Operating Instructions

Read and observe these operating instructions!

An additional letter before the NF model code is a country-specific designation, with no technical relevance.

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1. About this document

1.1. Using the operating instructions

The operating instructions are part of the pump.

- Pass on the operating instructions to the next owner.

Project pumps

Customer-specific project pumps (pump models which begin with "PL" or "PML") may differ from the operating instructions.

- For project pumps, also observe the agreed upon specifications.

1.2. Symbols and markings

Warning

A danger warning is located here.

Possible consequences of a failure to observe the warning are specified here. The signal word, e.g. Warning, indicates the danger level.

- Measures for avoiding the danger and its consequences are specified here.

<table>
<thead>
<tr>
<th>Danger levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal word</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>DANGER</td>
</tr>
<tr>
<td>WARNING</td>
</tr>
<tr>
<td>CAUTION</td>
</tr>
</tbody>
</table>

Tab. 1

Other information and symbols

- An activity to be carried out (a step) is specified here.

1. The first step of an activity to be carried out is specified here.

   Additional, consecutively numbered steps follow.

- This symbol refers to important information.
2. Use

2.1. Proper use

The pumps are exclusively intended for transferring liquids and gases.

Owner's responsibility

Operating parameters and conditions

Only install and operate the pumps under the operating parameters and conditions described in Chapter 4, Technical data.

The pump may be operated only when fully assembled.

Requirements for transferred medium

Before using a medium, check whether the medium can be transferred danger-free in the specific application case.

Before using a medium, check the compatibility of the materials of the pump head, diaphragm and valves with the medium.

The temperature of the media must lie within the allowed limits stated in chapter 4.

The media should not contain particles as these can prevent the pump from working correctly. If this can not be guaranteed a filter (approx. 50 µm) must be used in front of the pump.

.51* - Version – Version with Food grade approval

The .51 versions of our diaphragm liquid pump range have been certified by NSF according to the standard NSF/ANSI 169 and can therefore be used, without any limitations, with foodstuffs.

All materials used for the wetted parts have been through a series of toxilogical tests. In order to ensure that the food grade quality is maintained NSF will carry out a yearly audit checking all of the production processes.

Only the pumps marked with “.51” have been certified by NSF and contain materials which have a FDA certificate of conformity.

To see the operating conditions see 4.2

NSF: National Sanitary Foundation
FDA: Food and Drug Administration
ANSI: American National Standard Institute

*on request it is possible to deliver pumps with customer specific material combinations.
All certified pumps are clearly marked with “51” in the pump description on the type sticker along with the NSF-logo. If none or only one of these things are not present then the pump is not certified.

Because the requirements of how the pump needs to cleaned are dependant on the application and KNF can not influence this the responsibility lies with the user. The regulations NSF/ANSI 169 regulate OEM products and does not mention how the cleaning should be made.

All wetted parts can be replaced as spare parts without losing the certification. Component parts can not be traded as certified parts. Only original parts / assemblies from KNF may be used.

2.2. Improper use

The pumps may not be operated in an explosive atmosphere.

The pump may not be exposed to a positive pressure on the inlet side.

For special modifications outside the standard technical specifications please contact a KNF pump specialist.
3. Safety

Note the safety precautions in sections 6. Installation and connection, and 7. Operation.

The pumps are built according to the generally recognized rules of technology and in accordance with the occupational safety and accident prevention regulations. Nevertheless, dangers can result during their use which leads to injuries to the user or others, or to damage to the pump or other property.

Only use the pumps in proper technical condition and in accordance with their intended use in a safety and danger-conscious manner while observing the operating instructions.

