



## Swing Piston Compressors and Vacuum Pumps

NPK 018 AC Pressure

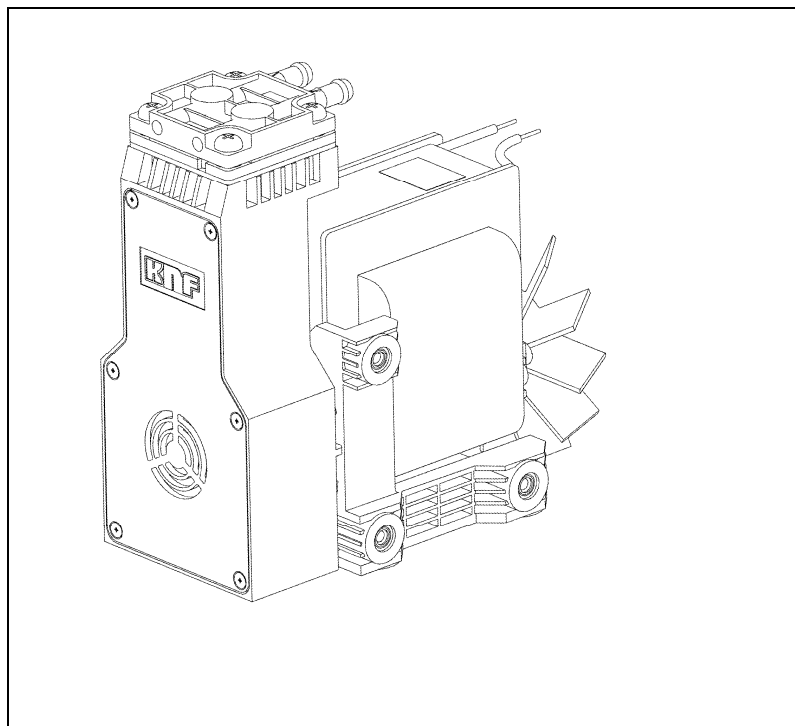
NPK 018 AC Vacuum

NPK 018 DC Pressure

NPK 018 DC Vacuum

### Operating and Installation Instructions

Read and observe these Operating and Installation Instructions!



KNF Neuberger GmbH  
Alter Weg 3  
D-79112 Freiburg  
Germany  
Tel. +49-(0)7664-5909-0  
Fax +49-(0)7664-5909-99  
E-Mail: [info@knf.de](mailto:info@knf.de)  
[www.knf.de](http://www.knf.de)

#### Contents

#### Page

1. About this document.....	2
2. Use .....	3
3. Safety .....	4
4. Technical Data .....	6
5. Installation and connection.....	8
6. Operation.....	10
7. Troubleshooting.....	12
8. Accessory .....	13
9. Returns.....	14
10. Health and safety clearance and decontamination form.....	15

# 1. About this document

## 1.1. Using the Operating and Installation Instructions

The Operating and Installation Instructions are part of the pump.

- ➔ Pass on the Operating and Installation Instructions to the next owner.

Project pumps

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

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

## 1.2. Symbols and markings

### Warning



**WARNING**

A danger warning is located here.

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

Warning, indicates the danger level.

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

### Danger levels

Signal word	Meaning	Consequences if not observed
<b>DANGER</b>	warns of immediate danger	Death or serious injuries and/or serious damage are the consequence.
<b>WARNING</b>	warns of possible danger	Death or serious injuries and/or serious damage are possible.
<b>CAUTION</b>	warns of a possibly dangerous situation	Minor injuries or damage are possible.

Tab. 1

### Other information and symbols

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

1. The first step of an activity to be carried out is specified here. Additional, consecutively numbered steps follow.

**i** This symbol refers to important information.

## 2. Use

### 2.1. Proper use

The pumps are designed for pumping air.

#### 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.

Requirements for transferred medium

When using a medium other than air: Before using a medium, check whether the medium can be transferred danger-free in the specific application case.

Before using a medium, check the compatibility of the materials of the pump head, swing piston and piston seal with the medium.

### 2.2. Improper use



**WARNING**

Hazard of explosion when the surrounding atmosphere is explosive

→ The pumps may not be operated in an explosive atmosphere.



