

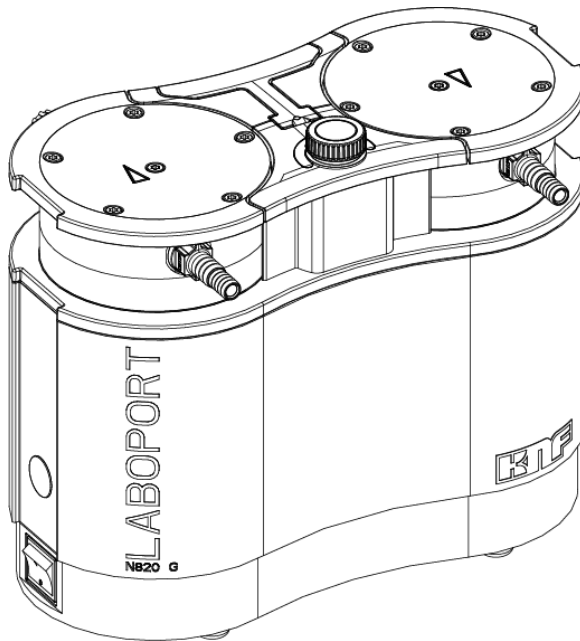
LAB

N820.18 CN / N840.18 CN

**TRANSLATION OF ORIGINAL
OPERATING INSTRUCTION
ENGLISH**

LABOPORT®

DIAPHRAGM PUMP



Notice!

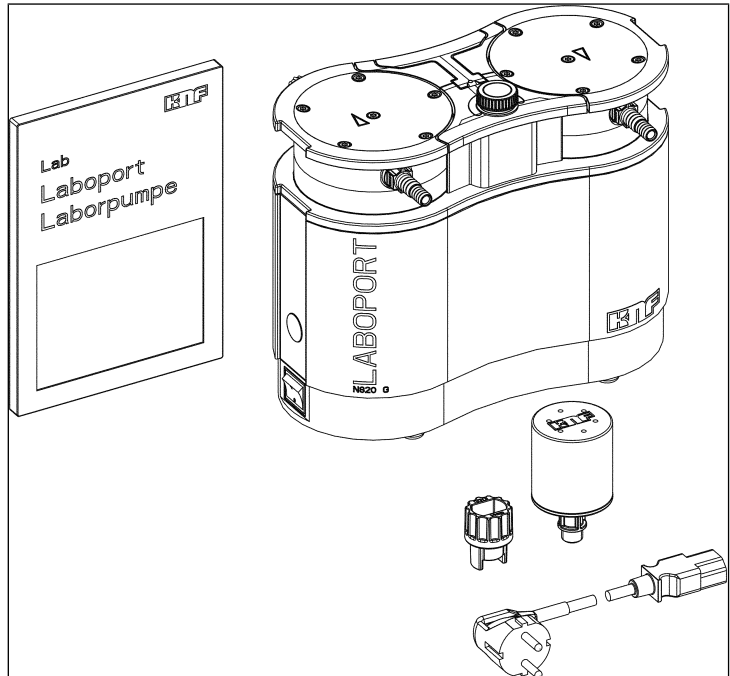
Before operating the pump and accessories, read and observe the operating and installation instructions as well as the safety information!

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1 Scope of delivery

- Key for hose connector (WAF 14)
- Power cable
- Silencer
- Operating instructions
- QuickStart



Unpacking the pump

1. Inspect the pump and the included accessories for transport damage after unpacking.
2. If the packaging is damaged, inform the responsible forwarding agent so that a damage report can be prepared. For further information, read Chapter 7 *Transport* [► 18].

2 About this document

2.1 Using the operating instructions

The operating instructions are part of the pump.

- In the event of uncertainties with regard to the content of the operating instructions, please contact the manufacturer (contact data: see *www.knf.com*). Please have the type and serial number of the pump ready.
- Read the operating instructions before you commission the pump.
- Only pass on the full and unchanged operating instructions to any subsequent owner.
- Keep the operating instructions within reach at all times.

Project pumps For customer-specific project pumps (pump models that begin with "PJ" or "PM"), there may be deviations from the operating and installation instructions.

- For project pumps, also observe the agreed specifications.

2.2 Exclusion of liability

The manufacturer assumes no liability for damages and malfunctions resulting from failure to observe the operating instructions.

The manufacturer assumes no liability for damages and malfunctions resulting from changes or modifications to the device and improper handling.

The manufacturer assumes no liability for damages and malfunctions resulting from impermissible spare parts and accessories.

2.3 Symbols and markings

Warning notice



A notice that warns you of danger is located here.

Possible consequences of a failure to observe the warning notice 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
DANGER	warns of immediate danger	Death or serious injury or serious damage will result.
WARNING	warns of possible danger	Death, serious injury or serious damage is possible.
CAUTION	warns of a possibly dangerous situation	Minor injury or damage is possible.
NOTICE	Warns of possible damage	Damage is possible.

Tab. 1: Danger levels













Other notices and symbols

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

1. The first step of an activity to be carried out is specified here.
Other sequentially numbered steps follow.

i This symbol indicates important information.

Explanation of pictograms

Pictogram	Meaning
	General warning symbol
	Warning of hot surface
	Warning of electrical voltage
	Warning of poisonous substances
	Warning of hand injuries through crushing
	ESD protected area
	Observe the operating instructions
	General mandatory sign
	Unplug mains plug
	Use foot protection
	Use hand protection
	Environmentally conscious disposal

Tab.2: Explanation of pictograms

3 Use

3.1 Proper use

The pumps are intended exclusively for transferring gases and vapors.

