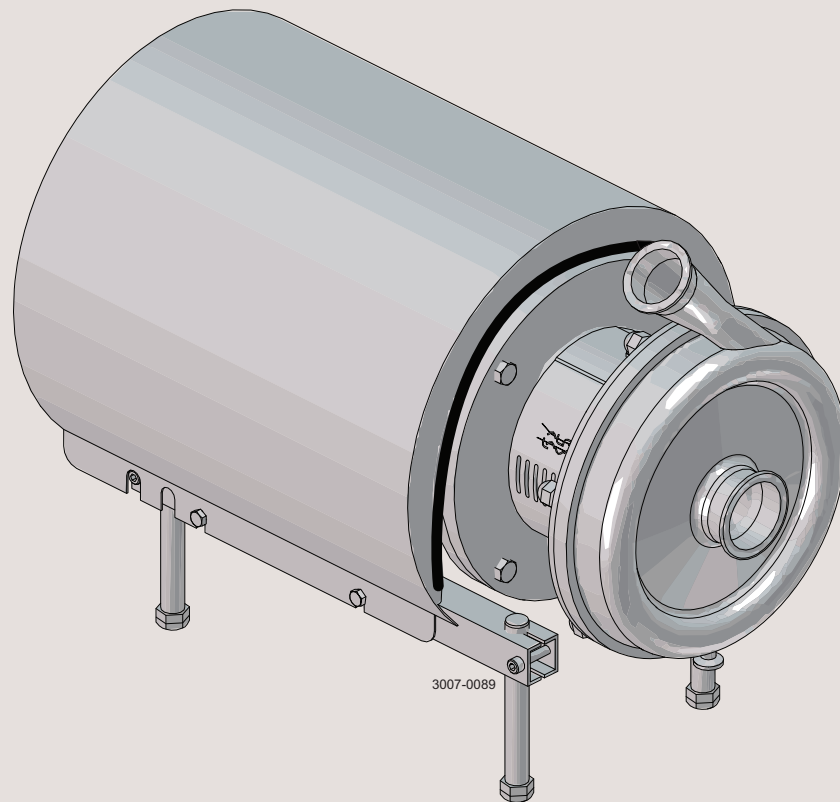




Instruction Manual

LKH UltraPure Centrifugal Pump



ESE01703-EN11 2018-02

Original manual

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

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

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

Global Product Quality Manager
Pump, Valves, Fittings and Tank Equipment

Title

Lars Kruse Andersen

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.



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)

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



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).

CAUTION

Alfa Laval cannot be held responsible for incorrect unpacking.

WARNING

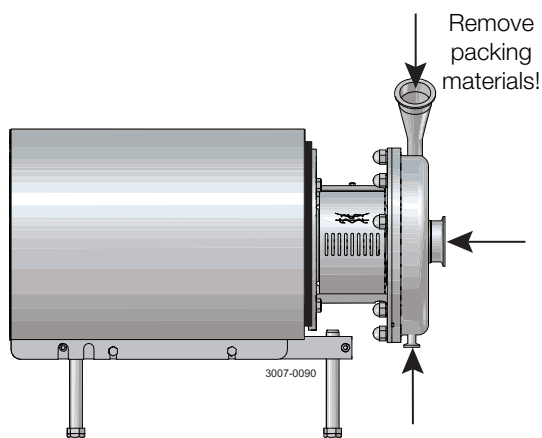
Be aware that certain pump configurations can tilt, and therefore cause injuries to feet or fingers. The pump should be supported underneath the adaptor, when not installed in the process line.

Check the delivery for:

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

Step 2

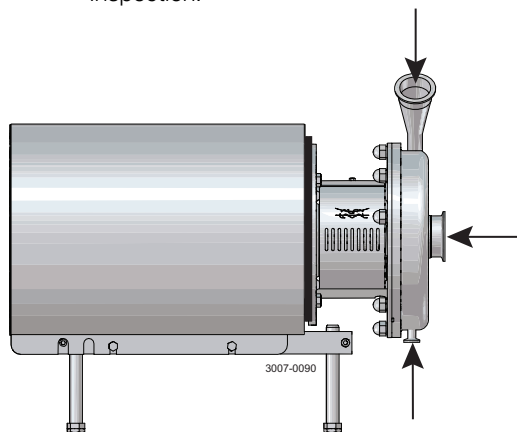
Remove any packing materials from the inlet and the outlet.
Avoid damaging the inlet and the outlet.



Step 3

Inspect the pump for visible transport damage.

Inspection!

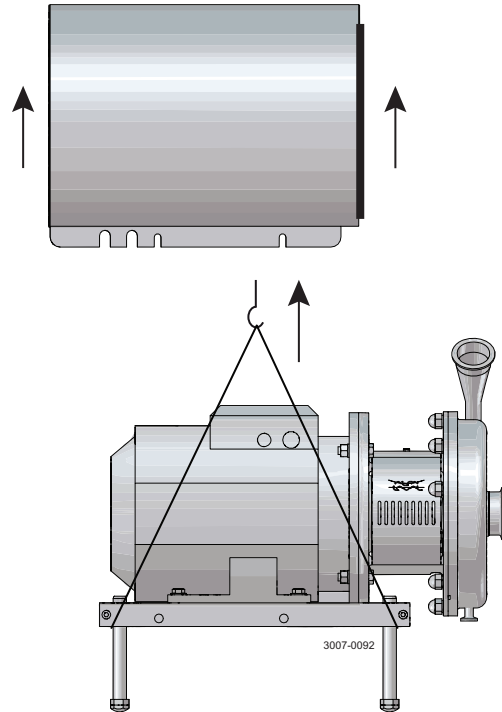


3 Installation

Step 4

Avoid damaging the flushing liquid connections, if supplied.

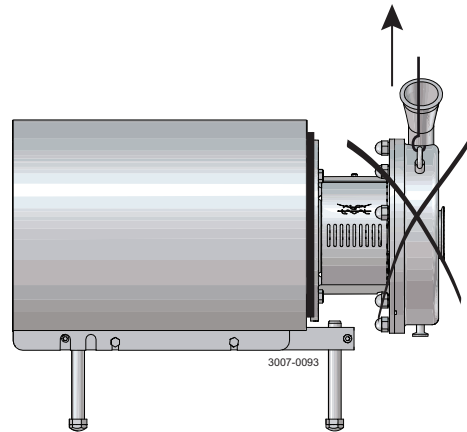
Caution!



Step 5

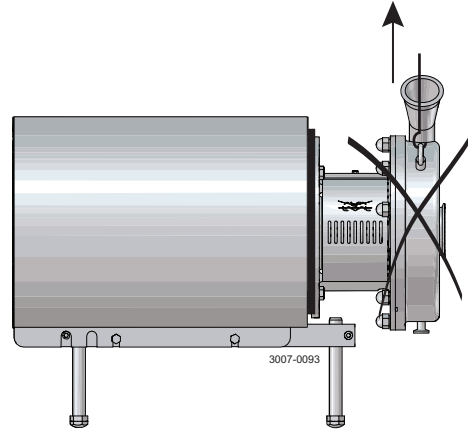
Always remove the shroud, if fitted, before lifting the pump.

Remove the shroud before lifting!



Step 6
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.

