DIAPHRAGM LIQUID PUMP

NF 1.30

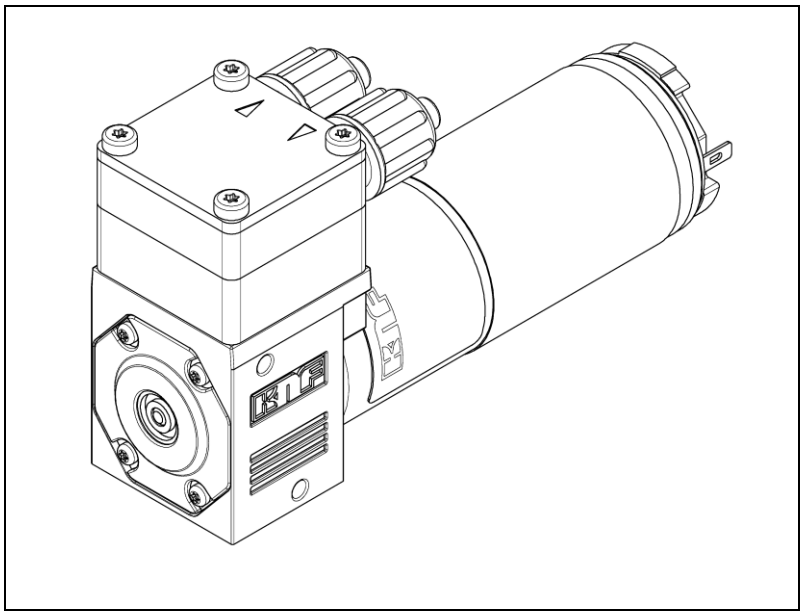
NF 1.30 KT DCG 12V

- 12V — Supply voltage [Ch. 4]
- DCG
- KT / TT [Ch. 4]
- 1.30
- NF
- - / PMLxxxx / PLxxxx [Ch. 1]

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
DANGER	warns of immediate danger	Consequences are death or serious injury and/or serious property damage.
WARNING	warns of potential danger	Death or serious injury and/or serious damage to property are possible.
CAUTION	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) that must be carried out.

1. This indicates the first step of an activity to be carried out. Any additional steps are numbered consecutively.

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

Install and operate the pumps only under the operating parameters and conditions described in Chapter 4. Technical data.

Only completely installed pumps may be taken into service.

Requirements for media to be transferred

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.

➔ Filters may be ordered as accessories, see Spare Parts and Accessories (Chapter 10).

2.2. Improper use

Risk of explosion

The pumps must not be operated in an explosive atmosphere.

DANGER

Please contact your local KNF partner for special designs that are not included in the technical specification (www.knf.com).

3. Safety

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, potential dangers during use can result in injuries to the user or others, or in 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

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 and Installation Instructions, and in particular the "Safety" chapter.

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 a 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 applies especially to parts contaminated with toxic substances.

Disposal

Dispose of all packaging in an environmentally-appropriate manner. The packaging materials are recyclable.

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.

EU directives/standards

The pumps comply with the fundamental requirements of Directive 2011/65/EU (RoHS2).

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.

The following harmonized standards are met:

NF 1.30 DCG

- EN 55014 - 1: 2001

Customer service and repairs

All repairs to the pumps must be carried out by the responsible KNF customer service team.

Use only genuine parts from KNF for servicing work.

4. Technical data

Pump materials

The pump type **KT** stands for:

Assembly	Material[1)]
Pump head*	PP
Valve socket	PP / FFKM
Sealing washer	FFKM
Diaphragm	PTFE

Tab. 2 [1)] according to DIN ISO 1629 and 1043.1

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

The pump type **TT** stands for:

Assembly	Material[1)]
Pump head*	PVDF
Valve socket	PVDF / FFKM
Sealing washer	FFKM
Diaphragm	PTFE

Tab. 3 [1)] according to DIN ISO 1629 and 1043.1

Hydraulic ratings

Parameter	Value
Flow rate [ml/min] [1), 2)]	≥170
Permissible pressure [bar g]	4
Suction head [mWG]	5

Tab. 4

[1)] Measured with water at 20°C / at atmospheric pressure

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

Hydraulic connections

Parameter	Value
Recommended hose size ID [mm] / OD [mm]	4/6

Tab. 5

Specifications NF 1.30 DCG

Motor voltage	12V	24V
Power consumption [W]	10.1	11
Max. I load [A]	0.61	0.35
Max. permissible operating current [A]	0.84	0.46
Lead size [-]	AWG28	
Protection class [-]	IP00	
Weight[1)] [g]	220	

Tab. 6

[1)] The weight may differ slightly from the stated value, depending on the version.