Responsibility of the owner

Operating parameters and conditions Only install and operate the pumps in accordance with the operating parameters and conditions described in Chapter 5 *Technical data* [► 12].

Only pumps that are fully assembled and in the condition as delivered may be operated.

Make sure that the installation location is dry and that the pump is protected against rain, splash, gushing, and drip water as well as from other contaminants.

Check the tightness of the connections between the pipes of the application and the pump (or the connection of the pump) at regular intervals. Leaky connections carry the risk of releasing dangerous gases and vapors from the pump system.

Requirements on the transferred medium Before transferring a medium, check whether the medium can be transferred danger-free in the specific application.

Before using a medium, check the compatibility of the media-contacting components (see 5 *Technical data* [► 12]) with the medium.

Only transfer gases that remain stable under the pressures and temperatures that arise in the pump.

Accessories Laboratory accessories or additional components that are connected to a pump must be designed for the pneumatic data of the pump (see 5 *Technical data* [► 12]).

3.2 Improper use

The pumps are not allowed to be operated in explosive atmospheres.

The pumps are not suitable for transferring:

- Dusts
- Liquids
- Aerosols
- Biological and microbiological substances
- Fuel
- Explosives and flammable materials
- Fibers
- Oxidants
- Food

Pumps that can produce both vacuum as well as overpressure may not be used to simultaneously produce vacuum and overpressure.

No overpressure may be applied to the suction side of the pump.

4 Safety

i Observe the safety information provided in the chapters entitled Installation and connection and Operation.

The pumps are produced in accordance with the generally recognized rules of engineering, as well as the occupational health, safety and accident prevention regulations. Nevertheless, dangers can arise during their use that lead to injuries to the user or third parties or to damage to the pump or other property.

Only use the pumps in perfect technical condition, for their intended use, safely and with an awareness of the dangers and in observation of the operating and installation instructions.

Make certain that the components that are to be connected to the pumps are designed according to the pneumatic data of the pumps.

When connecting the pumps to the electrical power, observe the corresponding safety rules.

Personnel Ensure that only specially trained and instructed personnel or specialist personnel work on the pumps. This applies in particular to assembly, connection and maintenance work.

Ensure that the personnel have read and understood the operating and installation instructions, particularly the chapter entitled Safety.

Working in a safety conscious manner Observe the regulations on accident prevention and safety during all work on the pumps and during operation.

Avoid contact with the heads and housing parts of the pump, as it heats up during operation.

Do not expose any body parts to the vacuum.

Ensure that no hazards arise from gas flowing when gas connections are open, from the effects of noise or from hot, corrosive, dangerous and environmentally hazardous gases.

Avoid the escape of hazardous, toxic, corrosive, harmful or environmentally hazardous gases or vapors, e.g. by using suitable laboratory equipment with fume cupboard and ventilation control.

Working with hazardous media When pumping hazardous media, follow the safety regulations that apply for working with these media.

Working with
combustible me-
dia and explo-
sive atmos-
pheres

Be aware that the pumps are not designed to be explosion-proof.

Make certain that the temperature of the medium is always sufficiently below the ignition temperature of the medium so as to prevent ignition or explosion. This also applies for abnormal operating situations.

Note here that the temperature of the medium increases as the pump compresses the medium.

You should therefore ensure that the temperature of the medium still remains far enough below the ignition temperature of the medium, even when it is compressed to the maximum permissible operating pressure of the pump. The maximum permissible operating pressure of the pump is stated in the technical data (5 *Technical data* [▶ 12]).

Where applicable, also take into account external energy sources (such as radiated heat sources) that might heat the medium further.

In case of doubt, contact KNF Customer Service.

Environmental
protection



Store and dispose of the pump, as well as all replacement parts, in accordance with applicable environmental regulations. Observe national and international regulations. This applies in particular to parts that are contaminated with toxic substances.



Dispose of packaging material that is no longer needed in an environmentally responsible manner. The packaging materials are recyclable.

Dispose of old devices in an environmentally responsible manner. Dispose of old devices via suitable collection systems. Old devices contain valuable recyclable materials.

EU/EC direc-
tives/standards

The pumps comply with directives:

- 2011/65/EU
- 2014/30/EU (EMC)
- 2006/42/EC.



The following harmonized standards are satisfied:

- EN 61326-1
- EN 61010-1
- EN 1012-2

- EN ISO 12100

Per IEC 664, the pumps comply with:

- Overvoltage category II
- Pollution degree 2

Customer service and repairs

The pumps are maintenance-free. However, KNF recommends periodic inspections to check the pump for obvious changes in noise and vibration.

Only have repairs to the pumps performed by the responsible KNF Customer Service department.

Housings with electrically live components may only be opened by specialist personnel.

Use only genuine spare parts from KNF when performing servicing work.

5 Technical data

Technical data

Pump materials

Assembly	Material
Pump head	Modified PTFE
Diaphragm	PTFE-coated
Valve	FFPM
Connection	PTFE/FFPM
Hose connector	PVDF/FFPM
Gas ballast	PTFE/FFPM

Tab.3: Pump materials

Pneumatic data

N820G

Parameter	Value
Max. permissible operating pressure [bar rel*]	0.1
Ultimate vacuum [mbar abs.]	
At min. speed:	
Gas ballast closed	≤ 6
Gas ballast open	≤17
At max. speed:	
Gas ballast closed	≤ 8
Gas ballast open	≤15
Flow rate at atm. pressure [l/min]**	
At min. speed:	10 ± 10%
At max. speed:	20 ± 10%

