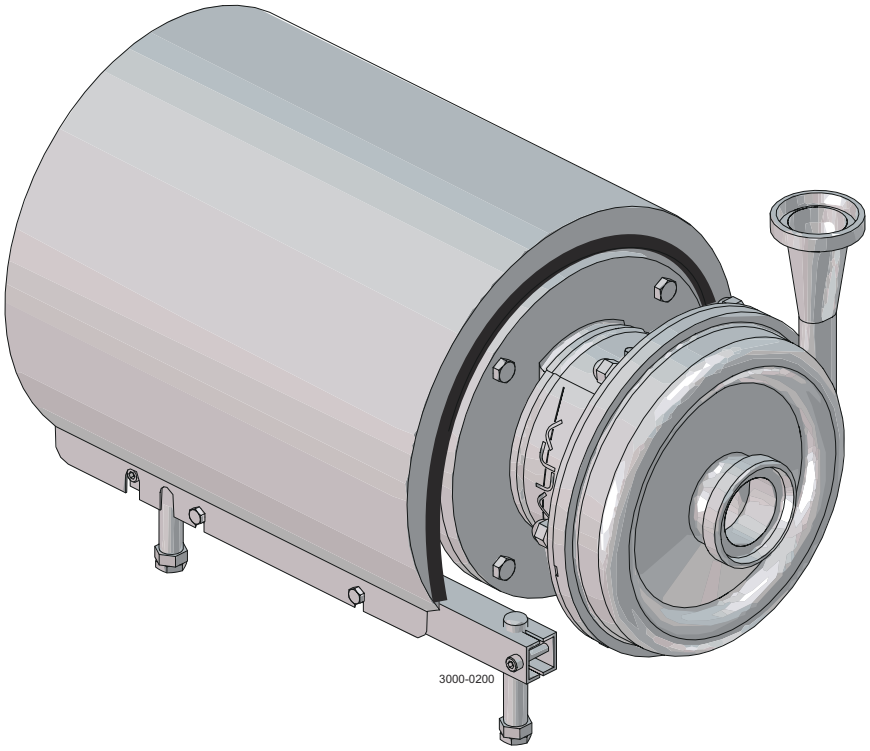
LKH Centrifugal Pump



Lit. Code 200007897-1-EN-GB

Instruction Manual

BRITISH ENGLISH

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

The original instructions are in English

Contents

1 Declarations of Conformity

1.1 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-5, LKH-10, LKH-15, LKH-20, LKH-25, LKH-35, LKH-40, LKH-45, LKH-50, LKH-60, LKH-70, LKH-85, LKH-90

Type

Serial number from AAB000000001 to AAB999999999

Serial number from 10.000 to 1.000.000

Serial number from 100700000001-100799999999

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	Lars Kruse Andersen
Title	Name
Kolding, Denmark	2022–10–01
Place	Date (YYYY-MM-DD)

Signature

This Declaration of Conformity replaces Declaration of Conformity dated 2020-01-23

1.2 UK Declaration 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-5, LKH-10, LKH-15, LKH-20, LKH-25, LKH-35, LKH-40, LKH-45, LKH-50, LKH-60, LKH-70, LKH-85, LKH-90

Type

Serial number from AAB000000001 to AAB999999999

Serial number from 10.000 to 1.000.000

Serial number from 100700000001-100799999999

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	Lars Kruse Andersen
Title	Name
Kolding, Denmark	2022–10–01
Place	Date (YYYY-MM-DD)

Signature

DoC Revison_01_102022

2 Safety

Read this first

This manual is designed for operators and service engineers working with the supplied Alfa Laval product.

Operators must read and understand the **"Safety, Installation and Operating Instructions"** of the respective product before carrying out any work or before you put the supplied product into service!

Not following the instructions can result in serious accidents.

This documentation describes the authorized way to use the supplied product.

Alfa Laval will take no responsibility for injury or damage if the equipment is used in any other way.

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

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.

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

This is the complete manual for the supplied product.

2.1 Important information

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!**

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.

2.2 Warning signs

Warning signs	
	**General warning:**
	**Dangerous electrical voltage:**
	**Caustic agents:**

2.3 Safety precautions

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.

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 without impeller screw:

Always remove the impeller before checking the direction of rotation.

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

Pump with Impeller screw:

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

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

Operation:

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

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

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

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

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

Always handle lye and acid with great care.

Never use the pump for products not mentioned in 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 acording to motor manufactures 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.

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)

How to contact Alfa Laval

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

Please visit www.alfalaval.com to access the information directly.

3 Installation

3.1 Unpacking/delivery

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.**

1 Always use a lifting crane when handling the pump (see technical data).

Check the delivery for:

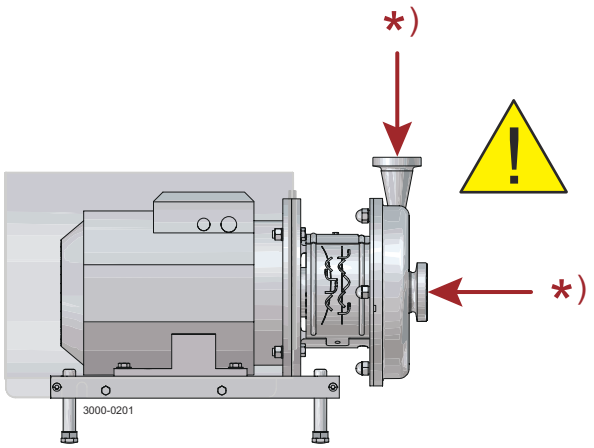
- Complete pump
- Delivery note
- Motor instructions

2 Remove any packing materials from the inlet and the outlet.

Avoid damaging the inlet and the outlet.

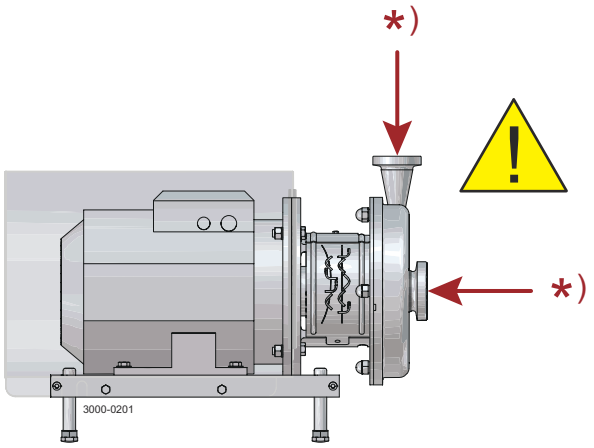
Avoid damaging the connections for flushing liquid, if supplied.

*) Remove packing materials!



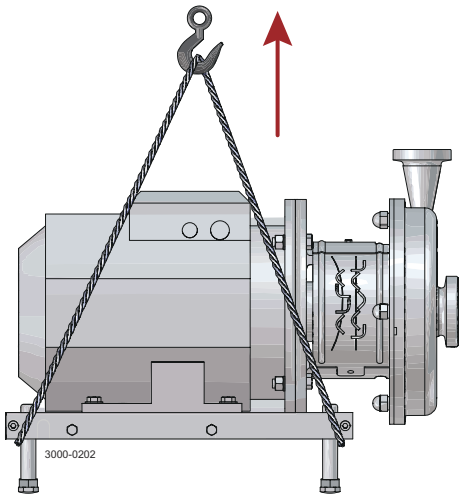
3 Inspect the pump for visible transport damage.

*) Remove packing materials!



Inspection!

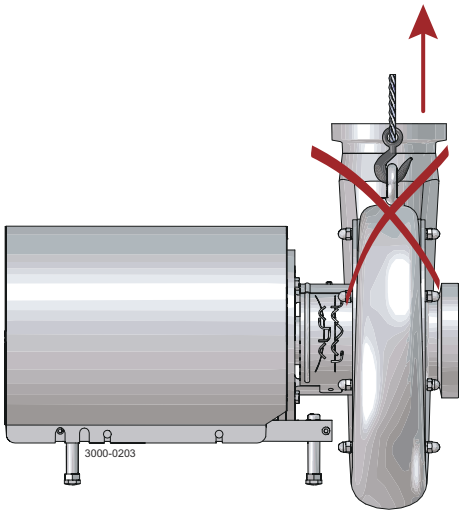
4 Always remove the shroud, if fitted, before lifting the pump.



Remove the shroud before lifting!

5 **ONLY LKH-85 and LKH-90**

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



3.2 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 and 3.4 Pre-use check.

The large pump sizes are very heavy.

Alfa Laval therefore recommends the use of a lifting crane when handling the pump.

WARNING

Always read the technical data thoroughly. (See chaper *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.

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.

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.

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 100mm (4 inch.)

WARNING

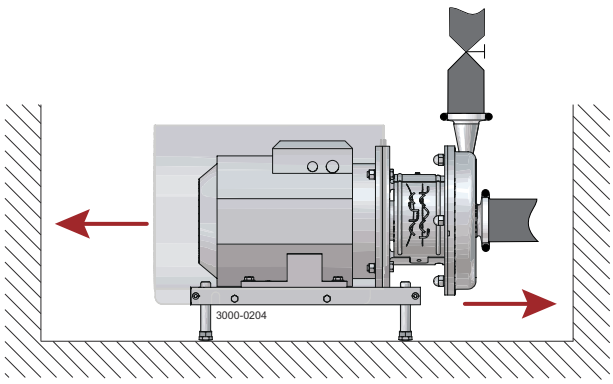
Alfa Laval recommends the supply disconnecting device shall be in accordance with EN60204-1. Always disconnect the supply disconnecting device safely after installation before continuing the installation.

1

Ensure at least 0.5 m (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.

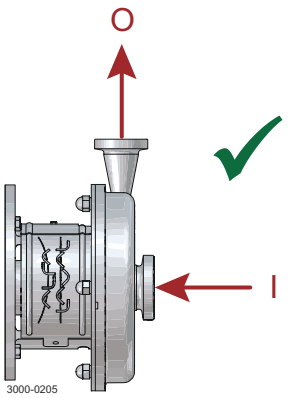


2

Check that the flow direction is correct.

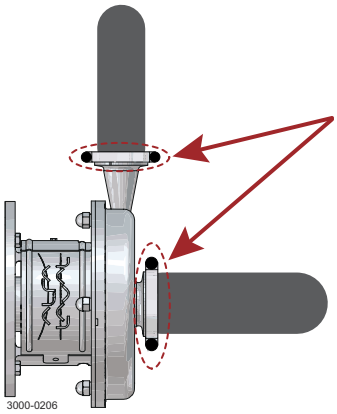
O: Outlet

I: Inlet



3

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



Correct

4

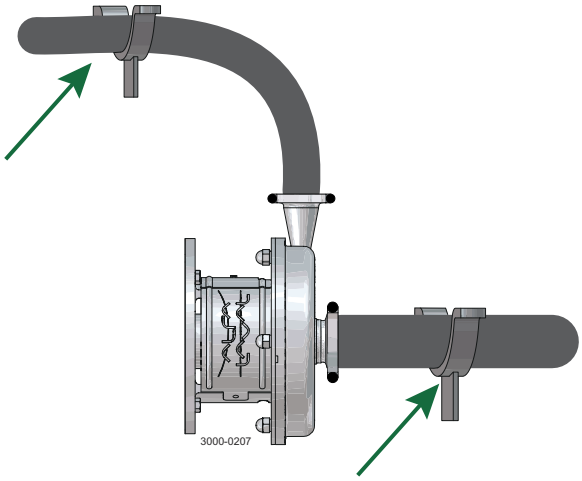
Avoid stress on the pump.