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

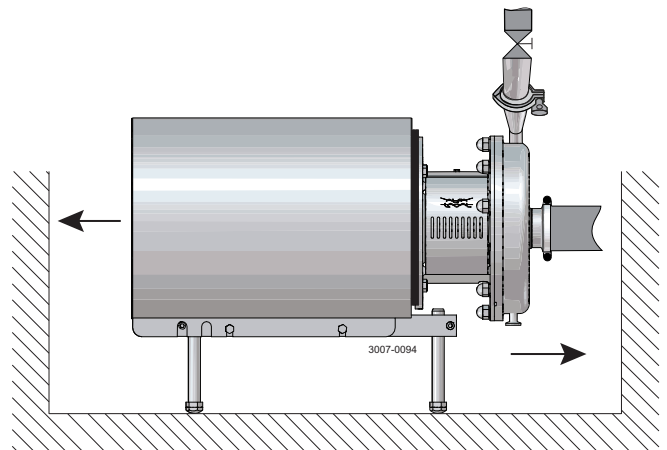
The pump does not prevent back flow when intentionally or unintentionally stopped. If back flow can cause any hazardous situations precautions must be taken e.g. check valve to be installed in the system to prevent the problem described above.

Note

The 3A standard requires minimum clearance between the lowest part of the base, pump, motor or drive and for the floor to be no less than 4 inch. (100mm)

Step 2

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



3 Installation

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

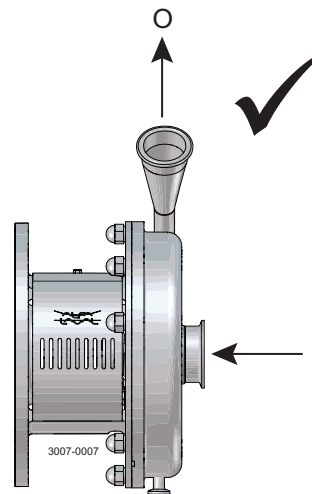
- See pre-use check in section 3.3 Pre-use check. The large pump sizes are very heavy. Alfa Laval therefore recommends the use of a lifting crane when handling the pump.

Step 3

Check that the flow direction is correct.

O: Outlet

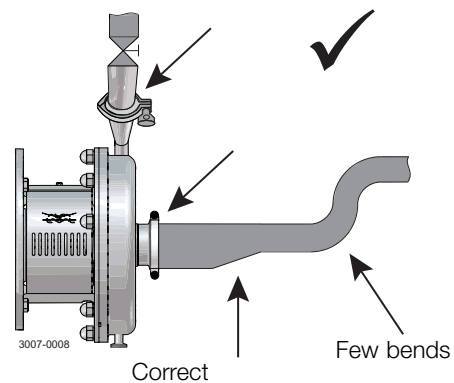
I: Inlet



Step 4

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

Remember seal rings!

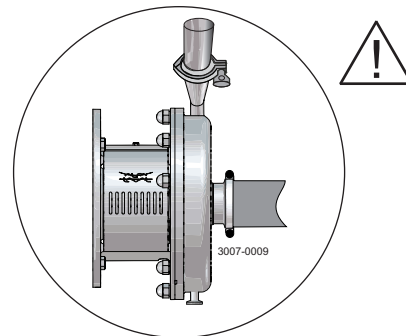


Step 5

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.



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.

3 Installation

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.

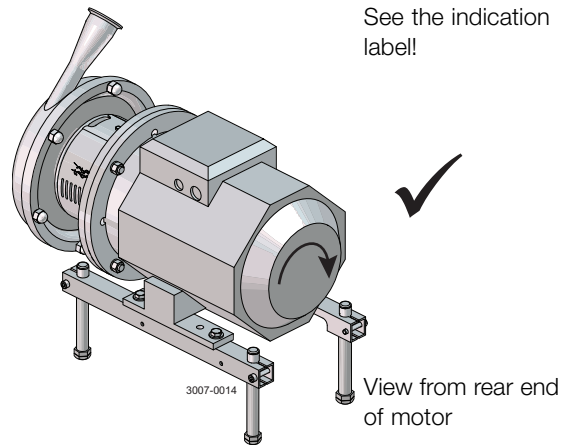
3.3 Pre-use check

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.



3.4 Recycling information

- **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.
-

4 Operation

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

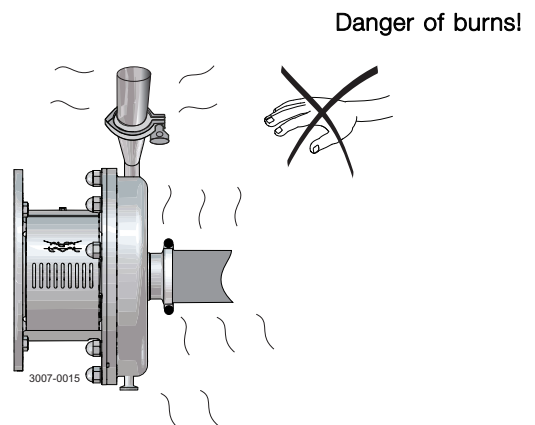
CAUTION

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

Step 2



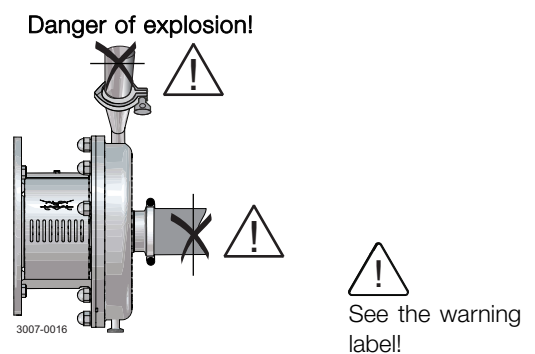
Never touch the pump or the pipelines when pumping hot liquids or when sterilising.



Step 3



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



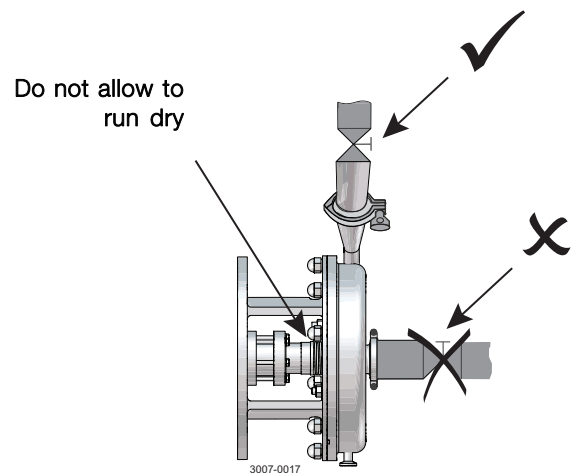
Step 4

CAUTION

The shaft seal must not run dry.

CAUTION

Never throttle the inlet side.

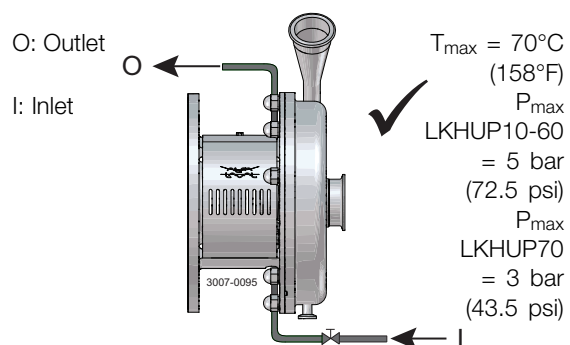


Read the instructions carefully and pay special attention to the warnings!