Tab.4: Pneumatic data N820G

*Bar rel related to 1013 hPa

**Liters in standard state (1013 hPa, 20°C)

N840G

Parameter	Value
Max. permissible operating pressure [bar rel*]	0.1
Ultimate vacuum [mbar abs.]	
At min. speed:	
Gas ballast closed	≤ 6
Gas ballast open	≤ 17
At max. speed:	
Gas ballast closed	≤ 8
Gas ballast open	≤ 15
Flow rate at atm. pressure [l/min]**	
At min. speed:	18 ± 10%
At max. speed:	34 ± 10%

Tab.5: Pneumatic data N840G

*Bar rel related to 1013 hPa

**Liters in standard state (1013 hPa, 20°C)

Pneumatic connections

Parameter	Value
Hose connection [mm] (stepped hose nipple)	ID 8 / 9.5

Tab.6: Pneumatic connections

Electrical data

Parameter	Value N820	Value N840
Voltage [V]	100 – 240	
Frequency [Hz]	50/60	
Power consumption [W]	60	100
Max. current consumption [A]	0.66 – 0.35	1.0 – 0.6
Max. permissible mains voltage fluctuations	± 10%	

Tab.7: Electrical data

Weight

Pump type	Weight [kg]
N820G	8.8
N840G	11.1

Tab.8: Weight

Other parameters

Parameter	Value
Permissible ambient temperature [°C]	+ 5 to + 40
Permissible media temperature [°C]	+ 5 to + 40
Highest permissible relative air humidity of the environment	80% for temperatures to 31°C, decreasing linearly to 50% at 40°C (non-condensing).
Maximum installation altitude [m above sea level]	2000
Protection class of pump	IP30
Dimensions L x H x W [mm] N820G	259 x 220 x 163
Dimensions L x H x W [mm] N840G	289 x 240 x 177
Equipment protection	<ul style="list-style-type: none"> ▪ Overcurrent protection ▪ Overtemperature protection (drive) ▪ Blocking protection (drive)

Tab.9: Other parameters

6 Product description and function

EN

Design

- 1 Pneumatic pump inlet
- 2 Handle
- 3 Rotary/push knob for:
 - Switching the pump on and off
 - Setting the pump speed
- 4 Pneumatic pump outlet
- 5 Power switch
- 6 Status display
- 7 Interface*

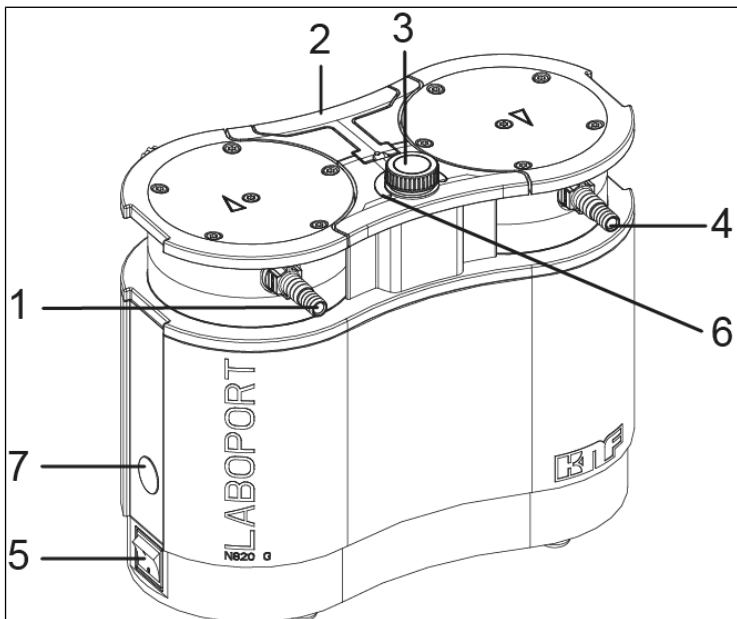


Fig. 1: Diaphragm pump (pump N820G shown)

*Interface:



NOTICE

Injury to property resulting from use of non-authorized accessories

- Only ever use accessories that are authorized by KNF (see the chapter entitled *12.2 Accessories* [▶ 42]).

Function of a diaphragm pump

- 1 Outlet valve
- 2 Inlet valve
- 3 Transfer chamber
- 4 Diaphragm
- 5 Eccentric
- 6 Connecting rod

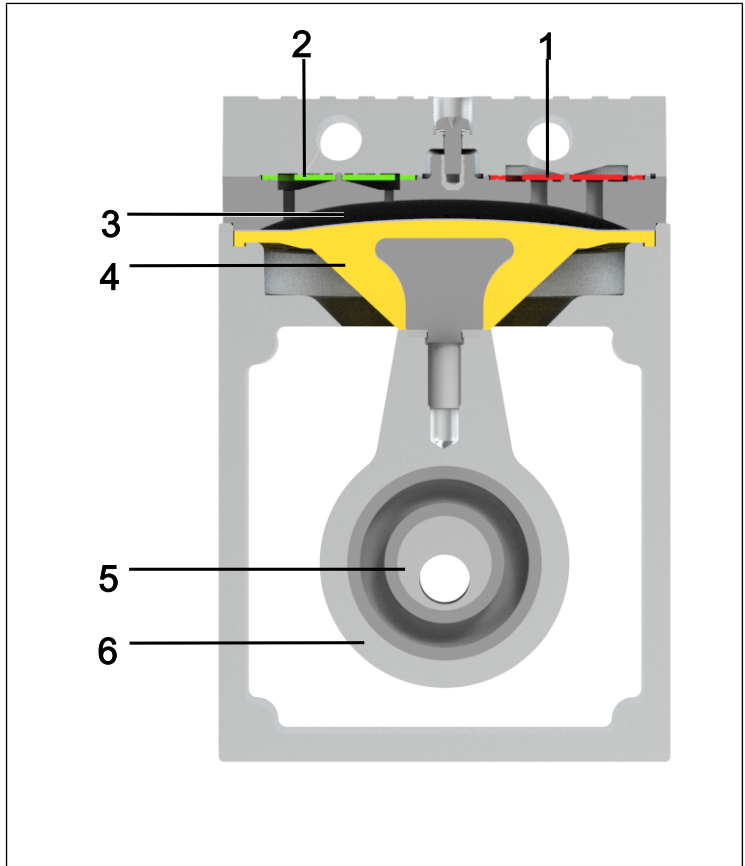


Fig.2: Function of a diaphragm pump

Diaphragm pumps transfer, compress (depending on the version) and evacuate gases and vapors.

