



FD 1.200

INSTALLATION
INSTRUCTIONS

DIAPHRAGM PUMP



FD 1.200 RCP

Before operating the product and the accessories, please read the Installation Instructions and pay attention to the safety precautions.

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1 General information

1.1 Information about the instructions

Contents	The Installation Instructions describe the requirements for correct and safe installation of the product in the complete machine.
Storage location	These Installation Instructions are part of the product. Information that relates to safety should be used for the documentation of the complete machine.
Project pumps	With customer-specific project pumps (pump types which begin with „PL“ or „PML“), there may be differences from the Installation Instructions.

1.2 Warnings

Warnings in the Installation Instructions are identified with the danger symbol, keywords, and colors. These provide an indication of the extent of the danger.



⚠ DANGER

Indicates a dangerous situation that will lead directly to death or serious injury if it is not avoided.



⚠ WARNING

Indicates a dangerous situation that may lead to death or serious injury if it is not avoided.



⚠ CAUTION

Indicates a dangerous situation that may lead to moderate or minor injuries if it is not avoided.

NOTICE

Indicates a situation that may cause damage to property if it is not avoided.

1.3 Disclaimer of liability

The manufacturer can accept no liability for any damage or malfunctions caused by failure to follow the Installation Instructions.

The manufacturer can accept no liability for any damage or malfunctions caused by modification or conversion of the device or improper handling.

The manufacturer can accept no liability for any damage or malfunctions caused by improper modification of parameters.

The manufacturer can accept no liability for any damage or malfunctions caused by the use of non-approved spare parts and accessories.

1.4 Manufacturer's address

KNF Flodos AG
Wassermatte 2
6210 Sursee, Switzerland
Tel +41 (0)41 925 00 25

www.knf.com

1.5 Other applicable documents

The documents listed must also be taken into consideration. The valid versions can be found at www.knf.com.

- Data sheet
- 3D model
- Declaration of incorporation

The following should also be observed:

- Local T&Cs
- Sales documents and agreement between KNF and the customer
- Interface description

2 Safety

2.1 Intended use

The pump is intended exclusively for use as follows:

- To transfer liquids and gases
- For operation in accordance with the operating parameters specified in the technical data of the applicable documents

2.2 Reasonably foreseeable misuse

The pump may not:

- be operated in an explosive atmosphere
- be used to transfer explosive media
- be used to transfer media whose compatibility with the pump head, valves, diaphragms, and seals has not been established
- be operated contrary to the specifications in the data sheet.

2.3 Responsibility of user

The user is responsible for ensuring compliance with the safety precautions in these Installation Instructions. Applicable safety, accident prevention, and environmental protection regulations must be complied with. The user is also responsible for ensuring that the configured firmware parameters guarantee the safe operation of the machine.

2.4 Product-specific dangers

This chapter describes residual risks that have been identified in a risk assessment. Safety precautions and warnings in this chapter and in other chapters in the Installation Instructions must be observed to prevent dangerous situations.



⚠ DANGER

Danger of injuries and property damage caused by hazardous materials

Poisoning and chemical burns or unintended reactions caused by leaking dangerous substances

- Observe the safety data sheets for the media to be transferred.
- Before transferring a medium, check whether it can be transferred safely in the specific instance.
- Ensure that the system is not subject to any risks of explosion – not even under extreme operating conditions (temperature, pressure) or in case of malfunctions.
- Ensure that the product is used by appropriately trained personnel.
- Determine the resistance of the materials in contact with the medium.
- Check that the product and system are leak-tight at the operating temperature of the medium to be transferred.
- Check the product regularly for damage.
- Operate the pump only when you are sure it has no technical malfunctions
- Operate the product in accordance with the technical data.
- Carry out work on the pump or fluid circuit only after they have been decontaminated and/or a decontamination declaration is available.

⚠ DANGER**Danger of injuries and property damage caused by leaks at interfaces to the pump head**

Poisoning and caustic burns, or undesirable reactions caused by escaping hazardous materials



- Wear personal protective equipment
- Connect the product correctly
- Operate the pump only when you are sure it has no technical malfunctions
- Operate the product in accordance with the technical data

⚠ DANGER**Danger of injuries and property damage caused by uncontrolled flows when the pump is not operating**

Poisoning and chemical burns or unwanted reactions caused by escaping hazardous substances. The valves are leak-tight in the specified flow direction up to a differential pressure of 2 bar.



