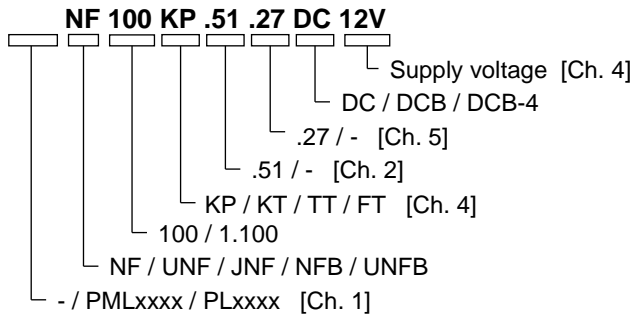


# DIAPHRAGM LIQUID PUMP

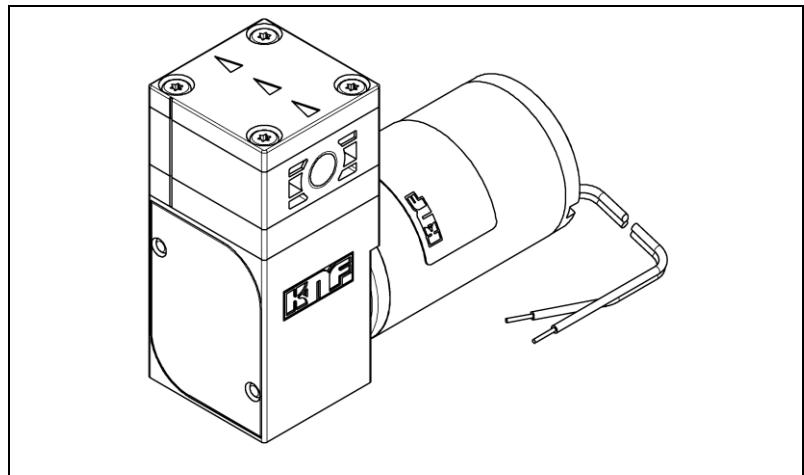
## NF 100, NF 1.100, NFB 100



### Operating and Installation Instructions

Read and observe these Operating and Installation Instructions!

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



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## 1. About this document

### 1.1. Use of the Operating and Installation Instructions

The Operating and Installation Instructions are part of the pump.

- Forward the Operating and Installation Instructions to any subsequent owners of the pump.

Project pumps

Customer-specific project pumps (pump models which begin with "PL" or "PML") may differ from the Operating and Installation Instructions.

- In the case of project pumps, take note of any additionally agreed specifications.

### 1.2. Symbols and markings

#### Warning



**WARNING**

**This symbol indicates a potential danger.**

It also indicates the possible consequences of failure to observe the warning. The signal word (e.g. "Warning") indicates the level of danger.

- Here you will see actions for avoiding the danger and potential consequences.

#### Danger levels

Signal word	Meaning	Consequences if not observed
<b>DANGER</b>	warns of immediate danger	Consequences are death or serious injury and/or serious property damage.
<b>WARNING</b>	warns of potential danger	Death or serious injury and/or serious damage to property are possible.
<b>CAUTION</b>	warns of a potentially dangerous situation	Minor injury or damage to property are possible.

Tab. 1

#### Other information and symbols

- This indicates a required activity (step).

1. This indicates the first step of a required activity. Additional consecutively numbered steps follow.

- i** This symbol indicates important information.

## 2. Use

### 2.1. Intended use

The pumps are intended for transferring and metering liquids.

#### 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.

Only completely installed pumps may be taken into service.

Requirements for transferred medium

Before transferring or metering 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, pump housing, diaphragm and valves with the medium.

The temperature of the medium must lie within the permissible temperature range (see Chapter 4).

The transferred medium should not contain particles as these can prevent the pump from working correctly. If this cannot be guaranteed, a filter < 100 µm with sufficiently large filter area must be used upstream 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 are therefore suitable for use with foodstuffs without any restrictions.

All materials used have been checked through a series of toxicological tests. In order to ensure that the food grade quality is maintained, NSF will carry out a yearly audit checking our certified products.

Only the pumps marked with ".51" are NSF certified. and contain a defined material combination that also has a FDA certificate of conformity.

NSF: National Sanitary Foundation

FDA: Food and Drug Administration

ANSI: American National Standard Institute

*\* Pumps with other customer-specific certified material combinations are available on request.*

- All certified diaphragm liquid pumps are clearly marked with “.51” in the type designation along with the NSF logo on the type plate. If either or both of these markings are missing, the pump is not certified.
- Because the cleaning requirements of the diaphragm liquid pumps depend on the application, KNF is unable to guarantee that they can be cleaned. The responsibility for cleaning therefore lies with the user. While the NSF/ANSI 169 standard regulates OEM products, it does not define cleaning methods for specific OEM products.
- All parts in contact with the medium can be replaced as spare parts without losing the certification. Component parts cannot be traded as certified parts. When replacing parts/assemblies only use original KNF parts.

## 2.2. Improper use

---

Risk of explosion



**DANGER**

**The pumps must not be operated in an explosive atmosphere.**

---

For special modifications outside the standard technical specifications, please contact your KNF technical adviser (see last page for telephone number).

### 3. Safety

- i** Observe the safety precautions in Chapters 6. Installation and connection and 7. Operation.

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

Only use the pumps when they are in a good technical and proper working order, in accordance with their intended use, observing the safety advice within the Operating and Installation Instructions, at all times.

Personnel	<p>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.</p> <p>Make sure that all personnel have read and understood the Operating and Installation Instructions, and in particular the "Safety" chapter.</p>
Working in a safety-conscious manner	Always ensure adherence to all pertinent accident prevention and safety regulations when working on and operating the pump.
Handling dangerous media	When transferring dangerous media, observe the safety regulations for handling such media.
Notes	Always ensure adherence to all information stickers on the pumps, such as flow direction arrows and type plates, and keep stickers in legible condition.
Environmental protection	All replacement parts should be properly stored and disposed of in accordance with the applicable environmental protection regulations. Ensure adherence to the pertinent national and international regulations. This especially applies to parts contaminated with toxic substances.
Disposal	<p>Dispose of all packaging in an environmentally-appropriate manner. The packaging materials are recyclable.</p> <p>Dispose of end-of-life equipment in an environmentally friendly manner. Use appropriate waste collection systems for the disposal of end-of-life equipment. Used pumps contain valuable recyclable materials.</p>