The elastic diaphragm (4) is moved up and down by the eccentric (5) and the connecting rod (6). In the downwards stroke, it aspirates the gas to be transferred via the inlet valve (2). In the upwards stroke, the diaphragm presses the medium out of the pump head via the outlet valve (1). The transfer chamber (3) is separated from the pump drive by the diaphragm.

6.1 Gas ballast

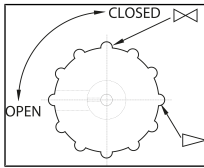


Fig.3: Operating button for gas ballast



DANGER

Personal injury through poisoning or explosion and damage to the pump

- When the gas ballast valve is open, make sure that no reactive or explosive mixtures can form.
- Close the gas ballast valve if necessary.
- If inert gas is necessary, contact KNF Service.

- i** If vaporous media are transferred, the formation of condensate in the pump heads can be minimized by opening the gas ballast valve.
- i** The final vacuum that can be achieved is worse when the gas ballast valve is open (see the chapter entitled 5 *Technical data* [▶ 12]).

7 Transport

General



CAUTION

Personal injury and/or property damage due to incorrect or improper transport of the pump

In the event of incorrect or improper transport, the pump can fall down, be damaged or injure persons.

- Use suitable auxiliary means if necessary (carrying strap, lifting gear, etc.).
 - Where appropriate, wear suitable personal protective equipment (e.g., safety shoes, safety gloves).
-



CAUTION

Risk of injury from sharp edges on the packaging

There is a risk of injury from cutting on the sharp edges when grabbing corners or when opening the packaging.

- Where appropriate, wear suitable personal protective equipment (e.g., safety shoes, safety gloves).
-

- Transport the pump in the original packaging to the installation location.
- Store the original packaging of the pump (e.g. for later storage).
- Inspect the pump for transport damage after receiving it.
- Document any transport damage in writing.

→ Remove any transport locking devices on the pump prior to commissioning.

Parameter

Parameter	Value
Storage temperature [°C]	+ 5 to + 40
Permissible humidity (non-condensing) [%]	30 to 85

Tab.10: Transport parameter and storage parameter



NOTICE

Prior to commissioning, make sure that the pump has reached the ambient temperature (5 *Technical data* [▶ 12]).

8 Commissioning

Only connect the pump in accordance with the operating parameters and conditions described in Chapter 5 *Technical data* [▶ 12].

- Observe the safety instructions (see Chapter 4 *Safety* [▶ 9]).
- Before connecting, store the pump at the installation location to allow it to reach the room temperature (no condensate may form).

Cooling air supply



WARNING

Danger of burning on hot surfaces

Hot surfaces could occur if the pump overheats.

- When installing the pump, make sure that sufficient cooling air in-feed and discharge is ensured.

Installation location

- Make sure that the installation location is dry and that the pump is protected against rain, splash, gushing, and drip water as well as from other contamination.
- Select a secure location (flat surface) for the pump.
- Protect the pump from dust.
- Protect the pump from vibration, impact and external damage.
- Make sure that it is easy to operate the power switch.

8.1 Preparing for commissioning

Before turning on the pump, make sure of the following points:

	Necessary operating requirements
Pump	- Connect all hoses correctly
Pump	- The voltage supply system is consistent with the details on the type plate of the pump. - Pump outlet not closed or restricted. - When operating with gas ballast: When venting the pump through the air inlet, no explosive or poisonous mixtures can occur.

Tab.11: Operating requirements for commissioning

8.2 Perform commissioning



WARNING

Risk of burns from hot vacuum parts and/or hot medium

during or after operation of the vacuum system, some vacuum system parts may be hot.

- Allow the vacuum system to cool down after operation.
 - Take protective measures to protect against touching hot parts.
-



WARNING

Injury to eyes

Coming too close to the inlet/outlet of the pump may result in injury to the eyes due to the present vacuum/operating pressure.

- Do not look into the pump inlet/outlet during operation.
-

- Only operate the pump in accordance with the operating parameters and operating conditions described in Chapter 5 *Technical data* [▶ 12].
- Ensure the proper use of the pump (See Chapter 3.1 *Proper use* [▶ 7]).
- Eliminate the possibility of improper use of the pump (see Chapter *Improper use*).
- Observe the safety instructions (see Chapter 4 *Safety* [▶ 9]).



Risk of pump head bursting due to excessive pressure increase

- Do not exceed the maximum permissible operating pressure (see 5 *Technical data* [▶ 12]).
- Monitor the pressure during operation.
- If the pressure exceeds the maximum permissible operating pressure of the pump: immediately switch off the pump and remedy the fault (see Chapter Troubleshooting).
- Only throttle or regulate the air or gas quantity on the suction line to prevent the maximum permissible operating pressure from being exceeded.
- If the air quantity or gas quantity on the pressure line is throttled or regulated, make sure that the maximum permissible operating pressure at the pump is not exceeded.
- Ensure that the pump outlet is not closed or restricted.