**WARNING**

Hazard of explosion from combustible and potentially explosive media

→ The pumps may not be used to pump combustible or potentially explosive media.

The pumps are not suitable for transferring dusts.

The pumps are not suitable for pumping vapors or liquids.

An overpressure must not be applied to the suction side of the pump.

### 3. Safety

**i** Note the safety precautions in sections 5. *Installation and connection*, and 6. *Operation*.

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

Only use the pumps in proper technical condition and in accordance with its intended use in a safety and danger-conscious manner while observing the Operating and Installation Instructions.

Personnel	<p>Make sure that only trained and instructed personnel or specially trained personnel work on the pump. This especially applies to assembly, connection and servicing work.</p> <p>Make sure that the personnel has read and understood the Operating and Installation Instructions, and in particular the "Safety" chapter.</p>
Working in a safety-conscious manner	Observe the accident prevention and safety regulations when performing any work on the pump and during operation.
Handling dangerous media	When transferring dangerous media, observe the safety regulations when handling these media.
Environmental protection	Store all replacement parts in a protected manner and dispose of them properly in accordance with the applicable environmental protection regulations. Observe the respective national and international regulations. This especially applies to parts contaminated with toxic substances.
EC Directives / Standards	<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 is in conformity with the provisions of the Machinery Directive 2006/42/EC. The following essential requirements of Annex I of Directive 2006/42/EC (general principles) are applied and observed:</p> <ul style="list-style-type: none"> <li>- General Principles No. 1</li> <li>- No. 1.1.2. / 1.1.3. / 1.3.1. / 1.3.3. / 1.3.4. / 1.4.1. / 1.5.1.* / 1.5.2.* / 1.5.8. / 1.5.9. / 1.7.4. / 1.7.4.1. / 1.7.4.3.</li> </ul> <p>(* only for pump type NPK 018 AC)</p> <p>As these partly completed machinery are OEM-models the power supplies and the equipment for disconnecting and switching-off the partly completed machinery respectively have to be considered when mounting as well as over-current and overload protective gear.</p> <p>In addition a protection against mechanical parts in motion and hot parts, if existing, has to be provided when mounting.</p>



The pumps conform to the Directive 2011/65/EU (RoHS2).

The pumps conform to the EC Directive 2004/108/EC concerning Electromagnetic Compatibility.

The following harmonized standards have been used:

NPK 018 AC	NPK 018 DC
DIN EN 55014-1/2	DIN EN 55014-1/2
DIN EN 61000-3-2/3	DIN EN 61000-3-2/3
DIN EN 60335-1	DIN EN 61000-6-1/3

Tab. 2

Customer service and repairs

Only have repairs to the pump carried out by the KNF Customer Service responsible.

## 4. Technical Data

### Pump materials

Assembly	Material
Head plate; cylinder	PPS
Valve plate	FPM
Piston seal	PTFE
Retainer plate	Aluminium

Tab. 3

### Pneumatic values

NPK 018 AC Vacuum

NPK 018 DC Vacuum

Parameter	Value
Max. permissible operating pressure [bar g]	-
Ultimate vacuum [mbar abs.]	120
Delivery rate at atm. pressure [l/min]*	18

Tab. 4 \*Liters in standard state (1,013 mbar)

NPK 018 AC Pressure

Parameter	Value
Max. permissible operating pressure [bar g]	1.5
Ultimate vacuum [mbar abs.]	-
Delivery rate at atm. pressure [l/min]*	15

Tab. 5 \*Liters in standard state (1,013 mbar)

NPK 018 DC Pressure

Parameter	Value
Max. permissible operating pressure [bar g]	1.5
Ultimate vacuum [mbar abs.]	-
Delivery rate at atm. pressure [l/min]*	18

Tab. 6 \*Liters in standard state (1,013 mbar)

### Electrical data

Parameter	Value
Electrical data	See type plate
Protection class	IP 00

Tab. 7

The ac motors used are fitted as standard with a thermal-switch to protect against overloading.

**Other parameters**

Parameter	Values
Permissible ambient temperature	+ 5 °C bis + 40 °C
Permissible media temperature	+ 5 °C to + 40 °C
Gas-tightness	The gas-tightness of the pump is dependent on the medium used.*

*Tab. 8*

\* If you have questions about this, please contact your KNF advisor.