Step 5

Double mechanical shaft seal:

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

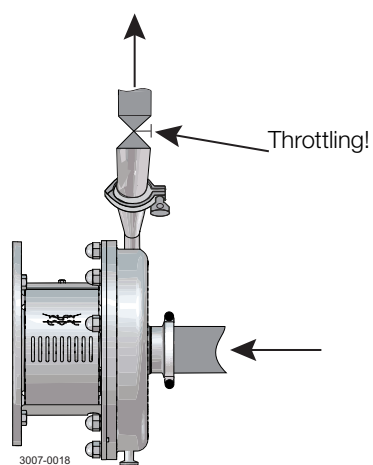


Step 6

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.



4 Operation

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

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.
HNO₃ = Nitric acid.

4.3 Recommended cleaning

Step 1



Always handle lye and acid with great care.

Caustic danger!



Always use rubber gloves!



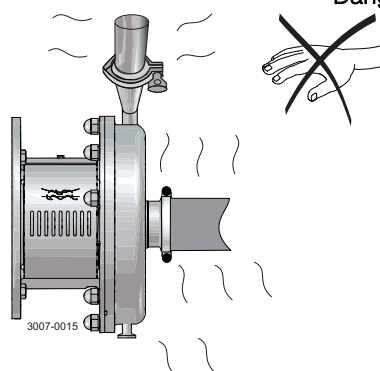
Always use protective goggles!

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.
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2. 0.5% by weight HNO₃ at 70°C (158°F).

0.7 l (0.2 gal) 53% HNO ₃	+	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.

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.

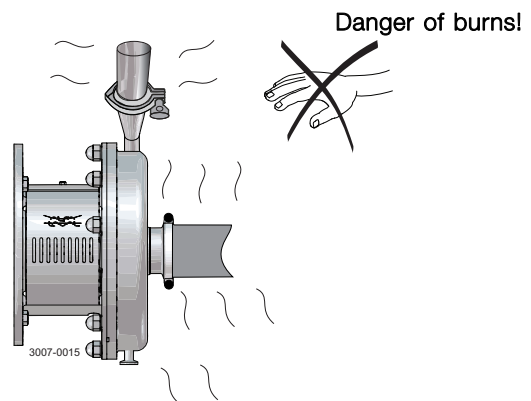
NOTE

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

Step 2



Never service the pump when it is hot.



Step 3

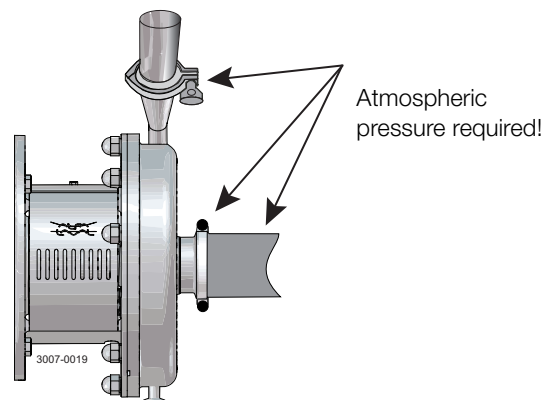


Never service the pump with pump and pipelines under pressure.

CAUTION

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

Pay special attention to the warnings!



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.

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

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.

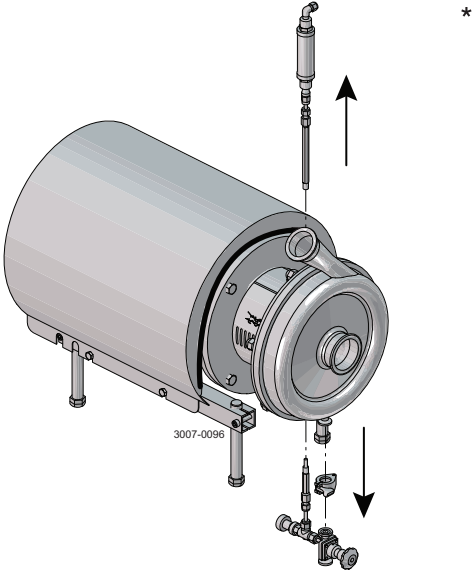
Should swab testing continue to fail, or time is of the essence, install a new (spare) stub shaft (7).

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

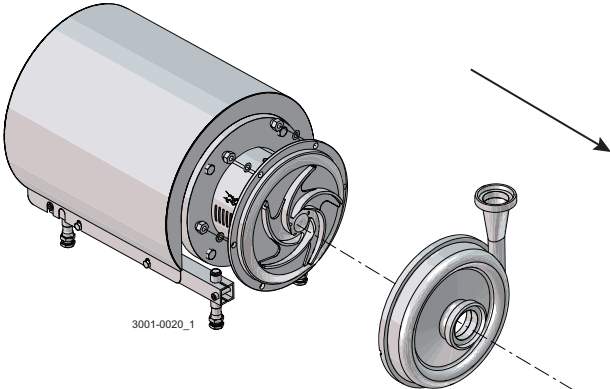
5.3 Dismantling of pump/shaft seals

Step 1
Flushing set for double mechanical shaft seal:

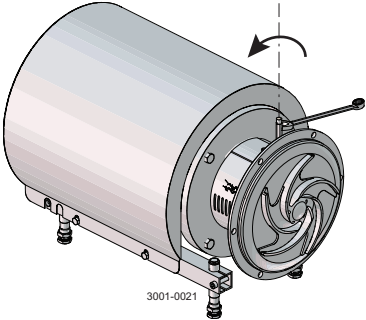
- 1. Remove flow meter.
- 2. Remove flushing set (54) from pump casing (29) and lower tube.



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

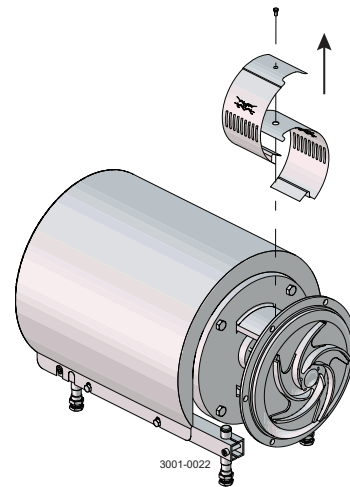
Read the instructions carefully. The items refer to the parts list and service kits section.

Handle scrap correctly.

* : Relates to the shaft seal.

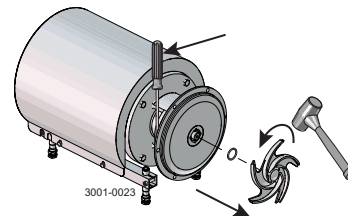
Step 4

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.

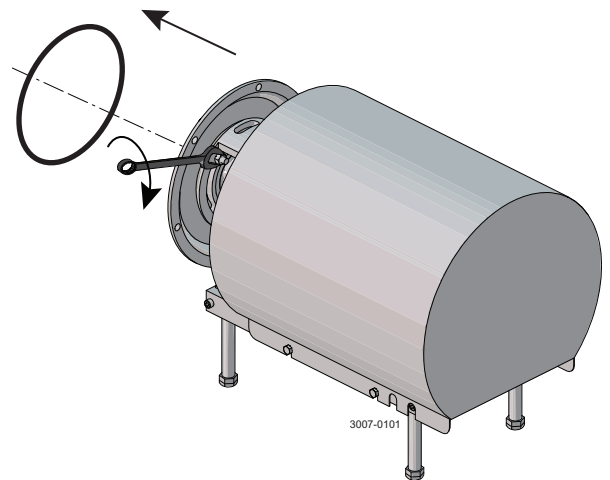


Counterhold with a screwdriver!