EU directives/standards	<p>The pumps comply with the fundamental requirements of Directive 2011/65/EU (RoHS2).</p> <p>For the purposes of the Machinery Directive 2006/42/EC, pumps are “partly completed machinery”, and are therefore to be regarded as not ready for use. Partly completed machinery may not be commissioned until such time as it has been determined that the machine in which the partly completed machinery is to be assembled conforms to the provisions of the Machinery Directive 2006/42/EC. The essential requirements of Annex I of Directive 2006/42/EC (general principles) are applied and observed.</p> <p>The following harmonised standards are met:</p> <p><b>NF 100 DC / NF 1.100 DC</b></p> <ul style="list-style-type: none"><li>▪ EN 55014 - 1</li></ul> <p><b>NF 100 DCB / NF 1.100 DCB<sup>1)</sup></b></p> <ul style="list-style-type: none"><li>▪ EN 55011</li><li>▪ EN 55022</li><li>▪ EN 61000-4-3</li></ul> <p><b>NFB 100 DCB-4<sup>1)</sup></b></p> <ul style="list-style-type: none"><li>▪ EN 55011</li><li>▪ EN 55022</li><li>▪ EN 61000-4-3</li></ul> <p><i><sup>1)</sup> In order to comply with the specified standards, the pump must be connected as described in Chapter 6.2.</i></p>
Customer service and repairs	<p>All repairs to the pump(s) must be carried out by the relevant KNF Customer Service team.</p> <p>Only use genuine parts from KNF for servicing work.</p>

## 4. Technical data

### Pump materials

The pump type **KP / KP.51** stands for:

Assembly	Material <sup>1)</sup>
Pump head*	PP
Valve plate	EPDM
Diaphragm	PTFE-coated
Resonating diaphragm	PTFE
Diaphragm. 27	EPDM

Tab. 2

<sup>1)</sup> according to DIN ISO 1629 and 1043.1

The pump type **KT** stands for:

Assembly	Material <sup>1)</sup>
Pump head*	PP
Valve plate	FFKM
Diaphragm	PTFE-coated
Resonating diaphragm	PTFE
Diaphragm. 27	FFKM / FKM

Tab. 3

<sup>1)</sup> according to DIN ISO 1629 and 1043.1

The pump type **TT** stands for:

Assembly	Material <sup>1)</sup>
Pump head*	PVDF
Valve plate	FFKM
Diaphragm	PTFE-coated
Resonating diaphragm	PTFE
Diaphragm. 27	FFKM / FKM

Tab. 4

<sup>1)</sup> according to DIN ISO 1629 and 1043.1

The pump type **FT** stands for:

Assembly	Material <sup>1)</sup>
Pump head*	PTFE
Valve plate	FFKM
Diaphragm	PTFE-coated
Resonating diaphragm	PTFE

Tab. 5

<sup>1)</sup> according to DIN ISO 1629 and 1043.1

\* The pump head (Fig. 1) comprises a connecting plate and an intermediate plate

**Hydraulic ratings**

Parameter	Value
Flow rate NF 100 [l/min] <sup>1), 2)</sup>	≥ 1.2
Flow rate NF 1.100 [l/min] <sup>1), 2)</sup>	≥ 1.3
Flow rate NFB 100 [l/min] <sup>1), 2)</sup>	≥ 2 x 1.3
Max. permissible pressure NF 100, NFB 100 [bar g]	1
Max. permissible pressure NF 1.100 [bar g]	6 <sup>3)</sup>
Suction head [mWG]	3

Tab. 6

<sup>1)</sup> Measured with water at 20 °C / at atmospheric pressure

<sup>2)</sup> Flow rates may vary from the values shown, depending on fluid viscosity, pump head material and the hoses / hose connectors used.

<sup>3)</sup> for DCB version 4 barg

**Hydraulic connections**

Parameter	Value
NF 100 / NF 1.100 / NFB 100	G 1/8"
UNF 100 / UNF 1.100 / UNFB 100	NPT 1/8"
Recommended hose size ID [mm]	8

Tab. 7

**Specifications NF 100 DC**

Motor voltage	12V / 24V
Power consumption [W]	9.6 / 8.4
Max. I load [A]	0.8 / 0.35
Max. permissible current consumption [A]	2.2 / 1.0
Protection class [-]	IP 50
Weight <sup>1)</sup> [g]	600

Tab. 9

**Specifications NF 100 DCB**

Motor voltage	12V / 24V
Power consumption [W]	11 / 11
Max. I load [A]	0.67 / 0.37
Max. permissible current consumption [A]	0.93 / 0.46
Protection class [-]	IP 30
Weight <sup>1)</sup> [g]	480

Tab. 10

**Specifications NF 1.100 DC**

Motor voltage	12V / 24V
Power consumption [W]	33 / 34
Max. I load [A]	1.3 / 0.5
Max. permissible current consumption [A]	2.8 / 1.0
Protection class [-]	IP 50
Weight <sup>1)</sup> [g]	720

Tab. 12



**Specifications NF 1.100 DCB**

Motor voltage	12V / 24V
Power consumption [W]	18 / 18
Max. I load [A]	1.29 / 0.75
Max. permissible current consumption [A]	1.5 / 0.75
Protection class [-]	IP 30
Weight <sup>1)</sup> [g]	500

Tab. 13

**Specifications NFB 100 DCB-4**

Motor voltage	12V / 24V
Power consumption [W]	15 / 15
Max. I load [A]	1.25 / 0.63
Max. permissible current consumption [A]	1.5 / 0.75
Protection class [-]	IP 30
Weight <sup>1)</sup> [g]	640

Tab. 14

<sup>1)</sup> The weight may differ slightly from the stated value, depending on the version.