<table>
<thead>
<tr>
<th>Personnel</th>
<th>Make sure that only trained and instructed personnel or specially trained personnel work on the pumps. This especially applies to assembly, connection and servicing work. Make sure that the personnel has read and understood the operating instructions, and in particular the &quot;Safety&quot; chapter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working in a safety-conscious manner</td>
<td>Observe the accident prevention and safety regulations when performing any work on the pump and during operation.</td>
</tr>
<tr>
<td>Handling dangerous media</td>
<td>When transferring dangerous media, observe the safety regulations when handling these media.</td>
</tr>
<tr>
<td>Notes</td>
<td>All warning stickers and pump information placed on the pump should be kept in a readable condition.</td>
</tr>
<tr>
<td>Environmental protection</td>
<td>Store all replacement parts in a protected manner and dispose of them properly in accordance with the applicable environmental protection regulations. Observe the respective national and international regulations. This especially applies to parts contaminated with toxic substances.</td>
</tr>
<tr>
<td>Disposal</td>
<td>Dispose of all packaging in an environmentally appropriate manner. The packaging materials are recyclable. Ensure that the pump is disposed of in an environmentally appropriate manner at the end of its useful life. Use appropriate waste collection systems for the disposal of end-of-life equipment. Used pumps contain valuable recyclable materials.</td>
</tr>
</tbody>
</table>
The pumps are in accordance with the requirements of the guidelines 2011/65/EU (ROHS2).

The diaphragm liquid pumps conform with the EU safety requirements and guidelines for the Electro magnetic interference 2004/108/EG.

According to the machinery directive 2006/42/EG pumps are incomplete machines and are thus to be considered as not ready for use. The use of an incomplete machine is forbidden until it has been proven that the machine in which the incomplete machine is integrated meets the requirements of the machinery directive 2006/42/EG.

The Basic requirements of the machinery directive 2006/42/EG according to appendix I (general principles) are to be used and maintained.

The following harmonised standards are fulfilled:

**NF 10 DC**
- EN 55022
- EN 55011

**NF 10 DCB**
- EN 61000-6-2
- EN 61000-6-3 (incl.: EN 55022 / EN 55011)

**NF 10 E**
- EN 55014-1

Customer service and repairs
- Only have repairs to the pumps carried out by the KNF Customer Service responsible.
4. Technical Data

Pump materials

The pump type KP stands for:

| Head component                  | Material  
|---------------------------------|----------
| Pump head *                     | PP       
| Valves / seals                  | EPDM     
| Diaphragm                       | EPDM     
| Resonating diaphragm            | EPDM     

Tab. 2  

The pump type KT stands for:

| Head component                  | Material  
|---------------------------------|----------
| Pump head *                     | PP       
| Valves / seals                  | FFKM     
| Diaphragm                       | PTFE     
| Resonating diaphragm            | FFKM     

Tab. 3  

The pump type KV stands for:

| Head component                  | Material  
|---------------------------------|----------
| Pump head *                     | PP       
| Valves / seals                  | FKM      
| Diaphragm                       | FKM      
| Resonating diaphragm            | FKM      

Tab. 4  

The pump type TT stands for:

| Head component                  | Material  
|---------------------------------|----------
| Pump head *                     | PVDF     
| Valves / seals                  | FFKM     
| Diaphragm                       | PTFE     
| Resonating diaphragm            | FFKM     

Tab. 5  

The pump type TV stands for:

| Head component                  | Material  
|---------------------------------|----------
| Pump head *                     | PVDF     
| Valves / seals                  | FKM      
| Diaphragm                       | FKM      
| Resonating diaphragm            | FKM      

Tab. 6  

* Pump head (Fig.1): contains connection plate and intermediate plate
Hydraulic ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate [ml/min] ¹), ²)</td>
<td>≥ 100</td>
</tr>
<tr>
<td>Max. allowed pressure NF 10 [bar]</td>
<td>1</td>
</tr>
<tr>
<td>Suction height [mWg]</td>
<td>3</td>
</tr>
</tbody>
</table>

Tab. 7

¹) Measured with water at 20°C / at atmospheric pressure
²) Flow rates may vary from the values shown according to fluid viscosity, pump head material and hoses / hose connectors used. Calibration with the pumped medium is required.

Hydraulic connections

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended tube size ID [mm]</td>
<td>≤ 4</td>
</tr>
</tbody>
</table>

Tab. 8

Specifications NF 10 DC

<table>
<thead>
<tr>
<th></th>
<th>12V</th>
<th>24V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor voltages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power [W]</td>
<td>3.7</td>
<td>3.4</td>
</tr>
<tr>
<td>Max. current at max load [A]</td>
<td>0.28</td>
<td>0.13</td>
</tr>
<tr>
<td>Max. motor current [A]</td>
<td>0.31</td>
<td>0.14</td>
</tr>
<tr>
<td>Lead size [-]</td>
<td>AWG22</td>
<td></td>
</tr>
<tr>
<td>Protection class [-]</td>
<td>IP30</td>
<td></td>
</tr>
<tr>
<td>Weight¹) [g]</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 9