- Set up the fluid circuit so that the pressure on the suction side is no more than 2 bar higher than on the pressure side.

The risk analysis indicates a risk of explosion due to certain materials and substances.

⚠ DANGER**Danger of injuries and property damage caused by an explosion in the pump**

The pump housing is made from aluminum. If the pump diaphragm is damaged, medium can accumulate in the housing and form hydrogen (especially with acids and lyes). This could cause an explosion in the pump housing.



- Check and monitor the reactivity of the medium with aluminum.
- No flammable materials in the immediate vicinity of the pump and piping.

The high-quality construction of the diaphragm and valves guarantees a service life of 50 million dosing cycles and permanent tightness when operated with water. If higher service life requirements are specified, the diaphragm and valves must be replaced after reaching this cycle count to prevent damage.

When using media that chemically or mechanically attack the diaphragm or valves, a significantly shorter operating time is to be expected. Replacement must be carried out by KNF.



DANGER

Danger of injuries and property damage caused by an explosion in the connection lines and in the pump

Evaporation of flammable liquids

- When flammable liquids are transferred, an explosive atmosphere can form in the pump and in the lines during filling and emptying.
- With the hoses that are used, make sure that no electrostatic charges can form (use conductive materials, grounding, and potential equalization).
- The hoses and piping used must be able to withstand the potential pressure of explosion.



DANGER

Danger of injuries and property damage caused by the pump exploding

If the pump has not been used or has been stored for some time, residual medium may evaporate and form an explosive atmosphere.

- If the pump has not been used for some time or is stored: Drain the pump and flush with neutral medium to prevent a subsequent reaction.



WARNING

Danger of injuries and property damage caused by leaks to the environment

Flammable materials

- Keep flammable materials away from the immediate vicinity of the pump and piping.



CAUTION

Danger from overheated electrical components

If the pump diaphragm is damaged, medium can reach the electronic circuit board and cause a partial short-circuit. In this case, inadmissibly high currents can occur if the overcurrent protection is insufficient.

- The product must be individually protected with an overcurrent protection device as specified on the rating plate.



⚠ WARNING

Danger due to failure of the diaphragm or valves

Injuries or damage to equipment due to leaking media in the event of damage to the delivery diaphragm.

- Take precautions in the design of the end device to ensure that any liquids that may escape do not pose a hazard.
- The high-quality design of the diaphragm and valves guarantees a service life of 50 million dosing cycles and permanent tightness when operated with water. If higher service life requirements are specified, the diaphragm and valves must be replaced after reaching this number of cycles to prevent damage.
- When using media that attack the diaphragm or valves chemically or mechanically, a significantly shorter operating time is to be expected.

2.5 Compliance

The declaration of standard SJ-T 11364-2024 “Hazardous Sub-stance Disclosure Table 有害物质含量表” is made in accordance with the specifications detailed in the appendix to this document.

EMV-certification according to EN IEC 61326-1:2021

- Environmental conditions: Industrial
- Interference emission: CISPR11, Group 1, Class B

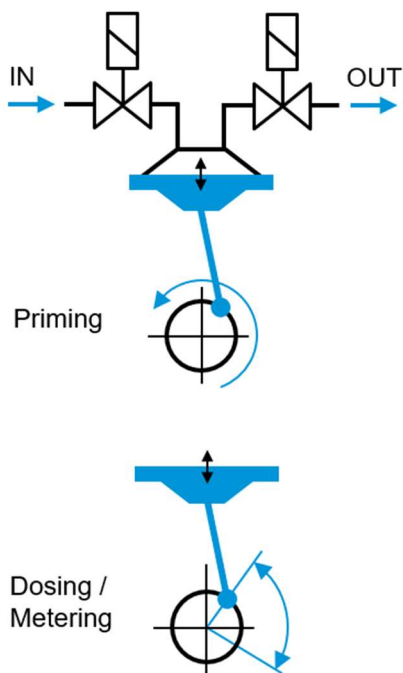


Fig. 1

3 Functional description

The pump has an elastomer diaphragm driven by an eccentric and two electromagnetically switched valves. The eccentric is driven by a stepper motor, which can be operated in two different modes under electronic control (Fig. 1).

