

#### NOTE

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

Always rinse!



Water      Cleaning agent

3007-0148

*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.*

---

**NOTE**

If pumps are sterilised using steam, standard 3A requires the process system to be designed to automatically shut down if the product pressure in the system becomes less than of the atmosphere and it cannot be started until the system is re-sterilised.

---

## 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.

### 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

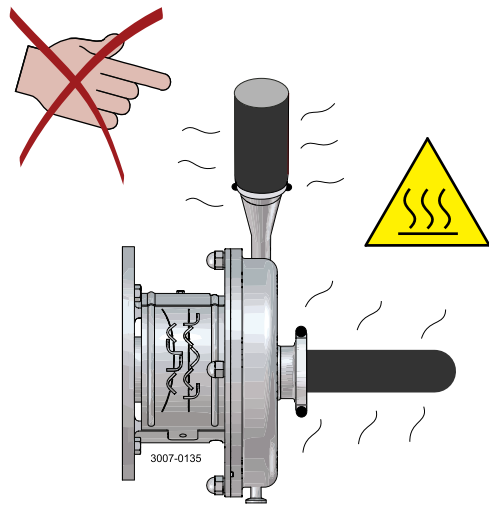
All scrap must be stored/disposed of in accordance with current rules/directives.

#### 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.

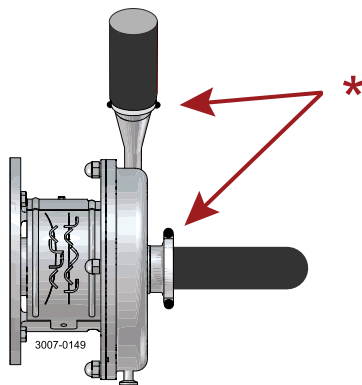
#### CAUTION

Fit the electrical connections correctly if they have been removed from the motor during service.

#### CAUTION

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.



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.

### Safety check

A visual inspection of adaptor shield and motor fan guard must be carried out every 12 months.

If loss or damage to shield or guard, especially when this leads to deterioration of safety performance, it shall be replaced. The fixing of shield and guards should only be replaced with fixings of the same or an equivalent type.

### Inspection acceptance criteria:

- It is not possible to reach the shaft or fan
- The shield and guard must be securely mounted
- Ensure that the screws are tightened

### Procedure in case of non-acceptance:

- Fix and/or replace the shield or guard.

	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).

#### Pay special attention to warnings!

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

## 5 Maintenance

---

### 5.2 Cleaning procedure

---

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

**Warning:** Always follow the instructions in the safety data sheet for the cleaning agent.

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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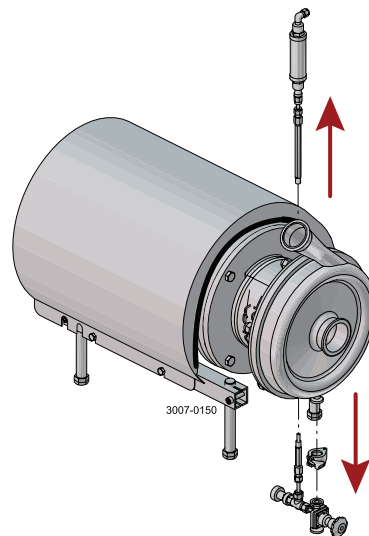
Read the instructions carefully. The items refer to the parts list and service kits section.  
 Handle scrap correctly.  
 \*: Relates to the shaft seal.

### 5.3 Dismantling of pump/shaft seals

#### Step 1

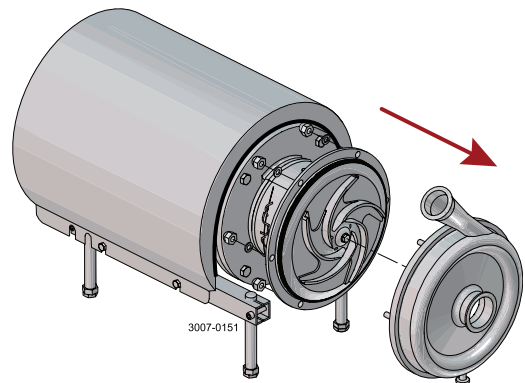
**Flushing set for double mechanical shaft seal:**

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



#### Step 2

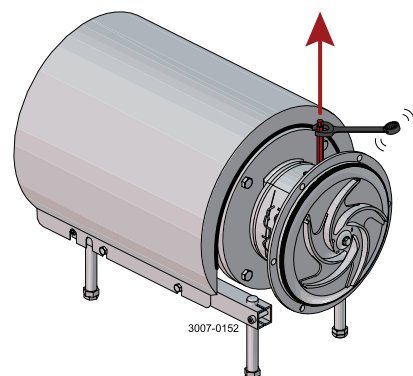
Unscrew cap nuts (24) and remove washers (24a) and pump casing (29).



#### Step 3

**Double mechanical shaft seal:**

Unscrew tubes (42) using a spanner.



## 5 Maintenance

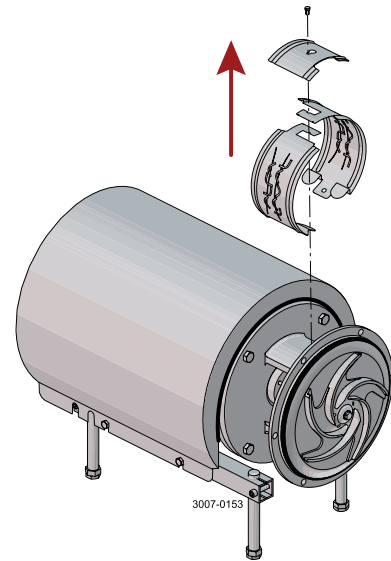
Read the instructions carefully. The items refer to the parts list and service kits section.

Handle scrap correctly.

\* : Relates to the shaft seal.

### Step 4

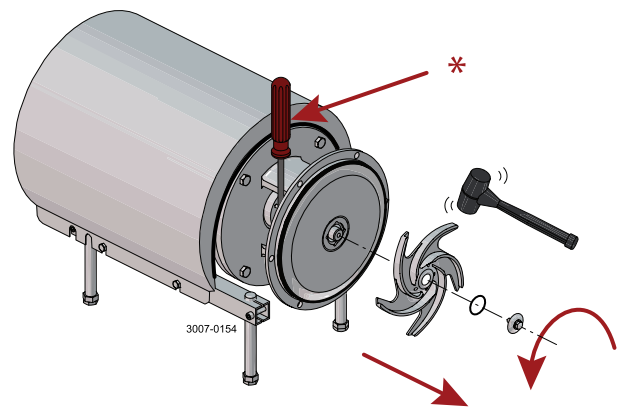
Remove screw (23) and safety guard (22).



