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

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1 EC Declaration of conformity

The designated company

Alfa Laval
Company Name

Albuen 31, DK-6000 Kolding, Denmark
Address

+45 79 32 22 00
Phone No.

hereby declares that

Pump
Denomination

LKHP Filtration
Type

2011-01-24
Year

conforms with the following directives with amendments:
- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC
- Machinery Directive 2006/42/EC

The technical construction file is retained at the above address

Manager, Product Center Fluid Handling
Title

Bjarne Søndergaard
Name

Alfa Laval Kolding
Company

Signature

Designation

CE


glass symbol
Unsafe practices and other important information are emphasised in this manual. Warnings are indicated 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 serious personal injury and/or damage to the pump are avoided.

2.3 Safety precautions

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

Pump without impeller screw:
Always remove the impeller before checking the direction of rotation.
Never start the pump if the impeller is fitted and the pump casing is removed.

Pump with impeller screw:
Never start in the wrong direction of rotation with liquid in the pump.
Always have the pump electrically connected by authorised personnel.

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

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 when 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 pressurized.
Always use Alfa Laval genuine spare parts.

Motors with grease nipples:
Remember that lubrication is in accordance with the information plate/label on the motor.
Always disconnect the power supply when servicing the pump.

Transportation:
Transportation of the pump or the pump unit:
Never lift or elevate the pump in any way other than as 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.
The LKHPF is a highly efficient and economical centrifugal pump, specially designed for high inlet pressure e.g. for use in filtration systems. The LKHPF pump meets the requirements of sanitary and gentle product treatment and chemical resistance, and is available in the following sizes, LKHPF-10, -20, -25, -35, -40, -45, -50, -60, -70. Read the instructions carefully. The larger pumps sizes are very heavy. Alfa Laval therefore recommends the use of a lifting crane when handling the pump.

3.1 Unpacking/Delivery

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

CAUTION
Alfa Laval cannot be held responsible for incorrect unpacking.

WARNING:
Be aware that certain pump configurations can tilt, and thereby 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.

Step 2
Remove any packing materials from the inlet and the outlet.
Avoid damaging the inlet and the outlet.
Avoid damaging the connections for flushing liquid, if supplied.

Step 3
Inspect the pump for visible transport damage.

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

Read the instructions carefully and pay special attention to the warnings! Always check the pump before operation. - See the pre-use check in section 3.3 Pre-use check - pump without/with impeller screw.
The larger pumps 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. (See chapter 6 Technical data)

⚠️ 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.

Step 2

Ensure that there is sufficient clearance around the pump (min. 0.5 m) (1.64").

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. a check valve is to be installed in the system preventing that described above.

Step 3

Check that the flow direction is correct.
O: Outlet
I: Inlet

Correct!

Step 4

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

Remember seal rings!

Correct!

Few bends
3 Installation

Read the instructions carefully and pay special attention to the warnings! Always check the pump before operation.
- See the pre-use check in section 3.3 Pre-use check - pump without/with impeller screw.
The larger pumps sizes are very heavy. Alfa Laval therefore recommends the use of a lifting crane when handling the pump.

Step 5
Avoid stress on the pump.
Pay special attention to:
- Vibrations.
- Thermal expansion of the tubes.
- Excessive welding.
- Overloading of the pipelines.

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

Study the instructions carefully and pay special attention to the warnings!
LKH-5 to LKH-60 are supplied without impeller screw as standard but this can be supplied.
Check the direction of rotation of the impeller before operation.
- See the indication label on the pump.

3.3 Pre-use check - pump without/with impeller screw

**Step 1**
**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.
1. Remove cap nuts (28), washers (29) and pump casing (45).
2. Remove impeller (39) (see also the instruction in section 5.4 Assembly of pump/shaft seal).

**Step 2**
1. Start and stop the motor momentarily.
2. Ensure that the direction of rotation of the stub shaft (9) is anti-clockwise as viewed from the inlet side.