3.1 Priming (filling mode)

In this Prime mode, the stepper motor rotates at a uniform, adjustable speed or flow rate. This mode is selected to fill the pump and the system optimally. A relatively high speed and filling time suitable for the system should be selected. This mode can also be used for optimal emptying of the system. The delivery direction can be reversed via the control system.

NOTE

The maximum continuous operating time in filling mode is limited by various factors (e.g., back pressure, ambient temperature) depending on the situation but it is at least 30 minutes. The pump switches off automatically in accordance with the limitations.

3.2 Dosing / Metering (dosing mode)

In this mode, the stepper motor oscillates and changes the direction of rotation for suction and discharge. The speed profile of the motor is controlled so that the current flow rate Flow IN and Flow OUT remains as constant as possible. (see Fig. 2)

In this mode, the diaphragm stroke can be changed using the control system, allowing a volume per shot of 40–210 microliters (μl) to be set.

This mode is selected for precise dosing and metering. Dosing refers to the delivery of a specific volume, e.g., 1 ml (in several strokes). Metering refers to the setting of a specific flow rate, e.g., 20 ml/min. The most accurate dosing or metering result is achieved when the stroke volume is set as high as possible and the fluid circuit is free of air.

Efficient filling and emptying can also be achieved in this mode by selecting the highest possible cycle frequency and shot volume. The delivery direction can also be changed flexibly in this mode via the control system.

3.3 Dosing cycle

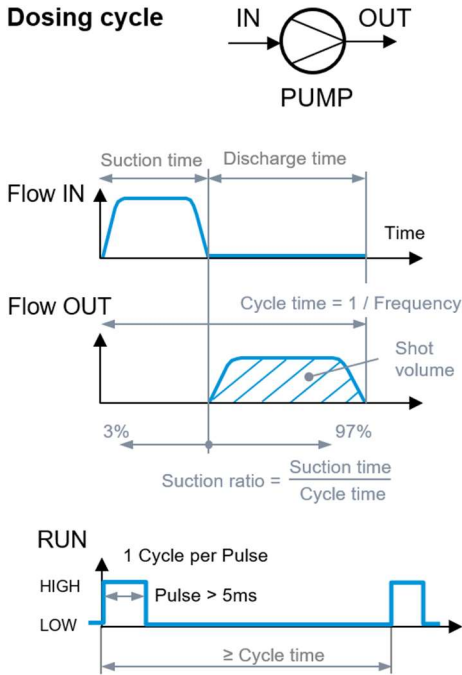


Fig. 2 Dosing cycle

The RUN signal starts the suction cycle, during which the diaphragm moves downwards and is filled with liquid. This is followed by the discharge cycle, during which the pump delivers the shot volume. Once the discharge cycle is complete, one dosing cycle is finished. The cycle frequency can be specified by the control system, taking into account the range that is technically achievable for the dosing pump.

Furthermore, the ratio of suction time to cycle time (suction ratio) can be specified in %. For example, a suction ratio of 20% results in fast suction and slow discharge. This achieves a quasi-continuous flow rate at the pump outlet.

If the suction ratio is 80%, for example, suction is slow and discharge is fast. This setting is suitable, for example, for dosing volatile media or for long suction lines. This mode can also be used to ensure that no drops remain when dosing above the mirror level, which is important for accurate dosing.

The suction ratio can only be changed until the suction or discharge time is at least 0.15 seconds.

4 Interfaces

The pump can be controlled using an analog/digital interface or a serial interface. There is a separate connector for each option, labeled on the pump's type plate.

For testing and commissioning, the pump can be easily operated using the KNF Connect graphical user interface (GUI). A separate operating manual and a quick start guide are available for this purpose. KNF Connect is not intended for permanent use in the end application.