### Step 5

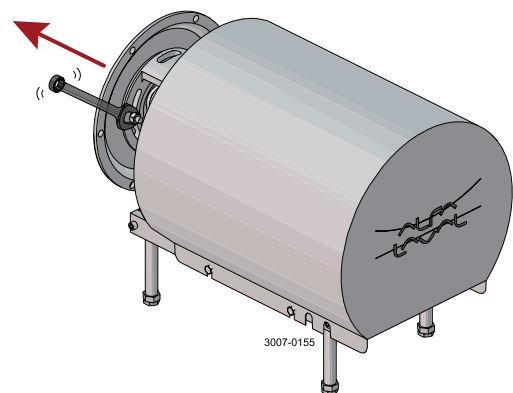
1. Remove impeller screw (36).
2. Remove impeller (37). If necessary, loosen the impeller by tapping gently on the impeller vanes.
3. Remove the O-ring (38) from the impeller.

\* Counterhold with a screwdriver!  
If necessary!



### Step 6

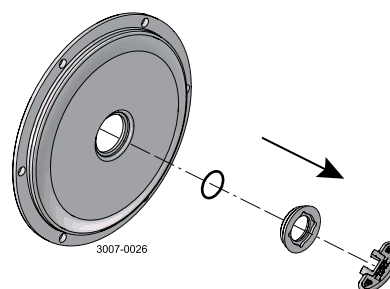
1. Pull off the O-ring (26) from back plate (25).
2. Unscrew nuts (20) and remove washers (21) and the back plate.



### Step 7

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

\* Use the tool supplied  
Left hand thread!



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

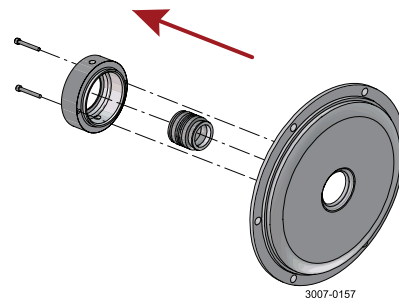
Handle scrap correctly.

\* : Relates to the shaft seal.

### Step 8

#### Double mechanical shaft seal:

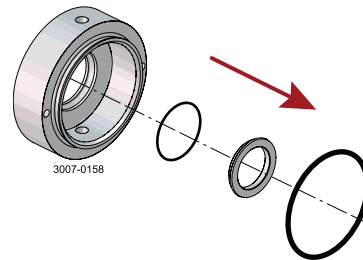
1. Remove screws (41) and seal housing (40a).
2. Remove rotating seal rings (14) and drive ring (52) from spring (13).
3. Remove O-rings (15) from rotating seal rings (14).



### Step 9

#### Double mechanical shaft seal:

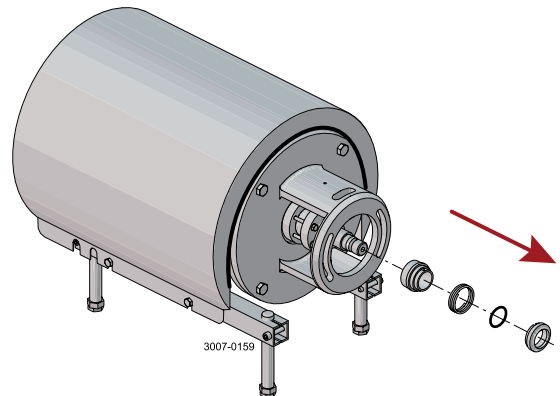
1. Remove stationary seal ring (51) from seal ring (52) (40a/40b).
2. Remove O-ring (50) from stationary seal ring (51).
3. Remove O-ring (44) from seal housing (40a/40b).



### 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).



## 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.

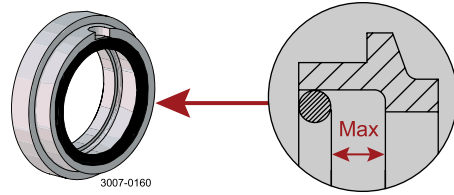
### 5.4 Assembly of pump/single shaft seal

#### Step 1

1. Remove spring (13).

#### NOTE!

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

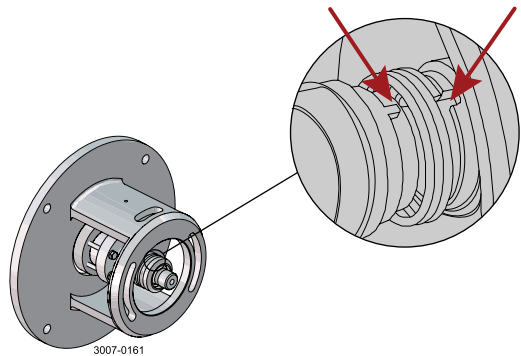


#### Step 2

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.

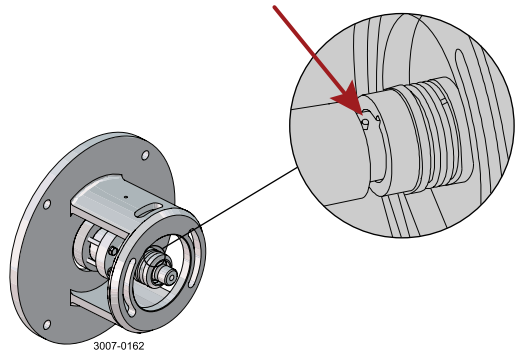


#### Step 3

- 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).

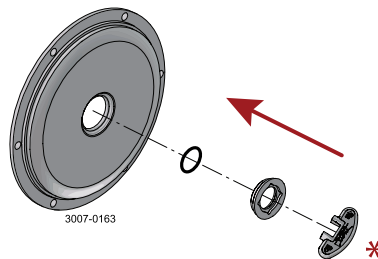


#### Step 4

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  
Left hand thread!

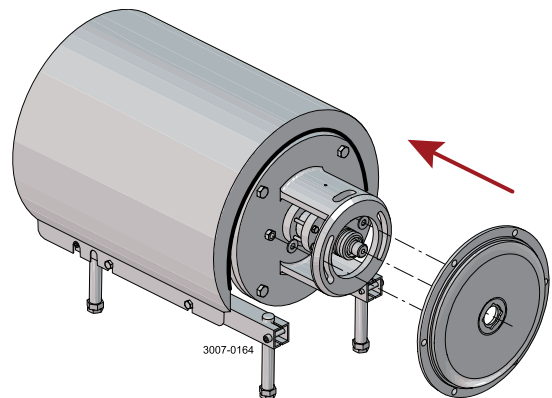
Read the instructions carefully. The items refer to the parts list and service kits section.

Handle scrap correctly.

\* : Relates to the shaft seal.

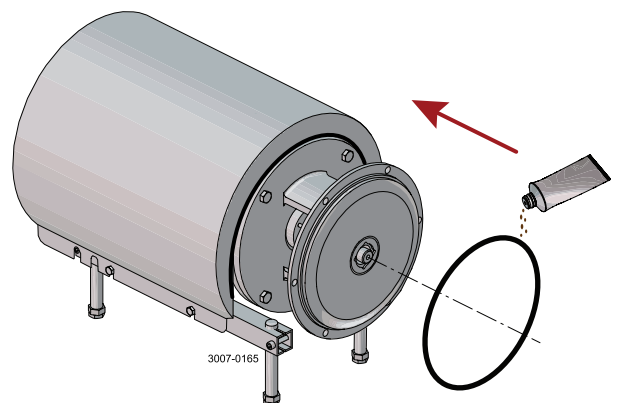
### Step 5

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).