**DANGER**

Risk of dangerous gas mixtures during pump operation

Depending on the medium being transferred, breakage of the media-contacting components can result in a dangerous mixture if the medium mixes with the air in the compressor housing or the surroundings.

- Before using a medium, check the compatibility of the media-contacting components (see *5 Technical data* [▶ 12]) with the medium.

i Excessive pressure, with all of the associated hazards, can be prevented by means of a bypass line with a pressure relief valve between the pressure side and suction side of the pump. Further information is available from KNF Customer Service (contact data: see www.knf.com).

Pump standstill → Establish normal atmospheric pressure in the lines while the pump is at a standstill (relieve pump pneumatically).

Connecting the pump

1. Remove the protective caps from the pneumatic connections of the pump.

Vacuum operation with silencer

1. Remove the hose connector on the pneumatic outlet with the supplied tool (see *1 Scope of delivery* [▶ 3]).
2. Finger-tighten the silencer or its vacuum system component on the pneumatic outlet.
3. Connect the line to the pneumatic inlet.

**NOTICE**

When using a silencer, KNF recommends operating the pump in a safe environment, e.g., fume cupboard, to avoid dangers posed by harmful gases.

Vacuum operation without silencer

- | | |
|----------------------|---|
| Connected components | 1. Connect the lines to the pneumatic inlet and outlet. |
| Pump discharge | 2. Only connect components to the pump that are designed for the pneumatic data of the pump (see Chapter 5 <i>Technical data</i> [▶ 12]). |
| | 3. When using as a vacuum pump: Safely drain the pump discharge at the pneumatic outlet of the pump. |
| | 4. Plug the plug of the power cable into a properly installed, grounded socket. |

9 Operation

9.1 Information on switching the pump on and off

Switching on the pump

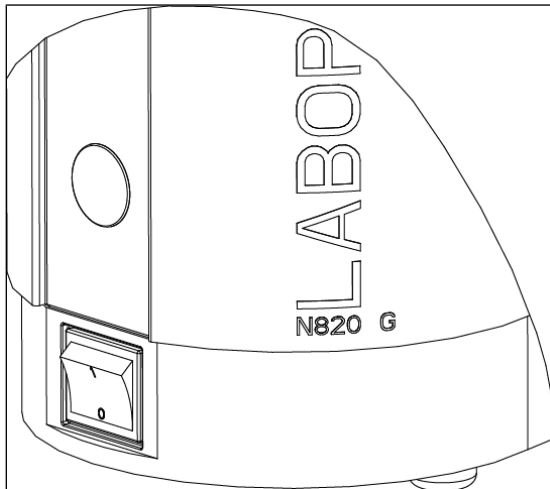


Fig. 4: Switching the pump on and off with power switch

- i** The pump must not be started up against operating pressure during switch-on. This also applies during operation after a brief power failure. If a pump starts up against pressure, the pump may block, thereby activating blocking protection (drive) and switching off the pump.

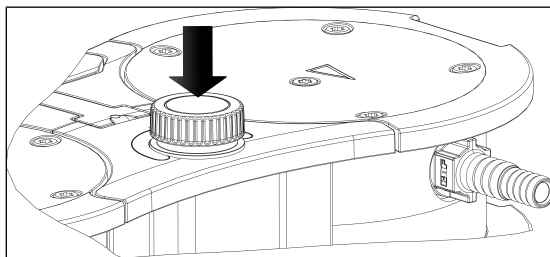


Fig. 5: Switching the pump on and off with rotary/push knob

- ➔ Ensure that no pressure is present in the lines when switching on.

- Switch on the pump with the power switch (see Fig. 4).
- Switch on the pump by pushing the rotary/push knob (see Fig. 5).

Set flow rate

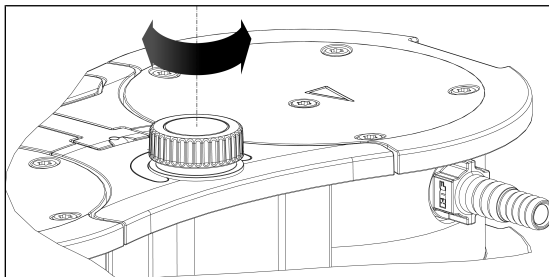


Fig. 6: Set flow rate

You can vary the speed of the pump with the rotary/push knob. This allows you to set the flow rate (see Fig. 6).

- The speed setting of the rotary/push knob is retained when the pump is switched off.

Switching off/decommissioning the pump

- When transferring aggressive media, flush the pump before switching off to extend the service life of the diaphragm (see Chapter 10 Servicing [▶ 29]).
- Switch the pump with the rotary/push knob (see chapter *Information on switching the pump on and off* [▶ 27]).
- Switch off the pump with the power switch (see Fig. 1/5).
- Establish normal atmospheric pressure in the lines (relieve pump pneumatically).
- Pull out power plug of the pump.



Status display (see Fig. 1/6)

- Illuminates green if the pump was switched on via the power switch.
- Illuminates blue if the pump was also switched on via the rotary/push knob.
Pump is running:
The higher the speed is set, the brighter the status display lights up.

→ Illuminates red if there is a fault:

Signal duration	Fault type
100% ON (continuous light)	Drive blocked
50% ON; 50% OFF	Temperature too high (drive)
90% ON, 10% OFF	Other fault

Tab.12: Fault signal via status display

For further information, see Chapter 11 *Troubleshooting* [▶ 38].

10 Servicing

EN



NOTICE

Servicing the pump

Damage to the pumps can result from failure to observe the applicable legal regulations and procedures for the location or intervention by untrained or uninstructed personnel.