**i** Electrostatic sensitive components (ESD)

**Other parameters**

Parameter	Value
Permissible ambient temperature range (°C)	+ 5 to + 40
Permissible media temperature range (°C)	+ 5 to + 80
Permissible kinematic viscosity of medium [cSt]	≤ 150

Tab. 15

## 5. Assembly and function

- 1 Outlet
- 2 Inlet
- 3 Connecting plate
- 4 Motor
- 5 Leads
- 6 Head plate
- 7 Intermediate plate

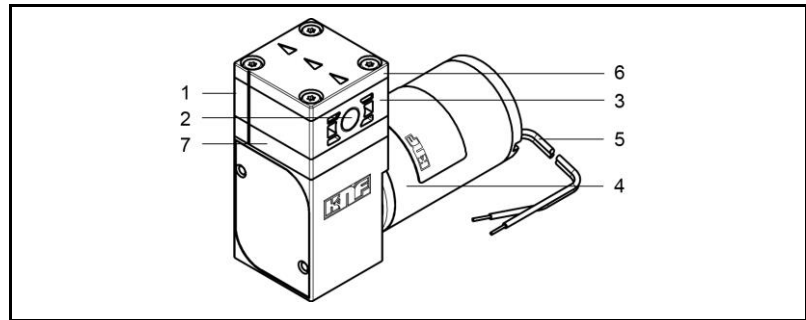


Fig. 1: Diaphragm liquid pump NF 100

- 1 Outlet valve
- 2 Inlet valve
- 3 Working chamber
- 4 Diaphragm
- 5 Eccentric
- 6 Connecting rod
- 7 Pump drive

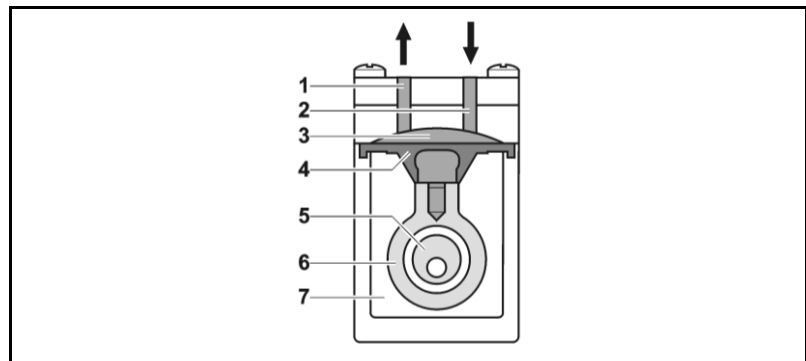


Fig. 2: Operating principle

The diaphragm liquid pumps are based on reciprocating displacement pump technology. The elastic diaphragm (4) is moved up and down by the eccentric (5) and the connecting rod (6). In the downward stroke it aspirates the medium to be transferred via the inlet valve (2). In the upward stroke, the diaphragm pushes the medium out of the pump head via the outlet valve (1). The diaphragm hermetically seals off the working chamber (3) from the pump drive (7).

### NF 100 version (fixed flow rate)

This pump type represents this product in its simplest form and transfers media at the fixed flow rate.

### NF 100.27 version (fixed flow rate with overpressure limiting)

If the diaphragm liquid pump is operating against a closed system, the delivery pressure quickly exceeds the maximum permissible value. To prevent this from happening, an overflow valve is integrated in the top part of the pump head. If the pressure exceeds the adjustable limit range (min. 1.5 to max. 6.5 barg), the valve opens and the liquid circulates from the pressure side to the suction side via an internal bypass system. This prevents any further pressure rise.

**NFB 100 version (double-headed pump with fixed flow rate)**

This pump type has two NF100 pump heads that can be operated individually or together (see Chapter 6.3.2).

## 6. Installation and connection

Only install 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 9)

