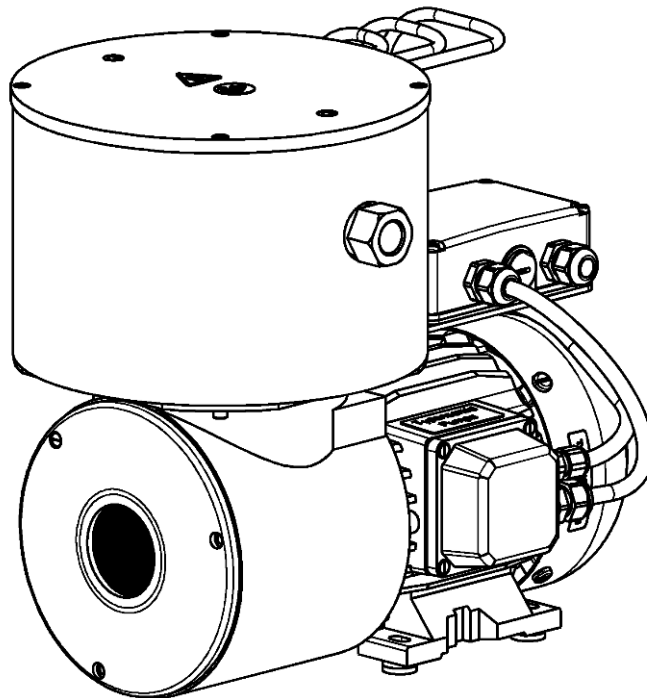


OEM

N 0100_ .11/.16
TRANSLATION OF ORIGINAL OPERATING AND
INSTALLATION INSTRUCTIONS
ENGLISH

DIAPHRAGM VACUUM PUMPS AND COMPRESSORS



Note!

Before operating the pump and the accessories, please read the operating instructions and pay attention to the safety precautions!

KNF Neuberger GmbH
Alter Weg 3
79112 Freiburg
Germany
Phone +49-(0)7664-5909-0
Fax +49-(0)7664-5909-99

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

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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 pump

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



A danger is located here.

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

WARNING 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 injuries and/or serious damage are the consequence.
WARNING	warns of possible danger	Death or serious injuries and/or serious damage are possible.
CAUTION	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.



This symbol refers to important information.

2. Use

2.1. Proper use

The pumps are exclusively intended for transferring gases and vapors.

Owner's responsibility

Operating parameter and conditions

Only install and operate the pumps under the operating parameters and conditions described in Chapter 4. Technical Data.

Only complete pumps may be taken into service.

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

Requirements for transferred medium

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, diaphragm and valves with the medium.

Only transfer gases which remain stable under the pressures and temperatures occurring in the pump.

2.2. Improper use

The pumps may not be operated in an explosive atmosphere.

The pumps are not suitable for transferring dusts.

The pumps are not suitable for transferring liquids.

The pumps are not suitable for transferring Aerosol.

The pumps are not suitable for transferring biological and microbiological substances.

The pumps are not suitable for transferring fuel.

The pumps are not suitable for transferring explosive and combustible materials.

The pumps are not suitable for transferring fibers.

The pumps are not suitable for transferring oxidizing agent.

The pumps are not suitable for transferring foodstuffs.

The pumps are not suitable for use with aggressive media. Other pumps in the KNF product line are designed for use with aggressive media. Please contact us for more information.

The pumps must not be used to create vacuum and overpressure simultaneously.

Pumps designed to create either a vacuum or an overpressure must not be used for these two purposes simultaneously.

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

3. Safety

i Note the safety precautions in Chapter 6. Installation and connection and 7. Operation.

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

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

Components connected to the pump must be designed to withstand the pneumatic performance of the pump.

Take care that safety regulations are observed when connecting the pump to the electricity supply.

Personnel Make sure that only trained and instructed personnel or specially trained personnel work on the pumps. This especially applies to assembly, connection and servicing work.

Make sure that the personnel has read and understood the Operating and Installation Instructions, and in particular the "Safety" chapter.

Working in a safety conscious manner

Observe the accident prevention and safety regulations when performing any work on the pump and during operation.

Ensure that the pump is separated from the mains and is de-energized.