**Step 3**
Fit and tighten impeller (39).

**Step 4**
1. Fit pump casing (45).
2. Fit washers (29) and cap nuts (28) and tighten.

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

**Step 1**
**Pump with impeller screw**

⚠️ Never start in the wrong direction of rotation with liquid in the pump.
1. Start and stop the motor momentarily.
2. Ensure that the direction of rotation of the motor fan is clockwise as viewed from the rear end of the motor.

See the indication label!

Correct

View from rear end of 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 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.

- **Scraping**
  - At the end of use, the equipment must be recycled according to the relevant, local regulations. Besides the equipment itself, any hazardous residues from the process liquid must be considered and disposed of 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.
4 Operation

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

---

**Step 5**

**Flushed shaft seal:**
1. Connect the inlet of the flushing liquid correctly (ø6 tube).
2. Regulate the water supply correctly.
3. Observe the steam data.

O: Outlet
I: Inlet

---

**Step 6**

**Control:**
Reduce the capacity and the power consumption by means of:

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

---

Tmax = 100°C
Pmax = 1 bar (flush seal)
Pmax = 5 bar (double mechanical seal)
# 4 Operation

Pay attention to possible faults.
Read the instructions carefully.

## 4.2 Troubleshooting

NOTE!
Study the maintenance instructions carefully before replacing worn parts. - See section 5.1 General maintenance

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause/result</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| Overloaded motor         | - Pumping of viscous liquids  
- Pumping of high density liquids  
- Low outlet pressure (counter pressure)  
- Lamination of precipitates from the liquid | - Larger motor or smaller impeller  
- Higher counter pressure (throttling)  
- Frequent cleaning |
| Cavitation:              | - Low inlet pressure  
- High liquid temperature                                                    | - Increase the inlet pressure  
- Reduce the liquid temperature  
- Reduce the pressure drop before the pump  
- Reduce speed                 |
| Dry run                  | - Incorrect rubber grade                                                     | Replace:  
All wearing parts |
| Abrasive particles in the liquid |                                                                             | If necessary:  
- Change rubber grade |
| Leaking O-ring seals     | Incorrect rubber grade                                                      | Change rubber grade |

- Select stationary and rotating seal ring in silicon carbide/silicon carbide
The pump is designed for cleaning in place (CIP). CIP = Cleaning In Place. Read 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.

**Step 2**

⚠️ Never touch the pump or the pipelines when sterilising.

**Step 3**

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

1. 1% by weight NaOH at 70°C (158°F).

   | 1 kg (2.2 lb) NaOH | 100 l (26.4 gal) water |
   | = Cleaning agent. |

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

   | 0.7 l (2 gal) 53% HNO₃ | 100 l (26.4 gal) water |
   | = Cleaning agent. |

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

**Step 4**

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

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

Maintain the pump carefully. 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

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/discharged in accordance with current rules/directives.

Step 2

⚠️ Never service the pump when it is hot.

Step 3

⚠️ Never service the pump with the pump and pipelines under pressure.

CAUTION
Fit the electrical connections correctly if they have been removed from the motor during service. (see 3.3 Pre-use check - pump without/with impeller screw)

CAUTION
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 replacing the casing O-ring during pump maintenance.
5 Maintenance

Maintain the pump carefully. 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.

NOTE! Read the maintenance instructions carefully before replacing worn parts. - See section 5.1 General maintenance