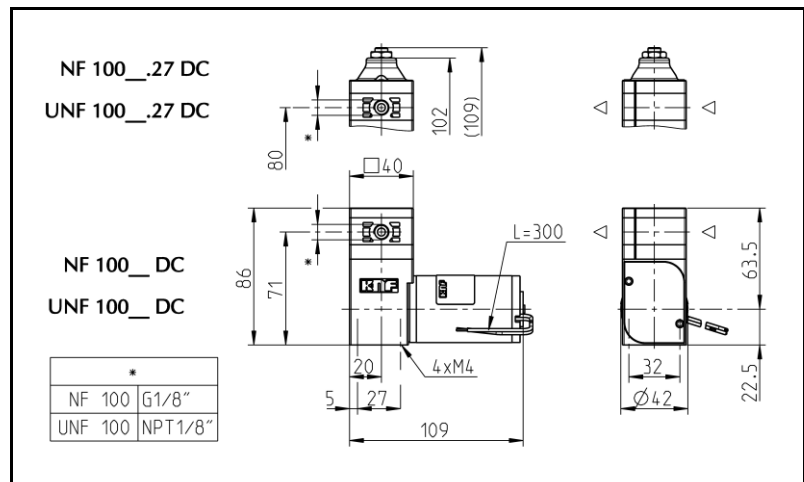


Fig. 5: Mounting dimensions NF 100 DC

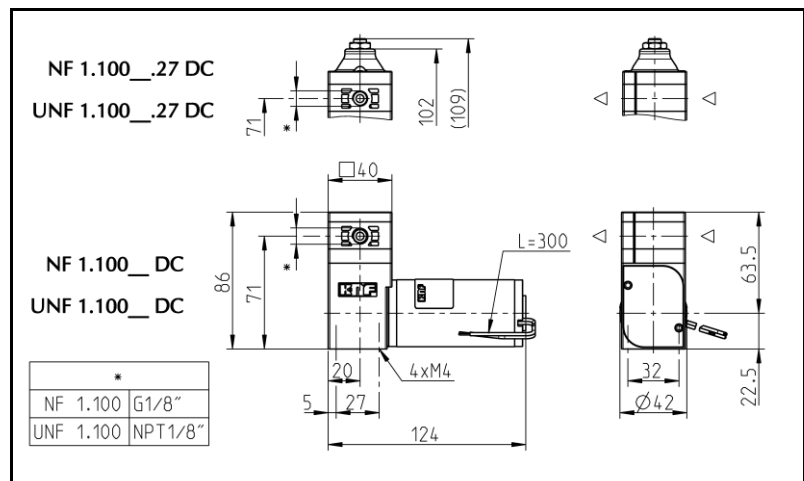


Fig. 6: Mounting dimensions NF 1.100 DC

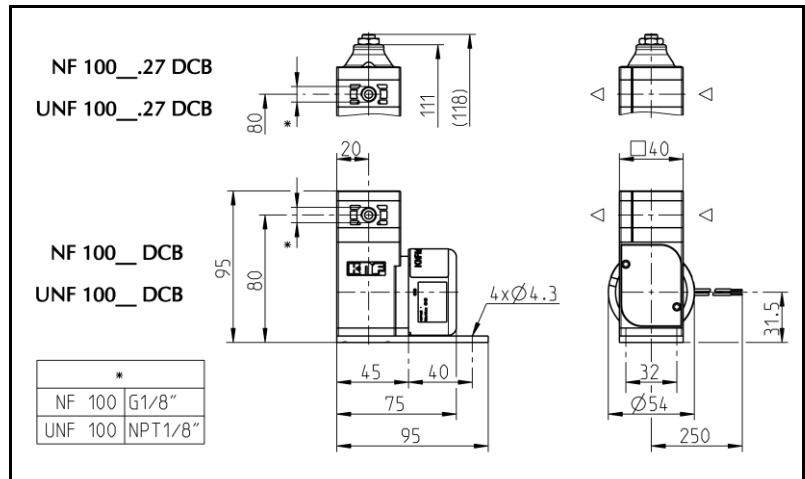


Fig. 7: Mounting dimensions NF 100 DCB

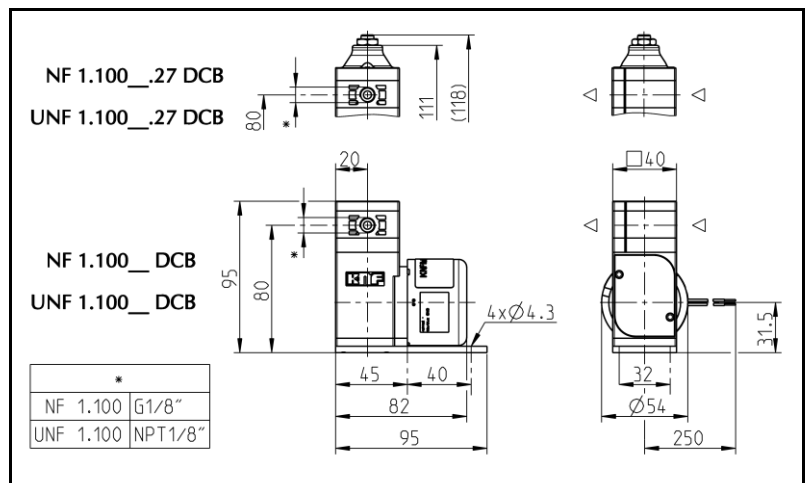


Fig. 8: Mounting dimensions NF 1.100 DCB

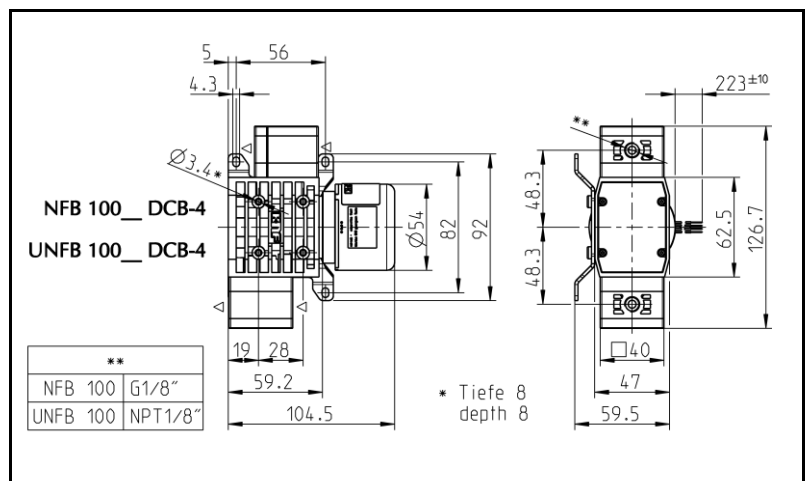


Fig. 9: Mounting dimensions NFB 100 DCB-4

- Cooling air supply → For pumps with fan: When installing the pump, make sure that the motor's fan can draw in an adequate amount of cooling air.
- Installation location → Make sure that the installation location is dry and the pump is protected against water in the form of rain, spray, splashes and drips.
- Protect the pump against dust.
- Protect the pump against vibration and impact.
- Installation position → Generally speaking, the pump can be installed in any position. The venting and accuracy of one-headed pumps is optimal if installed as shown in the illustration (Fig. 10).

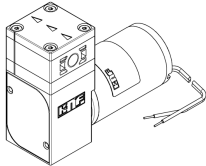


Fig. 10: optimum installation position for one-headed pumps: vertical

- Decoupling → KNF recommends mechanically decoupling the pump from the piping system. This can be achieved with flexible hoses or pipes, for example. This prevents any oscillations of the pump being transferred to the system.

Contact and foreign-object protections

For pumps with alternating current motors:



**WARNING**

**Danger of injury during operation**

- 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).

**Danger of damaging the pump during operation**

- Take protective measures to ensure that no foreign objects can get into the pump or penetrate the motor (see protection class).

## 6.2. Electrical connection

For pumps with alternating current motors:



**DANGER**

### Risk of electric shock, danger of death

- Only have the pump connected by an authorized specialist.
- Only have the pump connected when the power supply is disconnected.

For pumps with direct current motors:

- Only have the pump connected by an authorized specialist.
- Only have the pump connected when the power supply is disconnected.
- When connecting the device to a power source, the relevant norms, directives, regulations and technical standards must be observed.

### Connecting the pump

1. Make sure that the power supply data match the data on the motor's type plate. The current consumption can be found on the type plate.
2. Connect the motor cables. For electrical data see Chapter 4.



Note the proper polarity.

For DC motors:

red motor cable: +

black / blue motor cable: -

In the case of brushless DC motors:



**CAUTION**

### Damage to the motor

Incorrect polarity may damage the electronics.

### Leads DCB-4

Function	lead	signal name	signal
+ voltage	red	+Vs	12 / 24 VDC
ground	blue	GND	-
control voltage	white	Vctrl	2 .. 5 VDC
impulse generator	green	FG	6 pulses / rot.

Tab. 16

If using AC motors, the power supply must not deviate more than a maximum of +/- 10 % from the specifications on the type plate.

Supplemental circuit  
for brushless DCB motors

In order to ensure that emissions comply with the EN 55011 or EN 55022 emission standards, this pump type with a brushless DC motor DCB must be fitted with a supplemental circuit. The supplemental circuit must be installed as close as possible to the motor.

The supplemental circuit must be installed according to the following wiring diagram and its defined components in order to achieve the required level of attenuation.

C1: Condenser  
1  $\mu\text{F}$  /  $U_N > 30 \text{ V}$

C2: Condenser  
1000  $\mu\text{F}$  /  $U_N > 30 \text{ V}$

L1: Choke coil  
6  $\mu\text{H}$  /  $I_N > 1.5 \text{ A}$

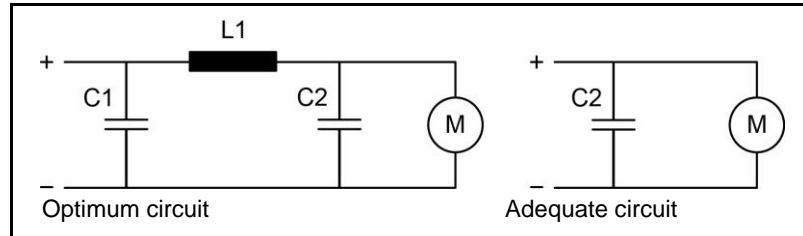


Fig. 11: Supplemental circuit



### 6.3. Hydraulic connection

Connected components

→ Only connect components to the pump that are designed to handle the hydraulic data of the pump (see Chapter 4, Technical data).