Specifications NF 10 DCB

<table>
<thead>
<tr>
<th></th>
<th>12V</th>
<th>24V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor voltages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power [W]</td>
<td>1.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Max. current at max load [A]</td>
<td>0.14</td>
<td>0.07</td>
</tr>
<tr>
<td>Max. motor current [A]</td>
<td>0.45</td>
<td>0.45</td>
</tr>
<tr>
<td>Power supply range [V]</td>
<td>10...28</td>
<td>10...28</td>
</tr>
<tr>
<td>Lead size [-]</td>
<td>AWG28</td>
<td></td>
</tr>
<tr>
<td>Protection class [-]</td>
<td>IP40</td>
<td></td>
</tr>
<tr>
<td>Weight¹) [g]</td>
<td>56</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 10

¹) The weight can differ slightly from the stated value depending on the version
Specifications NF 10 E

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor voltage</td>
<td>230V/50Hz 115V/60Hz</td>
</tr>
<tr>
<td>Power [W]</td>
<td>18.5 19.6</td>
</tr>
<tr>
<td>Max. current at max. load [A]</td>
<td>0.17 0.37</td>
</tr>
<tr>
<td>Max. motor current [A]</td>
<td>0.19 0.41</td>
</tr>
<tr>
<td>Power supply range [V]</td>
<td>230V ±10% 115V ±10%</td>
</tr>
<tr>
<td>Protection class [-]</td>
<td>IP00</td>
</tr>
<tr>
<td>Weight [g]</td>
<td>385</td>
</tr>
</tbody>
</table>

Tab. 11

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor voltage</td>
<td>100V/50-60Hz</td>
</tr>
<tr>
<td>Power [W]</td>
<td>18 13.3</td>
</tr>
<tr>
<td>Max. current at max. load [A]</td>
<td>0.40 0.28</td>
</tr>
<tr>
<td>Max. motor current [A]</td>
<td>0.44 0.31</td>
</tr>
<tr>
<td>Power supply range [V]</td>
<td>100V ±10%</td>
</tr>
<tr>
<td>Protection class [-]</td>
<td>IP00</td>
</tr>
<tr>
<td>Weight [g]</td>
<td>385</td>
</tr>
</tbody>
</table>

Tab. 12

1) The weight can differ slightly from the stated value depending on the version

Electrostatic sensitive components (ESD)

Various parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature range (°C)</td>
<td>+ 5 to + 40</td>
</tr>
<tr>
<td>Media temperature range (°C)</td>
<td>+ 5 to + 80</td>
</tr>
<tr>
<td>Allowed kinematic viscosity of the media [cSt]</td>
<td>≤ 150</td>
</tr>
</tbody>
</table>

Tab. 13
5. Assembly and function

Assembly

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1. Outlet
2. Inlet
3. Connection plate
4. Motor Drive
5. Motor leads
6. Head plate
7. Intermediate plate

---

Diaphragm fluid pumps are based on reciprocating displacement pump technology. An elastic diaphragm (4) is moved up and down by the eccentric (5) and the connecting rod (6). During the down stroke, the diaphragm sucks in the medium through the inlet valve (2). During the up stroke, it forces medium out of the pump head through the exhaust valve (1). The diaphragm hermetically seals off the working chamber (3) from the pump drive (7).
6. **Installation and connection**

Only install and operate the pumps under the operating parameters and conditions described in Chapter 4, Technical data. Observe the safety precautions (see Chapter 3).

6.1. **Installation**

- Before installation, store the pump at the installation location to bring it up to ambient temperature.

**Mounting dimensions**

- Mounting dimensions (see Fig. 3 to 7)

![Mounting dimensions NF 10 DC](image1)

*Fig. 3: Mounting dimensions NF 10 DC*

![Mounting dimensions NF 10 DCB](image2)

*Fig. 4: Mounting dimensions NF 10 DCB*
Fig. 5: Mounting dimensions NF 10 E
Installation

- Make sure that the installation location is dry and the pump is protected against rain, splash, hose and drip water.
- Protect the pump from dust.
- Protect the pump from vibrations and jolts.
- The pump can be mounted in any orientation. The priming and accuracy of the pump is optimal if installed as in the illustration (Fig. 8).