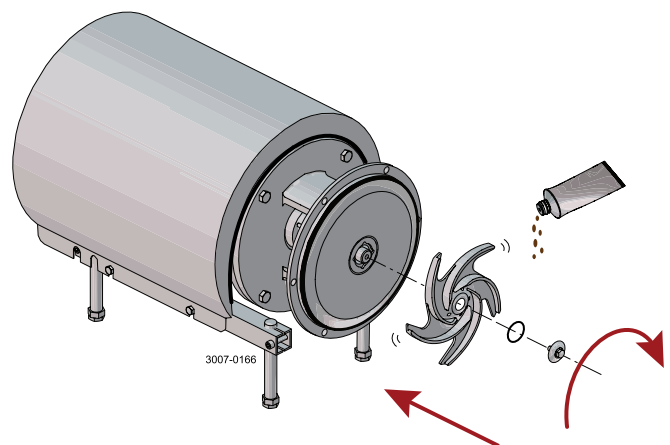
### Step 7

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 values:

LKHUP10-60: 20 Nm (15 lbf-ft)

LKHUP70: 50 Nm (37 lbf-ft)



## 5 Maintenance

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

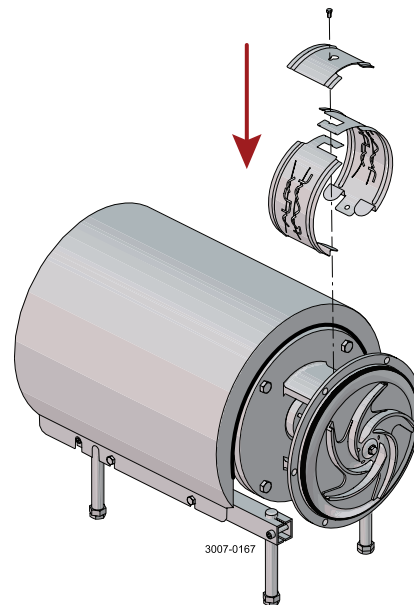
Handle scrap correctly.

\* : Relates to the shaft seal.

### Step 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.



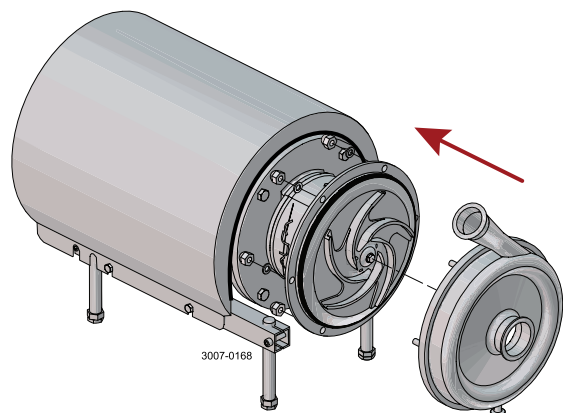
### Step 9

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).

Torque values:

LKHUP10-20 = 20 Nm/14.8 lbf-ft

LKHUP25-70 = 40 Nm/29.5 lbf-ft





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

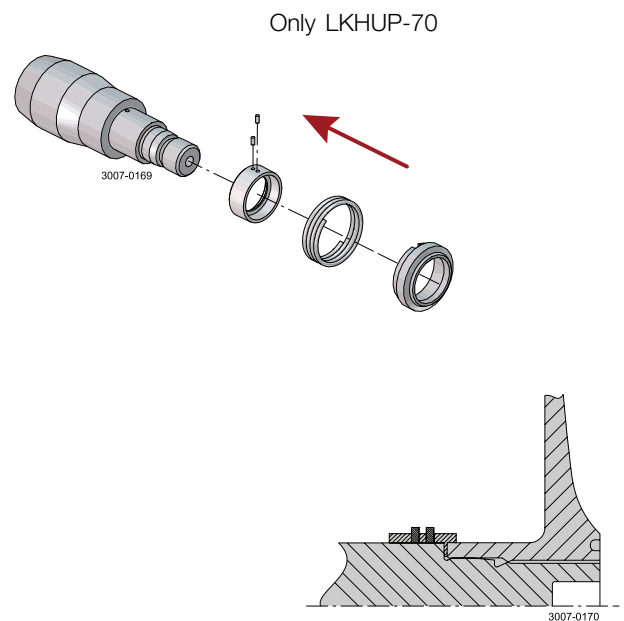
1. Fit O-rings (15) in rotating seal rings (14).
  2. Fit spring (13) on one of the rotating seal rings (14) and place the drive ring (52) in between.
  3. Fit the second rotating seal ring (14) on the other end of the spring.
- Note:** Ensure that both drive pins on the drive ring enter the notches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

#### Step 2

1. LKHUP-70: Turn the drive ring (52) in order to place it correctly on the pump shaft (7).
2. Fit the second rotating ring (14) on the other end of the spring.
3. Place the parts on the stationary seal ring fitted in back plate (25).

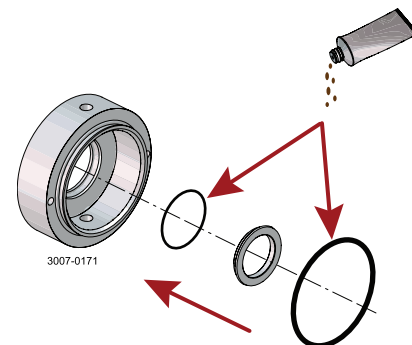
#### NOTE

Ensure that both drive pins on the drive ring enter the notches in rotating seal rings.



#### Step 3

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.

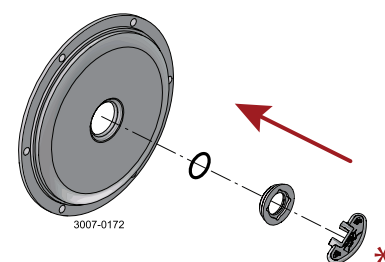


#### Step 4

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  
Left hand thread!

## 5 Maintenance

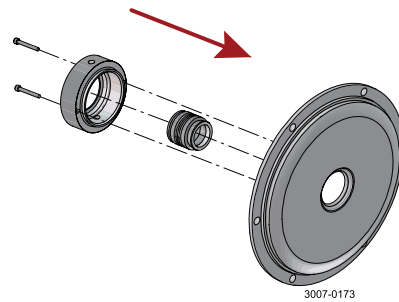
Read the instructions carefully. The items refer to the parts list and service kits section.

Lubricate the rubber seals before fitting them.

\* : Relates to the shaft seal.