If necessary!

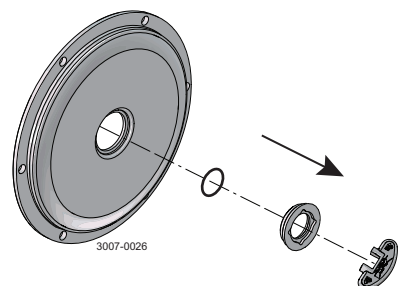
Step 6

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

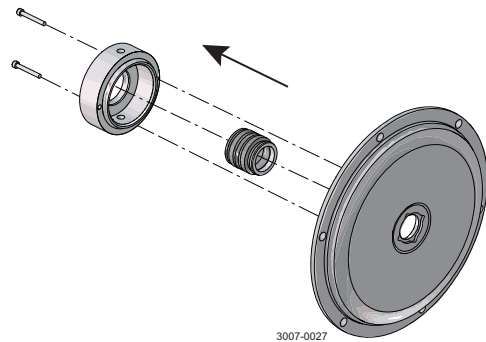
Left hand thread!

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:

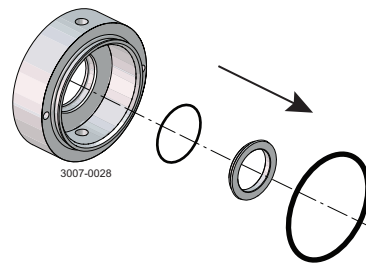
1. Remove screws (41) and seal housing (40a).
2. Remove rotating seal rings (14) and drive ring (52) from spring (13).
3. Remove O-rings (15) from rotating seal rings (14).



Step 9

Double mechanical shaft seal:

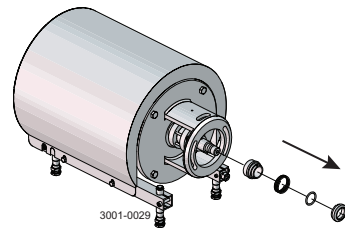
1. Remove stationary seal ring (51) from seal housing (40a/40b).
2. Remove O-ring (50) from stationary seal ring (51).
3. Remove O-ring (44) from seal housing (40a/40b).



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.

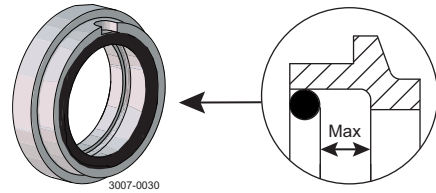
5.4 Assembly of pump/single shaft seal

Step 1

1. Remove spring (13).

NOTE!

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

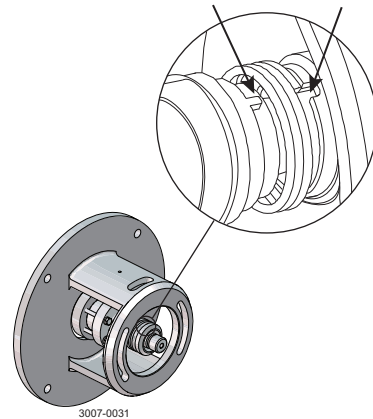


Step 2

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.

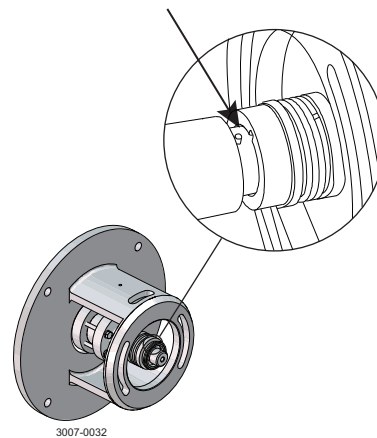


Step 3

- 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).

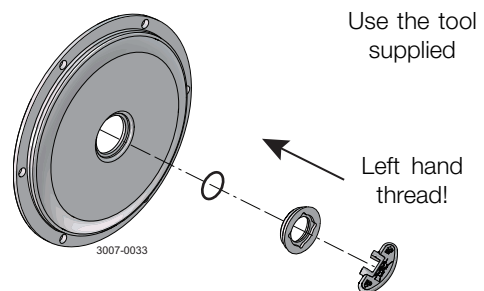


Step 4

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)



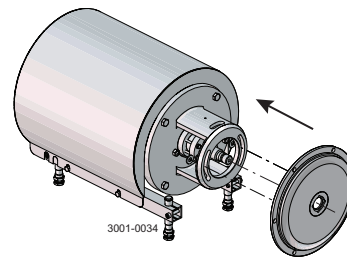
Read the instructions carefully. The items refer to the parts list and service kits section.

Handle scrap correctly.

* : Relates to the shaft seal.

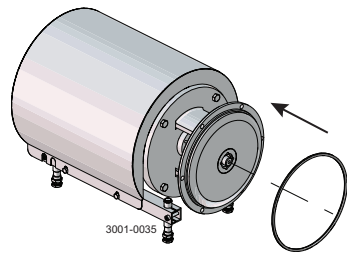
Step 5

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).



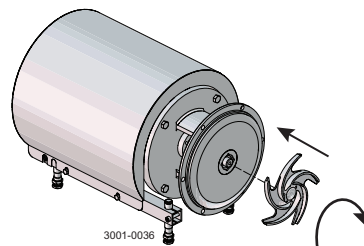
Step 7

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)

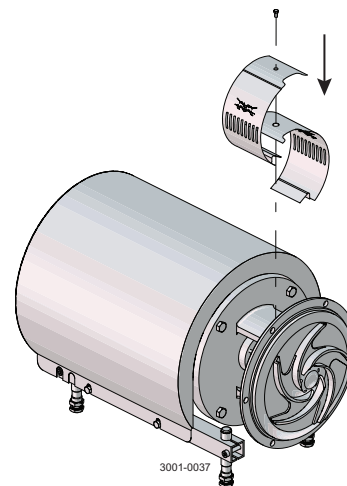
LKHUP70: 50 Nm (37 lbf-ft)



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.



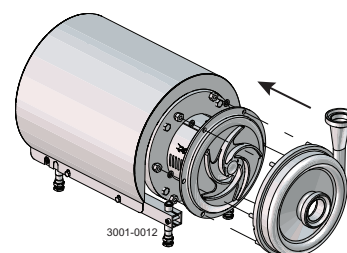
Step 9

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



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.

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.

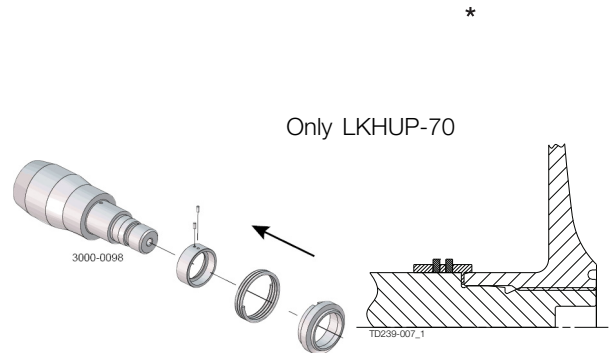
4. Place the parts on the stationary seal ring fitted in back plate (25).

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).

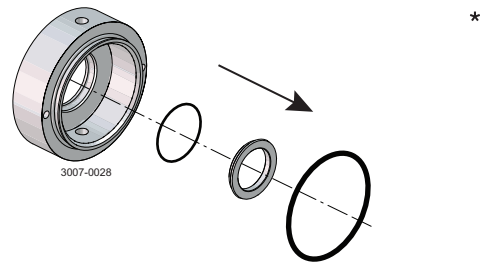
NOTE

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.