Mounting orientation

For pumps with alternating current motors:

- Take protective measures against touching parts which are energised (live) such as electrical connections or windings.
- Take protective measures against touching moving parts (e.g. fan).

**WARNING**

- Danger of injury whilst in use
- Danger of damaging the pump whilst in use.
- Take protective measures that water, dust or foreign objects can get into the pump. E.g. penetrate into the motor (see protection class)

6.2. Electrical Connection

For pumps with alternating current motors:

- Pump should only be connected by a specialist.
- Only connect the pump when the power supply is turned off.

**CAUTION**

For pumps with direct current motors:

1. Pump should only be connected by a specialist.
2. Only connect the pump when the power supply is turned off.

- For the electrical connection ensure that the relevant guidelines, regulations and technical standards are fulfilled.
Connecting the pump

1. Compare the data of the supply voltage and the maximum permissible current with the information on the motor type plate.


**Attention:** observe the polarity of the leads!

For DC motors:
- Red motor lead: +
- Black motor lead: -

In the case of a Brushless motor false polarity can cause damage to the electronics.

For an alternating current motor the power supply may only vary by a maximum of +/- 10 % of the specifications on the type plate.

6.3. Hydraulic connection

**Connected components**
- Only connect components to the pump which are designed for the pneumatic data of the pump (see Chapter 4, Technical data).

**Tubing**
- Only use tubing which is suitable for the maximum pressure of the pump. (see section 4.)
- Only use tubing which is resistant to the liquids being pumped.

6.3.1. Connecting tubing to the pump

**Arrows on the pump head indicate the flow direction.**

1. Remove the protective caps from the connections.

2. Connecting the inlet and outlet tubing.

**Keep the inlet tube so short as possible in order to keep the priming process as short as possible.**

3. If the pump is used to build up pressure it is important to ensure that all hydraulic connections on the outlet side are secure to prevent leakage.

4. Check tubes and hose barbs for leak tightness.

5. Check that the system is leak tight.
7. **Operation**

- The pumps should only be used under normal operating parameters / conditions which are described in section 4 – technical data.
- Ensure that the pumps are being used correctly (see section 2.1).
- Improper use of the pump must be avoided (see section 2.2).
- Observe the safety notes (see chapter 3).
- The pumps are components which have to be integrated into a machine. Before they are put into operation it is important to ensure that the machine / equipment complies with the appropriate regulations.

---

![Danger of burning](image)

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don’t touch the motor</td>
</tr>
<tr>
<td>Don’t let the motor come in contact with flammable materials</td>
</tr>
</tbody>
</table>

---

**Excessive pressures and the dangers thus caused can be prevented by using a bypass system with a pressure relief valve between the pressure and suction side of the pump. For further information please contact a KNF specialist (Telephone number: see front page).**

---

**Pump standstill**

- If the pump stops running release the pressure in the system to that atmospheric conditions are created.

For pumps with a thermal switch:

---

![Physical injury and damage to the pump due to automatic start](image)

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure that no dangerous situation can thereby arise</td>
</tr>
</tbody>
</table>

---

**Switching the pump on and off**

- The motor speed and thus the flow rate can be adjusted / controlled

For more details see section 4 technical data.
Duty cycle / impulse operation

KNF pumps are designed for continual use. Short start and stop cycles can change the lifetime of the brushed motors.

If the pump is operated with short cycles in your application, please contact a KNF pump specialist for further information (Telephone number: see front page).

Turning the pump on

- In order to guarantee that the pump can start every time it is advisable to reduce the back pressure down to an acceptable level. This is also the case if there is a short power cut.

- For more specific information contact the KNF specialist (Telephone number: see front page).

Turning the pump off

- KNF recommends that after pumping aggressive liquids the pump should be rinsed thoroughly. (see section 8.2.1), as this will help to lengthen the lifetime.