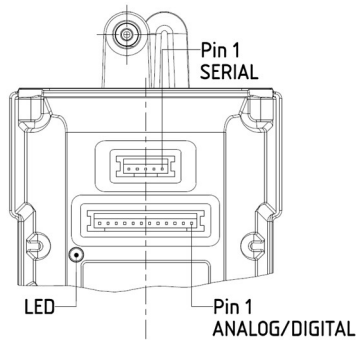


Fig. 3: Interfaces

4.1 Analog / digital interface (12-pin connector)

Socket: JST, manufacturer no. B12B-PH-SM4-TB

Nr.	Description	Type	Function
PIN 1	24 V		Power supply
PIN 2	GND		GND for power supply
PIN 3	Run	Digital Input	<ul style="list-style-type: none"> HIGH Impuls (>5 ms, 5 V) Starts dosing cycle Permanent HIGH for continuous dosing (ends dosing cycle, as soon as LOW)
PIN 4	Reverse	Digital Input	At HIGH (5 V) transfer occurs in reverse (applies to Run and Prime)
PIN 5	Error	Digital Output	HIGH (5 V) in the event of a fault (malfunctions and defects, see chapter 9)
PIN 6	Overpressure warning	Digital Output	HIGH (5 V) when there is excess pressure at the pump outlet (default: >7 bar)
PIN 7	Cycle complete	Digital Output	HIGH pulse (10 ms, 5 V) after each dosing cycle
PIN 8	Prime	Analog Input	Prime mode (filling mode) 0.5 V = 5 ml/min (23 rpm) 6.5 V = 65 ml/min (300 rpm)
PIN 9	GND Diff	GND PIN10-12	GND (differential) for input signals PIN10-12
PIN 10	Suction ratio (siehe Kap. 3.3)	Analog Input*	Analog Input 0-10 V 0.3 V = 3% (Min) 9.7 V = 97% (Max) Default (<0.2 V): 50% **
PIN 11	Shot volume	Analog Input*	Analog Input 0-10 V 1.6 V = 40 µl (Min) 8.4 V = 210 µl (Max) Default (< 0.2 V): 200 µl **
PIN 12	Frequency	Analog Input*	Analog Input 0-10V 0.3 V = 0.1 Shots per sec (Min) 10 V = 3.33 Shots per sec (Max) Default (<0.2 V): 2 Shots per sec **

** or value of the serial interface

Notes

- Adjust: To adjust the dosing result in the customer system, the shot volume can be re-adjusted.
- * PIN10-12: Customizable inputs/outputs (analog input: 0-10 V or PWM), default: 0-10 V
For accurate dosing, it is important that the differential voltage at the input is sufficiently accurate.
- Digital Input / Out: Levels adjustable for 3.3 V or 24 V (default 5 V)
If necessary, contact your local KNF representative.

4.2 Serial interface (5-pin connector)

Serial communication is recommended if several variables need to be adjusted or read out during operation.

Socket: JST, manufacturer no.: B5B-PH-SM4-TB

Nr.	Description	Function
PIN 1	24 V	Power supply
PIN 2	GND	GND for power supply
PIN 3	Serial GND	GND for serial communication
PIN 4	Serial COM 2	Tx (send)
PIN 5	Serial COM 1	Rx (receive)

Default: UART TTL (customizable for RS232, I2C, CAN)

The CANopen protocol is used for communication via the serial interface. The following tools are available:

- KNF Connect for device configuration and initial testing (separate documentation)
- Documentation of the serial interface and sample code for implementation in customer applications (separate documentation)
- USB connection cable (see accessories)

5 Application examples

This chapter describes the two applications with examples.

The shot volume is factory-calibrated to 200 microliters (μl) with water and 0 bar back-pressure. The adjustment range for the frequency is 0.1...3.33 shots per second and for the shot volume 40...210 μl .

For the most accurate result, the shot volume should be set as high as possible.

5.1 Metering

If a specific flow rate is to be set, the following formula can be used.

$$\text{flow rate} \left[\frac{\text{ml}}{\text{min}} \right] = \text{Shot volume} [\mu\text{l}] * \text{Frequency} [\text{Shots per sec}] * \frac{60}{1000}$$

Sample calculation

$$\text{Flow rate} = 200 [\mu\text{l}] * 2 [\text{Shots per sec}] \cdot \frac{60}{1000} = 24 \text{ml/min}$$

For adjustment in the system, the frequency can be adjusted until the result is correct under system conditions.