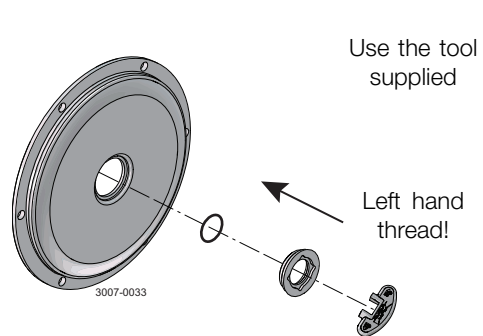


Step 4

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

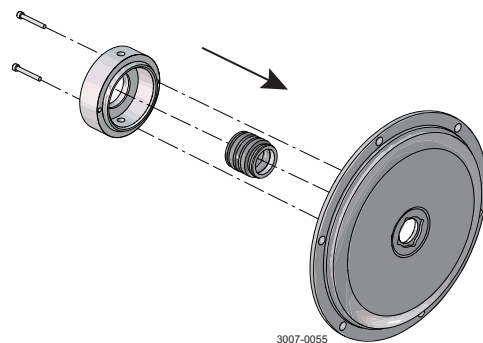
CAUTION

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



Step 5

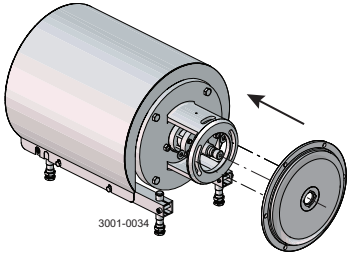
1. Clean the sealing surfaces with contact cleaner.
2. Fit seal housing (40a) on the back plate (25) and tighten screws (41).



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.

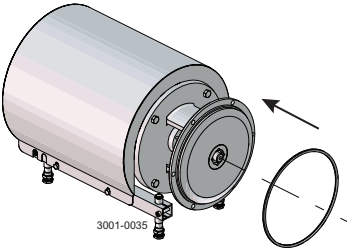
Step 6

- 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

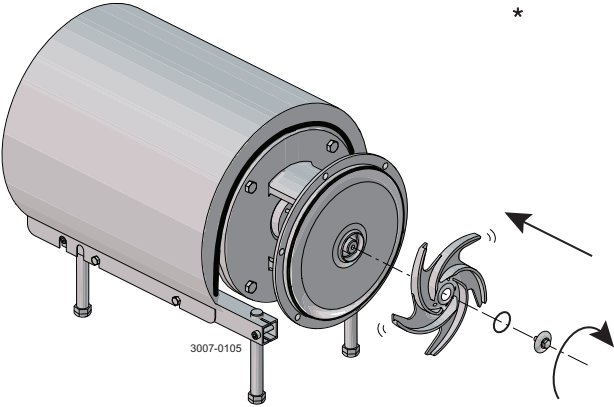
Lubricate O-ring (26) and slide it onto back plate (25).



Step 8

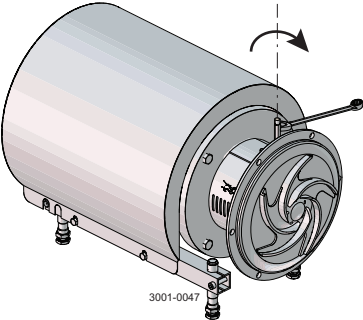
- 1. Lubricate O-ring (38) and fit it in impeller (37).
- 2. Lubricate the impeller hub with silicone grease or oil.
- 3. Screw impeller (27) onto stub shaft (7).
- 4. Fit impeller screw (36) and tighten.

Torque values:
LKHUP10-60: 20 Nm (15 lbf-ft)
LKHUP70: 50 Nm (37 lbf-ft)



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.



5 Maintenance

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

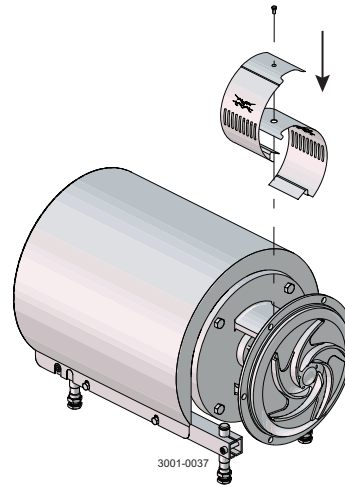
Lubricate the rubber seals before fitting them.

* : Relates to the shaft seal.

Step 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.



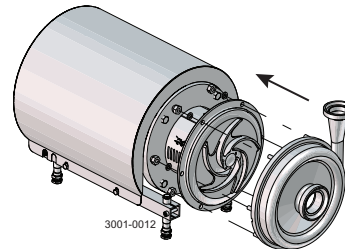
Step 11

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

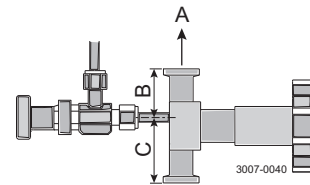
LKHUP25-70 = 40 Nm/29.5 lbf-ft



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"

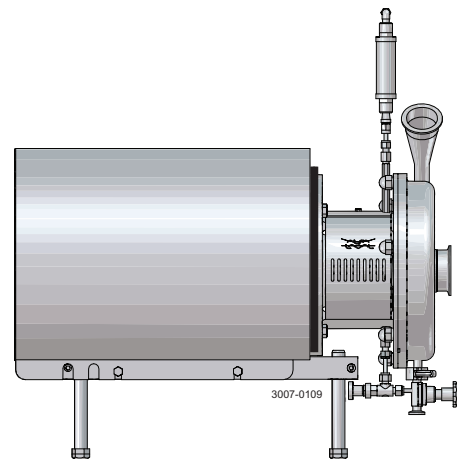
Step 13

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.

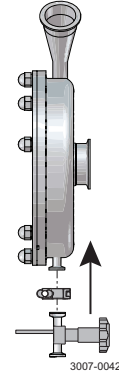
5.6 Assembly of flushing set - if not supplied with pump

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)

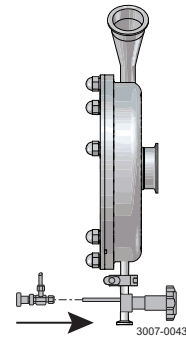
Step 2

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).



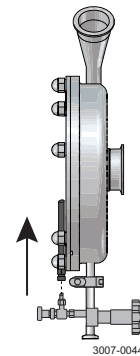
Step 3

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

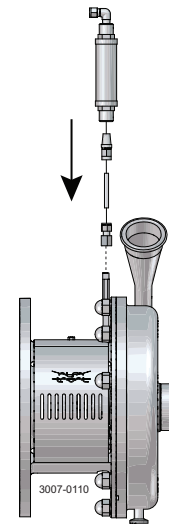
Study the instructions carefully. The items refer to the parts list and service kits section.

Lubricate the rubber seals before fitting them.

* : Relates to the shaft seal.