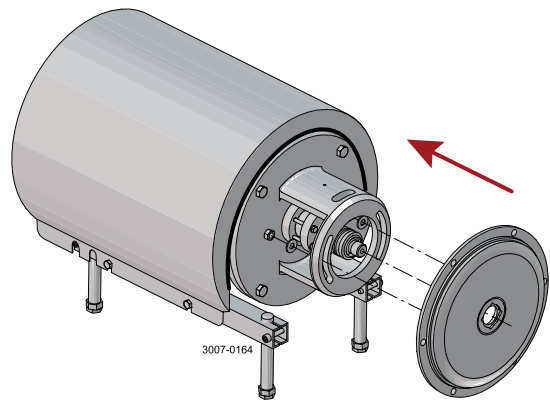
### Step 5

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



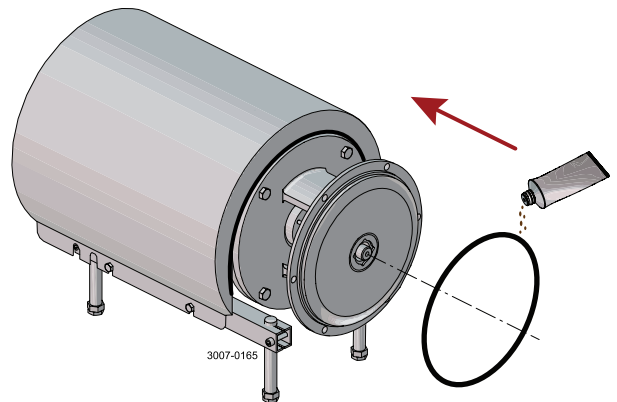
### Step 6

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 7

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



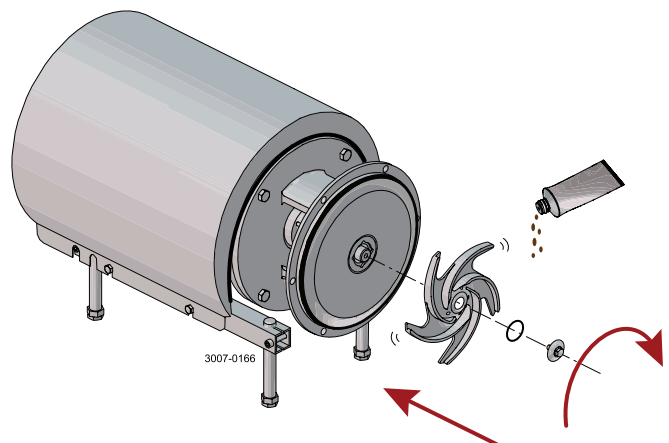
### Step 8

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 values:

LKHUP10-60: 20 Nm (15 lbf-ft)

LKHUP70: 50 Nm (37 lbf-ft)



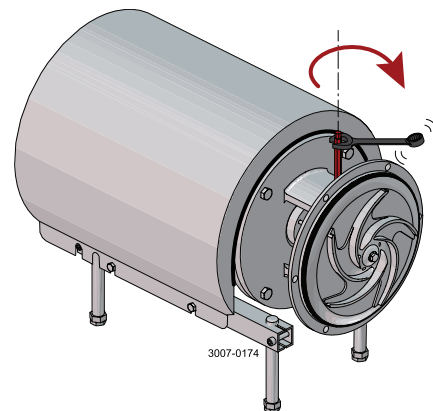
Read the instructions carefully. The items refer to the parts list and service kits section.

Lubricate the rubber seals before fitting them.

\* : Relates to the shaft seal.

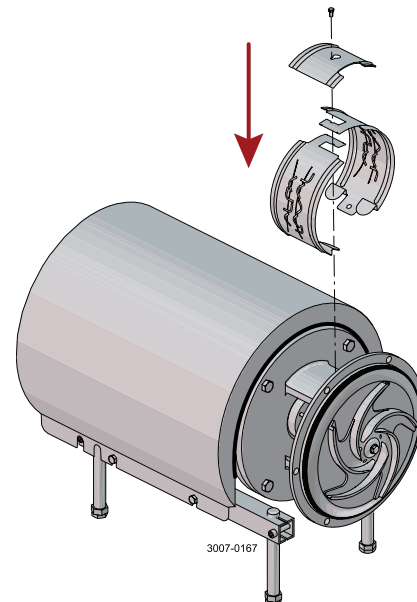
### Step 9

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 10

- 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.



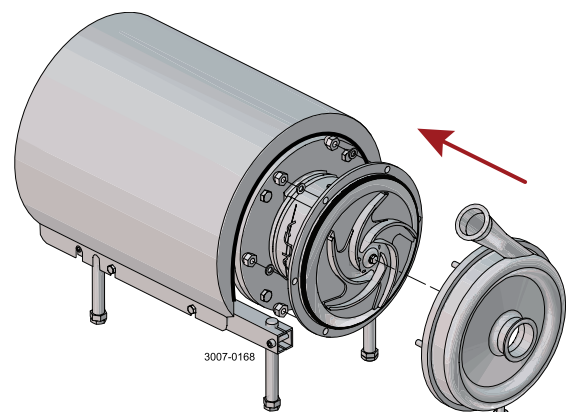
### Step 11

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).

Torque values:

LKHUP10-20 = 20 Nm/14.8 lbf-ft

LKHUP25-70 = 40 Nm/29.5 lbf-ft



## 5 Maintenance

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

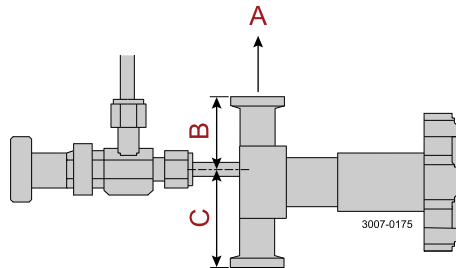
Lubricate the rubber seals before fitting them.

\* : Relates to the shaft seal.

### Step 12

#### 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.



A: Up  
B: 26 mm/1.2"  
C: 37.6 mm/1.48"

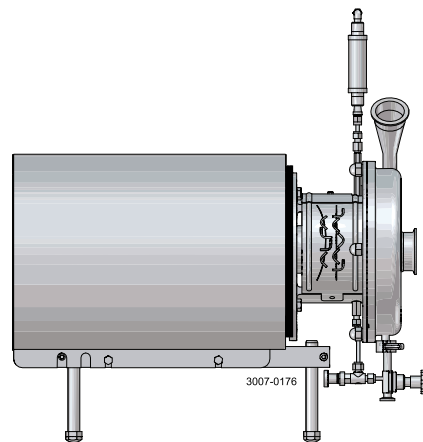
### Step 13

#### Adjustment of flushing set:

1. Drain valve is used for draining the pump.
2. Flushing water is adjusted by the needle valve until the flow meter reads between 250 and 500 ml/min (0.25 - 0.5 l/min) (0.066 - 0.132 gpm)

#### NOTE

Flushing set is not considered product area and therefore not hygienically designed. Flushing set will not prevent return flush into the pump. If return flush is at risk Alfa Laval recommend precautions to be taken for preventing this.



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.

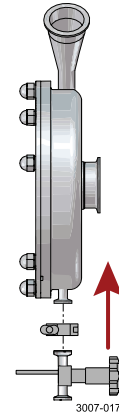
### 5.6 Assembly of flushing set – if not supplied with pump

#### 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)

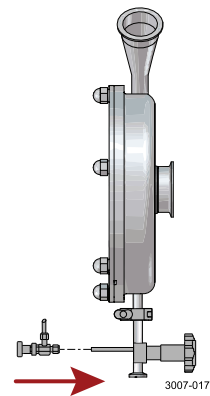
#### Step 2

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).