5.2 Dosing

If a specific volume is to be dispensed within a specific time, the following formulas can be used.

$$\text{Number of shots} = \text{round up} \left(\frac{\text{volume} [\text{ml}]}{200 [\mu\text{l}]} \cdot 1000 \right)$$

$$\text{Shot volume} [\mu\text{l}] = \frac{\text{volume} [\text{ml}]}{\text{Number of shots}} \cdot 1000$$

$$\text{Frequency} [\text{Shots per sec}] = \frac{\text{Number of shots}}{\text{time} [\text{sec}]}$$

Sample calculation: Dispense 1.9 ml in 5 seconds

$$\text{Number of shots} = \text{round up} \left(\frac{1.9 [\text{ml}]}{200 [\mu\text{l}]} \cdot 1000 \right) = 10$$

$$\text{Shot volume} = \frac{1.9 [\text{ml}]}{10} \cdot 1000 = 190 [\mu\text{l}]$$

$$\text{Frequency} = \frac{10}{5 [\text{sec}]} = 2 [\text{Shots per sec}]$$

For adjustment in the system, the shot volume can be adjusted until the result is correct under system conditions. If the shot volume cannot be increased sufficiently, the number of shots must be increased.

The KNF Connect GUI is recommended for easy commissioning and testing. It also includes a calculator for determining the optimal shot volume, as well as an adjust function for maximizing accuracy under system conditions.

6 Installation



⚠ WARNING

Danger due to incorrect installation

Injuries or damage to equipment due to leaking median

- After installation, check the system for leaks using a non-hazardous medium.
- Follow the requirements for intended use.
- Take precautions in the design of the terminal device to ensure that any liquids that may leak out cannot come into contact with live components.

The following requirements apply to all activities described in this chapter:

6.1 Installation location

The installation site must:

- Keep aggressive or flammable liquids and vapors away
- Allow hose connections without tensile or bending stress
- Take cooling of the pump drive into account
- Have appropriate precautions in place if flammable media are used

6.2 Mechanical mounting

Protect the product from impacts, shocks and strong vibrations

The following mounting options (Fig. 4) are available:

- Through holes for M3 screws on the base (1)
- Holes for Ø3 self-tapping screws on the front (2))
- Holes for Ø3 self-tapping screws on the pump head for mounting on a front plate (dashed line) to separate the fluid and drive sides (3)

Tighten the screws to 0.5 Nm. For dimensions, measurements, and fluid connections, see the product data sheet.

6.3 Connection the fluid system

The tightness of the fluid connection must be checked using suitable means. For further information regarding dimensions, see the data sheet.

6.4 Electrical connection

For pin assignment, performance data, and control requirements, see Chapter 4 and the data sheet.

The regulatory requirements for electrical installations must be followed:

- Overload protection and isolating protective devices in accordance with the current rating on the nameplate. The pump must be fused individually.
- Touch protection and additional insulation
- Grounding connections
- Protection against vibrations, tensile loads, and corrosion
- A DC power supply must be used that does not transmit transient overvoltages >500 V to the pump via the connection cable.

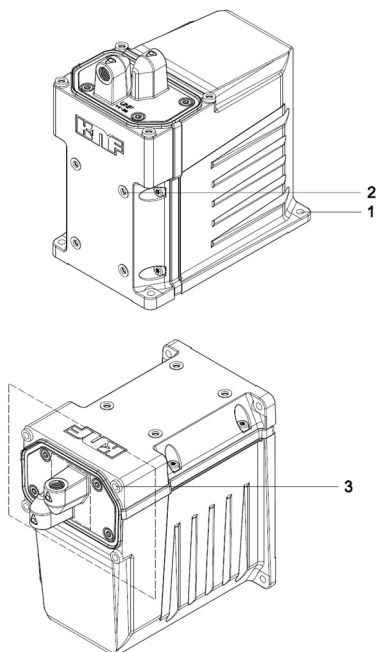


Fig. 4: Mounting options

- Recommended cable lengths
 - Analog / digital interface (12-PIN connector): < 3 m
 - Serial interface (5-PIN connector)
 - UART TTL: < 3 m
 - RS-232 and CAN: > 3 m
 - Combination (12-PIN connector & 5-PIN connector): < 3m
 - Note: External EMC measures may be necessary for longer cables.

7 Initial start-up

The product may not be put into service until it has been determined that the machine in which the product is to be installed complies with the provisions of the Machinery Directive 2006/42/EC, if applicable.

WARNING

Danger of rupture of the fluid system as a consequence of overpressure

The pump builds up pressure. In a closed system, it is possible that the maximum permitted operating pressure may be exceeded. This can cause injuries or damage to the product and system.