Step 5

1. Fit 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

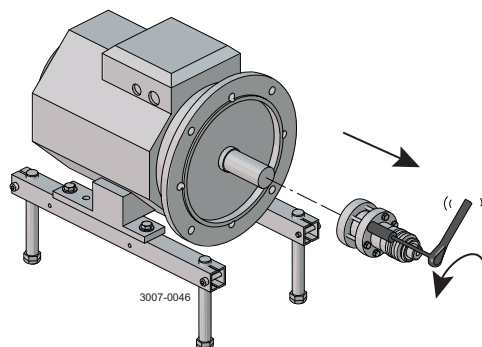
Step 1

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

LKHUP-70:

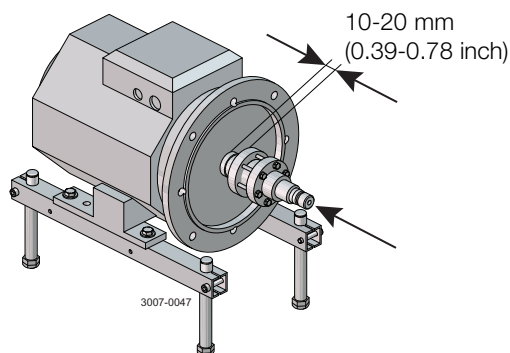
For securing the best fixture to the motor shaft ensure the following:

- 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.



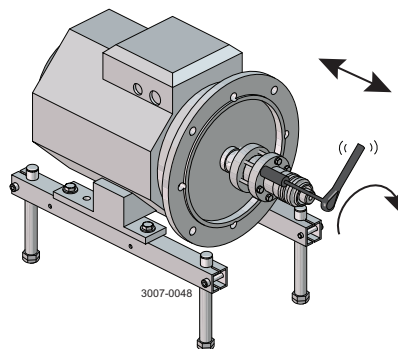
Step 2

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).



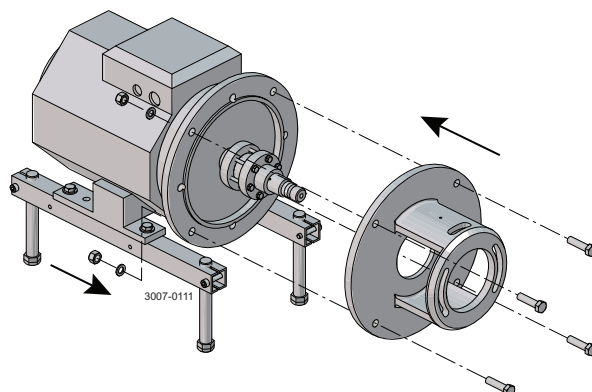
Step 3

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



Step 4

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



5 Maintenance

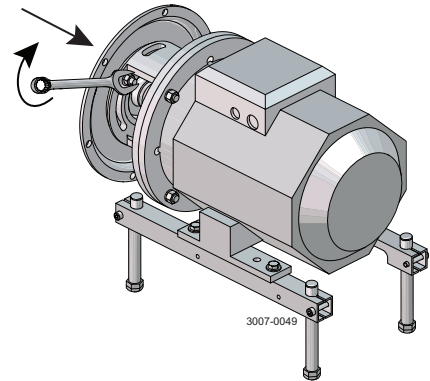
Study the instructions carefully. The items refer to the parts list and service kits section.

Lubricate the rubber seals before fitting them.

* : Relates to the shaft seal.

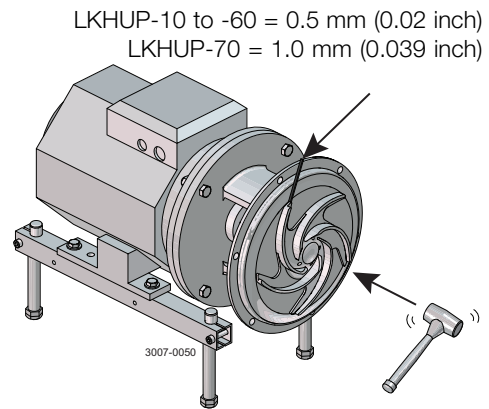
Step 5

1. 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.



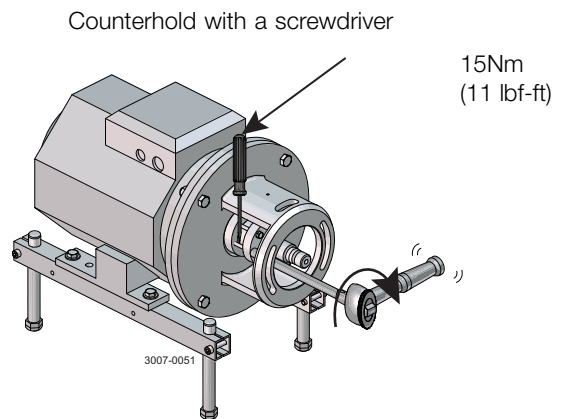
Step 6

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 LKHUP-10 to 60 and 1.0 mm (0.039 inch) for LKHUP-70.
3. Tighten screws (6) evenly until the stub shaft (7) cannot move on the motor shaft.



Step 7

1. Remove impeller (37), back plate (25) and drive ring (52).
2. Tighten screws (6) evenly to 15 Nm (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	4000 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 NOTE: 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

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 LKH110 -60* LKH-110* LKHSP LKH UltraPure 50/60 Hz	LKHPF-10 -60 LKH1-10 -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.

*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	18 Months
	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!

Table 2. Baldor NEMA motors

Motor RPM	Frame	Type of service	
		Standard 8 hrs/day	Severe >16 hrs/day
3600	- 210	5500 hrs	2750 hrs
	> 210 - 280	3600 hrs	1800 hrs
	> 280 - 360	2200 hrs	1100 hrs
	> 360 - 449	2200 hrs	1100 hrs
1800	- 210	12000 hrs	6000 hrs
	> 210 - 280	9500 hrs	4750 hrs
	> 280 - 360	7400 hrs	3700 hrs
	> 360 - 449	3500 hrs	1750 hrs
1200	- 210	18000 hrs	9000 hrs
	> 210 - 280	15000 hrs	7500 hrs
	> 280 - 360	12000 hrs	6000 hrs
	> 360 - 449	7400 hrs	3700 hrs

Recommended grease for general applications: Polyrex EM (Exxon Mobil)

For other grease types, grease amounts and/or duty conditions please refer to the Baldor Instruction manual.

6 Technical data

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

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.

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 LKHHex.
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.