<table>
<thead>
<tr>
<th></th>
<th>Shaft seal</th>
<th>Rubber seals</th>
<th>Motor bearings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preventive maintenance</td>
<td>Replace after 12 months:</td>
<td>Replace when replacing the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(one-shift) Complete shaft seal</td>
<td>shaft seal</td>
<td></td>
</tr>
<tr>
<td>Maintenance after leakage</td>
<td>Replace at the end of the day:</td>
<td>Replace when replacing the</td>
<td></td>
</tr>
<tr>
<td>(leakage normally starts</td>
<td>Complete shaft seal</td>
<td>shaft seal</td>
<td></td>
</tr>
<tr>
<td>slowly)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned maintenance</td>
<td>- Regular inspection for</td>
<td>Replace when replacing the</td>
<td>Annual inspection is</td>
</tr>
<tr>
<td></td>
<td>leakage and smooth operation</td>
<td>shaft seal</td>
<td>recommended</td>
</tr>
<tr>
<td></td>
<td>- Keep a record for the pump</td>
<td></td>
<td>- Replace complete bearing</td>
</tr>
<tr>
<td></td>
<td>- Use the statistics for</td>
<td></td>
<td>if worn</td>
</tr>
<tr>
<td></td>
<td>inspection planning purposes</td>
<td></td>
<td>- Ensure that the bearing is</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>axially locked (See motor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>instructions)</td>
</tr>
<tr>
<td></td>
<td>Replace after leakage:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete shaft seal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication</td>
<td>Before fitting</td>
<td>Before fitting</td>
<td>See section 6.4 Relubrication</td>
</tr>
<tr>
<td></td>
<td>Lubricate the O-rings with</td>
<td>Silicone grease or silicone</td>
<td>intervals</td>
</tr>
<tr>
<td></td>
<td>silicone grease or silicone oil</td>
<td>oil</td>
<td></td>
</tr>
</tbody>
</table>

Pre-use check

CAUTION!
Fit the electrical connections correctly if they have been removed from the motor during service. (See 3.3 Pre-use check - pump without/with impeller screw).

Pay special attention to warnings!
1. Start and stop the motor momentarily
2. Ensure that the pump operates smoothly.

5.2 Cleaning procedure

Cleaning procedure for soiled impeller screw tapped hole:
1. Remove stub shaft (9) in accordance with section 5.3 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 (9) in acid sanitiser for 5 minutes, then scrub the 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 the swab test is passed.

Should swab testing continue to fail, or time is of the essence, install a new (spare) stub shaft (9).
5 Maintenance

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

5.3 Dismantling of pump/shaft seals

Step 1
1. Unscrew cap nuts (28) and remove washers (29) and pump casing (45).

Step 2
Remove screw (14) and safety guard (15).

Step 3
Flushed shaft seal:
Unscrew fittings (23) using a spanner.

Step 4
1. Remove impeller screw (41), if fitted, and pull off O-ring (42).
2. Remove impeller (39/40). If necessary, loosen the impeller by knocking gently on the impeller vanes.

Step 5
Pull out impeller (39/40) and the rotating part of the shaft seal.

Step 6
Remove space ring (33) and the rotating part of the shaft seal from impeller (39)/(40).
Step 7
Separate rotating seal ring (34), quad rings (35, 38), support ring (36), guide ring (37) and washer (37) from rotating seal housing (37).

Step 8
1. Unscrew nuts (19) and remove washers (20) and back plate (30).
2. Pull off joint ring (43) from the back plate.

Step 9
1. Pull out stationary seal ring (32).
2. Remove O-ring (31) from the stationary seal ring.

Step 10
Flushed shaft seal
1. Remove screws (22) and seal housing (21).
2. Pull out lip seal (24) and O-ring (26) from the seal housing.
3. Slide off sleeve (27) from stub shaft (9).
4. Remove O-ring (25) from the sleeve.

Step 11
1. Remove shroud (2).
2. Unscrew nuts (7) and remove washers (6), screws (18) and adaptor (17).

Step 12
1. Loosen screws (13).
2. Slide off stub shaft (9) together with compression rings (12a+b).

Read the instructions carefully. The items refer to the parts list and service kits section.
Handle scrap correctly.
* : Relates to the shaft seal.
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 13
Separate screws (13), washers (13a) and compression rings (12a+b).
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/shaft seal

Step 1

LKHPF-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.

1. Fit compression rings (12a, 12b), washers (13a) and screws (13) on stub shaft (9).
2. Slide the stub shaft onto the motor shaft.
3. Check the clearance between the end of the stub shaft and the motor flange (10-20 mm) (0.39” - 0.78”).

Step 2

1. Tighten screws (13) lightly and evenly.
2. Ensure that stub shaft (9) can be moved on the motor shaft.

Step 3

Fit adaptor (17), screws (18), washers (6) and nuts (7) and tighten.