### 5. Installation and connection

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

Observe the safety precautions (see Chapter 3).

#### 5.1. Installation

- Before installation, store the pump at the installation location to bring it up to room temperature.
- See the data sheet for the mounting dimensions.

Mounting dimensions

Protection against touching and foreign objects

For pumps with AC motors:



**WARNING**

Hazard of injuries during operation

- Take protective measures against touching parts connected to electrical power (electrical connection, possibly motor coils).
- Take protective measures against touching moving parts (e.g. fans).

Hazard of damage to the pump during operation

- Take protective measures against foreign objects which could enter the pump.

Cooling air supply

- For pumps with motor fan: Install the pump so that the motor fan can intake sufficient cooling air.

Installation location

- Make sure that the installation location is dry and the pump is protected against rain, splash, hose and drip water.
- Install the pump at the highest point in the system to prevent condensate from collecting in the pump head.
- Protect the pump from dust.
- Protect the pump from vibrations and jolts.

#### 5.2. Electrical connection



**DANGER**

Extreme danger from electrical shock

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

- In the electrical installation, arrangements (complying with EN 60335-1) must be made for disconnecting the pump motor from the electrical supply.

- For pumps with AC motors KNF recommends that a fuse is installed in the motor supply circuit (overcurrent release).

- i** → For operating current see type plate or data sheet.



**Connecting pump**

1. Compare the supply data with the data on the motor-plate.

**i** At AC motors the voltage must not vary by more than + 10% and - 10% from that shown on the type-plate.

2. Connect the plus and minus pole.

**i** With DC motors, note the proper polarity:  
red motor cable: +  
black motor cable: -

3. Connect the earth (ground) wire to the motor (not necessary on dc motors up to 24 V).

**5.3. Pneumatic connection**

- |                      |   |
|----------------------|---|
| Connected components | → Only connect components to the pump which are designed for the pneumatic data of the pump (see Chapter4, Technical data). |
| Pump exhaust         | → If the pump is used as a vacuum pump, safely discharge the pump exhaust.  |

**Connecting pump**

**i** A marking on the pump head shows the direction of flow.

1. Remove the protective plugs from the hose connectors.
2. The accessory silencer/filter (where applicable) is put onto the hose connector.
3. Connect the suction line and pressure line (tube ID 6 mm).
4. Lay the suction and pressure line at a downward angle to prevent condensate from running into the pump.

## 6. Operation

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

Make sure the pumps are used properly (see section 2.1).

Make sure the pumps are not used improperly (see section 2.2).

Observe the safety precautions (see Chapter 3).



### WARNING

Hazard of the pump head bursting due to excessive pressure increase

- Do not exceed max. permissible operating pressure (see Chapter 4, Technical data).
- Only throttle or regulate the air quantity (the gas quantity) in the suction line to prevent the maximum permissible operating pressure from being exceeded.
- If the air quantity (the gas quantity) in the pressure line is throttled or regulated, make sure that the maximum permissible operating pressure is not exceeded.
- Watch pressure during operation.
- If the pressure reaches the maximum permissible operating pressure of the pump, shut down pump and eliminate faults (see section 7).

**i** Excessive pressure (with all of the related hazards) can be prevented by placing a bypass line with a pressure-relief valve between the pressure and suction sides of the pump. For further information, contact our technical adviser (see front page for telephone number).

- Pump standstill → With the pump at a standstill, open pressure and suction lines to normal atmospheric pressure.
- Thermal switch For pumps with thermal switch: When the operation of the pump is interrupted by the thermal switch, the pump will restart automatically after cooling down.
- Take all necessary care to prevent this leading to a dangerous situation.
- Silencer/filter Change the silencer/filter (accessory) if it is dirty.

### 6.1. Switching pump on and off

#### Switching pump on

**i** The pump may not start up against pressure or vacuum during switch-on. This also applies in operation following a brief power failure.

- Make sure that normal atmospheric pressure is present in the lines during switch-on.

## 7. Troubleshooting



Extreme danger from electrical shock!

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

**DANGER** → Make sure the pump is deenergized and secure.

Check the pump (see Tab. 9 and 10).