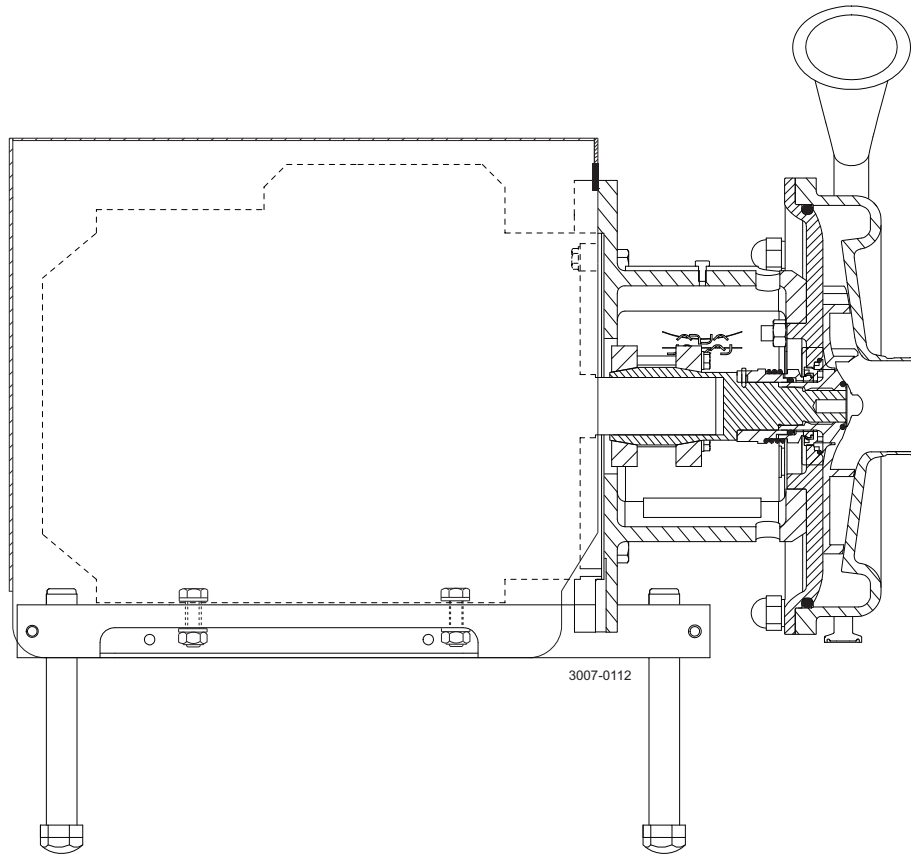
Very often the noise level generated by the flow through the process system (e.g. valves, pipes, tanks etc.) is much higher than that generated by the pump itself. Therefore, it is important to consider the noise level from the total system and take the necessary precautions with regard to personal safety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

7 Parts list and service kits

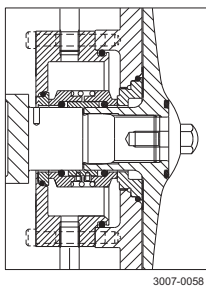
The drawing shows the LKH UltraPure pump, sanitary version.

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

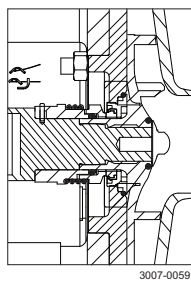
7.1 LKH UltraPure -10, -20, -25, -35, -40, -45, -60, -70.



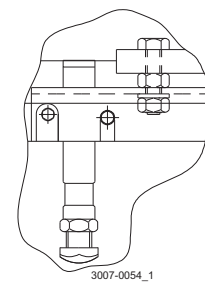
US legs are different to the ones shown. For further information see US spare parts.



Double mechanical shaft seal



Single shaft seal



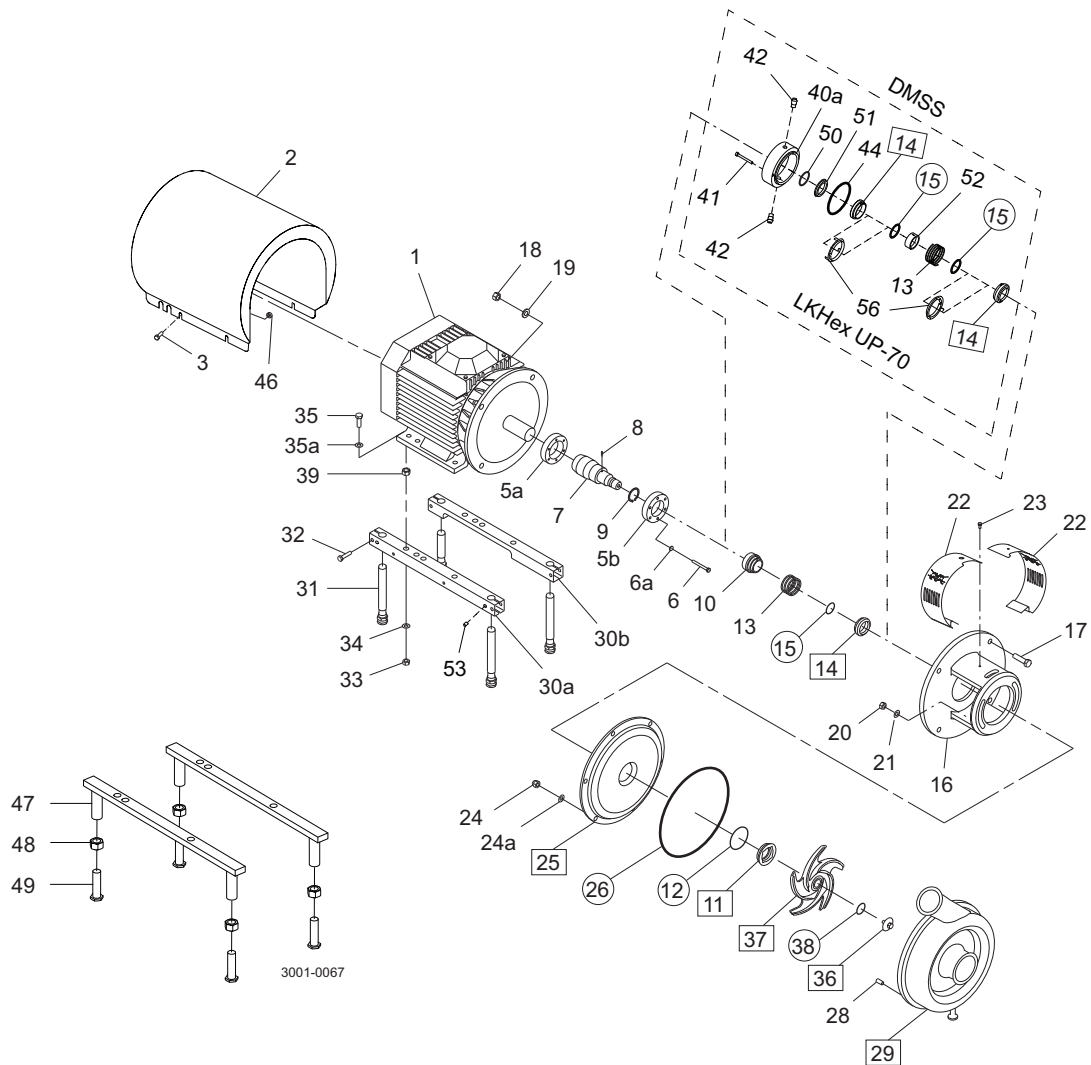
Only used for 3 kW
Fitting of legs

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 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