Hoses

→ Only use hoses that are suitable for the maximum permissible operating pressure of the pump (see Chapter 4).

→ Only use hoses that are sufficiently chemically resistant to the liquids being transferred.

#### 6.3.1. Connecting the pump

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

1. Remove the protective caps.

2. Connect the suction and pressure lines.

**i** Keep the suction line as short as possible in order to keep the priming process as brief as possible.

3. If the pump is used to build up pressure, make sure that all transition joints between hose and pump are secure in order to ensure that the hoses cannot come off.

4. Check that the hoses and transition joints are fitted correctly and securely.

5. Check that the system is leak-tight.

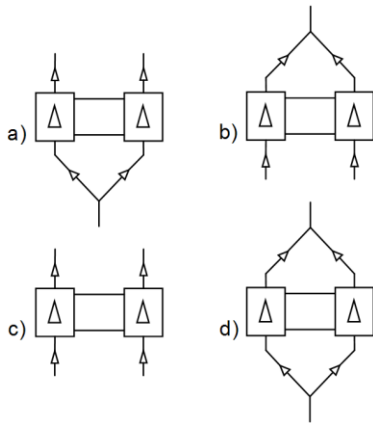


Fig. 12: Hose connection options for NFB versions

**6.3.2. NFB 100 hose configuration**

**i** A double-headed pump is normally selected to reduce the pressure surges caused by the alternation between suction and exhaust in a diaphragm pump. In order to achieve this effect, in addition to the pump configuration it is important to configure the hoses correctly.

For low pulsation (pressure surges) in NFB pumps:

- ➔ Use pump in non-boxer (standard) version so that the heads expel alternately.
- ➔ Configure pump head hoses in parallel (see Fig. 13).
- ➔ Keep hoses between pump and junction as short as possible.
- ➔ As little constriction as possible should be caused when using connecting components. As a guide: min. inner diameter 5.5 mm.

**i** Contact your KNF technical advisor if you have any questions (see last page for telephone number).

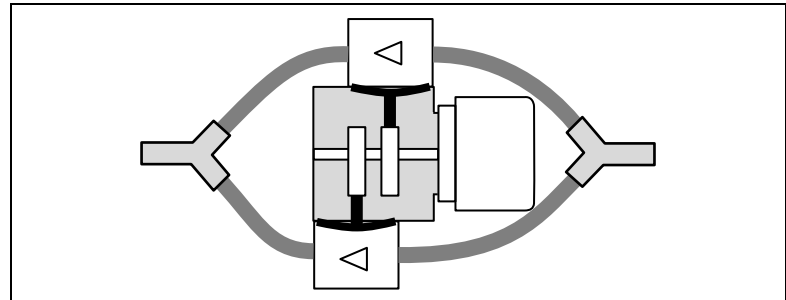


Fig. 13: NFB 100 hose configuration for low pulsation

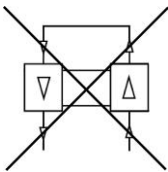


Fig. 14: no series connection in the case of NFB versions



**Series connection damages pump**

If the two heads in the NFB versions are connected in series, the pump will be damaged, and may leak.

**CAUTION**



**Changed technical characteristics**

In the case of NFB versions, the use of .27 versions may affect technical characteristics. (See Fig. 12, Hose connection options b) and d) ).

**CAUTION**

## 7. Operation

- Operate the pumps only under the operating parameters and conditions described in Chapter 4, Technical data.
- Make sure that the pumps are being used properly (see Chapter 2.1).
- Avoid improper use of the pumps (see Chapter 2.2).
- Observe the safety precautions (see Chapter 3).
- The pumps are components that are intended to be incorporated into another machine. Before putting them into service it must be established that the machinery or systems in which they are installed meet the relevant regulations.



**CAUTION**

### Risk of burning

The drive heats up.

- Avoid contact with the pump drive.
- Avoid contact with flammable materials.



**WARNING**

### Danger of bursting of the fluid system due to overpressure.

The pump builds up pressure. A closed system can cause the max. permitted operating pressure to be exceeded. This can cause injuries or damage to the pump and the system.

- Avoid operation against a closed system.
- Only use wetted parts that are rated for at least the operating pressure of the pump.
- If necessary, limit the maximum system pressure by suitable measures.

- i** Excessive pressure and the inherent dangers thereof can be prevented by placing a bypass line with a pressure relief valve between the pressure and suction side of the pump. For further information, contact your KNF technical adviser (for telephone number, see last page).



**CAUTION**

### Risk of burns when transferring hot media

- Do not touch the pump or the media transfer system.

- Avoid contact with flammable materials.

Pump standstill

- If the pump stops running, restore the system to normal atmospheric pressure.

For pumps with thermal switch or electronic overload protection:



**Risk of physical injury and damage to the pump due to automatic start**

**WARNING**

If the pump overheats and pump operation is stopped by the thermal switch / electronics, the pumps will restart automatically as soon as they have had time to cool down.

- Take steps to ensure that this cannot produce a hazardous situation.
-

**Switching the pumps on and off**

Setting and regulating motor speed      The motor speed of the pump, and thus the flow rate, is adjustable and can also be regulated to some extent.

For more details, see Chapter 4, Technical data

**Duty cycle / short cycle operation**

Short cycle operation      KNF pumps are designed for continuous operation.

Short start and stop cycles may adversely affect the service life of the brushed motors.

**i** If the pump is operated with short cycles in your application, please contact a KNF technical adviser for further information (for telephone number, see last page).

#### Switching on the pump

→ In order to ensure that the pump starts every time, make sure that counterpressure is reduced to an acceptable level before start-up. This should also be done during operation after a brief power cut.

**i** For more specific information contact your KNF technical adviser.

#### Switching off the pump

→ KNF recommends: If transferring aggressive liquids, the pump should be flushed thoroughly prior to switch off (see Chapter 8.2.1), as this will help to lengthen the service life of the diaphragm.

→ Restore the system to normal atmospheric pressure (release hydraulic pressure in pump).