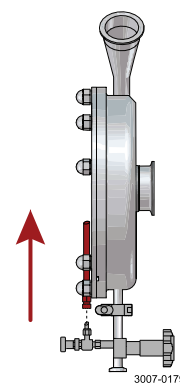
#### Step 3

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/2.6") to bottom hole in flush housing.
2. Fit connection to Hex tube.
3. Cut and fit 6mm/1/4" tube in between needle valve and connection.



## 5 Maintenance

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

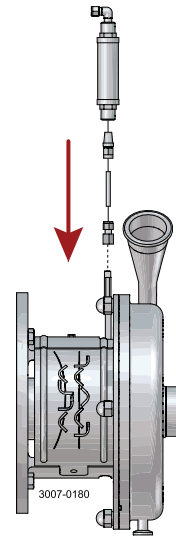
Lubricate the rubber seals before fitting them.

\* : Relates to the shaft seal.

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### Step 5

1. Fit Hex tube (140mm/5.5") to top hole of flush housing.
2. Fit straight connection to HEX tube.
3. Cut and fit 6mm/1/4" tube supplied in between straight connections.
4. Fit flow meter to straight connection and fit elbow connection to other end of flowmeter.
5. Connection or 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

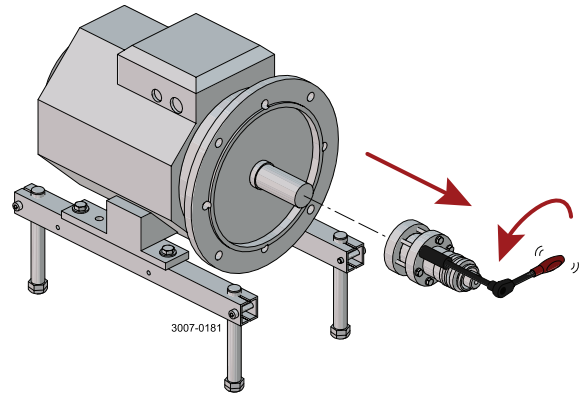
#### Step 1

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

LKHUP-70:

For securing the best fixture to the motor shaft ensure the following:

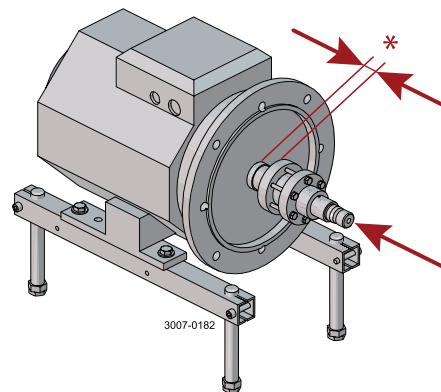
- Conical surfaces on the pump shaft and compression rings are applied with grease.
- No grease on the motor shaft.
- No grease on the inside diameter of the pump shaft.
- Screws for the compression rings are applied with grease.



#### Step 2

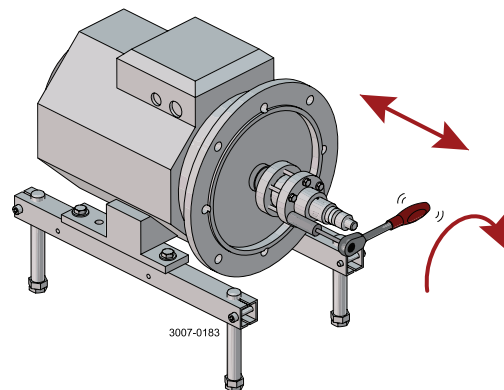
1. Push stub shaft (7) together with compression rings (5a, 5b) onto the motor shaft.
2. Check that the clearance between the end of the stub shaft and the motor flange is 10-20 mm (0.39-0.78 inch).

\* 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.



## 5 Maintenance

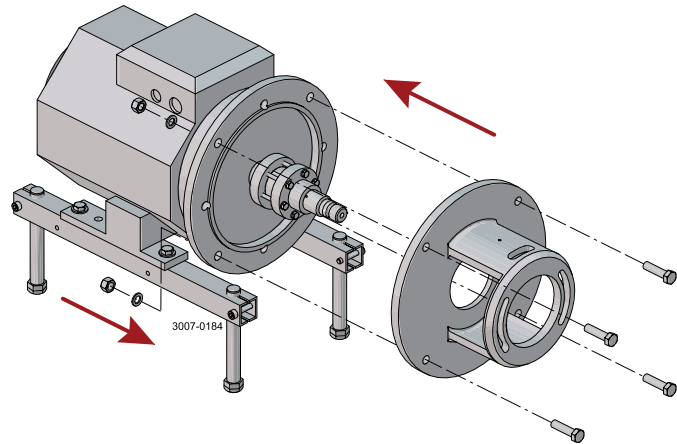
Study the instructions carefully. The items refer to the parts list and service kits section.

Lubricate the rubber seals before fitting them.

\* : Relates to the shaft seal.

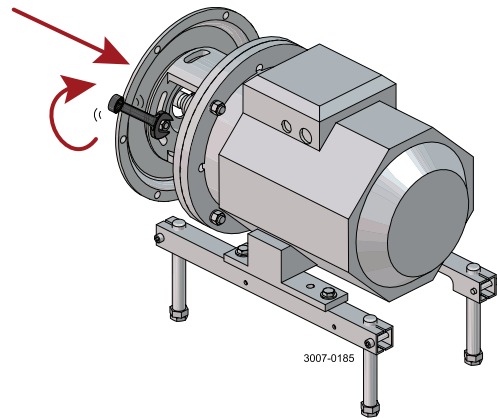
### Step 4

Fit adaptor (18), screws (19), washers (8) and nuts (7).



### Step 5

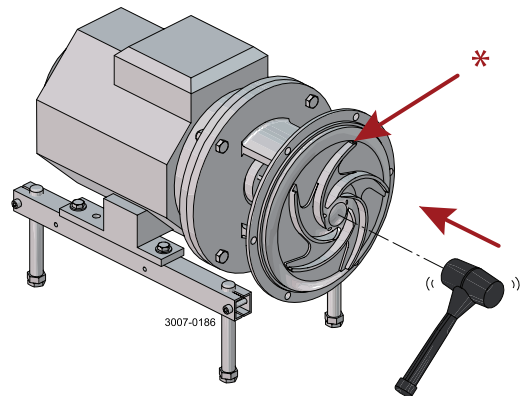
1. **For double mechanical shaft seal:** Fit drive ring (52) on stub shaft (7).
2. Fit back plate (25), washers (21) and nuts (20) and tighten.



### Step 6

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) for LKHUP10, 20, 25, 35, 45, and 60 and 1.0 mm (0.039 inch) for LKHUP40 and 70.
3. Tighten screws (6) evenly until the stub shaft (7) cannot move on the motor shaft.