<b>Pump does not transfer</b>	
Cause	Fault remedy
Thermal switch has operated following to over-heating.	<ul style="list-style-type: none"> <li>→ Disconnect pump from mains.</li> <li>→ Allow pump to cool.</li> <li>→ Trace cause of over-heating and eliminate it.</li> </ul>
Connections or lines blocked.	<ul style="list-style-type: none"> <li>→ Check connections and lines.</li> <li>→ Remove blockage.</li> </ul>
External valve is closed or filter is clogged.	<ul style="list-style-type: none"> <li>→ Check external valves and filters.</li> </ul>
Condensate has collected in pump head.	<ul style="list-style-type: none"> <li>→ Install pump at highest point in system.</li> </ul>
Piston seal or valve plates are worn.	<ul style="list-style-type: none"> <li>→ Replace pump.</li> </ul>

Tab. 9

<b>Flow rate, pressure or vacuum too low</b>	
The pump does not achieve the output specified in the Technical data or the data sheet.	
Cause	Fault remedy
Condensate has collected in pump head.	<ul style="list-style-type: none"> <li>→ Install pump at highest point in system.</li> </ul>
There is gauge pressure on pressure side and at the same time vacuum or a pressure above atmospheric pressure on suction side.	<ul style="list-style-type: none"> <li>→ Change the pressure conditions.</li> </ul>
Pneumatic lines or connection parts have an insufficient cross section.	<ul style="list-style-type: none"> <li>→ Disconnect pump from system to determine output values.</li> <li>→ Eliminate throttling (e.g. valve) if necessary.</li> <li>→ Use lines or connection parts with larger cross section if necessary.</li> </ul>
Leaks occur on connections, lines or pump head.	<ul style="list-style-type: none"> <li>→ Eliminate leaks.</li> </ul>
Connections or lines completely or partially jammed.	<ul style="list-style-type: none"> <li>→ Check connections and lines.</li> <li>→ Remove the jamming parts and particles.</li> </ul>
Head parts are soiled.	<ul style="list-style-type: none"> <li>→ Clean head components.</li> </ul>
Piston seal or valve plates are worn.	<ul style="list-style-type: none"> <li>→ Replace pump.</li> </ul>

Tab. 10

**Fault cannot be rectified**

If you are unable to determine any of the specified causes, send the pump to KNF Customer Service (see last page for the address).

1. Flush the pump to free the pump head of dangerous gases. For this purpose, flush the pump under atmospheric conditions some minutes with air (if necessary for safety reasons: with an inert gas).
2. Remove the pump.
3. Clean the pump.
4. Send the pump, together with completed Health and Safety Clearance and Decontamination Form (Chapter 10), to KNF stating the nature of the transferred medium.

**8. Accessory**

Accessories	Order No.
Silencer/filter	058987

Tab. 11

## 9. Returns

Pumps and systems used in laboratories and process-based industries are exposed to a wide variety of conditions. This means that the components contacting pumped media could become contaminated by toxic, radioactive, or otherwise hazardous substances.

For this reason, customers who send any pumps or systems back to KNF must submit a Health and safety clearance and decontamination form in order to avoid a hazardous situation for KNF employees. This Health and safety clearance and decontamination form provides the following information, among other things:

- physiological safety
- whether medium-contacting parts have been cleaned
- whether the equipment has been decontaminated
- media that have been pumped or used

and must declare physiological safety. To ensure worker safety, work may not be started on pumps or systems without a signed Health and safety clearance and decontamination form.

For optimal processing of a return, a copy of this declaration should be sent in advance via e-mail, regular mail, or fax to KNF Customer Service (refer to final page for address). In order to avoid endangering employees who open the shipment's packaging, despite any residual hazards, the original version of the Health and safety clearance and decontamination form must accompany the delivery receipt on the outside of the packing.

The template for the Health and safety clearance and decontamination form is included with these operating instructions and may also be downloaded from the KNF website.

The customer must specify the device type(s) and serial number(s) in the Health and safety clearance and decontamination form in order to provide for the unambiguous assignment of the Declaration to the device that is sent to KNF.