Step 4

Fit back plate (30), washers (20) and nuts (19) and tighten.

Tightening torques: See addendum.

Step 5

Assemble the rotating part of the shaft seal as shown above.

CAUTION!

Ensure that the driver in the rotating seal housing enters the notch in the rotating seal ring.
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 6
Fit the rotating part of the shaft seal and space ring (33) on impeller (39/40).

Step 7
1. Fit impeller (39) or (40) on stub shaft (9) by rotating clockwise.
2. Ensure that the clearance between the impeller and back plate (30) is 1.0 mm (0.04").

Step 8
1. Remove impeller (39) and back plate (30).
2. Tighten screws (13) evenly to 15 Nm (11.06 lbf-ft).

Step 9
1. Slide O-ring (31) onto stationary seal ring (32).
2. Press the stationary seal ring into back plate (30).

Step 10
Flushed shaft seal:
1. Fit lip seal (24) and O-ring (26) in seal housing (21).
2. Fit the housing on back plate (30) and tighten the screws (22).
3. Slide sleeve (27) with O-ring (25) onto stub shaft (9).

Step 11
1. Fit back plate (30), washers (20) and nuts (19) and tighten.
   Tightening torques: See 6 Technical data
2. Fit O-ring (43) on the back plate.

Step 12
1. Lubricate impeller hub (39) with silicone grease or oil.
2. Screw the impeller onto stub shaft (9).
3. If used, fit O-ring (42) and impeller screw (41).
   Tightening torque for impeller screw: 20 Nm (7.4 lbf-ft)
5 Maintenance

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

Step 13
Flushed shaft seal
1. Screw fittings (23) into seal housing (21).
2. Tighten with a spanner.

Step 14
1. Fit pump casing (45).
2. Fit washers (29) and cap nuts (28) and tighten.

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

Step 15
1. Mount shroud (2).
2. Position safety guard (15) and screw (14) and tighten.
If the pump is not supplied with flush connections, the holes in the adaptor must be covered by the guard.
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

<table>
<thead>
<tr>
<th><strong>Data</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. inlet pressure</td>
<td>4000 kPa (40 bar)</td>
</tr>
<tr>
<td>Max. inlet pressure (USA)</td>
<td>600 psi</td>
</tr>
<tr>
<td>Temperature range</td>
<td>-10°C to +140°C (14 to 284°F) (EPDM)</td>
</tr>
<tr>
<td>Max. speed</td>
<td>4000 rpm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Materials</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Product wetted steel parts</td>
<td>AISI 316L</td>
</tr>
<tr>
<td>Other steel parts</td>
<td>AISI 304</td>
</tr>
<tr>
<td>Finish</td>
<td>Semi-bright</td>
</tr>
<tr>
<td>Product wetted seals</td>
<td>EPDM (standard)</td>
</tr>
<tr>
<td>Other O-rings</td>
<td>EPDM</td>
</tr>
<tr>
<td>Alternative seals</td>
<td>Nitrile (NBR), Fluorinated rubber (FPM)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Shaft seal</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal types</td>
<td>Single internal, flushed seal</td>
</tr>
<tr>
<td>Max. temperature flush media</td>
<td>70°C</td>
</tr>
<tr>
<td>Max. water pressure (flushed seal)</td>
<td>Normally atmospheric (max. 1 bar) (max. 14.5 psi)</td>
</tr>
<tr>
<td>Water consumption (flushed seal)</td>
<td>0.25 - 0.5 l/min. (0.06-0.13 gl)</td>
</tr>
<tr>
<td>Material, stationary seal ring</td>
<td>Silicon carbide</td>
</tr>
<tr>
<td>Material, rotating seal ring</td>
<td>Silicon carbide</td>
</tr>
<tr>
<td>Material, Quad/O-rings</td>
<td>EPDM (standard)</td>
</tr>
<tr>
<td>Alternative material, O-rings</td>
<td>Nitrile (NBR) and fluorinated rubber (FPM)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Motor</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC LKHPF</td>
<td></td>
</tr>
<tr>
<td>Standard foot-flanged motor according to IEC metric standard 2 poles = 3000/3600 rpm at 50/60 Hz IP55 (drain hole with labyrinth plug), insulation class F.</td>
<td></td>
</tr>
<tr>
<td>Motor sizes (kW), 50 Hz</td>
<td>1.5 - 75 kW</td>
</tr>
<tr>
<td>Motor sizes (kW), 60 Hz</td>
<td>1.75 - 86 kW</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Nama LKHPF</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For LKHPF-10 to -70: Standard foot-flanged motor according to NEMA standard. 2 pole = 3600 rpm at 60 Hz.</td>
<td></td>
</tr>
<tr>
<td>Motor sizes (Hp), 60 Hz</td>
<td>7.5 - 100 Hp</td>
</tr>
</tbody>
</table>