**CAUTION**

**Overpressure on the suction side causes medium to flow through the switched-off pump**

→ Take steps to ensure that this cannot produce a hazardous situation.

---

**Flow rate NF 100**

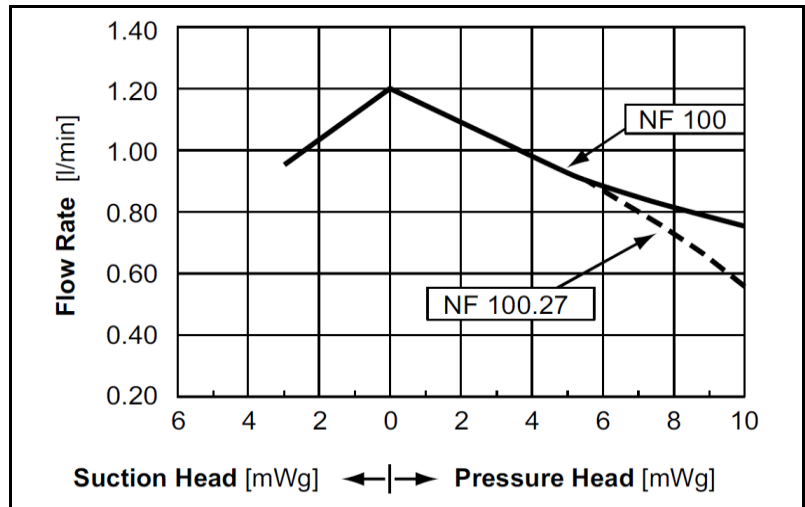


Fig. 15: Flow rate of pump NF 100 DC / DCB

**Flow rate NF 1.100**

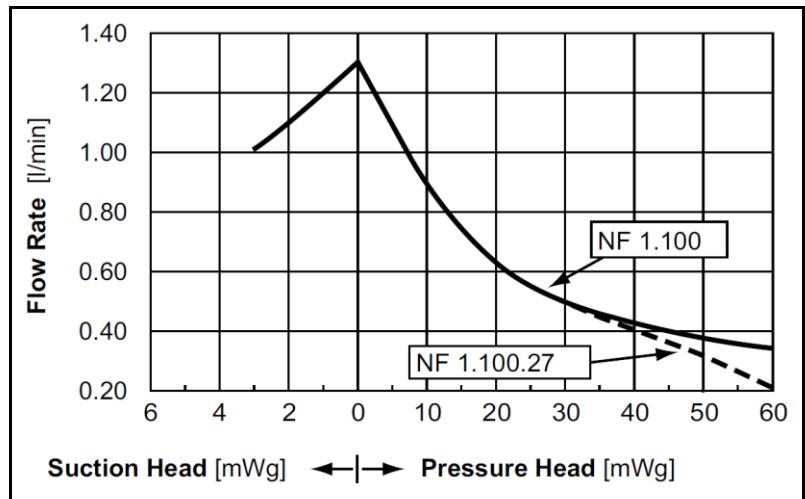


Fig. 16: Flow rate of pump NF 1.100 DC

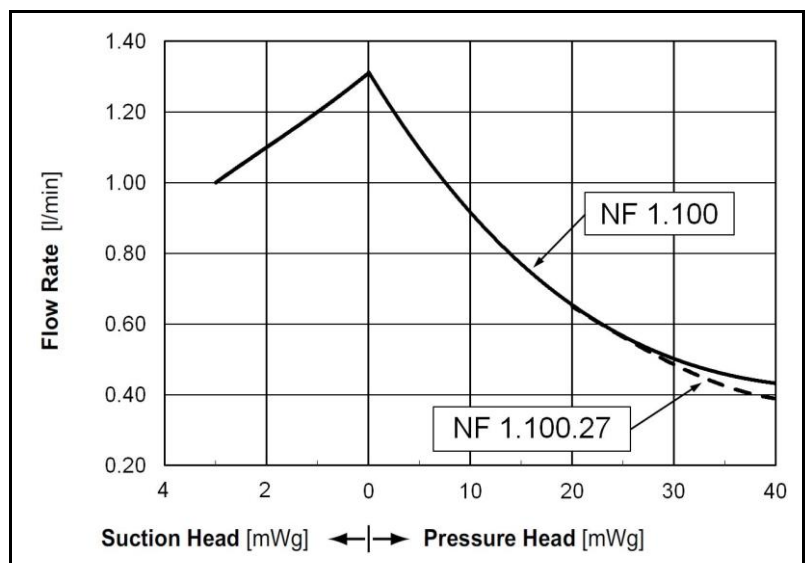
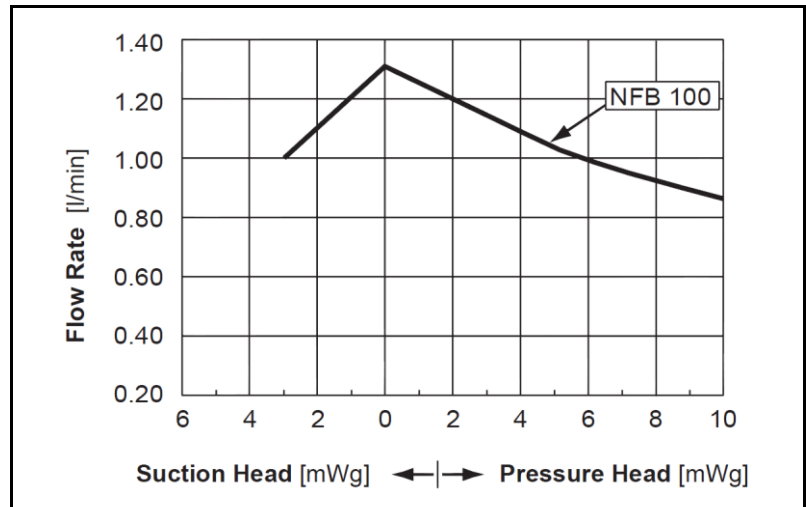
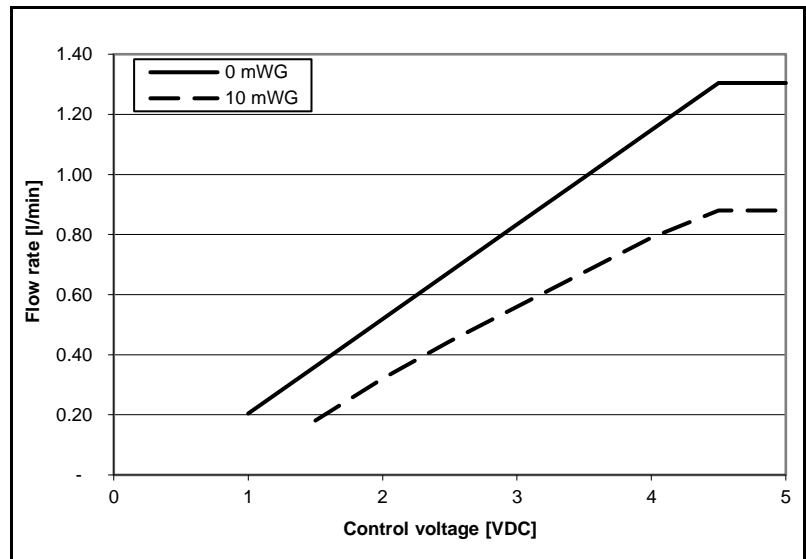