- Prevent operation against a closed system.
- In the case of parts that are in contact with the fluid, use only those that are designed for the system's operating pressure as a minimum.
- The pump stops automatically if the pressure exceeds the permissible limit or the temperature becomes too high (see chapter 9: LED status display).



CAUTION

Danger of unexpected chemical reactions with water

Water residues left in the product from testing in the factory may react with the transferred medium.

- Before putting the product into service, flush it with a medium that is not critical with regard to water.





⚠ CAUTION

Danger of hot surfaces

The pump becomes hot during operation. Burns may be caused by hot surfaces or injuries may occur as a result of uncontrolled movements.

- The pump must not be operated without its housing.
- Do not touch the pump while it is operating.
- Ensure sufficient cool air and keep an appropriate distance to adjacent components.
- Operate the pump in accordance with the technical data.
- At medium temperatures above 50°C, take safety precautions against burns on fluid components.

Before switching on the product, check the following:

- All hoses attached properly
- Pump is mechanically secured
- Specifications of the power supply correspond with the data on the pump's type plate
- Product outlet not blocked
- All cables properly connected
- Contact protection for electrical connections and moving parts installed

Notes:

- The product can be parameterized so that the pump starts transferring the medium immediately when the power supply is applied. Parameterization is carried out via the serial interface.
- The product automatically detects various device states such as warnings, malfunctions, and defects (see chapter 9 LED status display). In the event of a malfunction (flashing red, motor stops), a so-called SelfReset mechanism is activated: As soon as the cause of the malfunction is resolved, the device automatically switches back to normal operation and the motor restarts independently.



⚠ CAUTION

Risk of the pump starting up unexpectedly

- When operating in autostart mode, ensure that there is no danger from the pump starting up directly.
- For the cases of malfunction, ensure that no danger arise from the automatic restart (SelfReset mechanism).
- To ensure a safe shutdown, disconnect the power supply to the product.

**⚠ CAUTION****Danger from rotating and moving parts**

Moving parts may cause injury to the hands.

- The pump must not be operated without the housing.

8 Maintenance



⚠ WARNING

Health hazard due to hazardous substances in the pump

Depending on the medium being pumped, chemical burns or poisoning are possible.

- Wear protective equipment if necessary, e.g., protective gloves
- Flush the pump with a neutralizing liquid and then pump it empty.

Nr.	Tools
1	Torque wrench
1	Socket wrench bit Torx T10
1	Socket wrench bit Torx T8
1	Slotted screwdriver

8.1 Preparing for disassembly

1. Rinse the pump with a suitable neutralizing liquid and make sure that there are no dangerous substances left in the pump (see warnings above).
2. Pump the unit empty.
3. Disconnect electrical connections.
4. Remove hoses from the pump head.