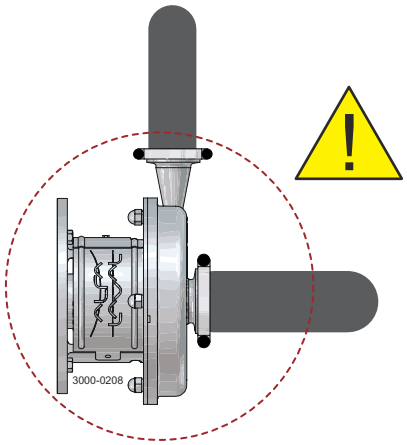
Piping system must be self-supported.

Pay special attention to:

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

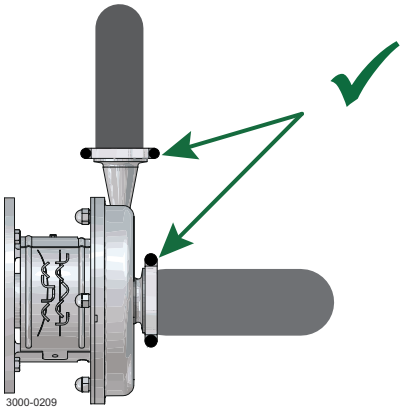
Example of piping system self-supported.

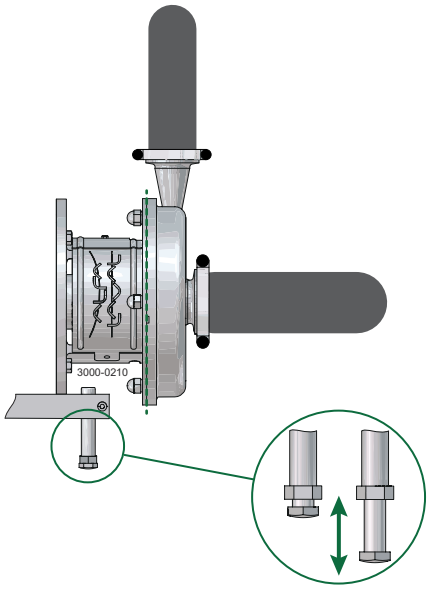




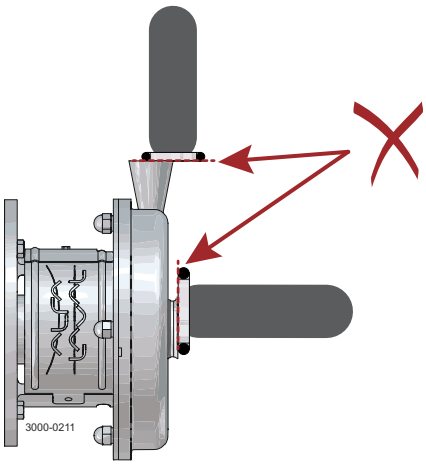
Ensure correct alignment of pump inlet and outlet with piping system.

Alignment can be done by adjusting the pump legs.

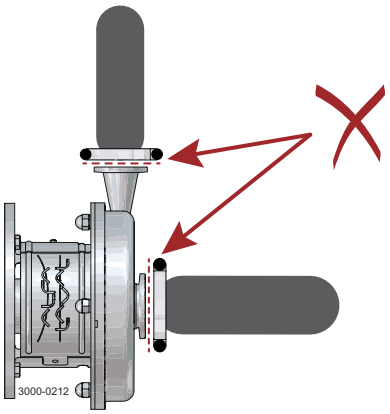




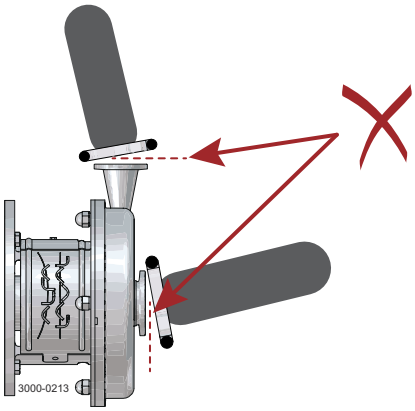
Centre of inlet and outlet to be aligned with centre of piping system.



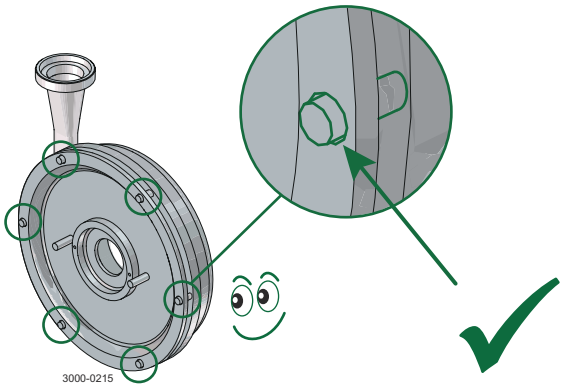
No gaps between connections on pump inlet and inlet pipe, and pump outlet and outlet pipe.

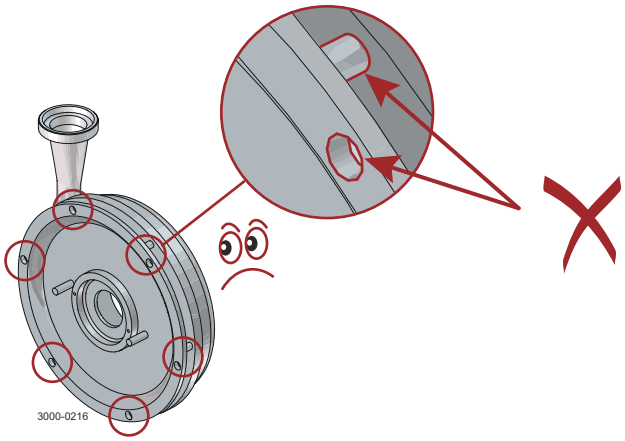


Angel between connections on pump inlet and inlet pipe, pump outlet and outlet pipe not allowed.

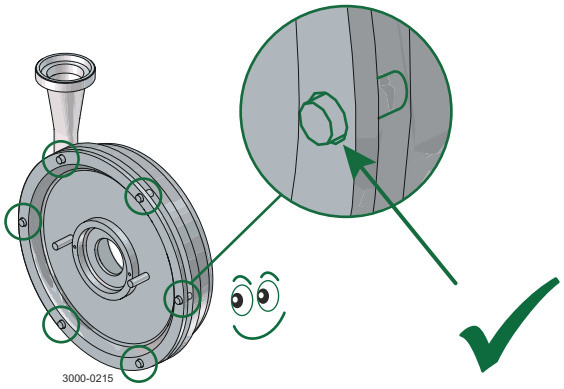


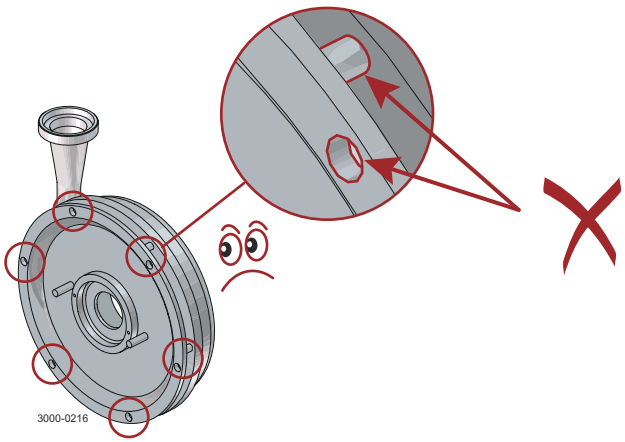
Ensure correct alignment of pump casing and pump backplate. Angle not allowed. Alignment can be done by adjusting the pump legs.





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



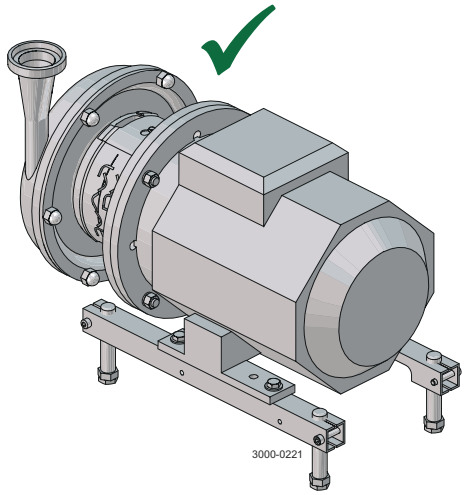


NOTE

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.

WARNING

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.



3.3 Pre-use check - pump without impeller screw

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

Check the direction of rotation of the impeller before operation.

- See the indication label on the pump.

CAUTION

Always remove the impeller before checking the direction of rotation.

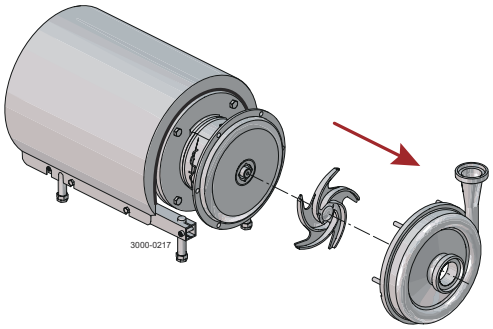
Never start the pump if the impeller is fitted and the pump casing is removed.

1

1. **a.** LKH-5: Remove screws (56), spring washers (56a), clamps (55+55a) and pump casing (29).

   b. LKH-10 to -60: Remove cap nuts (24), washers (24a) and pump casing (29).

2. Remove impeller (27) (see also instruction in section *5.4 Assembly of pump/single shaft seal*).

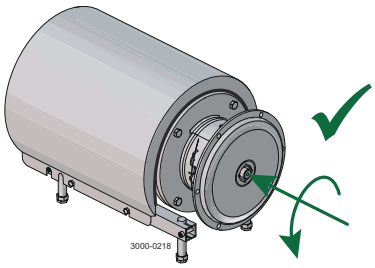


2

WARNING

Stay clear and ensure no one is near the shaft during test of rotation.

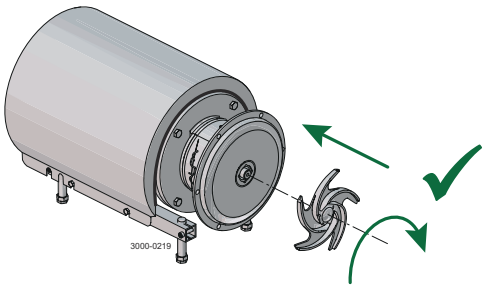
1. Connect power supply.
2. Start and stop the motor momentarily.
3. Ensure that the direction of rotation of the stub shaft (7) is anticlockwise as viewed from the inlet side.
4. Disconnect power supply safety.



Stub shaft

3

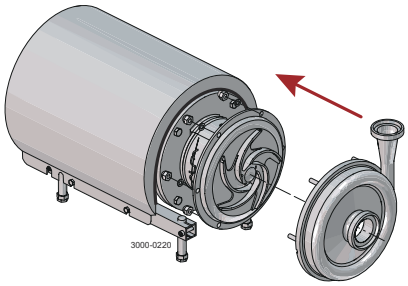
Fit and tighten impeller (27).



4

1. Fit pump casing (29).
2. **a.** LKH-5: Fit clamps (55+55a), spring washers (56a) and tighten screws (56).

   b. LKH-10 to -60: Fit washers (24a) and tighten cap nuts (24), according to torque values in chapter *6 Technical data.*



3.4 Pre-use check - pump with impeller screw

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

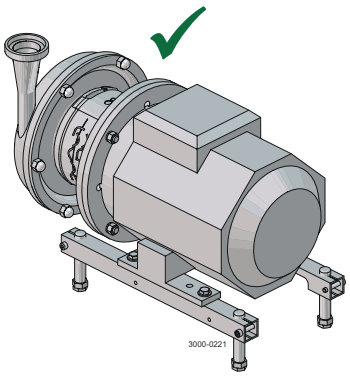
Check the direction of rotation of the impeller before operation.

- See the indication label on the pump.

CAUTION

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.