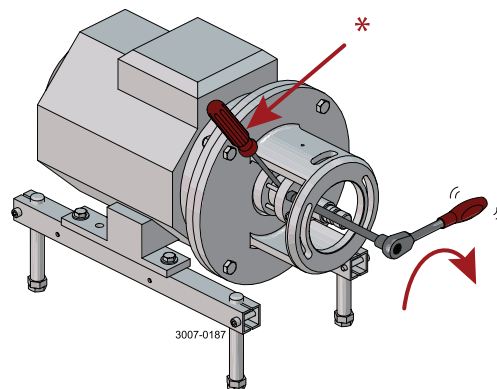
\* LKHUP10, 20, 25, 35, 45, and 60 = 0.5mm (0.02 inch)  
LKHUP40 and 70 = 1.0mm (0.039 inch)  
Please note LKHUP40 impeller is marked with "1mm gap". If NOT marked with "1mm gap" the clearance shall be 0.5mm.



### Step 7

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  
15Nm  
(11 lbf-ft)





*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, -40, -45, -60 and -70. The instruction manual is part of the delivery. Study the instructions carefully.

Data			
Max. inlet pressure USA - Not CE marked LKHUP 10-60	1000 kPa	(10 bar)	(145 psi)
LKHUP 70	500 kPa	(5 bar)	(72.5 psi)
Rest of the world LKHUP 10-70	500 kPa	(5 bar)	(72.5 psi)
Temperature range	-10°C to +140°C	(EPDM)	(14°F to 284°F)
Max. speed	2 poles: 0,75 - 45 kW	900 - 4000 rpm	
	2 poles: 55 - 110 kW	900 - 3600 rpm	
	4 poles: 0,75 - 75 kW	900 - 2200 rpm	
Maximum product viscosity	800 cP		
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 <b>NOTE:</b> When the pump is not in operation the flush housing can be sterilized up to 125°C		
Max. water pressure LKHUP 10-60 (DMS)	Normally atmospheric	(max. 5 bar)	(max. 72.5 psi)
Max. water pressure LKHUP 70 (DMS)	Normally atmospheric	(max. 3 bar)	(max. 43.5 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 - 75 kW		
Motor sizes (kW), 60 Hz	1.2 - 80 kW		
Motor sizes (Hp), 60 Hz	1.5 - 110 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

For recommended grease types and general maintenance follow the recommendations in the motor instruction manual.

For relubrication intervals see motor name plate.

For further information contact your local Alfa Laval Technical Support.

**Warning: Polyurea based grease (used on eg. LKH85 motors) must not be mixed with Lithium based grease or vice versa.**

### 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	Spanner width	Torque values	
		Nm	lbf-ft
M8	13mm/0.51"	20	15
M10	17mm/0.67"	40	30
M12	19mm/0.75"	67	49
M14	22mm/0.87"	110	81

### 6.4 Weight (kg)

Pump Type: LKH UltraPure

Size	90		100	112	132		160		180	200		250			
	1.5 kW	2.2 kW	3 kW	4 kW	5.5 kW	7.5 kW	11 kW	15 kW	18.5 kW	22 kW	30 kW	37 kW	45 kW	55 kW	75 kW
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					
45				82	99	113	172	186							
60					102	116	175	189	207	226	334				
70					138	152	196	210	228	259	365	380	396	522	557

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

*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 LKHDPF, 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.

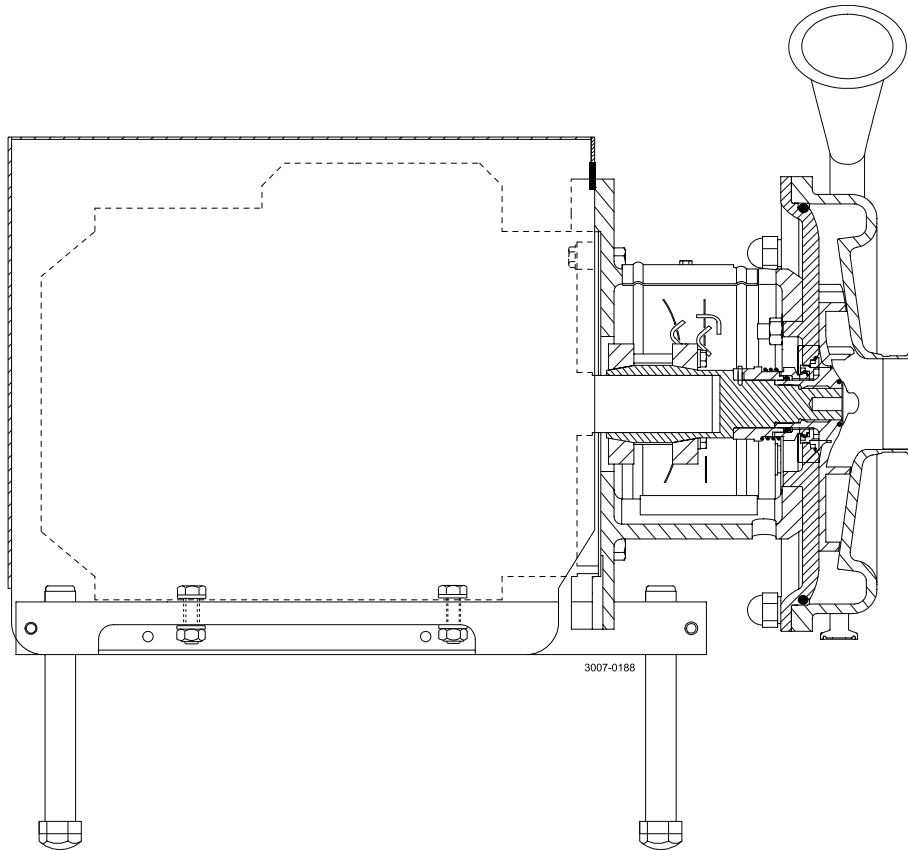
Very often the noise level generated by the flow through the process system (e.g. valves, pipes, tanks etc.) is much higher than that generated by the pump itself. Therefore, it is important to consider the noise level from the total system and take the necessary precautions with regard to personal safety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

## 7 Parts list and service kits

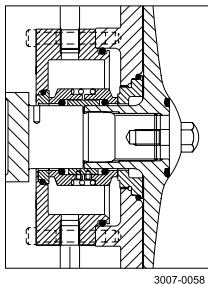
The drawing shows the LKH UltraPure pump, sanitary version.

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

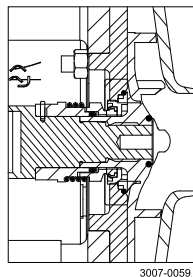
### 7.1 LKH UltraPure -10, -20, -25, -35, -40, -45, -60, -70.



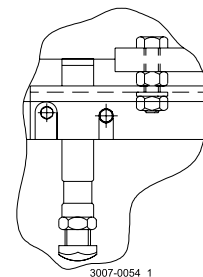
US legs are different to the ones shown. For further information see US spare parts.