Fig. 17: Flow rate of pump NF 1.100 DCB

**Flow rate NFB 100 (per pump head)**



*Fig. 18: Flow rate of pump NFB 100 DCB-4 (per pump head)*



*Fig. 19: Flow rate of pump NFB 100 DCB-4 (per pump head), depending on control voltage*

## 8. Servicing

### 8.1. Servicing schedule

Component	Servicing interval
Pump	- Regular inspection for external damage or leaks
Pump head	- Clean if the flow rate decreases, the pump does not work or no vacuum is created (Chapter 8.2)
Diaphragm, valve plates and seals	- Change as soon as pumping capacity decreases, preferably sooner

Tab. 17

### 8.2. Cleaning

Information on procedure



**WARNING**

#### Health hazard due to dangerous substances in the pump

Depending on the medium transferred, caustic burns or poisoning are possible.

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

#### 8.2.1. Flushing the pump

- ➔ When transferring aggressive media, KNF recommends flushing the pump with air (or an inert gas if necessary for safety reasons) under atmospheric conditions for a few minutes before switching off in order to extend the service life of the diaphragm.

#### 8.2.2. Preparations for disassembly

1. Flush the pump with a suitable neutralising liquid, and make sure that no dangerous substances are left in the pump
2. Pump empty
3. Separate electrical connections
4. Disconnect hoses from pump head

Tools

Qty	Tools for KP, KP.51, KT and TT versions
1	Torx 20 screwdriver
Qty	Tools for FT version
1	Phillips screwdriver No. 2

Tab. 18



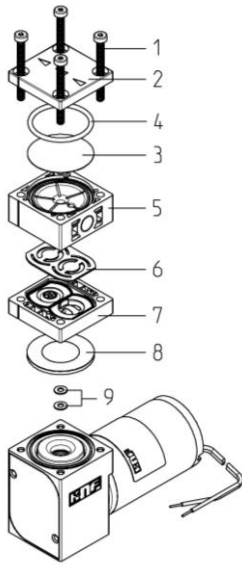


Fig. 20:  
NF 100

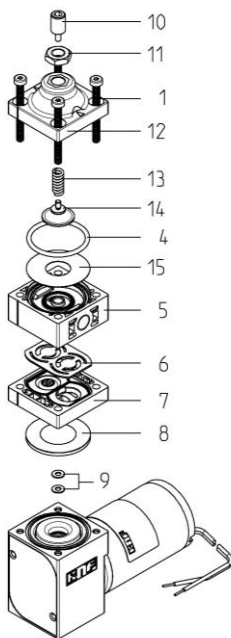


Fig. 21:  
NF 100 .27

- 1 Head screw
- 2 Head plate
- 3 Resonating diaphragm
- 4 O-Ring
- 5 Connecting plate
- 6 Valve plate
- 7 Intermediate plate
- 8 Diaphragm
- 9 Washer
- 10 Setscrew
- 11 Hexagon nut
- 12 Head plate.27
- 13 Pressure spring.27
- 14 Diaphragm.27
- 15 Resonating diaphragm.27

### 8.2.3. Disassembling the pump head

1. Loosen the four head screws (1) and remove the whole head.
2. Take the valve plate (6) out of the intermediate plate (7).
3. Remove the resonating diaphragm (3), or resonating diaphragm.27 (15), if fitted diaphragm.27 (14) and pressure spring.27 (13) from the connecting plate (5).
4. Remove O-ring (4) from head plate (2) or (12).
5. Carefully grip the diaphragm (8) and remove by turning anti-clockwise. Remove the washers (9) and make sure that no washers 9 fall into the pump housing.

We recommend replacing the diaphragm (8).

### 8.2.4. Clean or replace parts

6. Clean the diaphragm (8), O-Ring (4), resonating diaphragm (3), or resonating diaphragm.27 (15), if fitted diaphragm.27 (14), valve plate(6), intermediate plate (7) and connecting plate (5) with a cloth and then blow off with compressed air or replace.

### 8.2.5. Assembling the pump head

1. Place the same number of washers on the connecting rod (9) as were there previously. Make sure that no washers (9) fall into the pump housing.
  2. Screw in the diaphragm (8). By lightly pressing on the diaphragm push the ridge on the underside of the diaphragm into the groove of the housing.
  3. Place the "dust free" valve plate(6) into the intermediate plate (7), making sure it is in the correct position.
- ➔ The method of assembly which follows will differ according to the pump type used. For this reason, please proceed with the section (**NF 100 and NFB 100 versions** or **NF 100.27 version**) that corresponds to the pump type you are using.

### NF 100 and NF 100 versions

4. Insert the resonating diaphragm (3) in the connecting plate (5) and cover with the head plate (2) fitted with a new O-ring (4).
5. The positions of the intermediate plate (7), the connecting plate (5) and the head plate (2) with respect to one another are determined by the arrangement of the visible grooves.
6. Insert the four head screws (1) in the through holes of the pump head.
7. Make sure that the flow direction of the pump head (see directional arrow on the head plate (2)) is the same as previously.
8. Place the pump head onto the pump housing and alternately tighten the four head screws (1). The maximum tightening torque is 2.5 Nm.
9. Reconnect the hoses to the pump head.