- Servicing may only be performed according to the legal regulations (e.g. work safety, environmental protection) and provisions.
 - Servicing may only be performed by specialized personnel or trained and instructed personnel.
-

10.1 Servicing schedule



WARNING

Risk of injury when not using original parts

Failure to use original parts will result in a loss of pump functionality and safety.

The validity of the CE conformity is rendered void if genuine parts are not used.

- Use only genuine spare parts from KNF when performing maintenance/repair work.

Component	Servicing interval
Pump	<ul style="list-style-type: none"> → Inspect the pump periodically for external damage or leakage. → Periodically check for noticeable changes to noises and vibrations.
Diaphragm and valve plates/seals	<ul style="list-style-type: none"> → At the latest, replace when the pump flow rate decreases.

Tab. 13: Servicing schedule

10.2 Cleaning



NOTICE

During cleaning work, ensure that no fluids enter the interior of the housing.

10.2.1 Flushing the pump



WARNING

Personal injury through poisoning or explosion and damage to the pump

- When flushing the pump with inert gas, ensure that the gas ballast valve is closed and that no reactive or explosive mixtures form.
-

- Before switching off, flush the pump with air at atmospheric conditions (ambient pressure) for about 5 minutes (if necessary for safety reasons: with an inert gas).

10.2.2 Cleaning the pump

- Only clean the pump with a damp cloth and non-flammable cleaning agents.
- If compressed air is present, blow out the parts.

10.3 Replace diaphragm, valve plates/seals and O-rings

Requirements	Necessary requirements
Pump	<ul style="list-style-type: none"> - Pump switched off and power cable pulled out of socket - Pump cleaned and free of hazardous materials - Hoses removed from pneumatic inlet and outlet

Tab. 14:

Material and tools	Quantity	Material
	1	TORX® screwdriver T20
	1	TORX® T25 screwdriver (only for N840.3FT.29.18G)
	1	Spare parts set (see Chapter Spare parts)
	1	Pencil

Tab. 15:

- Information on the procedure
- ➔ Always replace diaphragms, valve plates/seals, and O-rings together to maintain the performance of the pump.
 - ➔ Replace the diaphragms and valve plates/seals of the individual pump heads one after the other.

**WARNING**

Health hazard due to dangerous substances in the pump

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

- Wear protective equipment if necessary, e.g., protective gloves, goggles.
- Clean the pump with suitable measures.

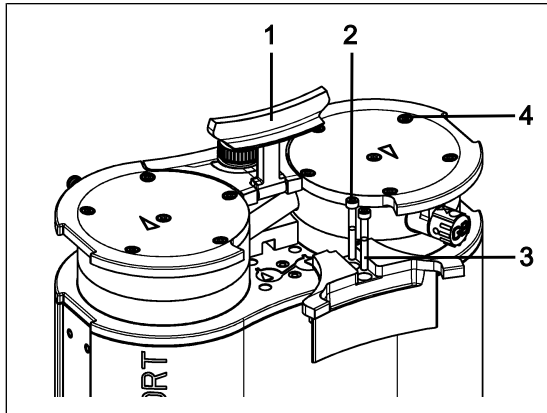
Initial steps

Fig. 7: Dismount cover

1. Set the handle (1/Fig. 7) to a vertical position.
2. Loosen the screws (2/Fig. 7) on the cover (3/Fig. 7).
3. Remove the cover (3/Fig. 7).

4. Loosen the external cap screws (4/Fig. 7).

i The two internal cap screws (1/Fig. 8) remain tightened for the time being.

Removing pump head

- 1 Screw
- 2 Pressure plate
- 3 Head cover
- 4 Valve plates/seals
- 5 Locating pin
- 6 Intermediate plate
- 7 Diaphragm
- 8 Shim rings

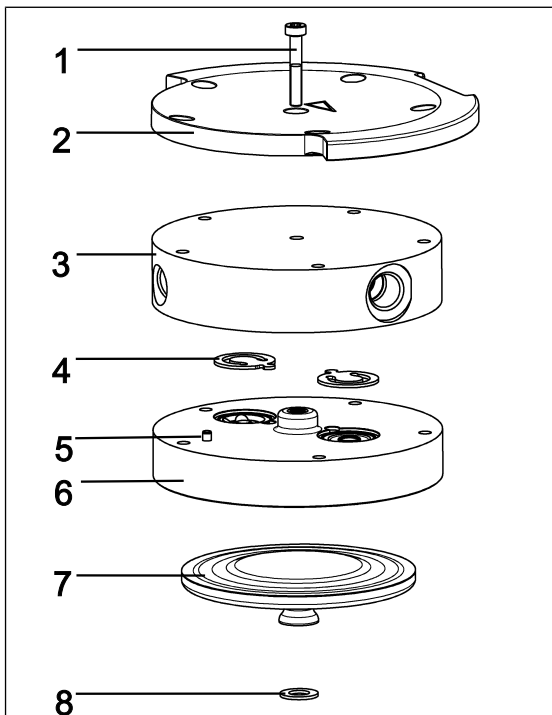


Fig.8: Pump head (pump N820 shown)

i The following item numbers refer to Fig. 8 unless specified otherwise.

1. Mark the pressure plate (2), head cover (3) and intermediate plate (6) with a continuous pencil stroke. This prevents the parts from being incorrectly mounted later on.
2. Loosen the external screws (4/Fig. 7) of the pump heads.
3. Carefully remove the pump heads.

Replacing the diaphragm

i On the pump, the diaphragms (7) are changed successively to ensure that the shim rings (8) are used in the same quantity as previously.