3007-0058  
Double mechanical shaft seal



3007-0059  
Single shaft seal



3007-0054\_1  
Only used for 3 kW  
Fitting of legs

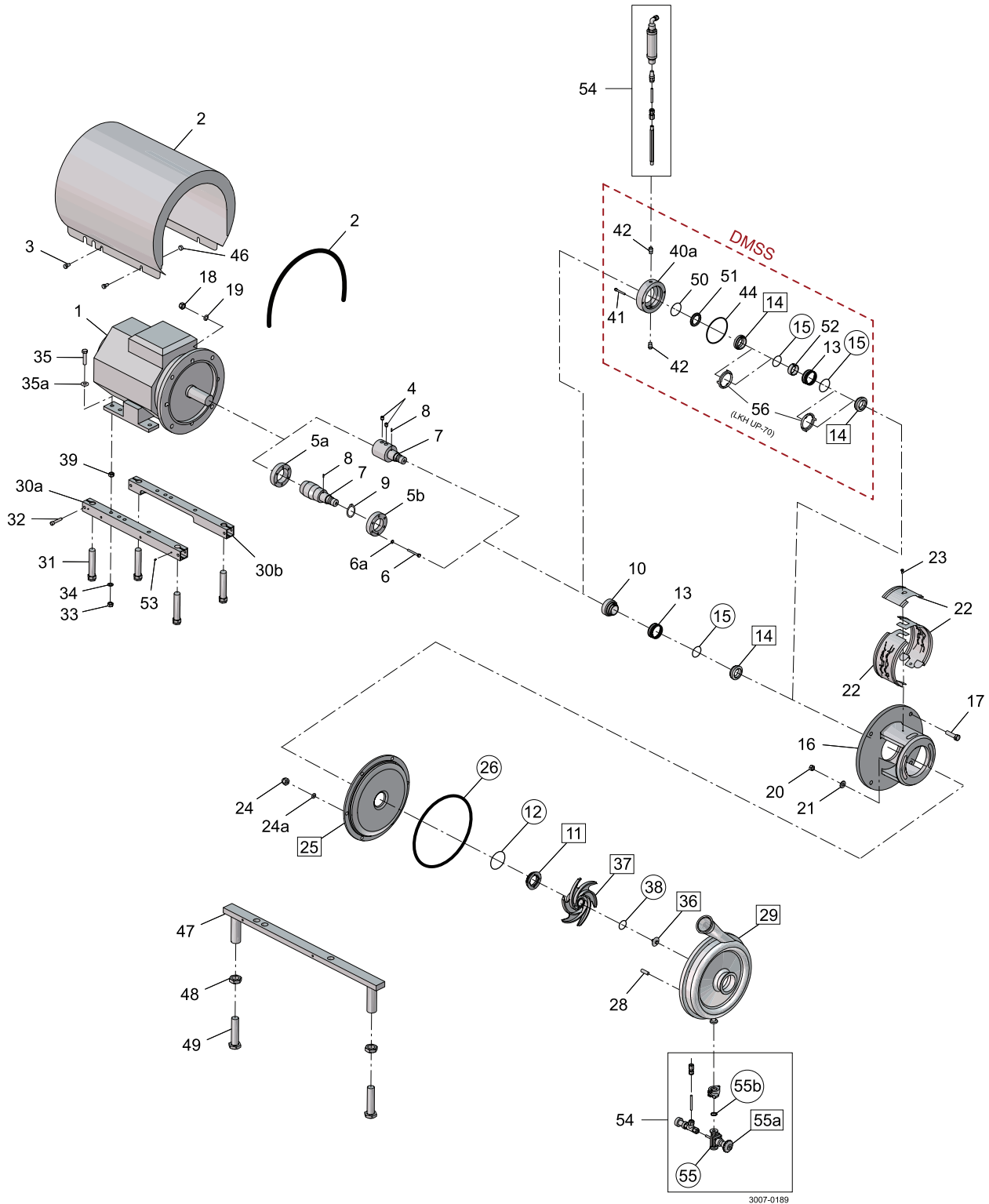


# 7 Parts list and service kits

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 steel parts
- Product wetted elastomer parts

## 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

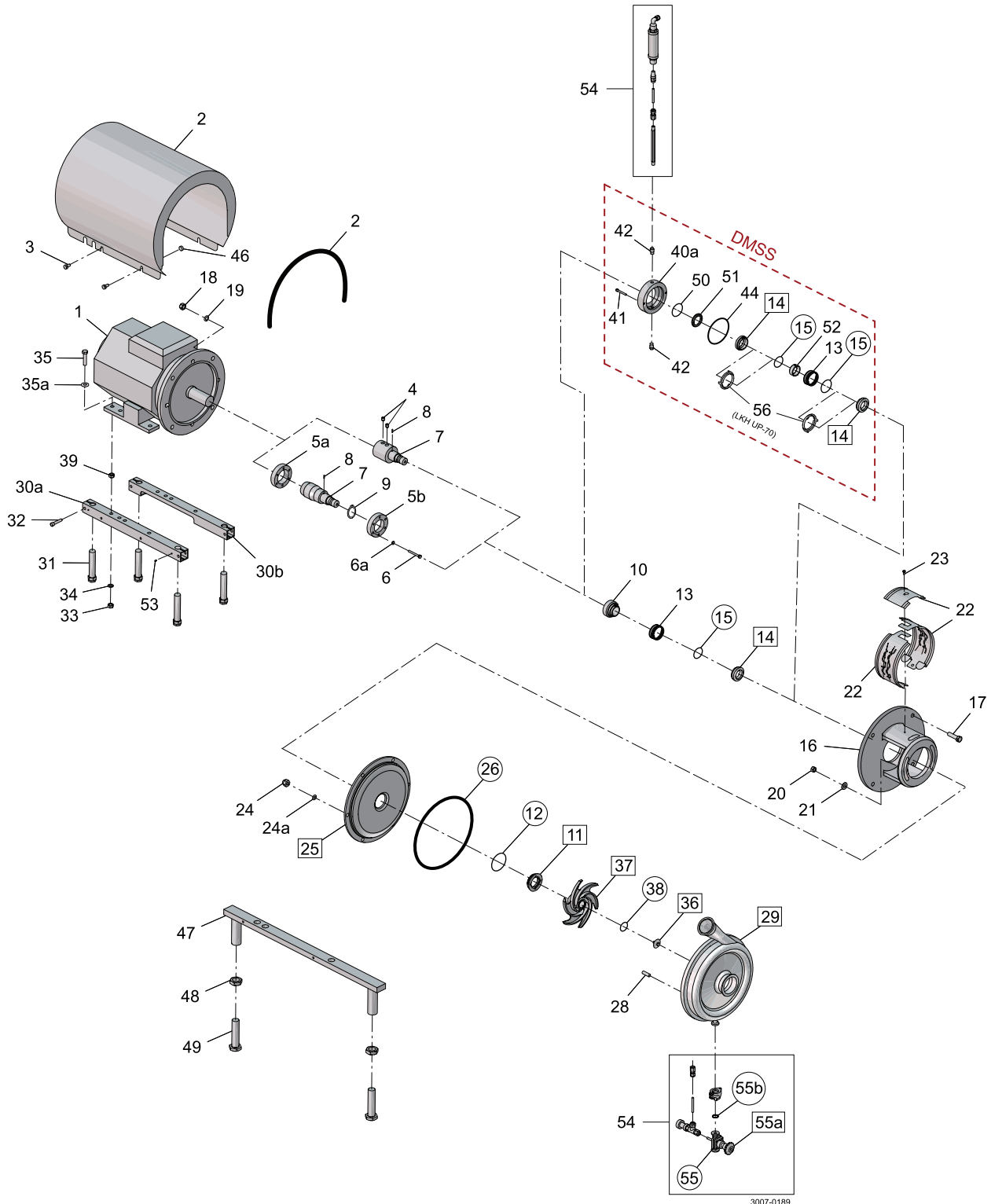
Pos.	Qty	Denomination
20	2	Nut
21	2	Washer
24	6	Cap nut
24a	6	Washer
25	1	Backplate compl
26 <input type="checkbox"/> ◆	1	Pump casing O-ring
28	6	Bolt
29	1	Connections and drain
36	1	Impeller screw
37	1	Impeller
38 <input type="checkbox"/> ◆	1	O-ring impeller screw