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. 7

5. Assembly and function

Assembly

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

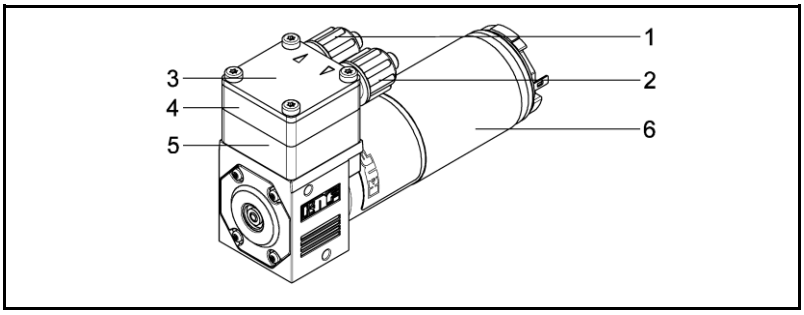

Fig. 1: Diaphragm liquid pump

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

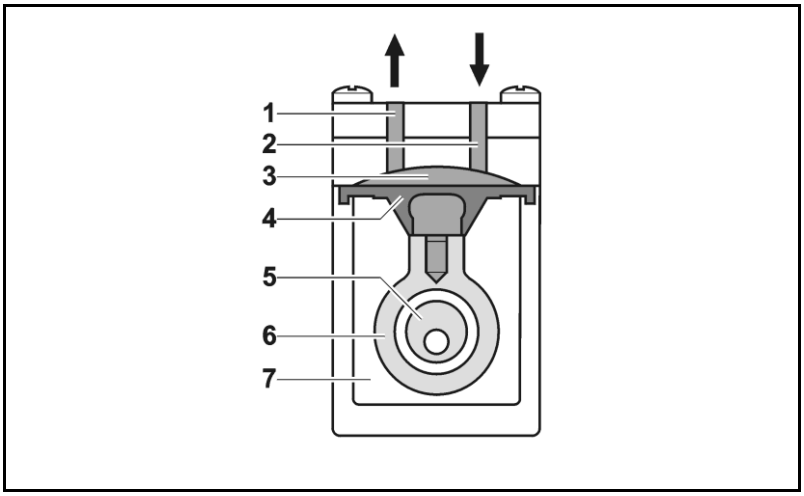

Fig. 2: Pump assembly

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**).

6. Installation and connection

Install the pumps only under the operating parameters and conditions described in Chapter 4. Technical data.

Observe all 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)

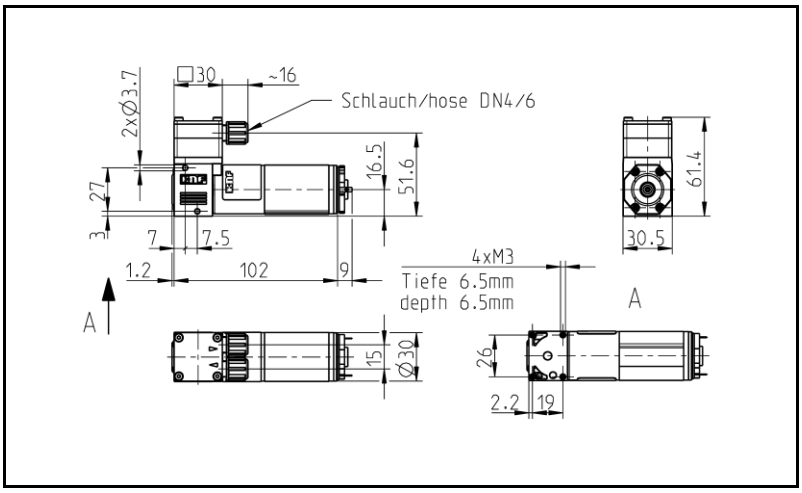

Fig. 3: Mounting dimensions NF 1.30 DCG

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. For maximum precision and rapid venting, install pump as shown in the illustration (Fig. 4).