- Ensure that there are atmospheric pressure conditions in the system (release the hydraulic pressure).
Flow rate NF 10

<table>
<thead>
<tr>
<th>Suction Head [mWg]</th>
<th>Pressure Head [mWg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.35</td>
<td>0.30</td>
</tr>
<tr>
<td>0.30</td>
<td>0.25</td>
</tr>
<tr>
<td>0.25</td>
<td>0.20</td>
</tr>
<tr>
<td>0.20</td>
<td>0.15</td>
</tr>
<tr>
<td>0.15</td>
<td>0.10</td>
</tr>
<tr>
<td>0.10</td>
<td>0.05</td>
</tr>
<tr>
<td>0.05</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Fig. 7:** Flow rate of the pump NF 10 DC

Flow rate NF 11-DC

Flow rate NF 10-E

Flow rate NF 10-DCB

**Fig. 8:** Flow rate of the pumps NF 10 E and NF 10 DCB
8. Servicing

8.1. Servicing schedule

<table>
<thead>
<tr>
<th>Component</th>
<th>Servicing interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump</td>
<td>Regular inspection for external damage or leaks</td>
</tr>
<tr>
<td>Pump head</td>
<td>Clean the pump internally: if the flow rate changes, the pump does not pump or no vacuum is created (section 8.2)</td>
</tr>
<tr>
<td>Diaphragm and valves</td>
<td>At the latest change when the flow drops off</td>
</tr>
</tbody>
</table>

Tab. 14

8.2. Cleaning

**WARNUNG**

Health hazard due to dangerous substances in the pump!

Depending on the substance transferred, caustic burns or poisoning are possible

- Wear protective clothing if necessary, e.g. protective gloves.
- Rinse the pump with a neutral liquid and pump empty.

8.2.1. Flushing the pump

- When pumping aggressive media, KNF recommends flushing the pump with a neutral fluid under atmospheric conditions for a few minutes before switching off, to extend the service life of valves and diaphragm.

8.2.2. Cleaning the pump

- Wipe the outside of the pump with a soft dry cloth. Ensure that any cleaning solvents used will not damage the materials of the pump head and crankcase housing (check material resistance properties).
- If there is compressed air available, blow off the separate parts.

Prior requirements

- Pump must be switched off and mains plug removed from the socket.
- The pump must be free of any hazardous substances.
- Hoses must be disconnected from the pump head.
- It is recommended to replace the diaphragm when the head parts are removed.

Tools

<table>
<thead>
<tr>
<th>Qty.</th>
<th>Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Screwdriver TORX T6</td>
</tr>
</tbody>
</table>

Tab. 15
Disassembling the pump head
1. Undo the 4 head screws (1) using a Torx T6 screwdriver and remove the head plate (2).
2. Remove the resonating diaphragm (3) from the connection plate (4).

Removing valves and seals
3. Remove the connection plate (4) from the intermediate plate (6).
4. Take out the valves (5) from the intermediate plate (6).
5. Grip the diaphragm (7) and turn it anti-clockwise. Ensure that none of the spacers (8) don’t fall into the housing.

It is recommended to replace the diaphragm (7).

Clean the parts
6. Using a cloth clean the Head plate (2), connecting plate (4), intermediate plate (6), valve plate (5) and diaphragm (7) and blow compressed air over them.

Replace the diaphragm
7. Place all of the spacers (8) back onto the diaphragm thread.
8. Screw the diaphragm (7) securely back into the con-rod. Make sure that no spacers (8) fall into the housing.
9. By lightly pressing on the diaphragm push the ridge on the underside of the diaphragm into the groove of the housing.

Install the valves
10. Place the „dust free“ valve plate (5) into the intermediate plate (6).

Assemble the pump head
11. Place the resonating diaphragm (3) in the top of the connection plate (4) and cover with the head plate (2).
12. The visible lines down the side of the pump must be inline on the intermediate and connection plate.
13. The head plate (2) must be positioned so that the arrows coincide with the hydraulic connections on the connection plate (4).
14. Push the four head screws (1) into the head holes.
15. Place the pump head onto the pump housing and tighten the head screw diagonally.
16. Connect the pump up with the inlet and outlet tubes.

8.3. Replace the diaphragm and valves
The same procedure is to followed as in section 8.2 cleaning. But instead of just cleaning the diaphragm (7), resonating diaphragm (3) and valves (5) these must be replaced with new parts.
9. Troubleshooting

For pumps with alternating current motors:

Life threat by electric shock

GEFAHR

⇒ Before working on the pump separate the pump from the power supply.
⇒ Ensure that the pump is de-energised.