# 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 dependent parts





## 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

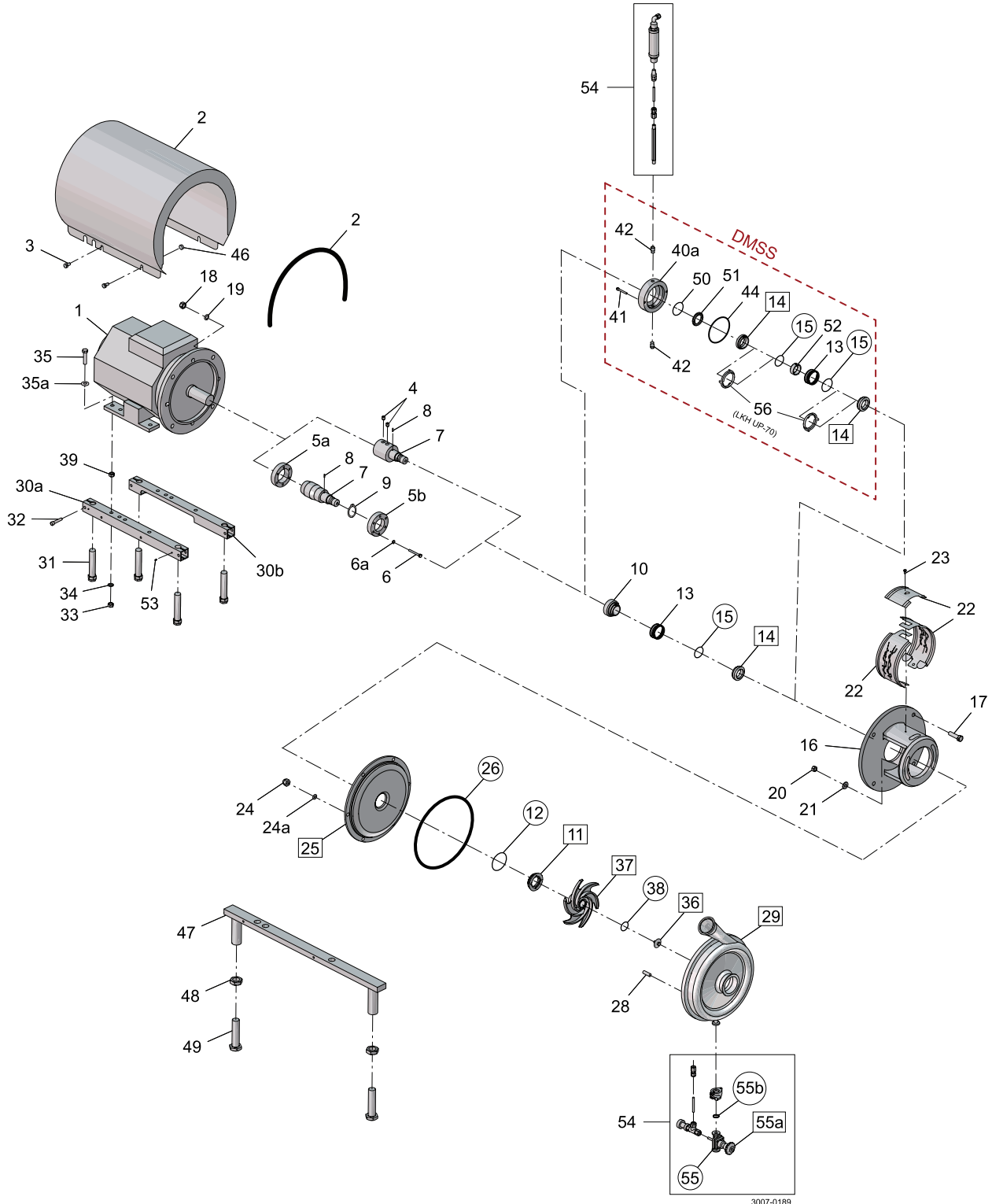
Pos.	Qty	Denomination
	1	Tool complete
1	1	Motor ABB
2	1	Shroud
3	4	Screw
5a	1	Compression ring with thread
5b	1	Compression ring without thread
6	6	Screw
6a	6	Washer
7	1	Shaft
8	1	Connex pin
9	1	Retaining ring
16	1	Adaptor
17	4	Screw for adaptor
18	4	Nut for adaptor
19	4	Washer for adaptor
22	1	Safety 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
47	2	Leg bracket
48	4	Nut for leg
49	4	Screw for leg
53	4	Pivot screw

# 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 – Shaft seal



- Product wetted steel parts
- Product wetted elastomer parts

## 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
□		Single shaft seal
◆		Double mechanical shaft seal
10	1	Drive ring
11 □	1	Stationary seal ring
12 □	1	O-ring
13 □	1	Spring
14 □	1	Rotating seal ring
15 □	1	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
55a	1	Diaphragm valve
55b	1	1/2" clamp gasket
56 ◆	2	Cup

### Service kits

Denomination	EPDM	FPM	FEP
<b>Service kit for single shaft seal (incl. Q-doc)</b>			
□ Service kit LKHUP-10 .....	9611922339	9611922338	9611922340
□ Service kit LKHUP-20 .....	9611922357	9611922356	9611922358
□ Service kit LKHUP-25/35/45 .....	9611922375	9611922374	9611922376
□ Service kit LKHUP-40/60 .....	9611922393	9611922392	9611922394
□ Service kit LKHUP-70 .....	9611920549	9611920550	9611920551
<b>Service kit for double mechanical shaft (incl. Q-doc)</b>			
◆ Service kit LKHUP-10 .....	9611922345	9611922344	9611922346
◆ Service kit LKHUP-20 .....	9611922363	9611922362	9611922364
◆ Service kit LKHUP-25/35/45 .....	9611922381	9611922380	9611922382
◆ Service kit LKHUP-40/60 .....	9611922399	9611922398	9611922400
◆ Service kit LKHUP-70 .....	9611920552	9611920553	9611920554

Note: All service kits are as standard delivered with Q-doc, including 3.1 certification on product wetted steel parts and declarations of conformity.

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

(900065/19)

**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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