View from rear end of motor

3.5 Recycling information

Unpacking

- Packing material consists of wood, plastics, cardboard boxes and in some cases metal straps
- Wood and cardboard boxes can be re-used, 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 wearing 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 wearing parts must be disposed of in accordance with local regulations

Scrapping

- At the end of use, the equipment must be recycled according to relevant local regulations. Besides the equipment itself, any hazardous residues from the process liquid must be taken into consideration 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

CAUTION

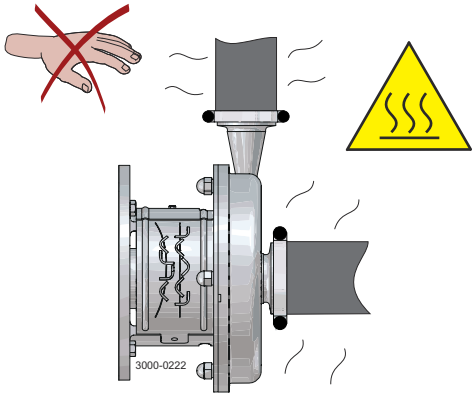
Always read the technical data thoroughly. See chapter *6 Technical data*.

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

1

WARNING

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



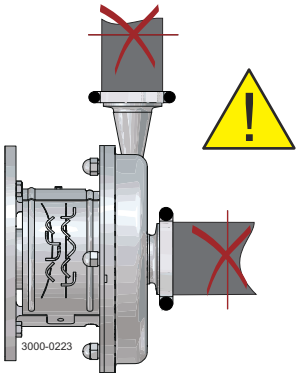
2

WARNING

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

Danger of explosion!

See the warning label!



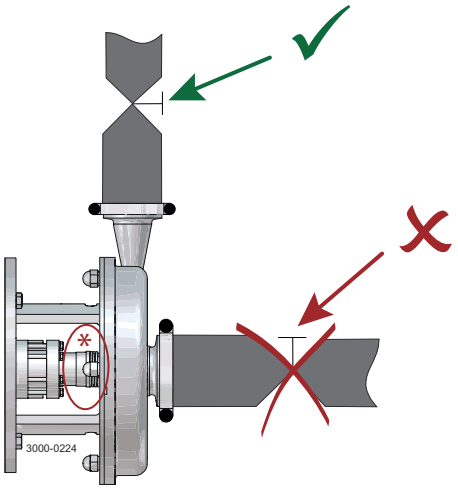
3

CAUTION

The shaft seal must not run dry.

Never throttle the inlet side.

*) **Do not allow to run dry**



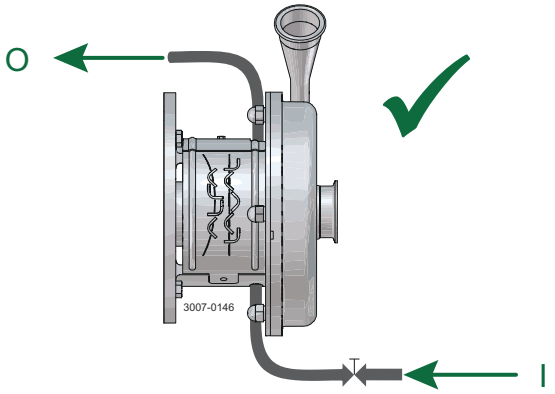
4 Double mechanical/flushed shaft seal:

1. Connect the inlet of the flushing liquid correctly. (1/8¨.
2. Regulate the water supply correctly.

For LKH-85: connect inlet/outlet of the flushing liquid directly on the flushing housing. (Ø6 tube).

O: Outlet

I: Inlet



T_{max} = 70°C

P_{max} = 1 bar (flush seal)

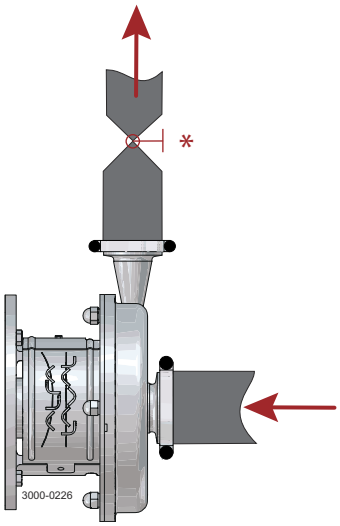
P_{max} LKH 5-60 = 5 bar (DMS)

P_{max} LKH 70-90 = 3 bar (DMS)

5 **Control:**

Reduce the capacity and the power consumption by means of:

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



4.2 Trouble shooting

Pay attention to possible faults. Read the instructions carefully.

> **NOTE**
>
> Read the maintenance instructions carefully before replacing worn parts.

Problem	Cause/result	Remedy
Motor overloaded	• Pumping of viscous liquids	• Larger motor or smaller impeller
	• Pumping of high density liquids	
	• Low outlet pressure (counter pressure)	• Higher counter pressure (throttling)
	• Lamination of precipitates from the liquid	• Frequent cleaning
Cavitation: • Damage • Pressure reduction (sometimes to zero) • Increase in the noise level	• Low inlet pressure	• Increase the inlet pressure
	• High liquid temperature	• Reduce the liquid temperature
		• Reduce the pressure drop before the pump
		• Reduce speed
Leaking shaft seal	• Running dry	Replace: All wearing parts
	• Incorrect rubber grade	If necessary: • Change rubber grade
	• Abrasive particles in the liquid	• Select stationary and rotating seal ring in silicon carbide/silicon carbide
Leaking O-ring seals	Incorrect rubber grade	Change rubber grade

4.3 Recommended cleaning

NOTE

The supplied product is designed for cleaning in place (CIP).

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

NaOH = Caustic soda.

HNO_3 = Nitric acid.

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

WARNING

Never touch the supplied product or the pipelines when sterilizing.

Always handle lye and acid with great care.

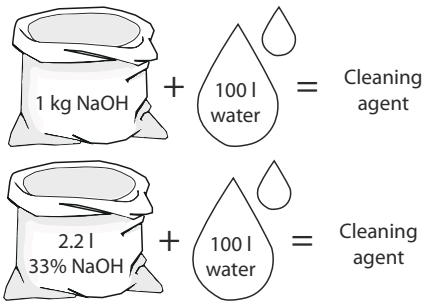
Always follow the instructions in the safety sheet for the cleaning agent.

Examples of cleaning agents

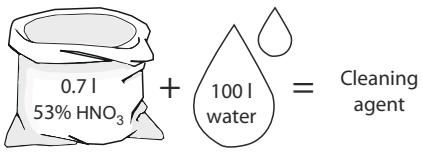
Use clean water free from chlorides

Metric System

1. 1% by weight NaOH at 70°C

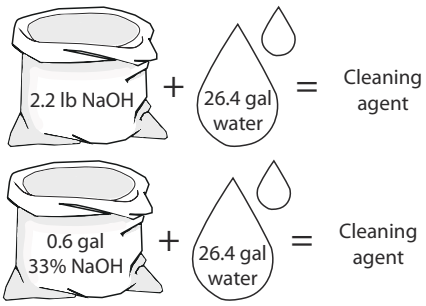


2. 0.5% by weight HNO_3 at 70°C

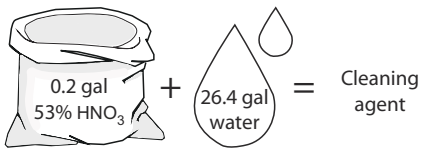


Imperial System

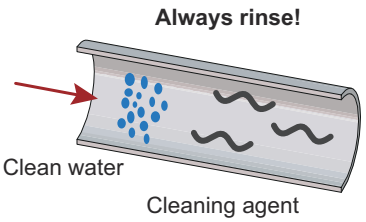
1. 1% by weight NaOH at 158°F



2. 0.5% by weight HNO_3 at 158°F



1. Avoid excessive concentration of the cleaning agent ⇒ **Dose gradually!**
2. Adjust the cleaning flow to the process **Milk sterilization/viscous liquids ⇒ Increase the cleaning flow!**



CAUTION

Always rinse well with clean water after the cleaning.

NOTE

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

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 that of the atmosphere and it cannot be started until the system is re-sterilised.

The LKH pump range has been designed for Clean in Place (CIP) operation with both 3A and EHEDG certification. However, due to variations in pumped product, system design, cleanliness requirements and chemicals used we recommend that users develop suitable CIP processes during commissioning on normal operation conditions and product s and verify these meet the required levels od cleanliness ensuring a minimum flow velocity of 1,5 m/s in the pumpt inlet.

To ensure optimum drainability of the pumpcase we recommend the pump is specified with 270º outlet position (horizontal bottom) or a drainvalve.

5 Maintenance

Maintain the pump with care. Read the instructions carefully and pay special attention to the warnings!

Always keep spare shaft seals and rubber seals in stock.

See separate motor instructions.

Check the pump for smooth operation after service.

5.1 General maintenance

1

WARNING

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

Always disconnect the power supply safely when servicing the pump.

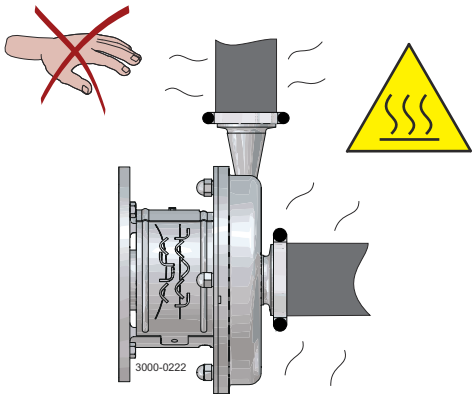
NOTE

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

2

WARNING

Never service the pump when it is hot.



3

WARNING

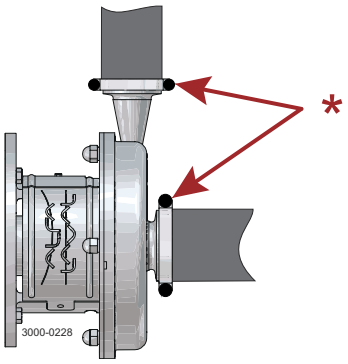
Never service the pump if pressurised.

CAUTION

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

Pay special attention to the warnings!

*) Atmospheric pressure required!



4

Recommended spare parts:

Order service kits from the service kits list.

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.

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	**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:**	Replace when replacing the shaft seal	

	Shaft seal	Rubber seals	Motor bearings
	Complete shaft seal		
Planned maintenance	• Regular inspection for leakage and smooth operation • Keep a record of the pump • Use the statistics for inspection planning **Replace after leakage:**	Replace when replacing the shaft seal	Yearly inspection is recommended • Replace complete bearing if worn • Ensure that the bearing is axially locked (See motor instructions)
	Complete shaft seal		
Lubrication	**Before fitting**	**Before fitting**	See section *6.2 Relubrication intervals*
(Use food approved grease or oil)	Lubricate the O-rings with silicone grease or silicone oil	Silicone grease or silicone oil	

Pre-use check

CAUTION

Fit the electrical connections correctly if they have been removed from the motor during servicing. (See pre-use check in section *3 Installation*).

Pay special attention to warnings!

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

5.2 Cleaning Procedure

Cleaning procedure for soiled impeller screw tapped hole:

WARNING

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

1. Remove stub shaft (7) as per section 4 of the Service manual.
2. Submerge and soak the stub shaft for 5 minutes in 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 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 the swab test is passed.

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

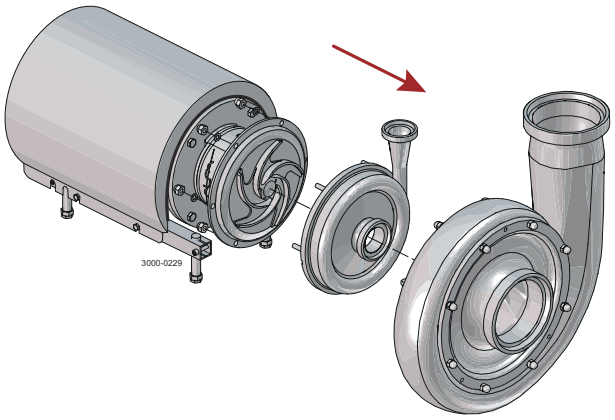
5.3 Dismantling of pump/shaft seals

Read the instructions carefully. The items refer to the parts list. Handle scrap correctly.