In addition to the customer's declaration of physiological safety, information about operating conditions and the customer's application are also of importance to ensure that the return shipment is handled appropriately. Therefore, the Health and safety clearance and decontamination form requests this information as well.

### 10. Health and safety clearance and decontamination form



Form: Rev. 00 / download: [www.knf.com](http://www.knf.com)

#### Health and safety clearance and decontamination form

This declaration must be present and complete (the original must accompany the shipment's delivery receipt) before the returned device can be examined.

Device type: .....

Serial number(s): .....

.....

.....

Reason for returning the device (please describe in detail):

(The device(s) was(were) in operation  yes  no)

.....

.....

.....

.....

.....

We confirm that the above device(s)

has(have) pumped exclusively **physiologically unobjectionable** media and that it(they) are free of hazardous materials and any materials that are harmful to health.

The device(s) was(were) cleaned  yes  no

has(have) pumped media of the following category(categories) which are not physiologically unobjectionable and that cleaning of the device(s) (potentially only media-contacting parts) is required.

Name, chemical formula, Material Safety Data Sheet

aggressive .....

biological .....

radioactive .....

toxic .....

other .....

The device(s) was(were) decontaminated and work can proceed without special measures  yes

Method / proof: .....

.....

The device(s) was(were) not decontaminated and special measures are required before starting work  yes

Measures: .....

.....

Legally binding declaration

We herewith affirm that the information provided in this form is correct and complete. Shipment of the devices and components is in compliance with statutory regulations.

.....  
Company (stamp)

.....  
Date

.....  
Name

.....  
Authorized signature

.....  
Position

# KNF worldwide

---

## Benelux

Netherlands  
**KNF Verder B.V.**  
Utrechtseweg 4a  
NL-3451 GG Vleuten  
Tel. 0031 (0)30 677 92 40  
Fax 0031 (0)30 677 92 47  
E-mail: [info@knf-verder.nl](mailto:info@knf-verder.nl)  
[www.knf-verder.nl](http://www.knf-verder.nl)

## Benelux

Belgium, Luxembourg  
**KNF Verder N.V.**  
Kontichsesteenweg 17  
B-2630 Aartselaar  
Tel. 0032 (0)3 8719624  
Fax 0032 (0)3 8719628  
E-mail: [info@knf.be](mailto:info@knf.be)  
[www.knf.be](http://www.knf.be)

## China

**KNF Neuberger Trading**  
(Shanghai) Co., Ltd  
No. 36 Lane 1000  
Zhang Heng Road  
Shanghai 201203, P.R. China  
Tel. 0086 (0)21 685 965 66  
Fax 0086 (0)21 339 006 26  
E-mail: [info@knf.com.cn](mailto:info@knf.com.cn)  
[www.knf.com.cn](http://www.knf.com.cn)

## Germany

**KNF Neuberger GmbH**  
Alter Weg 3 D-79112 Freiburg  
Tel. 0049 (0)7664 5909-0  
Fax 0049 (0)7664 5909-99  
E-mail: [info@knf.de](mailto:info@knf.de)  
[www.knf.de](http://www.knf.de)

## France, Morocco, Algeria

**KNF Neuberger SAS**  
4, Bld. d'Alsace Z.I.  
F-68128 Village-Neuf  
Tel. 0033 (0)389 70 35 00  
Fax 0033 (0)389 69 92 52  
E-mail: [info@knf.fr](mailto:info@knf.fr)  
[www.knf.fr](http://www.knf.fr)

## Great Britain

**KNF Neuberger U.K. Ltd.**  
Avenue 2  
Station Lane  
Industrial Estate  
Witney Oxon OX28 4FA  
Tel. 0044 (0)1993 77 83 73  
Fax 0044 (0)1993 77 51 48  
E-mail: [info@knf.co.uk](mailto:info@knf.co.uk)  
[www.knf.co.uk](http://www.knf.co.uk)

## India

**KNF Pumps + Systems**  
**(India) Pvt. Ltd.**  
RAJIV GANDHI INFOTECH PARK  
Phase 1  
Ganga Estate, Survey No. 152/2/2  
Above AXIS BANK  
Hinjewadi  
Pune 411 057  
Tel. 0091 (0)20 640 13 923  
0091 (0)20 640 08 923  
Fax 0091 (0)20 229 33 923  
E-mail: [info@knfpumps.in](mailto:info@knfpumps.in)  
[www.knfpumps.in](http://www.knfpumps.in)