The pump heads heat up during operation – avoid contact with them.

Make sure that there are no hazards of electrical shock when working on the pump.

Ensure that an EMC-compatible installation of the pump is ensured at all times and that this cannot lead to a hazardous situation.

Handling dangerous media

When transferring dangerous media, observe the safety regulations when handling these media.

If the working diaphragm ruptures, the transferred medium will mix with the air in the environment.

Take all necessary care to prevent this leading to a dangerous situation.

Handling combustible media

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

Make sure the temperature of the medium is always sufficiently below the ignition temperature of the medium, to avoid ignition or explosion. This also applies for unusual operational situations.

Note that the temperature of the medium increases when the pump compresses the medium (compressor operation).

Hence, make sure the temperature of the medium is sufficiently 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 specifications (Chapter 4).

If necessary, consider any external sources of energy, such as radiation, that may add heat to the medium.

When the operation of the pump is interrupted by the thermal switch, the pump will re-start automatically after cooling down. Take all care necessary to prevent this leading to a dangerous situation.

In case of doubt, consult the KNF customer service.

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.

EU/EC Directives / Standards

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:

- General Principles No. 1
- 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.

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.

In addition a protection against mechanical parts in motion and hot parts, if existing, has to be provided when mounting.

The safety objectives of the following Directive(s) have been met:

- Directive 2014/35/EU on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits in accordance with Annex I, No. 1.5.1. of the Directive 2006/42/EC.
- Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (Annex II amended by Commission Delegated Directive (EU) 2015/863).

The following harmonized standards were taken as a basis:

- EN IEC 63000

- EN 61326-1 class A
- EN IEC 61000-3-2
- EN 61000-3-3
- EN 60204-1

Customer service and
repairs

The pump is maintenance-free. But KNF recommends, checking the pump regularly with regard to conspicuous changes in noise and vibrations.

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

Housing with voltage-caring parts may be opened by technical personnel only.

Use only genuine parts from KNF for servicing work.

4. Technical Data

Pump materials

N 0100 AT.16 E

Assembly	Material
Pump parts in contact with gas	Aluminum alloy, stainless steel
Diaphragm	PTFE
Valve Plate	PTFE

Tab. 2

N 0100 ST.11 E

N 0100 ST.16 E

Assembly	Material
Pump parts in contact with gas	Stainless steel
Diaphragm	PTFE
Valve Plate	PTFE

Tab. 3

Pneumatic values

Parameter	Value
Max. permissible operating pressure [bar g]	1.5
Ultimate vacuum [mbar abs.]	180
Delivery rate at atm. pressure [l/min]*	100

Tab. 4

*Liters in standard state (1,013 mbar)

Pneumatic Connections

Pump type	Value
Hose connection [mm]	M18 x 1.5 (2x)

Tab. 5

Electrical data

Parameter	Value
Electrical data	See type plate
Protection class Motor	IP44
Protection class Pump heads (.11 design)	IP20
Temperature control fuse [A]*	0.5 delayed

Tab. 6

*according to spare parts list, chapter 10

Thermal switch



The pumps are fitted as standard with a thermal-switch to protect against overloading.

Other parameters

Parameter	Value
Permissible ambient temperature	+ 10°C to + 40°C
Permissible media temperature	+ 5°C to + 240°C
Dimensions: L x H x W [mm]	261 x 204 x 110
Maximum permissible ambient relative humidity	80% for temperatures up to 31°C, decreasing linearly to 50% at 40°C
Max. altitude of site: [m above sea level]	2000

*Tab. 7***Weight**

Pump type	Value
N 0100 AT.16 E	21 kg
N 0100 ST.16 E	28 kg
N 0100 ST.11 E	28.5 kg

*Tab. 8***Variants**

- .16 designs have temperature-resistant pump heads for media with temperatures of up to 240°C.
- .11 designs have two heating insets which heats the pump head up to 240°C (thermostatically regulated).