For further information, see PD sheet.
It is important to observe the technical data during installation, operation and maintenance. Inform personnel about the technical data.

6.2 Torque specifications

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

<table>
<thead>
<tr>
<th>Size</th>
<th>Tightening torque Nm</th>
<th>Tightening torque lbf-ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>20</td>
<td>14.8</td>
</tr>
<tr>
<td>M10</td>
<td>40</td>
<td>29.5</td>
</tr>
<tr>
<td>M12</td>
<td>67</td>
<td>49.0</td>
</tr>
<tr>
<td>M14</td>
<td>110</td>
<td>81.0</td>
</tr>
</tbody>
</table>
6 Technical data

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

6.3 Noise emission

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

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

The noise measurements have been carried out with the original motor and shroud, at the approximate Best Efficiency Point (BEP), with the 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 levels of the whole system and take the necessary precautions with regard to personal safety, if required.
6 Technical data

Relubrication interval 50 Hz (3000 rpm)/Relubrication interval 60 Hz (3600 rpm). (Vendor) quantity in Drive End/quantity in Non Drive End.

6.4 Relubrication intervals

The table is for 100°C internal bearing temperature. 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

<table>
<thead>
<tr>
<th>Frame size</th>
<th>Motor power (kW)</th>
<th>LKHI-5 - 90</th>
<th>LKHI-10 - 60*</th>
<th>LKHI-110*</th>
<th>LKHSP-LKH Ultra Pure</th>
<th>LKHex 50/60 Hz</th>
<th>LKHPF-10 - 60</th>
<th>LKH-110 50/60 Hz</th>
<th>LKH-85 50/60 Hz</th>
<th>LKH-122/P LKH-123/P LKH-124/P LKHPF-70 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>0.75</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>1.1</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>1.5</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>2.2</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>3.0</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>112</td>
<td>4.0</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4300h/3300h - DE/NDE:10g</td>
</tr>
<tr>
<td>132</td>
<td>5.5</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3600h/3000h - DE/NDE:15g</td>
</tr>
<tr>
<td>132</td>
<td>7.5</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3600h/3000h - DE/NDE:15g</td>
</tr>
<tr>
<td>160</td>
<td>11</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3100h/2300h - DE/NDE:25g</td>
</tr>
<tr>
<td>160</td>
<td>15</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3100h/2300h - DE/NDE:25g</td>
</tr>
<tr>
<td>160</td>
<td>18.5</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3100h/2300h - DE/NDE:25g</td>
</tr>
<tr>
<td>180</td>
<td>22</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2600h/2000h - DE/NDE:30g</td>
</tr>
<tr>
<td>200</td>
<td>30</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8000h/6000h - DE/NDE:40g, 4500h/2000h - DE/NDE:45g</td>
</tr>
<tr>
<td>200</td>
<td>37</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8000h/6000h - DE/NDE:40g, 5000h/2500h - DE/NDE:45g</td>
</tr>
<tr>
<td>200</td>
<td>45</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8000h/6000h - DE/NDE:40g, 2500h/1000h - DE/NDE:45g</td>
</tr>
<tr>
<td>250</td>
<td>55</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8000h/3000h - DE/NDE:60g, 2500h/1000h - DE/NDE:70g</td>
</tr>
<tr>
<td>250</td>
<td>75</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4000h/1500h - DE/NDE:60g, 1500h/500h - DE/NDE:70g</td>
</tr>
<tr>
<td>280</td>
<td>90</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4000h/2800h - DE/NDE:45g</td>
</tr>
<tr>
<td>280</td>
<td>110</td>
<td>Permanently lubricated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4000h/2800h - DE/NDE:45g</td>
</tr>
</tbody>
</table>