## Italy

**KNF ITALIA S.r.l.**  
Via Flumendosa, 10  
I-20132 Milano  
Tel. 0039 02 27 20 38 60  
Fax 0039 02 27 20 38 48  
E-mail: [info@knf.it](mailto:info@knf.it)  
[www.knf.it](http://www.knf.it)

## Japan

**KNF Japan Co.Ltd.**  
Across Shinkawa Bldg. Annex 3F  
1-16-14 Shinkawa, Chuo-ku,  
Tokyo, Japan 104-0033  
Tel. 0081 (0)3 3551-7931  
Fax 0081 (0)3 3551-7932  
E-mail: [info@knf.co.jp](mailto:info@knf.co.jp)  
[www.knf.co.jp](http://www.knf.co.jp)

## Korea

**KNF Neuberger Ltd.**  
Woosan Bldg. RM#202,  
336-4, Hwiyung-Dong  
Dongdaemun-Ku.,  
130-090, Seoul  
Tel. 0082 (0)2 959-0255/6  
Fax 0082 (0)2 959-0254  
E-mail: [knf@knfkorea.com](mailto:knf@knfkorea.com)  
[www.knfkorea.com](http://www.knfkorea.com)

## Sweden, Denmark, Finland, Norway

**KNF Neuberger AB**  
Mejerivägen 4,  
P.O. Box 44060  
SE-10073 Stockholm  
Tel. 0046 (0) 87445113  
Fax 0046 (0) 87445117  
E-mail: [info@knf.se](mailto:info@knf.se)  
[www.knf.se](http://www.knf.se)

## Switzerland

Sales  
**KNF Neuberger AG**  
Stockenstrasse 6  
CH-8362 Balterswil  
Tel. 0041 (0)71 973 993 0  
Fax 0041 (0)71 973 993 1  
E-mail: [knf@knf.ch](mailto:knf@knf.ch)  
[www.knf.ch](http://www.knf.ch)

## Taiwan

**KNF Neuberger Ltd.**  
9-2 FL., No., 24, Lane 123,  
Section 6,  
Ming Chuan East Road  
Taipei City, Taiwan  
Tel. 00886-2-2794-1011  
Fax 00886-2-8792-1648  
E-mail: [knftwn@knftwn.com.tw](mailto:knftwn@knftwn.com.tw)  
[www.knftwn.com.tw](http://www.knftwn.com.tw)

## USA, Canada, Latin America

**KNF Neuberger, Inc.**  
Two Black Forest Road  
Trenton, New Jersey  
08691-1810  
Tel. 001 (609) 890-8600  
Fax 001 (609) 890-8323  
E-mail: [knfusa@knf.com](mailto:knfusa@knf.com)  
[www.knfusa.com](http://www.knfusa.com)  
Latin America  
Direct phone: 001 609-649-1010  
E-mail: [gb@knf.com](mailto:gb@knf.com)

---

# KNF product centres

## Product centre for gas pumps:

**Germany**  
**KNF Neuberger GmbH**  
Alter Weg 3  
D-79112 Freiburg  
Phone 0049(0)7664 5909-0  
Fax 0049(0)7664 5909-99  
E-mail: [info@knf.de](mailto:info@knf.de)  
[www.knf.de](http://www.knf.de)

## Product centre for fluid pumps:

**Switzerland**  
**KNF FLODOS AG**  
Wassermatte 2  
CH-6210 Sursee  
Phone 0041(0)41 925 00 25  
Fax 0041(0)41 925 00 35  
E-mail: [info@knf-flodos.ch](mailto:info@knf-flodos.ch)  
[www.knf-flodos.ch](http://www.knf-flodos.ch)

## Product centre for micro pumps:

**Switzerland**  
**KNF Micro AG**  
Zelglmatte 1b  
CH-6260 Reiden  
Tel. 0041(0)62 787 88 88  
Fax 0041(0)62 787 88 99  
E-mail: [info@knf-micro.ch](mailto:info@knf-micro.ch)  
[www.knf-micro.ch](http://www.knf-micro.ch)