5. Design and function

- 1 Head insulation
- 2 Pneumatic pump inlet
- 3 Pneumatic pump outlet
- 4 Terminal cover
- 5 Motor

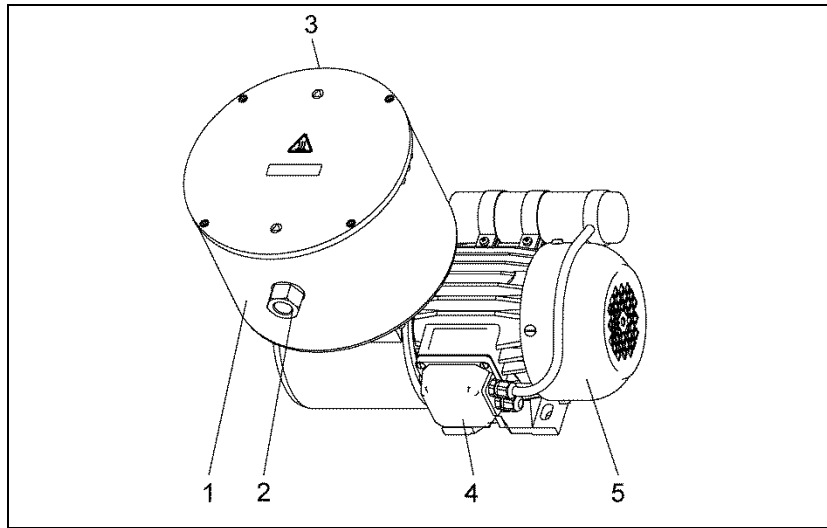


Fig. 1: N 0100_T.16 E

- 1 Head insulation
- 2 Pneumatic pump inlet
- 3 Pneumatic pump outlet
- 4 Terminal cover
- 5 Motor
- 6 Electric supply

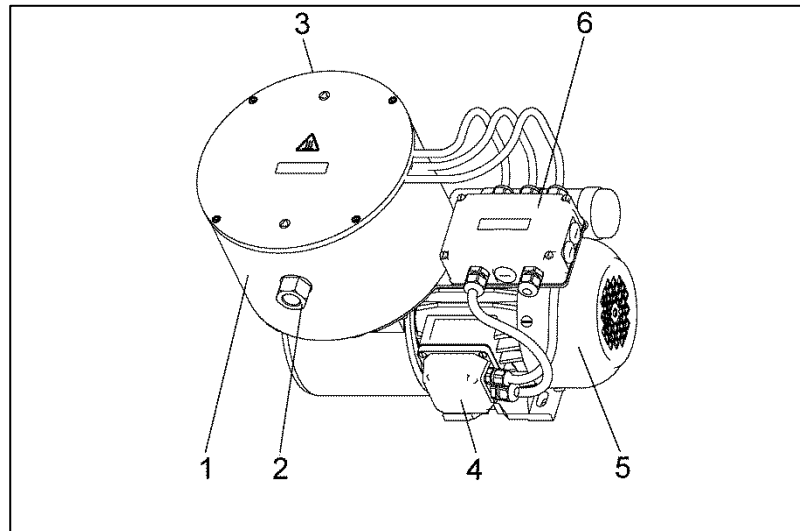


Fig. 2: N 0100_T.11 E

Function Diaphragm Pump

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

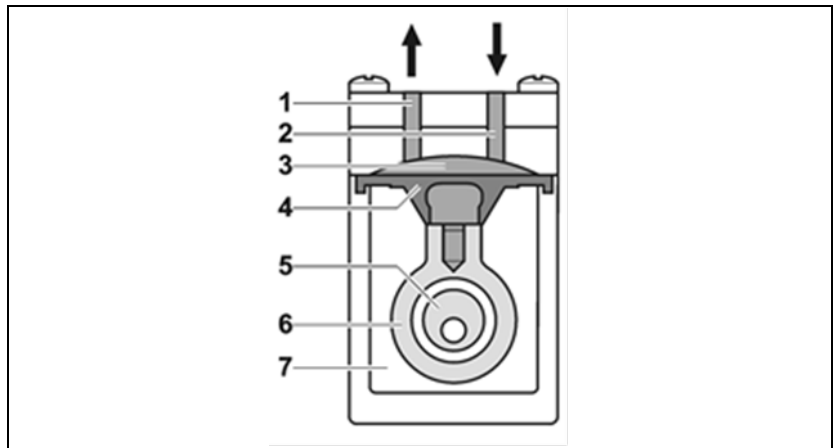


Fig. 3: Pump head

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

The elastic diaphragm (4) is moved up and down by the eccentric (5) and the connection rod (6). In the downward stroke it aspirates the gas to be transferred via the inlet valve (2). In the upward stroke, the diaphragm presses the medium out of the pump head via the outlet valve (1). The transfer chamber (3) is hermetically separated from the pump drive (7) by the diaphragm.