**NF 100.27 version**

4. Insert resonating diaphragm.27 (15) in the connecting plate (5).
  5. Place the diaphragm.27 (14) centrally on the resonating diaphragm.27 (15).
  6. Place the compression spring.27 (13) over the thread of the diaphragm.27 (14).
  7. Carefully place head plate.27 (12) with fitted new O-ring (4), screwed-in setscrew (10) and hexagon nut (11) over the whole unit.
  8. The positions of the intermediate plate (7), the connecting plate (5) and head plate.27(12) with respect to one another are determined by the arrangement of the visible grooves.
  9. Insert the four head screws (1) in the through holes of the pump head.
  10. Make sure that the flow direction of the pump head (see directional arrow on head plate.27 (12)) is the same as previously.
  11. Place the pump head onto the pump housing and alternately tighten the four head screws (1). The maximum tightening torque is 2.5 Nm.
  12. Reconnect the hoses to the pump head.
- The activities described above should not alter the set pressure of the overflow valve. If it is found that the setting has changed after assembly, the value can be readjusted within the permissible range of the pump in accordance with the instructions in Chapter 8.3, if necessary readjusting the peripheral installations.

**CAUTION****Escaping liquid**

After assembly the pump may not be leak-tight due to incorrect assembly, damaged or soiled seal faces, or other reasons.

- Run pump for several minutes with a harmless liquid at maximum operating pressure.
  - Check that pump is leak-tight
-

### 8.3. Adjusting the overflow

1. Test set-up/instrumentation as shown in the diagram.

#### Test set-up for overflow

Make sure that the container (a), pump (b), pressure gauge (c) and valve (d) are as level as possible (+/- 15 cm)

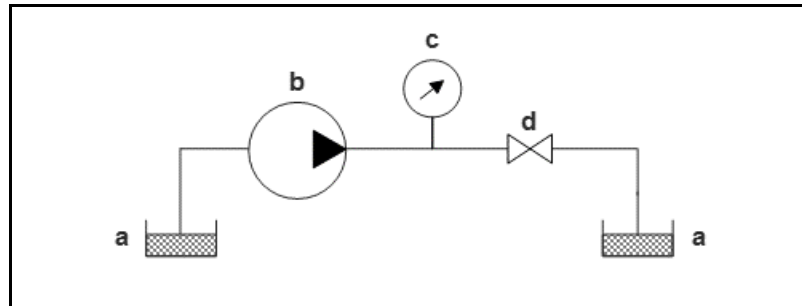


Fig. 22: Test set-up for overflow

2. Switch on the pump and run until there are no air bubbles in the system.
3. Close the valve downstream of the pressure gauge and check the overflow pressure at the gauge.
4. Undo the hexagon nut (11) on the setscrew (10).
5. To reduce the pressure, turn the setscrew (10) anti-clockwise, to increase the pressure, turn it clockwise.
6. Use the hexagon nut (11) to secure the setscrew (10) in the selected position.

## 9. Troubleshooting

For pumps with alternating current motors:



**Risk of electric shock, danger of death**

→ Disconnect the pump from the power supply before working on the pump.

**DANGER** → Make sure that the pump is de-energised.

Pump does not work	
Possible cause	Remedy
Pump not connected to power supply.	→ Connect pump to power supply.
Power supply is not switched on.	→ Switch on power supply.
Thermal switch or pump electronics have tripped.	→ Disconnect pump from the mains. → Allow pump to cool. → Identify and eliminate cause of overheating/overload.
Connections or hoses are blocked.	→ Check connections and hoses. → Remove blockage.
External valve is closed or filter is clogged.	→ Check external valves and filters.
Diaphragm or valve plate or seals are worn.	→ Replace diaphragm, valve plate and seals (see Chapter 8.2).

Tab. 19

Pump is not priming	
Possible cause	Remedy
Suction side of pump not connected.	→ Connect the suction side of the pump.
Liquid in the container is too low.	→ Fill container.
Hose connections are not leak-tight.	→ Secure transition joints between hose and connections with clamps or clamping elements.
Peripheral valve is closed or filter is clogged.	→ Open the peripheral valve. → Clean filter.
Pump head is filled with gas. The system is unable to handle the pressure on the pressure side.	→ Reduce pressure at pressure side.
Particles in the pump.	→ Clean the pump head (see Chapter 8.2).
The pump parts are not resistant to the medium to be transferred.	→ Replace the pump head with a compatible version.
Incorrect interchange of pressure and suction line connections.	→ Remove pressure and suction lines and reconnect correctly.

Tab. 20

<b>Flow rate, suction head or pressure head is too low</b>	
The pump does not achieve the performance stated in the technical data or on the data sheet.	
Possible cause	Remedy
Components in the system connected to the suction and pressure sides, such as hoses, valves or filters, are causing too much resistance.	➔ Modify installation, check the cross-section of components.
Hose connections are not leak-tight.	➔ Secure transition joints between hose and hose connections with clamps or clamping elements
Particles in the pump.	➔ Clean the pump head, install suction-side filter if required (see Chapter 8.2).
Viscosity of the transferred medium is too high.	➔ Contact KNF.
Incorrect interchange of pressure and suction line connections.	➔ Remove pressure and suction lines and reconnect correctly.
The pump parts are not resistant to the medium to be transferred.	➔ Replace the pump head with a compatible version.

Tab. 21

**Fault cannot be rectified**

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

1. Flush the pump to clear the pump head of any hazardous or aggressive liquids (see Chapter 8.2.1).
2. Dismantle the pump.
3. Clean the pump (see Chapters 8.2.2 to 8.2.5)
4. Send the pump, with completed decontamination declaration (see Chapter 11), to KNF customer service stating the nature of the transferred medium.

## 10. Spare parts and accessories

### Spare parts kit

Spare parts kit	Order No.
Spare parts kit KP <sup>1)</sup>	065261
Spare parts kit KT / TT	065262
Spare parts kit FT	152631
Spare parts kit KP.27	067529
Spare parts kit KT.27 / TT.27	067530

Tab. 22

<sup>1)</sup> For KP.51 version, contact your KNF technical advisor.

### Accessories

Accessories	Order No.
Screw-in nipple with seal EPDM R1/8" <sup>1)</sup>	168554
Screw-in nipple with seal EPDM NPT1/8"	168555
Screw-in nipple with seal FFKM R1/8" <sup>1)</sup>	168546
Screw-in nipple with seal FFKM NPT1/8"	168547

Tab. 23

<sup>1)</sup> For connecting thread G1/8"

## 11. Return of the pump

**i** KNF undertakes to repair the pump only under the condition that the customer provides a certificate of the pumped medium and cleaning of the pump. For this purpose, please follow the instructions on [www.knf.com/repairs](http://www.knf.com/repairs).

Please contact your KNF sales representative directly if you need additional support for your return service.

**KNF worldwide**

Please find your local KNF partners at: [www.knf.com](http://www.knf.com)