### Pump does not pump

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump not connected to mains power supply.</td>
<td>⇒ Connect pump to mains supply.</td>
</tr>
<tr>
<td>Power supply is not switched on.</td>
<td>⇒ Switch on power supply.</td>
</tr>
<tr>
<td>Connections or tubing are blocked</td>
<td>⇒ Check tubing lines and connections.</td>
</tr>
<tr>
<td></td>
<td>⇒ Remove blockage.</td>
</tr>
<tr>
<td>External valve is closed or filter is blocked</td>
<td>⇒ Check valve timing and filters.</td>
</tr>
<tr>
<td>Diaphragm or valves are worn out.</td>
<td>⇒ Replace diaphragm and valves (See paragraph 8.3).</td>
</tr>
</tbody>
</table>

Tab. 16

### Pump is not priming / sucking

<table>
<thead>
<tr>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump is not connected suction side.</td>
<td>⇒ Check the arrows on the pump head indicating flow direction.</td>
</tr>
<tr>
<td>Liquid in the container is too low.</td>
<td>⇒ Fill container.</td>
</tr>
<tr>
<td>Hose connections are not tight.</td>
<td>⇒ Check for tightness – use clamp to ensure a good fit.</td>
</tr>
<tr>
<td>System valve is closed or filter is blocked.</td>
<td>⇒ Open the valve.</td>
</tr>
<tr>
<td></td>
<td>⇒ Clean / replace filter.</td>
</tr>
<tr>
<td>The vacuum is too small for the suction height.</td>
<td>⇒ Reduce suction height.</td>
</tr>
<tr>
<td>Valves are blocked by particles</td>
<td>⇒ Clean the pump head (see section 8.2).</td>
</tr>
<tr>
<td>Pump head materials are not resistant to the liquids being pumped.</td>
<td>⇒ Check compatibility lists and choose suitable version.</td>
</tr>
<tr>
<td>Inlet and outlet tubes have been wrongly connected.</td>
<td>⇒ Check the arrows on the pump head indicating flow direction</td>
</tr>
</tbody>
</table>

Tab. 17
Flow rate, suction height or pressure is too low

The pump does not achieve the technical performance data stated on the data sheet

<table>
<thead>
<tr>
<th>Cause</th>
<th>Fault remedy</th>
</tr>
</thead>
</table>
| Components in the system such as tubing, valves or filter are causing too much resistance. | ➔ Change installation.  
   ➔ Take larger tubes. |
| Connections are not tight                        | ➔ Use another connection or use clamps to ensure a tight fit. |
| Particles in the pump                            | ➔ Use a filter – clean the pump head. (see section 8.2) |
| Viscosity of the liquid is too high              | ➔ Contact your local KNF company. |
| Inlet and outlet tubing are connected wrongly.   | ➔ Check the arrows on the pump head indicating flow direction. |
| The head parts are not resistant against the media. | ➔ Replace the head parts with a compatible variation. |

Tab. 18

Fault cannot be rectified

If you are unable to identify any of the above causes, please send the pump to KNF customer services (See address on last page).

1. Flush the pump to clear the pump head of any hazardous or aggressive fluids (see section 8.2.1).
2. Dismantle the pump.
3. Clean the pump (see section 8.2.2).
4. Send the pump, with completed decontamination statement (see Chapter 11), to KNF customer services, stating the nature of the pumped medium.
10. Spare parts

<table>
<thead>
<tr>
<th>Spare part</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spares-Kit Assembly sheet</td>
<td>151356</td>
</tr>
<tr>
<td>Spare part NF 10 JNF 10_P</td>
<td>151366</td>
</tr>
<tr>
<td>Spare part NF 10 JNF 10_T</td>
<td>151367</td>
</tr>
<tr>
<td>Spare part NF 10 JNF 10_V</td>
<td>151368</td>
</tr>
</tbody>
</table>

Tab. 19
11. Decontamination declaration

The condition for the repair of a pump by KNF is the certification of the customer on the transferred media and on the cleaning of the pump (decontamination declaration).

In order to send a product back use the decontamination declaration, which either was delivered with the product or is available on www.knf.com (Downloads).

Please fill in the pump type, serial number, pumped media and all other required information. Send the signed form together with the product to your KNF representative.