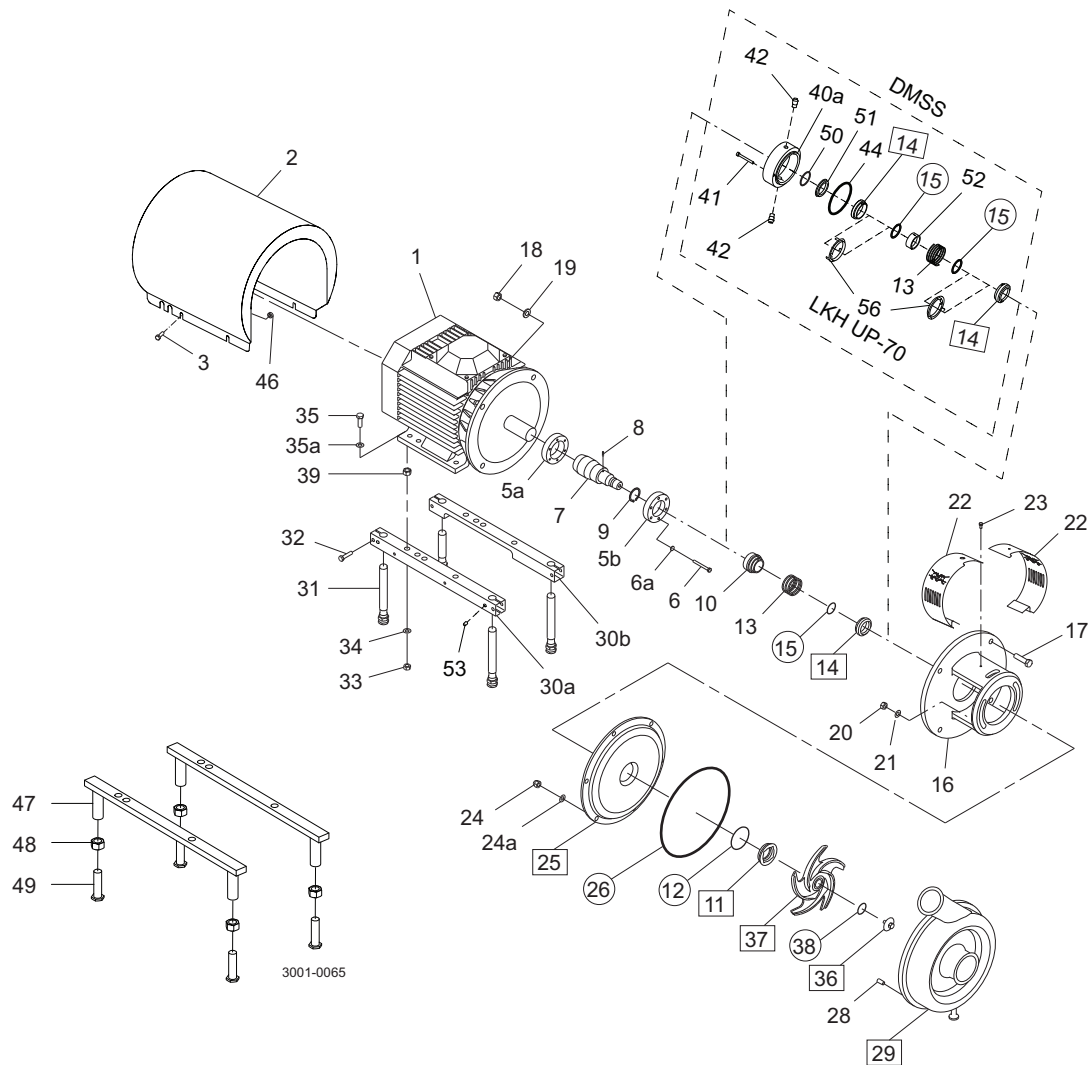
Pos.	Qty	Denomination
20	2	Nut
21	2	Washer
24	6	Cap nut
24a	6	Washer
25	1	Backplate compl
26 <input type="checkbox"/> ◆	1	Pump casing O-ring
28	6	Bolt
29	1	Connections and drain
36	1	Impeller screw
37	1	Impeller
38 <input type="checkbox"/> ◆	1	O-ring impeller screw

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

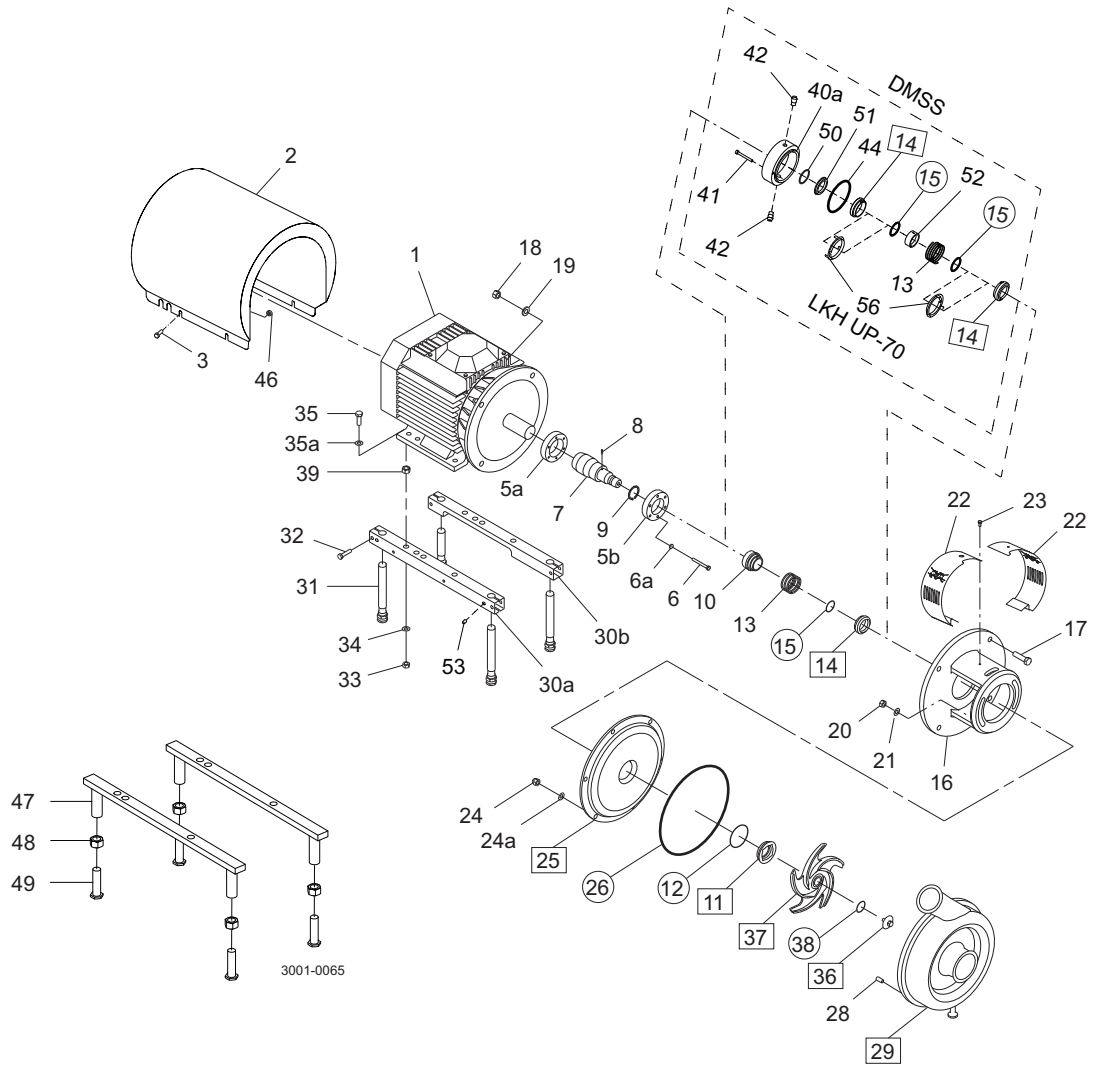
Pos.	Qty	Denomination
	1	Tool complete
1	1	Motor ABB
2	1	Shroud
3	4	Screw
5a	1	Compression ring with thread
5b	1	Compression ring without thread
6	6	Screw
6a	6	Washer
7	1	Shaft
8	1	Connex pin
9	1	Retaining ring
16	1	Adaptor
17	4	Screw for adaptor
18	4	Nut for adaptor
19	4	Washer for adaptor
22	1	Safety 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
Service kit for single shaft seal (incl. Q-doc)			
□ 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

Service kit for double mechanical shaft (incl. Q-doc)

◆ 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 to access the information directly.

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