* inlet pressure < 10 bar (145 psi)

**Recommended grease types:**

- **LKHPF-10/-70 – LKH-110 - LKH-120:**
  - Esso: Unirex N2 or N3 (Lithium complex base)
  - Shell: Albida EMS 2 (Lithium complex base)
  - FAG: Arcanol TEMP110 (Lithium complex base)
  - Mobil: Mobilith SHC 100 (Lithium complex base)
  - Klüber: Klüberplex BEM 41-132 (Special lithium base)
  - Lubcon: Turmogrease L 802 EP PLUS (Lithium complex base)
  - Lubcon: Turmogrease PU703 (polyurea base)

- **LKH-85:**
  - Klüber: Klüberplex Quiet BOH 72-102 (polyurea base)

**WARNING:** Polyurea based grease must not be mixed with lithium complex base grease and vice versa.
## 6 Technical data

Relubrication interval 50 Hz (3000 rpm)/Relubrication interval 60 Hz (3600 rpm). (Vendor) quantity in Drive End/quantity in Non Drive End.

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

* 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!
The drawing shows the LKHPF pump. The items refer to the parts lists in the following sections.

### 7.1 LKHPF Filtration centrifugal pump for high inlet pressure

- Mounting of back plate to adaptor
- Impeller screw
- Single shaft seal
- Mounting of legs 55-75 kW
- Flushed shaft seal
7 Parts list and service kits

The drawing shows the LKHPF pump. The items refer to the parts lists in the following sections.

7.2 LKHPF - Wet end
The drawing shows the LKHPF pump. The items refer to the parts lists in the following sections.

### Parts list

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Qty</th>
<th>Denomination</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>2</td>
<td>Nut</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>Washer</td>
</tr>
<tr>
<td>28</td>
<td>10</td>
<td>Cap nut</td>
</tr>
<tr>
<td>12</td>
<td>Cap nut</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Cap nut</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>10</td>
<td>Washer</td>
</tr>
<tr>
<td>12</td>
<td>Washer</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Washer</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>1</td>
<td>Back plate</td>
</tr>
<tr>
<td>39</td>
<td>1</td>
<td>Impeller</td>
</tr>
<tr>
<td>40</td>
<td>1</td>
<td>Impeller for impeller screw</td>
</tr>
<tr>
<td>41</td>
<td>1</td>
<td>Impeller screw</td>
</tr>
<tr>
<td>42</td>
<td>**</td>
<td>1 O-ring</td>
</tr>
<tr>
<td>43</td>
<td>☀☀</td>
<td>1 O-ring</td>
</tr>
<tr>
<td>44</td>
<td>10</td>
<td>Bolt</td>
</tr>
<tr>
<td>12</td>
<td>Bolt</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Bolt</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>1</td>
<td>Pump casing compl.</td>
</tr>
</tbody>
</table>
7 Parts list and service kits

The drawing shows the LKHPF pump.
The items refer to the parts lists in the following sections

7.3 LKHPF - Motor-dependent parts
7 Parts list and service kits

The drawing shows the LKHPF pump.
The items refer to the parts lists in the following sections