1. Press down one diaphragm (7) so that the other diaphragm is in the upper change point.
2. Carefully turn the upper diaphragm (7) counterclockwise by hand and remove it.

i Make sure that the shim rings located between the diaphragm and connecting rod do not fall into the pump housing.

Remove any shim rings stopping on the diaphragms and fit them on the associated connecting rod thread.

In order to guarantee the pneumatic performance of the pump, it is essential that the same number of shim rings are mounted as before.

3. Screw in the new diaphragm (7) by hand and tighten it by hand.
4. Perform steps 1 to 4 for the second pump head.
5. Dispose of the replaced diaphragms (7) properly.

Changing O-rings

- 9 Gas ballast valve
- 10 Connection tube
- 11 Hose connections

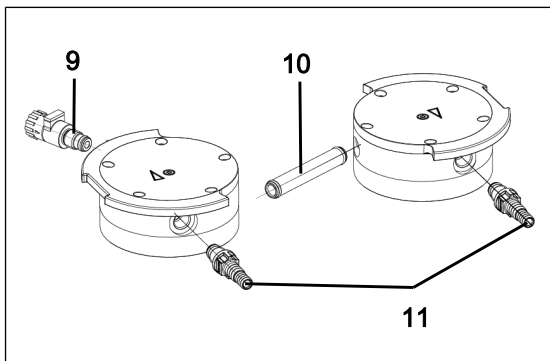


Fig.9: Changing O-rings

1. Pull the two pump heads apart.
2. Pull the connection tube (10/ Fig. 9) out of the head cover (3).

3. Replace the two O-rings on the connection tube (**10**/Fig. 9).
4. Loosen the internal cap screw (**1**) on both pump heads.
5. Remove the two pressure plates (**2**) together with the two internal cap screws (**1**).
6. Unscrew the gas ballast (**9**/Fig. 9) from the head cover (**3**).
7. Replace the O-ring on the gas ballast (**9**/Fig. 9).
8. Screw the gas ballast (**9**/Fig. 9) into the corresponding head cover (**3**) as far as it will go. Then turn it back again until the surface is oriented upwards.
9. Unscrew the hose connections (**11**/Fig. 9) from the head cover (**3**) using the tool supplied.
10. Replace the O-rings on the hose connections (**11**/Fig. 9).
11. Screw the hose connections (**11**/Fig. 9) into the head cover (**3**) hand-tight using the tool supplied.
12. Dispose of the replaced O-rings properly.

Replacing valve plates/sealing rings

i On the pump, the valve plates/sealing rings (**4**) are replaced one after the other.

1. Remove the head cover (**3**) from the intermediate plate (**6**).
2. Remove the old valve plates/seals (**4**).
3. Carefully clean the intermediate plate (**6**) (if there are deposits on it).
4. Insert the new valve plates/seals (**4**) into the corresponding seats on the intermediate plate (**6**).
5. Perform steps 1 – 4 for the second pump head.
6. Dispose of the old diaphragm (**7**) and valve plates/seals (**4**) properly.
7. Insert the connection tube (**10**/Fig. 9) into the head cover (**3**).

Mounting the pump head

1. Move the diaphragms (**7**) to the center position.
2. Press on the entire perimeter of the diaphragm (**7**). Only press on the diaphragm (**7**) on one pump head.

3. Place the intermediate plate (6) with valve plates/seals (4) on the mount according to the pencil line.
4. Place the head cover (3) on the intermediate plate (6) in line with the locating pin (5).
5. Place the pressure plate (2) on the head cover according to the pencil line.
6. Tighten the screws in a crosswise pattern (tightening torque: N820: 4 Nm; N840: 5 Nm).
7. Tighten the screw (1) in the center of the printing plates (tightening torque: 1 Nm).
8. Perform steps 1 to 7 for the second pump head.
9. Place the pump heads (consisting of head cover (3), intermediate plate (6) with valve plates/seals (4) and pressure plate (2)) together with the connection tube on the pump housing according to the pencil line.
10. Mount the handle cover (3/ Fig. 7).
11. Tighten the screws (2/ Fig. 7) of the handle cover (3/ Fig. 7) (tightening torque: 2 Nm).

Final steps

1. Function test
 - Connect the suction and pressure sides to the pump.
 - Electrically connect the pump.
 - Test the pump for proper function (among other things, ultimate vacuum).
 - Disconnect the pump electrically and pneumatically again.
2. Pump integrated in application
 - Connect the suction and pressure sides to the pump.
 - Electrically connect the pump.
 - Test the functionality of the pump.

11 Troubleshooting



Danger: electric shock can be life-threatening.

- All work on the pump may only be performed by an authorized specialist.
- Before working on the pump: Disconnect the pump from the power supply.
- Check and ensure that no voltage is present.

→ Check the pump (see following tables).

Pump not delivering	
Cause	Troubleshooting
No voltage in the electrical mains.	→ Check the circuit breaker for the room and switch it on if necessary.
Overtemperature protection of the pump has tripped	→ Disconnect the pump from the electrical mains. → Allow the pump to cool. → Determine the cause of the overheating and rectify.
Connections or lines are blocked.	→ Check the connections and lines. → Remove the blockage.
External valve is closed or filter is clogged.	→ Check external valves and filters.
Condensate has collected in the pump head.	→ Separate the source of the condensate from the pump. → Flush the pump with air at atmospheric pressure for a few minutes (if necessary for safety reasons: with an inert gas).
Diaphragms or valve plates/seals are worn.	→ Replace the diaphragms and the valve plates/seals (see Chapter Replacing diaphragm and valve plates).

Tab.16: Troubleshooting: Pump not delivering

Flow rate, pressure or vacuum too low

The pump does not reach the output stated in the technical data or data sheet.