(1)

1. **a.** LKH-5: Remove screws (56), spring washers (56a), clamps (55+55a) and pump casing (29).

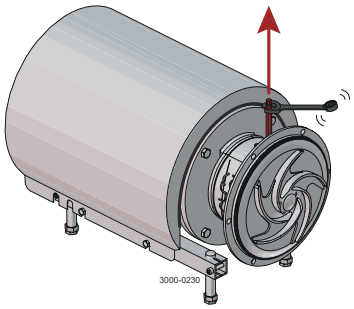
   b. LKH-10 to 90: Unscrew cap nuts (24) and remove washers (24a) and pump casing (29).



LKH-85 + LKH-90

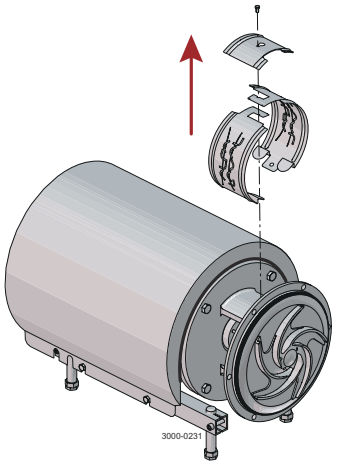
(2)

Flushed / Double mechanical shaft seal:
Unscrew tubes (42) using a spanner.



(3)

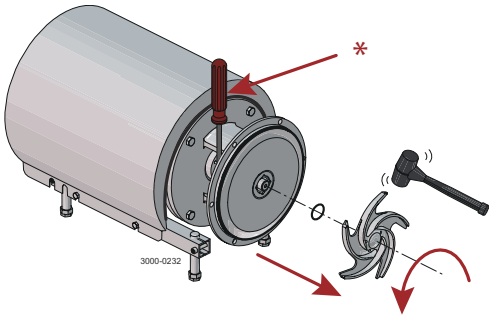
Remove screw (23) and safety guard (22).



4

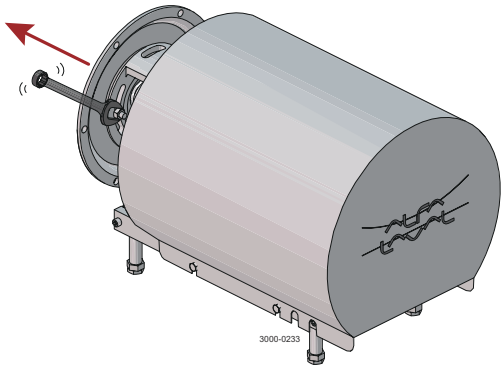
1. Remove impeller screw (36), if fitted.
2. Remove impeller (27). If necessary, loosen the impeller by knocking gently on the impeller vanes.
3. Remove the O-ring (38) from the impeller, if fitted.

*) Counterhold with a screwdriver!



5

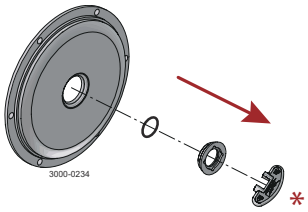
1. Pull off the O-ring (26) from back plate (25).
2. Unscrew nuts (20) and remove washers (21) and the back plate.



6

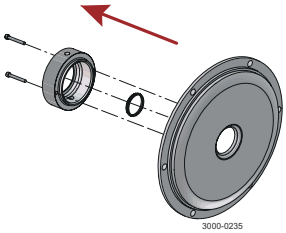
1. Remove the stationary seal ring (11).
2. Remove the O-ring (12) from back plate (25).

*) Use the tool supplied. Left hand thread!



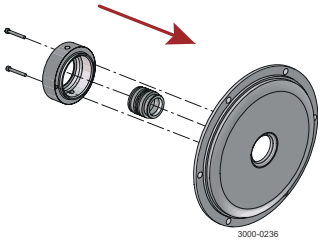
7 **Flushed shaft seal:**

1. Remove screws (41) and seal housing (40).
2. Pull out lip seal (43) from the seal housing.



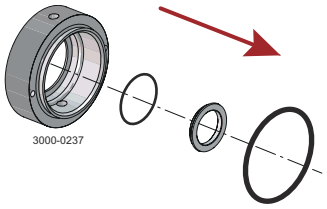
8 **Double mechanical shaft seal:**

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).
4. LKH-70 to 90: Remove cups (54) from rotating seal rings.



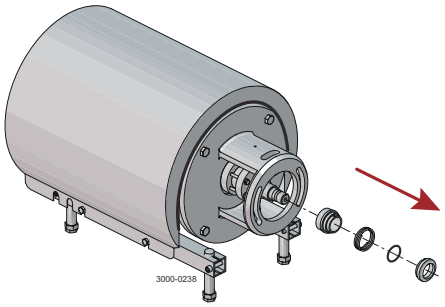
9 **Double mechanical shaft seal:**

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



10

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

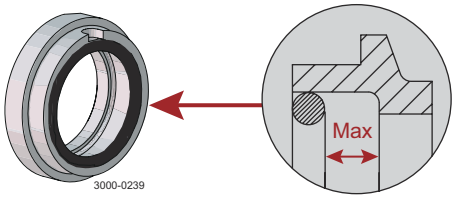


5.4 Assembly of pump/single shaft seal

Read the instructions carefully. the items refer to the parts list. Handle scrap correctly.

1

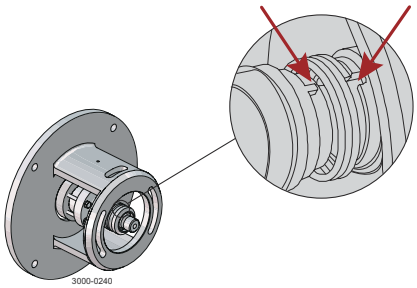
1. Remove spring (13).



> **NOTE**
>
> Make sure that O-ring (15) has maximum clearance from the sealing surface.
>
> If change from double mechanical shaft seal to single shaft seal the shaft needs to be adjusted. See Section *5.7 Adjustment of shaft (LKH-5)* and Section *5.8 Adjustment of shaft (LKH -10 to -90)*.

2

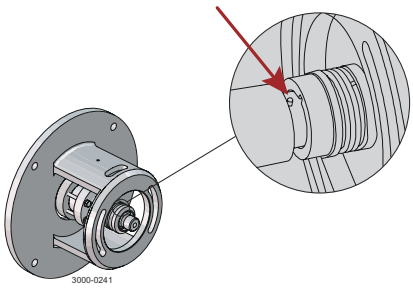
1. Refit spring (13) on rotating seal ring (14).
2. Fit the spring and the rotating seal ring on drive ring (10).



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

3

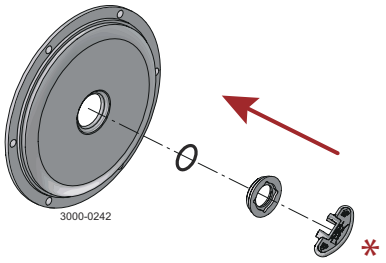
Fit the complete shaft seal on stub shaft (7).



> **NOTE**
>
> **Make sure that Connex pin (8) on the stub shaft enters the notch in drive ring (10).**

4

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



CAUTION

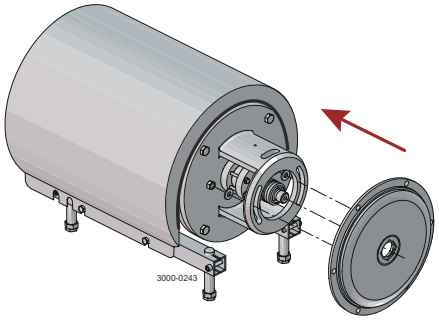
Only tighten by hand to avoid deforming the stationary seal ring.

(Max. 7 Nm/5 lbf-ft)

*) Use the tool supplied. Left hand thread!

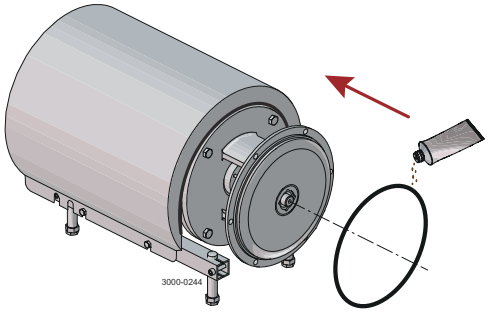
5

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).



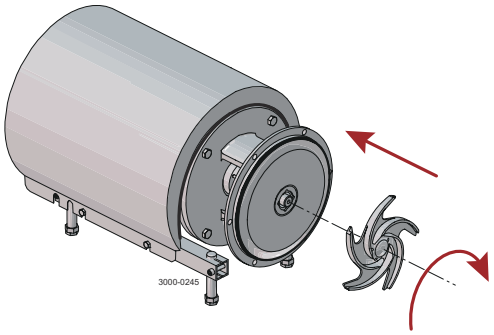
6

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



7

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



NOTE

Torque - 5-60 = 20 Nm (15 lbf-ft)

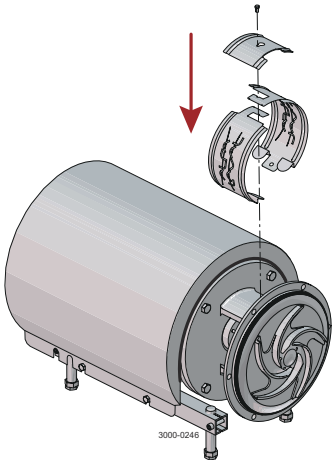
Torque - 70-90 = 50 Nm (37 lbf-ft)

8

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

NOTE

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

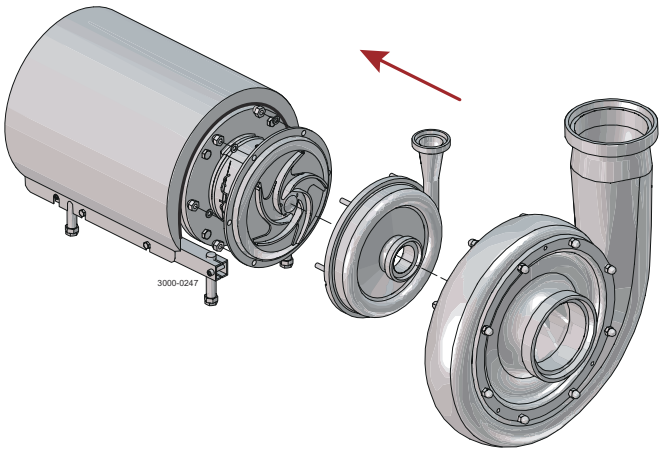


9

1. **a.** LKH-5: Fit pump casing (29), clamps (55+55a), spring washers (56a) and screws (56).

   b. LKH-10 to -90: Fit pump casing (29), washers (24a) and cap nuts (24).
2. Adjust pump casing to the right position.
3. **a.** LKH-5: Tighten nuts (20) for back plate (25) and tighten screws (56).

   b. LKH-10 to -90: Tighten nuts (20) for back plate (25) and tighten cap nuts (24), according to torque values in chapter *6 Technical data*.



LKH-85 + LKH-90

5.5 Assembly of pump/flushed shaft seal

Read the instructions carefully. The items refer to the parts list. Handle scrap correctly.