8.2 Removing the pump head

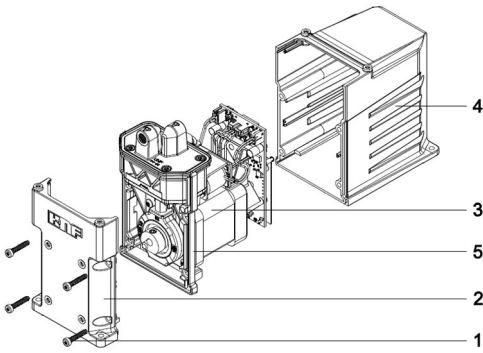


Fig. 5

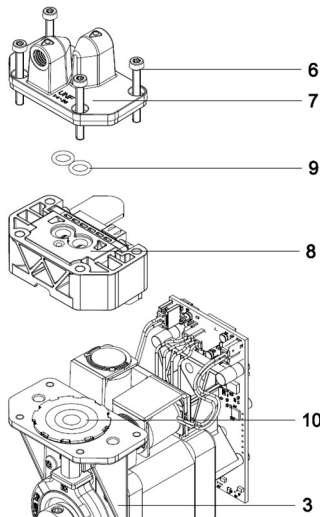


Fig. 6

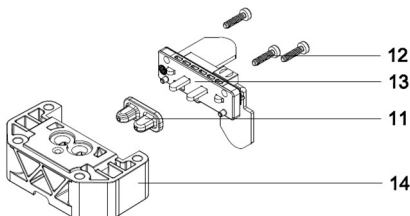


Fig. 7

1. Loosen the housing screws (1) and remove the housing cover (2).
2. Remove the pump (3) from the housing (4).
3. Loosen (6) head screws. (Fig. 6)
4. Remove the connection plate (7), valve assembly (8), and O-rings (9).
5. The surface of the diaphragm (10) can be cleaned. The diaphragm (10) may only be replaced by KNF, as the diaphragm clearance must be adjusted with washers!
6. Thoroughly clean the valve assembly (8) with integrated valve (11) of all residues. Blow out the fluid channels with compressed air while operating the valve plates by hand.
7. If the valve (11) is to be removed, loosen the three valve drive screws (12) and the valve drive assembly (13) can be pulled out. (Fig. 7)
8. Carefully pull the valve (11) off the metal tongues using a flat-bladed screwdriver.

8.3 Mounting the pump head

1. Place valve (11) on sheet metal tabs.
2. Insert valve drive assembly (13) into intermediate plate (14) and tighten valve holder screws (12) to a torque of 0.7 Nm.
3. Place O-rings (9) on connection plate (7).
4. Position the valve assembly (8) on the diaphragm (10) and place the connection plate (7) on top.
5. Screw in the cap screws (6) and tighten them crosswise to a torque of 1 Nm.
6. Place the gasket (5) over the connection plate (7) and secure it at the bottom in the pockets.
7. Insert the pump (3) with the seal (5) into the housing (4). Ensure that the sealing lips are positioned correctly.
8. Place the housing cover (2) on the seal (5) and ensure that the sealing lips are correctly positioned.
9. Fit the housing screws (1) and tighten to a torque of 0.5 Nm.

9 LED status display

The product has a built-in LED status display, which can assume the following statuses.

LED status	Cause	Remedy
Continuous green light	Normal operation	-
Green, flashing (Warning, engine continues to run)	Invalid value entered via the serial interface	Set permissible values for the parameters (see separate interface documentation) or use KNF Connect. Values for certain parameters are corrected automatically.
	Motor does not reach the specified speed in prime mode	Check the system for impermissible mechanical and fluidic resistance.
Red, flashing (fault, motor is stopped) <i>SelfReset: Once the fault has been rectified, the device returns to normal operation (continuous green light). In the case of serial control, the start command must be sent again.</i>	Supply voltage too high or too low	Check and maintain voltage according to specifications.
	Excessive temperature in the housing <i>(temperature above 80 °C in the electronics area)</i>	Ensure permissible temperatures for media and environment according to specification.
Continuous red light (critical malfunction or defect, motor is stopped) <i>Reset: Power OFF/ON necessary.</i>	Back pressure too high and outside specifications (>7 bar)	Eliminate the cause of excessive back pressure.
	Signal interference position sensor	Check whether a strong magnetic field is affecting the position sensor (AMR). (max. 50 mT on the housing surface in the area of the type plate)
	Position controller mechanically malfunctioning	Due to excessive mechanical resistance, the position controller cannot follow the setpoint. Disconnect power from the product. Check for unusual mechanical resistance (e.g., bearing defect).
	Motor is blocked or does not rotate despite being activated.	Disconnect power from the product. Check the motor for mechanical blockages and inspect the cable for visible damage.
	Internal communication error	Reset: Power OFF/ON required. If error persists (steady red light), check further points.

If the fault cannot be rectified, please refer to chapter «10 Rectifying dosing problems»