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Qty</th>
<th>Denomination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Motor</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Shroud</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>Screw</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>Distance sleeve</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>Washer for adaptor</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>Nut for adaptor</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Shaft incl. pin</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>Connex pin</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>Retaining ring</td>
</tr>
<tr>
<td>12a</td>
<td>1</td>
<td>Compression ring with thread</td>
</tr>
<tr>
<td>12b</td>
<td>1</td>
<td>Compression ring without thread</td>
</tr>
<tr>
<td>13</td>
<td>6</td>
<td>Screw</td>
</tr>
<tr>
<td>13a</td>
<td>6</td>
<td>Washer</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>Screw for safety guard</td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>Safety guard set</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>Adaptor</td>
</tr>
<tr>
<td>18</td>
<td>4</td>
<td>Screw for adaptor</td>
</tr>
<tr>
<td>46a</td>
<td>1</td>
<td>Support bar, right</td>
</tr>
<tr>
<td>46b</td>
<td>1</td>
<td>Support bar, left</td>
</tr>
<tr>
<td>47</td>
<td>4</td>
<td>Leg</td>
</tr>
<tr>
<td>48</td>
<td>4</td>
<td>Screw</td>
</tr>
<tr>
<td>49</td>
<td>4</td>
<td>Spring washer</td>
</tr>
<tr>
<td>50</td>
<td>4</td>
<td>Nut</td>
</tr>
<tr>
<td>51</td>
<td>4</td>
<td>Screw</td>
</tr>
<tr>
<td>52</td>
<td>4</td>
<td>Washer</td>
</tr>
<tr>
<td>53</td>
<td>4</td>
<td>Pivot screw</td>
</tr>
<tr>
<td>54</td>
<td>2</td>
<td>Leg bracket</td>
</tr>
<tr>
<td>55</td>
<td>4</td>
<td>Nut for leg</td>
</tr>
<tr>
<td>56</td>
<td>4</td>
<td>Screw for leg</td>
</tr>
</tbody>
</table>
7 Parts list and service kits

The drawing shows the LKHPF pump.
The items refer to the parts lists in the following sections

7.4 LKHPF - Shaft seals
The drawing shows the LKHPF pump.
The items refer to the parts lists in the following sections

### Parts list

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Qty</th>
<th>Denomination</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦</td>
<td></td>
<td>Shaft seal complete</td>
</tr>
<tr>
<td>♦</td>
<td></td>
<td>Shaft seal complete</td>
</tr>
<tr>
<td>21</td>
<td>1</td>
<td>Seal housing for flushed seal</td>
</tr>
<tr>
<td>22</td>
<td>2</td>
<td>Screw</td>
</tr>
<tr>
<td>23</td>
<td>2</td>
<td>Fittings</td>
</tr>
<tr>
<td>24</td>
<td>1</td>
<td>Lip seal</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>O-ring</td>
</tr>
<tr>
<td>26</td>
<td>1</td>
<td>O-ring</td>
</tr>
<tr>
<td>27</td>
<td>1</td>
<td>Sleeve</td>
</tr>
<tr>
<td>31</td>
<td>1</td>
<td>O-ring</td>
</tr>
<tr>
<td>32</td>
<td>1</td>
<td>Stationary seal ring</td>
</tr>
<tr>
<td>33</td>
<td>1</td>
<td>Spacing ring</td>
</tr>
<tr>
<td>34</td>
<td>1</td>
<td>Rotating seal ring</td>
</tr>
<tr>
<td>35</td>
<td>1</td>
<td>Quad ring/O-ring</td>
</tr>
<tr>
<td>36</td>
<td>1</td>
<td>PTFE support ring</td>
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<td>37</td>
<td>1</td>
<td>Rotating seal housing</td>
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<td>38</td>
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<td>Quad ring/O-ring</td>
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### Service kits

#### Service kit for single shaft seal SIC/SIC

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<td>Service kit, SIC/SIC (LKHPF -70)</td>
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#### Service kit for single shaft seal and impeller screw SIC/SIC

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#### Service kit for flushed shaft seal SIC/SIC

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#### Service kit for flushed shaft seal and impeller screw SIC/SIC

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Parts marked with ♦♦♦ are included in the service kits. Recommended spare parts: Service kits.
Conversion single to flushed shaft seal: Please order Flushed service kit + pos. 21+22+23+27 900099/2
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.