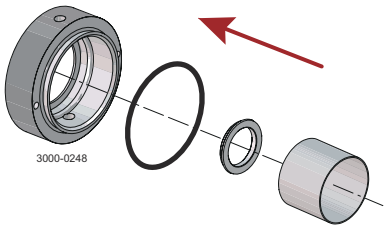
1

Flushed shaft seal:

LKH-5 to -60 use Ø63mm tube

LKH-70 to -90 press in lip seal by hand

1. Fit lip seal (43) in seal housing (40).
2. Lubricate O-ring (44) and slide onto the seal housing (40).
3. Fit the seal housing on back plate (25) and tighten screws (41).



Use Ø63 mm tube!

NOTE

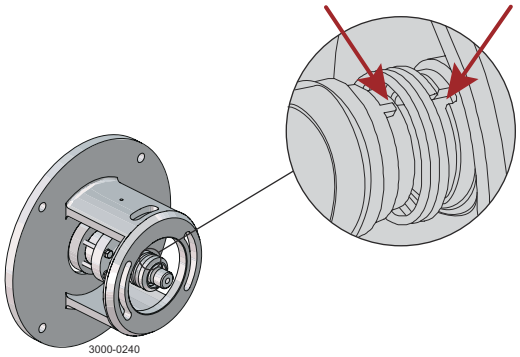
If change from double mechanical shaft seal to flushed shaft seal the shaft needs to be adjusted. See Section *5.7 Adjustment of shaft (LKH-5)* and Section *5.8 Adjustment of shaft (LKH-10 —90)*.

2

1. Lubricate O-ring (45) and fit it in drive ring (10).
2. Fit spring (13) and rotating seal ring (14) on the drive ring.

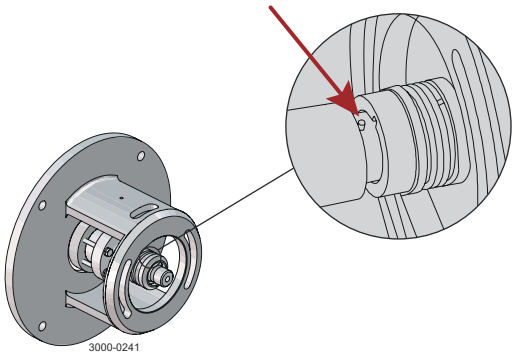
CAUTION

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



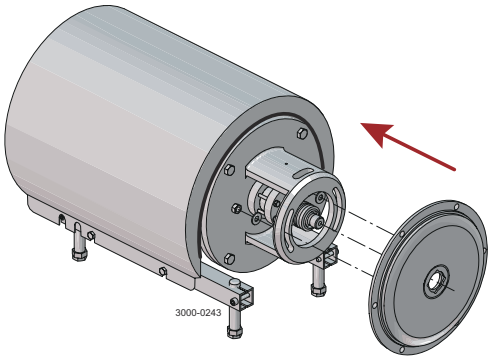
3

Fit complete shaft seal on stub shaft (7) so that Connex pin (8) on the stub shaft enters the notch in drive ring (10).



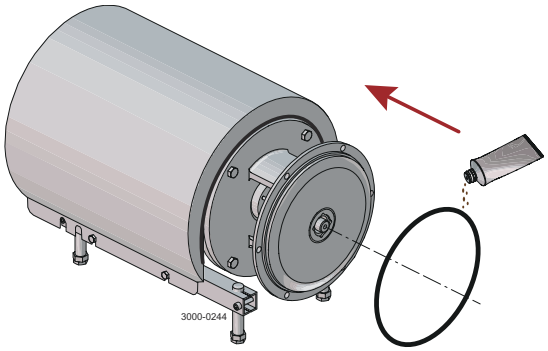
4

1. Carefully guide back plate (25) onto adaptor (16).
2. Fit washers (21) and nuts (20).



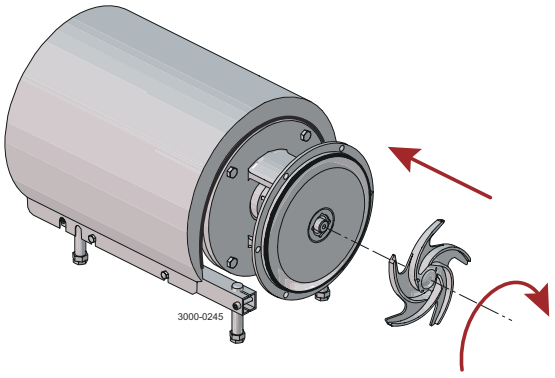
5

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



6

1. Lubricate O-ring (38) and fit it in impeller (37), if impeller screw is used.
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, if used.



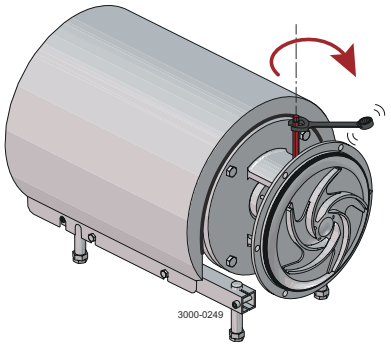
NOTE

Torque - 5-60 20 Nm (15 lbf-ft)

Torque - 70-90 50 Nm (37 lbf-ft)

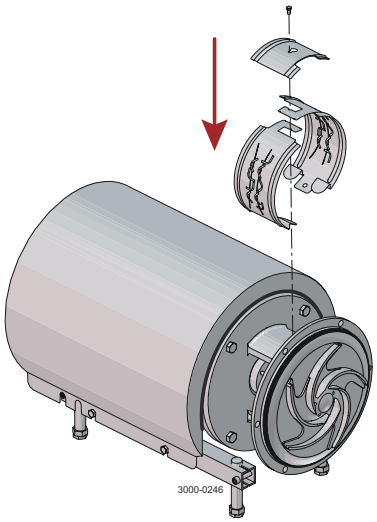
7

1. Screw tubes (42) into seal housing (40).
2. Tighten with a spanner.



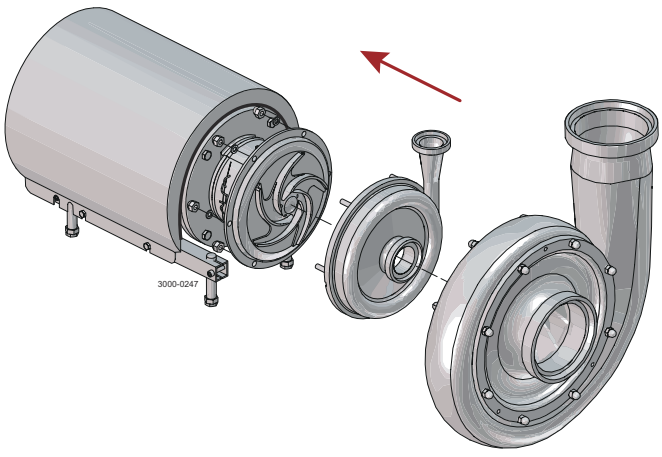
8

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



9

1. **a.** LKH-5: Fit pump casing (29), clamps (55+55a), spring washers (56a) and screws (56).
   b. LKH-10 to-90: Fit pump casing (29).
2. Tighten nuts (20) for back plate (25).
3. **a.** LKH-5: Tighten nuts (20) for back plate (25) and tighten screws (56).
   b. LKH-10 to -90: Fit washers (24a) and cap nuts (24) and tighten, according to the torque values in chapter *6 Technical data*.



LKH-85 + LKH-90

5.6 Assembly of pump/double mechanical shaft seal

Read the instructions carefully. The items refer to the parts list. Lubricate the rubber seals before fitting them.

NOTE

If changed from single shaft seal to double mechanical shaft seal the shaft needs to be adjusted. See Section 5.7 Adjustment of shaft (LKH5) and Section 5.8 Adjustment of shaft (LKH10-90).

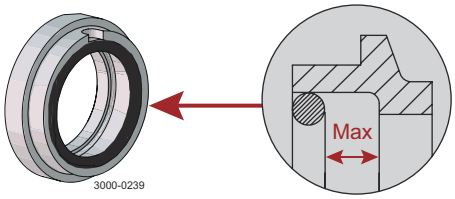
(1)

1. Fit O-rings (15) in rotating seal rings (14).

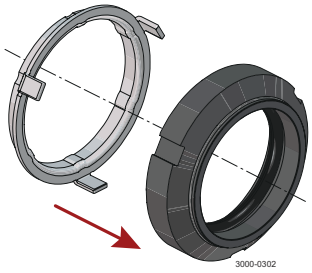
   NOTE

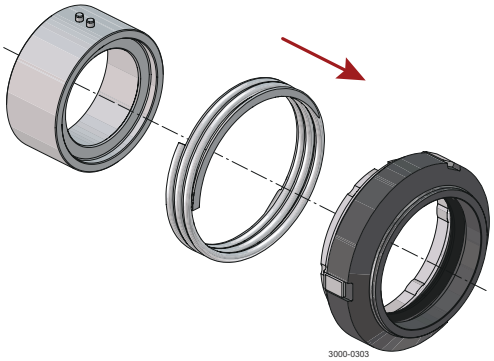
   Make sure that O-ring (15) has maximum clearance from the sealing surface.

2. LKH70–90: Fit cups (54) on rotating seal rings (14).
3. Fit spring (13) on one of the rotating seal rings (14) and place the drive ring (52) in rotating seal ring.
4. LKH70–90: Turn the drive ring (52) in order to be placed correctly on the pump shaft.

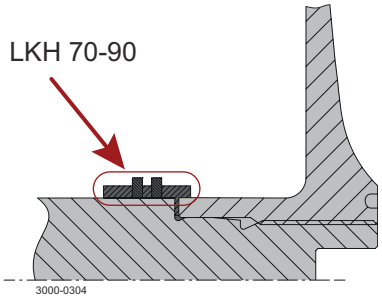


LKH 70-90





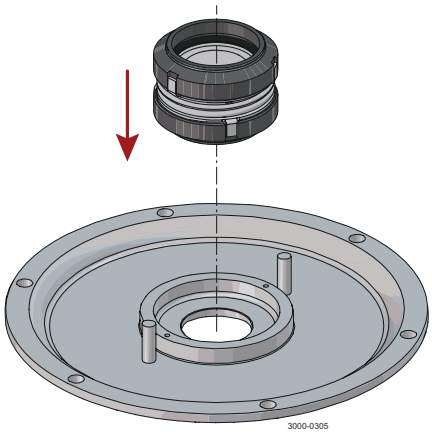
LKH 70-90



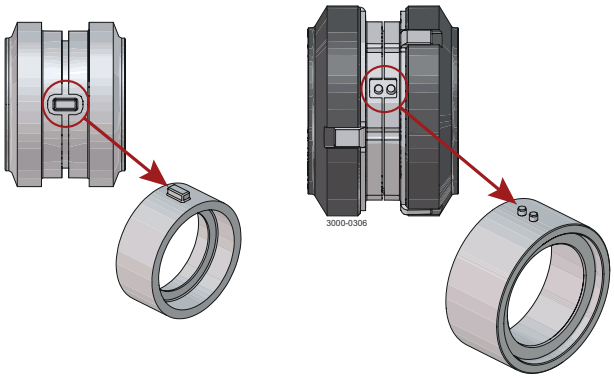
2

1. Fit the second rotating seal ring (14) on the other end of the spring.
2. Place the parts on the stationary seal ring fitted in the back plate (25).