Cause	Fault remedy
Condensate has collected in the pump head.	<ul style="list-style-type: none"> → Separate the source of the condensate from the pump. → Flush the pump with air at atmospheric pressure for a few minutes (if necessary for safety reasons: with an inert gas). → If present, open the gas ballast and flush the pump head.
There is overpressure on the pressure side and at the same time vacuum or pressure above atmospheric pressure on the suction side.	<ul style="list-style-type: none"> → Change the pneumatic conditions.
Pneumatic lines or connection parts have insufficient cross-sections or are throttled.	<ul style="list-style-type: none"> → Disconnect the pump from the system to determine the output values. → Eliminate any throttling (e.g. valve) if necessary. → Use lines or connection parts with a larger cross-section if necessary.
Leaks occur at connections, lines or pump head.	<ul style="list-style-type: none"> → Ensure the correct seating of the hoses on the hose connectors. → Ensure that the connections are correctly mounted. → Replace the leaky hoses. → Eliminate the leaks.
Connections or lines are completely or partially clogged.	<ul style="list-style-type: none"> → Check the connections and lines. → Remove any parts or particles that are causing blockages.
Head parts are soiled.	<ul style="list-style-type: none"> → Clean the head components.
Diaphragms or valve plates/seals are worn.	<ul style="list-style-type: none"> → Replace the diaphragms and the valve plates/seals (see Chapter Replacing diaphragm and valve plates).

Flow rate, pressure or vacuum too low	
The pump does not reach the output stated in the technical data or data sheet.	
Cause	Fault remedy
Replaced diaphragm and valve plates/seals.	<ul style="list-style-type: none"> → Ensure that shim rings were fitted on the diaphragm thread. → Check the hoses for leaks. → If necessary, carefully tighten the outer screws of the pressure plate crosswise.
Rotary/push knob is not set to max. speed.	<ul style="list-style-type: none"> → Set the rotary/push knob to max. speed.
Gas ballast still open.	<ul style="list-style-type: none"> → Connect the gas ballast.

Tab. 17: Troubleshooting: Flow rate, pressure or vacuum too low

Pump is switched on and not running; status display is not illuminated	
Cause	Fault remedy
Pump is not connected to the electrical mains.	<ul style="list-style-type: none"> → Connect the pump to the electrical mains.
No voltage in the electrical mains.	<ul style="list-style-type: none"> → Check the circuit breaker for the room and switch it on if necessary.

Tab. 18: Troubleshooting: Pump is switched on and not running; status display is not illuminated

Pump is switched on and not running; status display flashes red (50% ON, 50% OFF)	
Cause	Fault remedy
Pump has overheated, overtemperature protection has tripped.	<ul style="list-style-type: none"> → Pull power cable of the pump out of the socket. → Allow the pump to cool. → Determine the cause of the overheating and rectify.

Tab. 19: Troubleshooting: Pump is switched on but not running; status display is flashing red

Pump is switched on and not running; status display illuminates red (100% ON)

Cause	Fault remedy
Drive of the pump has blocked.	<ul style="list-style-type: none"> → Pull power cable of the pump out of the socket. → Allow the pump to cool. → Determine the cause of the blockage and rectify.

Tab.20: Troubleshooting: Pump is switched on but not running; status display lights up red

Pump is switched on and not running; status display flashes red (90% ON, 10% OFF)

Cause	Fault remedy
Other fault	<ul style="list-style-type: none"> → Pull power cable of the pump out of the socket. → Allow the pump to cool. → Contact KNF Customer Service.

Tab.21: Troubleshooting: Pump is switched on but not running; status display is flashing red

12 Spare parts and accessories

i To order spare parts and accessories, please contact your KNF sales partner or KNF Customer Service (contact data: see www.knf.com).

12.1 Spare parts

Spare part set

A spare part set consists of:

Parts	Quantity
Diaphragm	2
Valve plates/seals	4
O-ring connection tube (Ø 10 x 1.8)	2
O-ring hose connection and gas ballast valve (Ø 8 x 1.8)	3

Tab.22: Spare parts

*see Chapter 10.3 Replace diaphragm, valve plates/seals and O-rings [► 32]

Spare parts set	Order number
N820G	317435
N840G	317436

Tab.23: Spare parts set

12.2 Accessories

Accessories	Order number
Silencer	322528
Hose connector with O-ring	317278
Key for hose connector	316279
Interface cable (for combination with VC900) 2m	323829
Interface cable (for combination with VC900) 5m	323830

Tab.24: Accessories

13 Returns

Preparing for return

1. Flush the pump with air for a few minutes (if necessary for safety reasons: with inert gas) at atmospheric pressure to free the pump head of dangerous or aggressive gases (see Chapter 10.2.1 *Flushing the pump* [▶ 31]).
i Please contact your KNF sales partner if the pump cannot be flushed due to damage.
2. Remove the pump.
3. Clean the pump (see Chapter 10.2.2 *Cleaning the pump* [▶ 31]).
4. Send the pump together with the completed Health and Safety Clearance and Decontamination Form to KNF, stating the nature of the transferred medium.
5. Pack the device securely to prevent further damage to the product. If necessary, request original packaging for a fee.

Returns

KNF shall undertake to repair the pump only under the condition that the customer presents a certificate regarding the medium that is pumped and the cleaning of the pump. Please follow the instructions at [knf.com/repairs here](https://knf.com/repairs).

Contact your KNF sales partner directly if you require additional support for your return service.

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KNF Neuberger GmbH
Alter Weg 3
79112 Freiburg
Germany
Tel. +49 (0)7664/5909-0

E-mail: info.de@knf.com
www.knf.com

KNF worldwide

You can find our local KNF partners at: www.knf.com