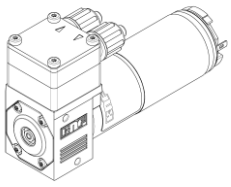

Fig. 4: Optimum installation position

Decoupling

➔ KNF recommends mechanically decoupling the pump from the piping system, e.g. by using flexible hoses or pipes. This prevents any oscillations of the pump being transferred to the system.

6.2. Electrical connection

➔ Only have the pump connected by an authorised 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 operating current can be found on the type plate.
2. Connect positive and negative terminals. For electrical data see Chapter 4

i With DC motors, please pay attention to correct polarity:
red motor cable: +
black motor cable: -

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.

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 Section 2.1).

➔ Avoid improper use of the pumps (see Section 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. Please contact your local KNF partner for further information (www.knf.com).

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.

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 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.

If the pump is operated with short cycles in your application, please contact your local KNF partner for further information (www.knf.com.)

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. Please contact your local KNF partner for further information (www.knf.com).

Switching off the pump

➔ KNF recommends: if transferring aggressive liquids, the pump should be flushed thoroughly prior to switch off (see Section 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 1.30

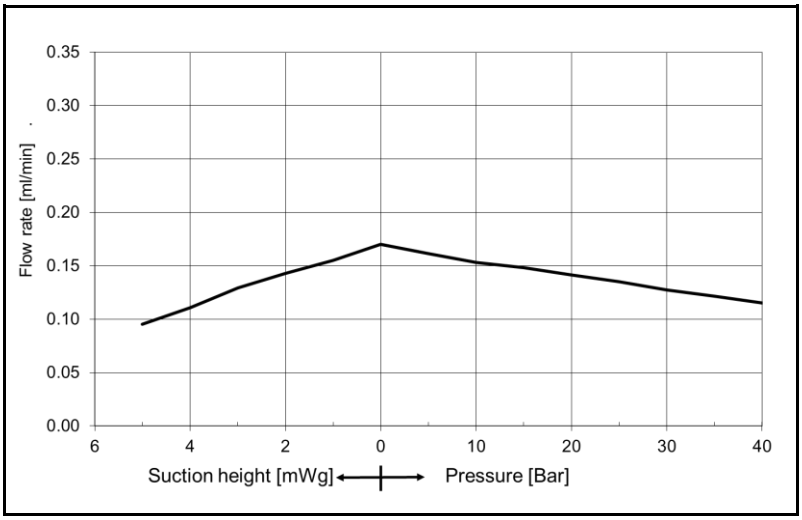

Fig. 5: Flow rate of the NF 1.30

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 sockets and sealing washers	- Change as soon as pumping capacity decreases, preferably sooner

Tab. 8

8.2. Cleaning and dismantling

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

➔ If transferring 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. 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
1	Torx 10 screwdriver