> **NOTE**
>
> **Ensure that both drive pin/pins on the drive ring enter the notches in the rotating seal rings.**

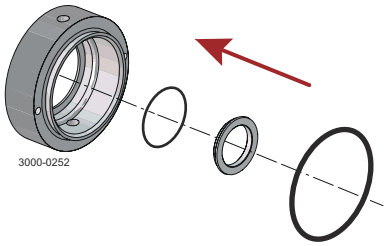


LKH 5-60 LKH 70-90



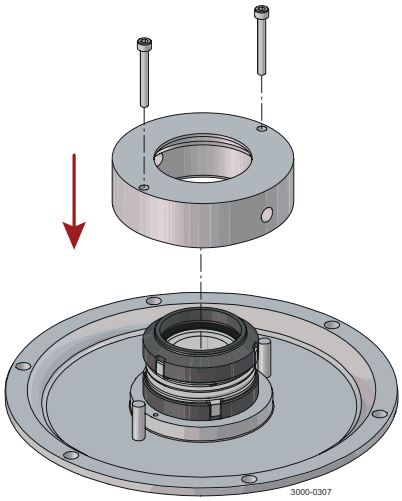
3

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.



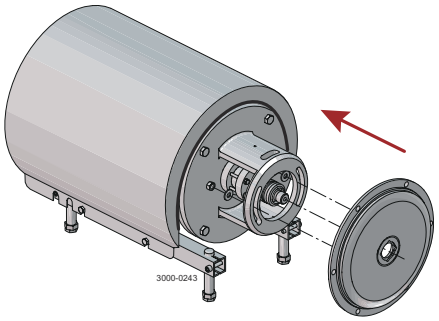
4

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



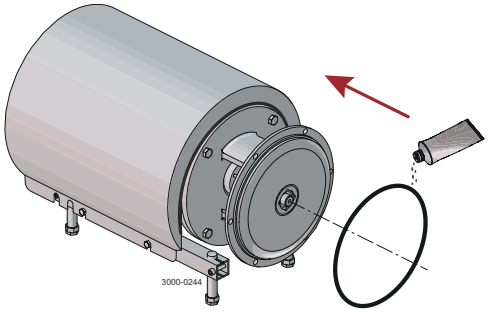
5

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



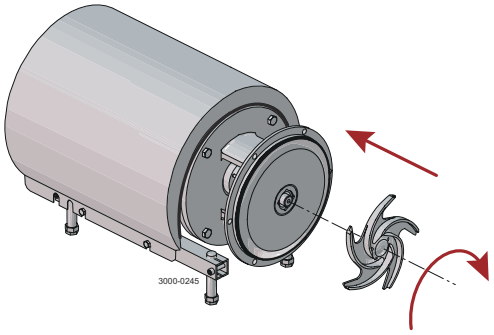
6

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



7

1. Lubricate O-ring (38) and fit it in impeller (37), if impeller screw is used.
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, if used.



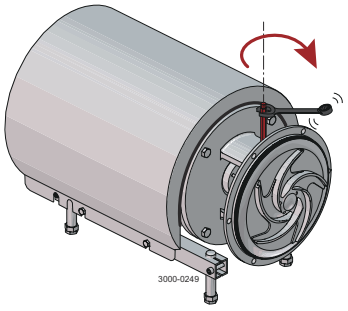
NOTE

Torque - 5-60 20 Nm (15 lbf-ft)

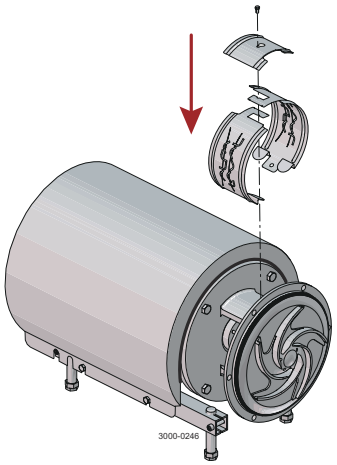
Torque - 70-90 50 Nm (37 lbf-ft)

8

1. Screw tubes (42) into seal housing (40a).
2. Tighten with a spanner.



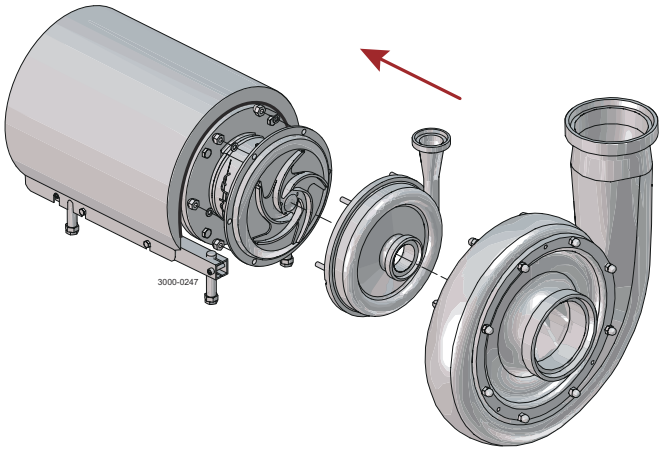
9 Fit safety guard (22) and screw (23) and tighten.



10

1. Fit pump casing (29).
2. Tighten nuts (20) for back plate (25).
3. **a.** LKH-5: Fit clamps (55+55a), spring washers (56a) and screws (56) and tighten.

   b. LKH-10 to -90: Fit washers (24a) and cap nuts (24) and tighten, according to torque values in chapter *6 Technical data*.



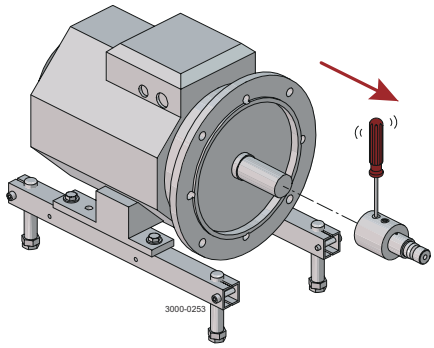
LKH-85 + LKH-90

5.7 Adjustment of shaft (LKH-5)

Read the instructions carefully. The items refer to the parts list and service kits section. Lubricate the rubber seals before fitting them.

1

1. Loosen screws (6).
2. Pull off stub shaft (7).

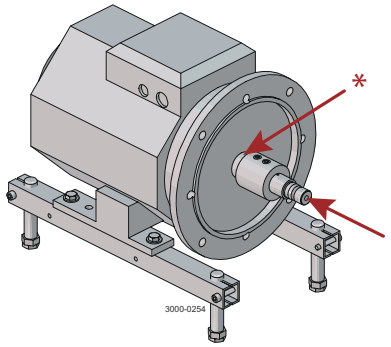


2

1. Push stub shaft (7) onto the motor shaft. Screws (4) must fit in the keyway on 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).

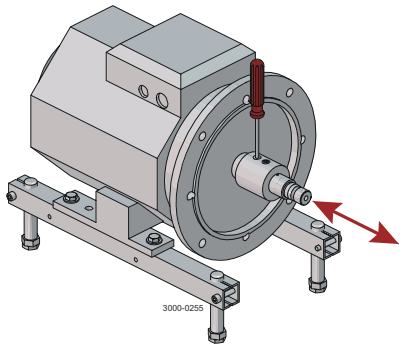
NOTE

*) 10-20 mm (0.39-0.78 inch).



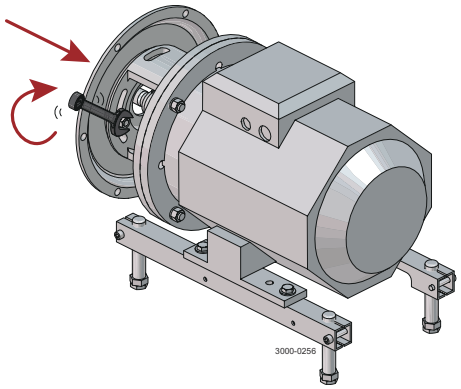
3

1. Tighten screws (4) lightly and evenly.
2. Ensure that stub shaft (7) can be moved on the motor shaft.



4

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



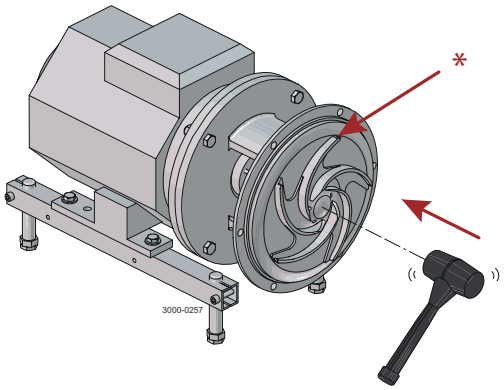
5

1. Fit impeller (27) 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 LKH-5.

NOTE

The clearance can be adjusted by knocking gently with a plastic hammer.

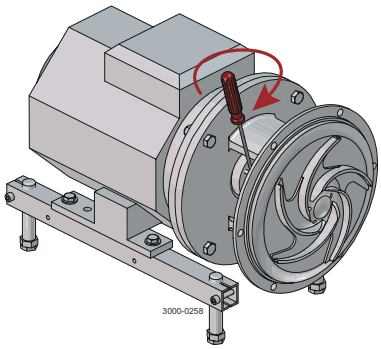
*) LKH-5 = 0.5 mm (0.02 inch)



6

Tighten screws (4) evenly to 15 Nm (11 lbf-ft).

Tighten screws diagonally.



5.8 Adjustment of shaft (LKH-10 to -90)

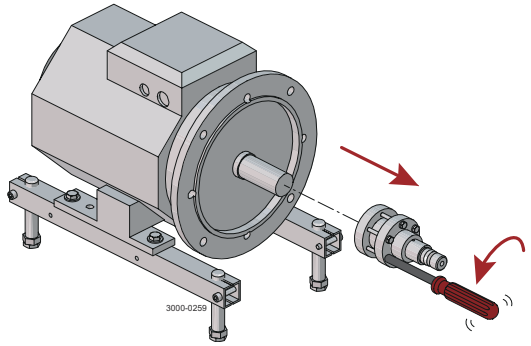
Read the instructions carefully. The items refer to the parts list and service kits section. Lubricate the rubber seals before fitting them.

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

1

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

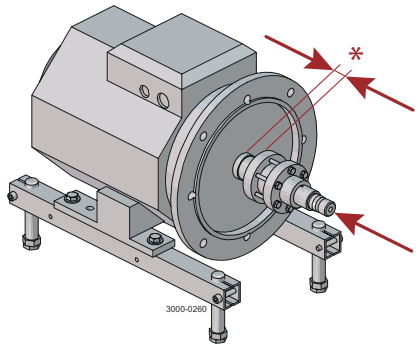


2

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).

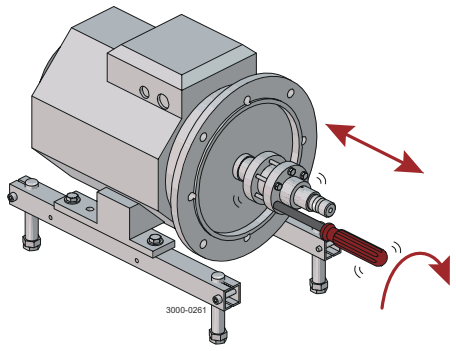
NOTE

*) 10-20 mm (0.39-0.78 inch)



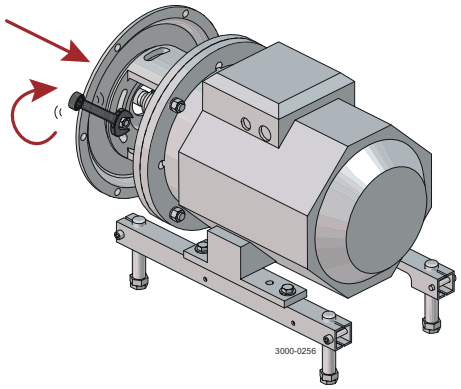
3

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



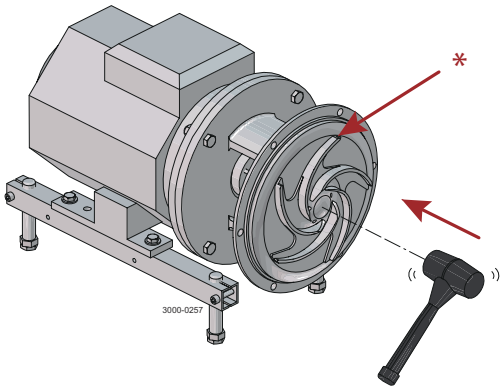
4

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



5

1. Fit impeller (27) 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 LKH10, 15, 20, 25, 35, 45, 50 and 60 and 1.0 mm (0.039 inch) for LKH40, 70, 75, 85 and 90.
3. Tighten screws (6) evenly until the stub shaft (7) cannot move on the motor shaft.