10 Rectifying dosing problems

Symptom	Cause	Remedy
Pump not working, no movement or noise detectable	No or incorrect control	Check LED status, supply voltage, and control signals
Pump does not prime or vacuum is insufficient	External valve is closed	Check external valves
	Back pressure on pressure side too high	Change pressure conditions on the pressure side
	Particles in the pump head	Flush the pump head Use preventive pre-filters
Pump not pumping	External valve is closed or filter is clogged or too small	Check LED status, external valves, and filters
	Connections or lines are blocked	Check connections or cables Remove blockage
Dosing volume is inaccurate	System conditions differ greatly from factory calibration	Perform adjustment in the system and adjust the dosing setting (see Chapter 5)
	Pump does not perform the specified number of shots	Check control signals according to specifications. Especially run pulses to frequency (Fig. 2)
Dosing accuracy is insufficient or unstable	Incorrect control	Check control signals according to specifications. For analog control, check the accuracy of the voltage values at the pump connector (KNF Connect recommended).
	Hydraulic lines have too small a cross-section or are restricted	Disconnect the pump from the system to determine performance values. If necessary, remove any throttling (e.g., valve). If necessary, use pipes or connection parts with a larger cross-section. Adjust the dosing settings (Chapter 6): Reduce the frequency. Change the suction ratio.
	Air in pump or fluid system	Ensure that the pump and the entire fluid system are properly filled. Air in the system has a negative effect on dosing accuracy.
	Higher back pressure in the system than assumed for design	Contact KNF representative
	Particles in the pump head	Flush the pump head Use preventive pre-filters Clean the pump head
	Pump has reached the end of its service life	Replace pump
Leakage at the pump head	Defective membranes or valves	Replace pump or valves

If the fault cannot be rectified, please contact your local KNF representative. (www.knf.com)

11 Accessories/Options

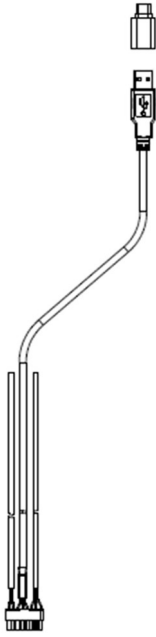


Fig. 8, Starter-Kit Kabel

Accessories	Id-Number
Starter kit USB to UART TTL cable	358830
Filter FS 60 T, PVDF, 70 μ m Mesh, UNF 1/4"	346932
Filter FS 60 X, PEEK, 35 μ m Mesh, UNF 1/4"	323625

12 Returning the product

KNF undertakes to repair the product only on condition that the customer provides a certificate of the pumped medium and cleaning of the pump. To do this, please follow the instructions at www.knf.com/repairs.

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

13 Appendix

13.1 RoHS Deklaration for China

SJ-T 11364-2024 Hazardous Substance Disclosure Table / SJ-T 11364-2024 有害物质含量表

This declaration is valid for the KNF products produced by:
 本声明适用于由以下KNF公司生产的产品:

KNF Flodos AG

CH-6210 Sursee

Switzerland

The following information has been made available to comply with SJ-T 11364-2024 the Marking for Control of Pollution Caused by Electronic Information Products as required by China's Management Methods for the Control of Pollution from Electronic Information Products. 提供以下信息旨在遵守中国《电子信息产品污染控制管理办法》所要求的 SJ-T 11364-2024 《电子信息产品污染控制标识》标准。

Part Name 部件名称	Hazardous Substances Table 有害物质含量表						EFUP / 环境友好使用期限	China RoHS comment / 中国RoHS注释	EU RoHS compliant 符合欧盟RoHS指令
	Lead 铅 (Pb)	Mercury 汞 (Hg)	Cadmium 镉 (Cd)	Hexavalent Chromium 六价铬 (Cr(VI))	Polybrominated biphenyls 多溴联苯 (PBB)	Polybrominated diphenyl ethers 多溴二苯醚 (PBDE)			
Pump head / 泵头	X	0	0	0	0	0	20	Lead within EU RoHS exemption limit / 铅含量在欧盟RoHS豁免限值以内	Yes / 是
Pump housing / 泵体	X	0	0	0	0	0	20	Lead within EU RoHS exemption limit / 铅含量在欧盟RoHS豁免限值以内	Yes / 是
Pump motor / 泵的电机电机	X	0	0	0	0	0	20	Lead within EU RoHS exemption limit / 铅含量在欧盟RoHS豁免限值以内	Yes / 是
Additional components for systems / 系统附加部件	X	0	0	0	0	0	20	Lead within EU RoHS exemption limit / 铅含量在欧盟RoHS豁免限值以内	Yes / 是
O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ-T 11364-2024. 表示该有害物质在该部件所有均质材料中的含量均在 SJ-T 11364-2024 规定的限量要求以下。 X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ-T 11364-2024. 表示该有害物质至少在该部件的某一均质材料中的含量超出 SJ-T 11364-2024 规定的限量要求。									
EFUP / 环境友好使用期限: Environment Friendly Using Period / 环境友好使用期									