Tab. 9

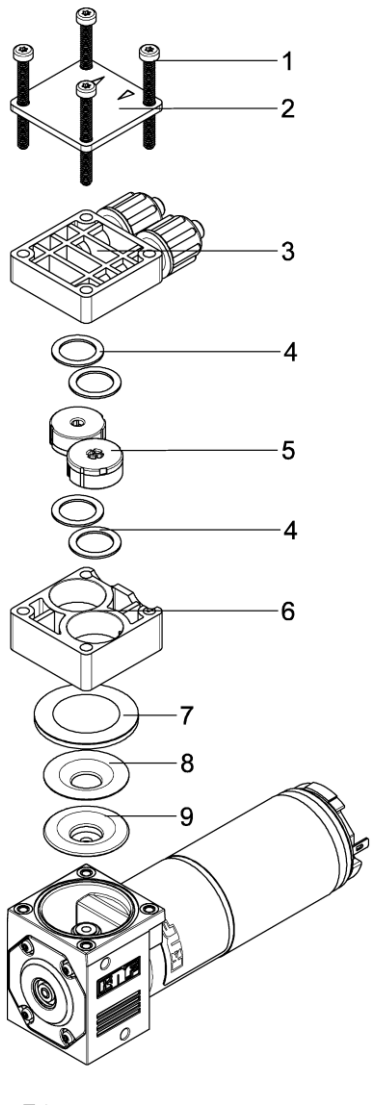

Fig. 6

1 Head screws
2 Head plate
3 Connecting plate
4 Sealing washer
5 Valve socket
6 Intermediate plate
7 Diaphragm
8 Sliding disk
9 Support

8.2.3. Disassembling the pump head

1. Use the screwdriver to undo the 4 head screws (**1**).
2. Remove the connecting plate (**3**) from the intermediate plate (**6**).
3. Remove the valve sockets (**5**) and sealing washers (**4**) from the intermediate plate (**6**). Do not use the valve sockets again.
4. Carefully grip the diaphragm (**7**) and remove by turning anti-clockwise.
5. We recommend replacing the diaphragm (**7**).

8.2.4. Clean or replace parts

6. Clean the diaphragm (**7**), sliding disk (**8**), support (**9**), intermediate plate (**6**), connecting plate (**3**) sealing washers (**4**) and head plate (**2**) with a cloth and then blow off with compressed air.

8.2.5. Installing the pump head

7. Place the sliding disk (**8**) and support (**9**) on the diaphragm (**7**).
8. Screw in the diaphragm (**7**) and tighten it securely.
9. Press the edges of the diaphragm all around.
10. Ensure the sealing washers (**4**) are dust free and place them in the centre of the valve socket seat of the intermediate plate (**6**) (one sealing washer per seat).
11. Insert the valve sockets (**5**).
12. **NOTE:** The location and position of the valve sockets is specified by the tappets on the intermediate plate and the grooves on the valve sockets. The location / position is different.
13. Place a dust-free sealing washer (**4**) in the centre of each valve socket.
14. Make sure that the sealing washers are in the centre of the valve sockets.
15. Carefully place the connecting plate (**3**) on top of the intermediate plate (**6**).
16. NOTE: only one position is possible.
17. The flow direction arrows on the head plate must be aligned with the connecting nozzles of the connecting plate.
18. Place the pump head onto the pump and tighten the four head screws diagonally.
19. Reconnect the hoses to the pump head.

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 the pump for several minutes with a harmless liquid at maximum operating pressure.

➔ Check that pump is leak-tight

9. Troubleshooting

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

➔ Ensure that there is no power.

Pump does not transfer	
Cause	Remedy
Pump not connected to power supply	➔ Connect pump to power supply
Power supply is not switched on	➔ Switch on power supply
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, valve sockets or seals are worn.	➔ Replace diaphragm, valve socket and seals (see Section 8.2.3). ➔ Replace pump

Tab. 10

Pump is not priming	
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 other 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. 11

Flow rate, suction head or pressure head is too low The pump does not achieve the performance stated in the technical data or on the data sheet.	
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-sections of components
Hose connections are not leak-tight	➔ Secure transition joints between hose and hose connector with clamps or clamping elements
Particles in the pump	➔ Clean the pump head; install suction-side filter if required (Spare Parts and Accessories), (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. 12

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 first page).

1. Flush the pump to clear the pump head of any hazardous or aggressive liquids (see Section 8.2.1).
2. Dismantle the pump.
3. Clean the pump (see Section 8.2).
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

Spare Part	Item	Number per pump	Order No.
Delta PT screw 30x30	1	4	160308
FFKM sealing washer	4	4	060463
PP / FFKM valve socket	5	2	060186
PVDF / FFKM valve socket	5	2	060161
PTFE diaphragm	7	1	019259
PTFE sliding disk	8	1	060728

Tab. 13

Accessories

Accessories	Order No.
Filter FS 60 T	165210
Filter FS 60 X	165212
Filter FS 25 T	165211
Filter FS 25 X	165213

Tab. 14

11. Return of the pump

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.

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