NOTE

The clearance can be adjusted by knocking gently with a plastic hammer

*) LKH10, 15, 20, 25, 35, 45, 50 and 60 = 0.5 mm (0.02 inch)

LKH40, 70, 75, 85 and 90 = 1.0 mm (0.039 inch)

Please note LKH40 impeller is marked with "1.0 mm GAP".

If NOT marked with “1.0 mm GAP” the clearance shall be 0.5 mm

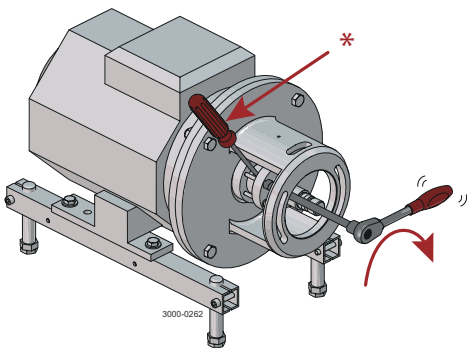
6

1. Remove impeller (27), back plate (25) and drive ring (52).
2. Tighten screws (6) evenly to 15 Nm (11 lbf-ft).

NOTE

Tighten screws diagonally.

*) 15Nm (11 lbf-ft)



Counterhold with a screwdriver

6 Technical data

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

6.1 Technical data

The LKH pump is a highly efficient and economical centrifugal pump, which meets the requirements of sanitary and gentle product treatment and chemical resistance.

LKH is available in the following sizes LKH-5, -10, -15, -20, -25, -35, -40, -50, -60, -70, -75, -85 and -90. The instruction manual is part of the delivery. Read the instructions carefully.

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

Data				
Max. inlet pressure *	LKH-5 :	600 kPa	(6 bar)	(87 PSI)
	LKH-10 to -70 (50 Hz):	1000 kPa	(10 bar)	(145 PSI)
	LKH-85 and LKH-90 (50 Hz):	500 kPa	(5 bar)	(72.5 PSI)
	LKH-10 to -60 (60 Hz):	1000 kPa	(10 bar)	(145 PSI)
	LKH-70, LKH-75, LKH-85, LKH-90 (60 Hz):	500 kPa	(5 bar)	(72.5 PSI)
Temperature range	-10ºC to +140ºC (EPDM) (14 to 284ºF)			
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
Product wetted seals	EPDM (standard)
Other O-rings	EPDM (standard)
Alternative seals	Nitrile (NBR), fluorinated rubber (FPM) and FEP

Shaft seal	
Seal types	External single, flushed or double mechanical seal
Max. temperature flush media	70º C **NOTE:** When the pump is not in operation the flush housing can be sterialilzed up to 125º C
Max. water pressure (flushed seal)	Normally atmospheric (max. 1 bar) (max. 14.5 PSI)
Water consumption (flushed seal)	0.25 - 0.5 l/min. (0.07-0.13 gl/min)
Max. water pressure LKH-5 to -60 (DMS)	Normally atmospheric (max. 5 bar) (max. 72.5 PSI)
Max. water pressure LKH-70 to -90 (DMS)	Normally atmospheric (max. 3 bar) (max. 43.5 PSI)
Water consumption (double mechanical seal)	0.25-0.5 l/min. (0.07-0.13 gl/min)
Material, stationary seal ring	Acid-resistant steel with sealing surface of silicon carbide
Material, rotating seal ring	Carbon (standard) or silicon carbide

Shaft seal	
Material, O-rings	EPDM (standard)
Alternative material, O-rings	Nitrile (NBR), fluorinated rubber (FPM) and FEP

Motor	
Foot-flanged motor according to IEC metric standard, 2 poles = 3000/3600 rpm. at 50/60 Hz IP55, insulation class F	
Motor sizes (kW), 50 Hz	0.75 - 110 kW
Motor sizes (kW), 60 Hz	0.9 - 110 kW
Motor sizes (Hp), 60 Hz	1.5 - 150 Hp

For further information, see PD sheet.

* Max 5 bar (72 PSI) inlet pressure allowed if the pump is mounted on an explosion proof motor Exd or Exde, type WEG W21.

6.2 Relubrication intervals

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

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.

CAUTION **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 torques specified below if no other values are stated. This can be a matter of personal safety.

Size	Tightening torque	
	Nm	lbf-ft
M8	20	15
M10	40	30
M12	67	49
M14	110	81

6.4 Weight (kg)

Pump Type: LKH

Size	Motor																		
	80		90		100	112	132			160		180	200			250		280	
kW	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
5	42	42	49	51															
10			53	55	70	75													
15					73	78	95												
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									
50							101	115	174	188	206	225							
60							102	116	175	189	207	226	334						
70							138	152	196	210	228	259	365	380	396	522	557		
85													417	432	448	574	609	889	949
90													430	445	461	587	622		

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

6.5 Noise emission

It is important to observe the technical data during installation, operation and maintenance.

Inform personnel about the technical data.

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-123	77
LKH-124	80
SolidC-1	68
SolidC-2	72
SolidC-3	73
SolidC-4	72
MR-166	76
MR-185	82
MR-200	81
MR-300	82
GM	54
FM-OS	61

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

The above SolidC noise levels are the same for SolidC UltraPure.

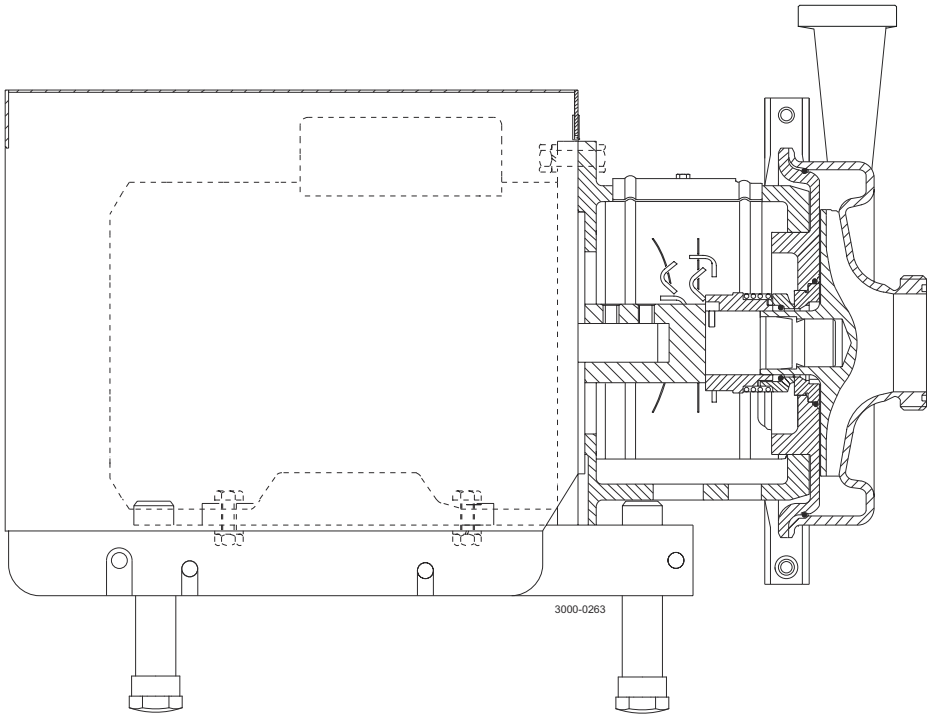
The noise measurements have been carried out using the original motor and shroud, at the approximate Best Efficiency Point (BEP) with water at ambient temperature and at 50 Hz.

Very often, the noise level generated by the flow through the process system (e.g. valves, pipes, tanks etc.) is much higher than what 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.

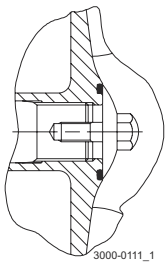
7 Parts List and Exploded view

7.1 LKH-5 Sanitary version

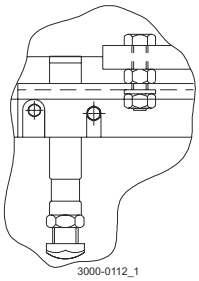
The drawings shows LKH pump, sanitary version.



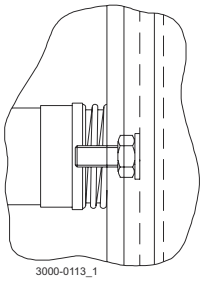
US legs are different to the ones shown. For further information see US spare parts



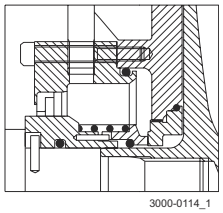
Impeller screw



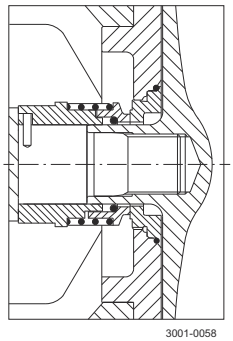
Fitting of legs
0.75–1.1 kW



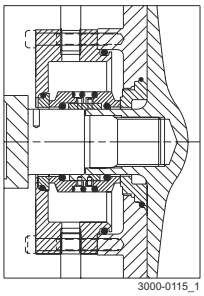
Fitting of back plate



Flushed shaft seal

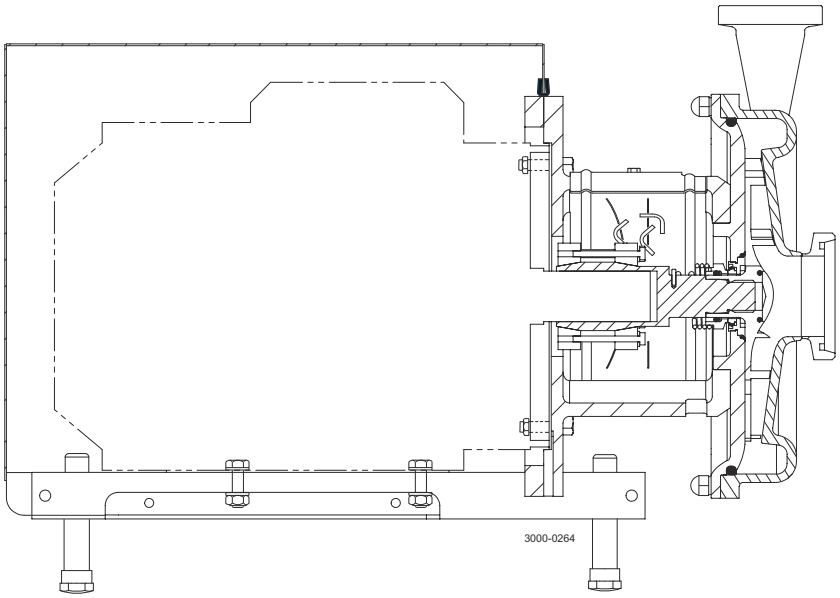


Single shaft seat

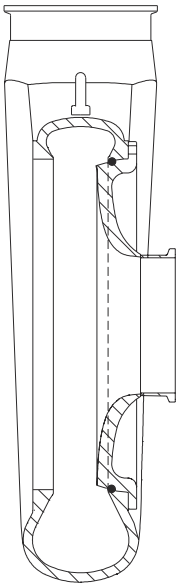


Double mechanical shaft seal

7.2 LKH-10, -15, -20, -25, -35, -40, -50, -60, -70, -75, -85, -90 sanitary version

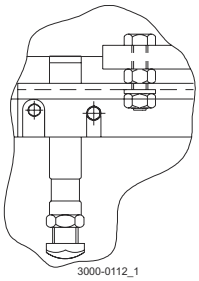


LKH10–75

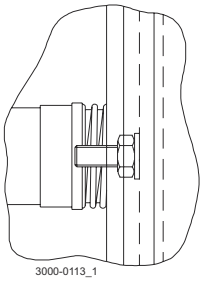


LKH-85 and LKH-90

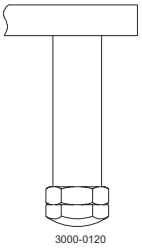
US legs are different to the ones shown. For further information see US spare parts



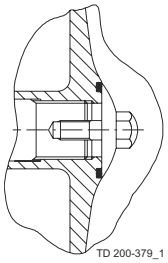
Only used for 0.75, 1.1 and 3 kW. Fitting of legs



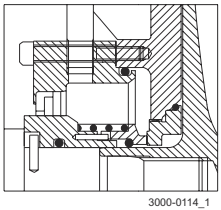
Fitting of back plate



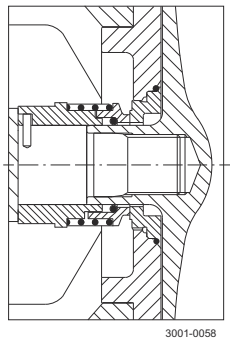
Only used for 55–110 kW Fitting of legs



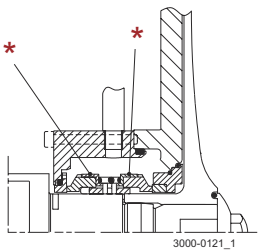
Impeller screw



Flushed shaft seal



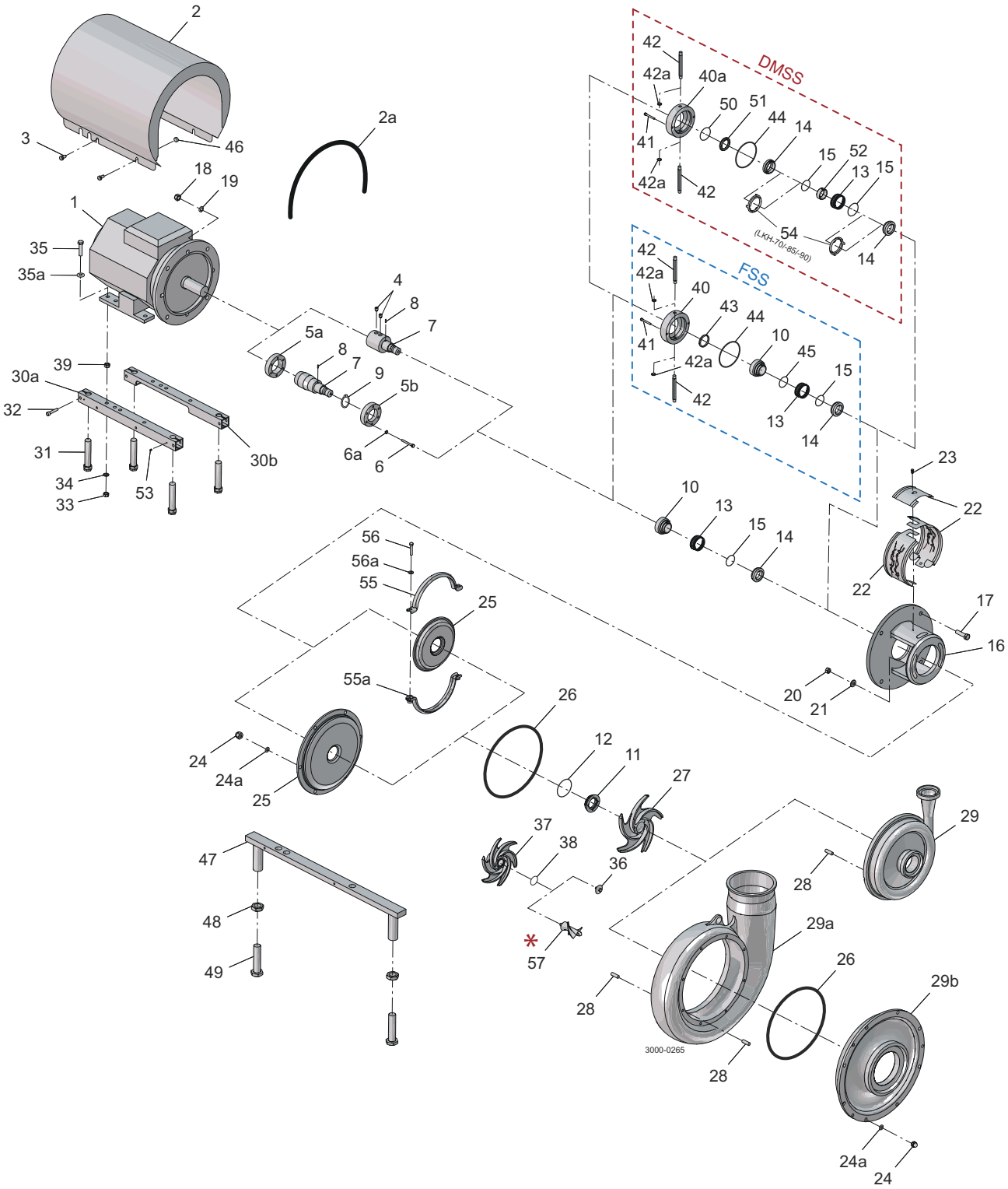
Single shaft seal



Double mechanical shaft seal

* Cups only used for LKH-70, -75, -85, -90

7.3 Parts List and Exploded View - drawing



* If reducer (57) is retrofitted. Pump inlet may have to be slightly ground.

Pos.	Qty	Denomination	Pos.	Qty	Denomination
1	1	Motor ABB	31	4	Legs
2	1	Shroud	32	4	Screw
3	4	Screw	33	4	Nut
4	2	Screw	34	4	Spring washer
5a	1	Compression ring with thread	35	4	Screw
5b	1	Compression ring without thread	35a	4	Washer
6	6	Screw	36	1	Impeller screw
7	1	Shaft incl. pin	37	1	Impeller for impeller screw
8	1	Connex pin	38	1	O-ring
9	1	Retaining ring	39	4	Nut
10	1	Drive ring	40	1	Seal housing
11	1	Stationary seal ring	40a	1	Seal housing
12	1	O-ring	41	2	Screw for seal housing
13	1	Spring	42	2	Tube
14	1	Rotating seal ring	42a	2	Fitting
15	1	O-ring	43	1	Lip seal
16	1	Adaptor	44	1	O-ring for seal housing
17	4	Screw for adaptor	45	1	O-ring for drive ring
18	4	Nut for adaptor	46	4	Distance sleeve
19	4	Washer for adaptor	47	2	Leg bracket
20	2	Nut	48	4	Pivot screw
21	2	Washer	49	4	Screw for leg
22	1	Safety guard set	50	1	O-ring
23	1	Screw for safety guard	51	1	Sec. stationary seal ring
24	6	Cap nut	52	1	Drive ring
24a	6	Washer	53	4	Pivot screw
25	1	Back plate	55	1	Upper clamp
26	1	O-ring	55a	1	Lower clamp
27	1	Impeller	56	2	Screw
28	6	Bolt	56a	2	Spring washer
29	1	IDF Malepart	57	1	Inducer
30a	1	Support bar, right			
30b	1	Support bar, left			

8 Spare Parts

For every delivered Alfa Laval Product, a spare part list is available.

This spare part list contains a range of the most common wear parts for the machinery. If any component not mentioned is required, please contact your local Alfa Laval representative for availability.

You can find our spare part catalogue at https://hygienicfluidhandling-catalogue.alfalaval.com/

Always use Alfa Laval genuine spare parts. The warranty of Alfa Laval products is dependent on use of Alfa Laval genuine spare parts.

8.1 Ordering Spare Parts

When ordering spare parts, please always state:

1. Serial number (if available)
2. Item number/spare part number (if available)
3. Capacity or other relevant identification

8.2 Alfa Laval Service

Alfa Laval is represented in all larger countries of the world.

Do not hesitate to contact your local Alfa Laval representative, with any questions or requirement of spare parts for Alfa Laval equipment.

9 General Installation Guidelines

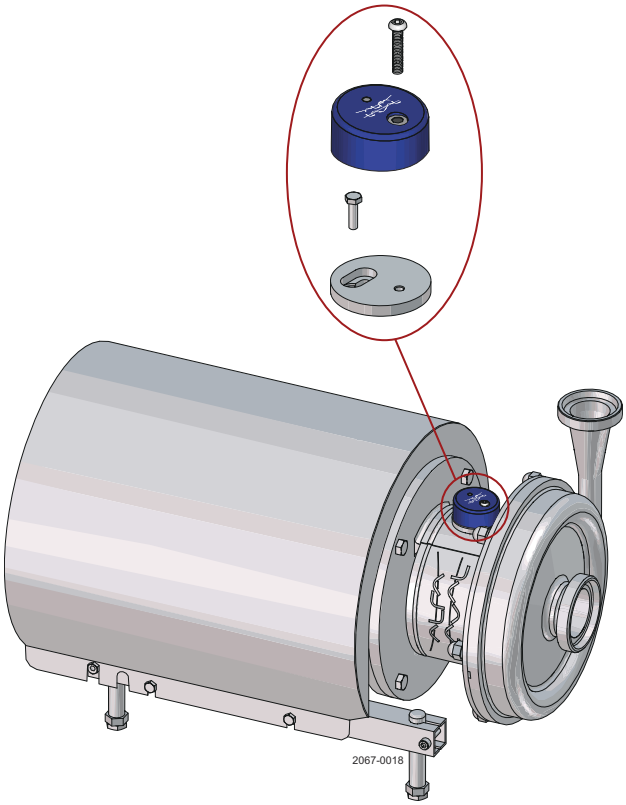
NOTE

When mounting the CM, it is important to achieve a solid mechanical connection between the equipment and the CM adapter plate. The CM can be mounted on surfaces up to 80° C (176° F).

9.1 LKH guidelines

The CM is assembled on the top of the adapter.

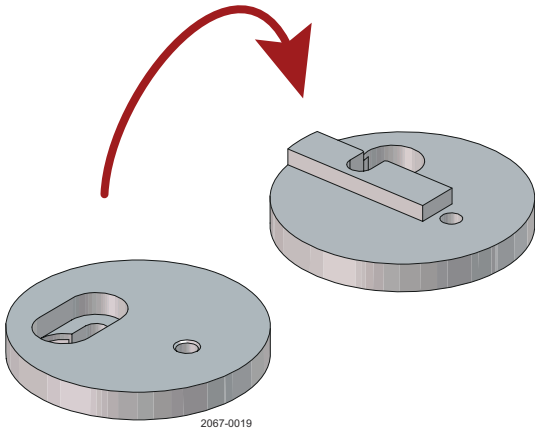
Motor size	**Tool** **Spanner** Adapter screw	**Tool** Hex key CM screw	**Max torque** [Adapter screw/ CM screw]
IEC 80–280 NEMA 182–405	8mm	4mm	4.5 Nm / 8 Nm 3.3 ft-lb / 5.9 ft-lb



9.2 Hygienic recommendations

For a hygienic installation, use an FDA approved sealant between the equipment and the adapter plate, and between the CM and the adapter plate.

9.3 Adapter details



Adapter Kit [Type / Article No.]*	**Apapter Screw** Hex screw	**Adapter Dimensions** [Ø/H]	**Adapter Weight**
8010008558	M5 x 16	58mm / 11mm 2.3 inch / 0.43 inch	0.13 kg 0.29 lbs

* All adapters are made of stainless steel EN 1.4301 (AISI 304).

* The CM is included.