6. Installation and connection

Only install and operate the pumps under the pneumatic operating parameters and conditions described in Chapter 4, Technical Data. Observe the safety precautions (see Chapter 3).

Heating elements **i** Since the insulating material of the heating elements is hygroscopic, before connecting the heating element, it may be necessary to check the insulation resistance with a suitable measuring instrument (megaohmmeter with 500V DC test voltage, $R_{min} = 5 \text{ M}\Omega$), depending on the type of heating element and the storage conditions (e.g. high humidity). If necessary, the heating element should be dried at an increased temperature (at about 120°C in the oven. Time: some hours, until acceptable measured values are reached).

6.1. Installation of the pump

➔ Before installation, store the pump at the installation location to bring it up to ambient temperature.

Mounting dimensions See Fig. 4 (.16-design) or Fig. 5 (.11-design) for mounting dimensions.

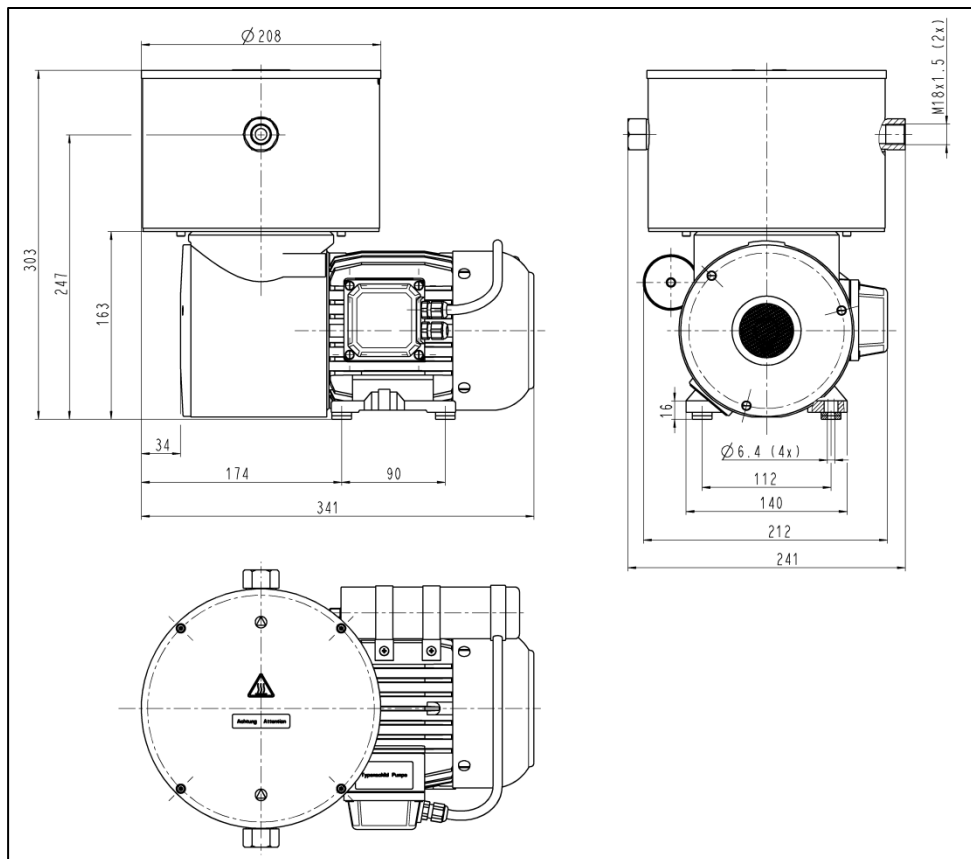


Fig. 4: Mounting dimensions .16-design (All dimensional tolerances conform to DIN ISO 2768-1, Tolerance Class V)

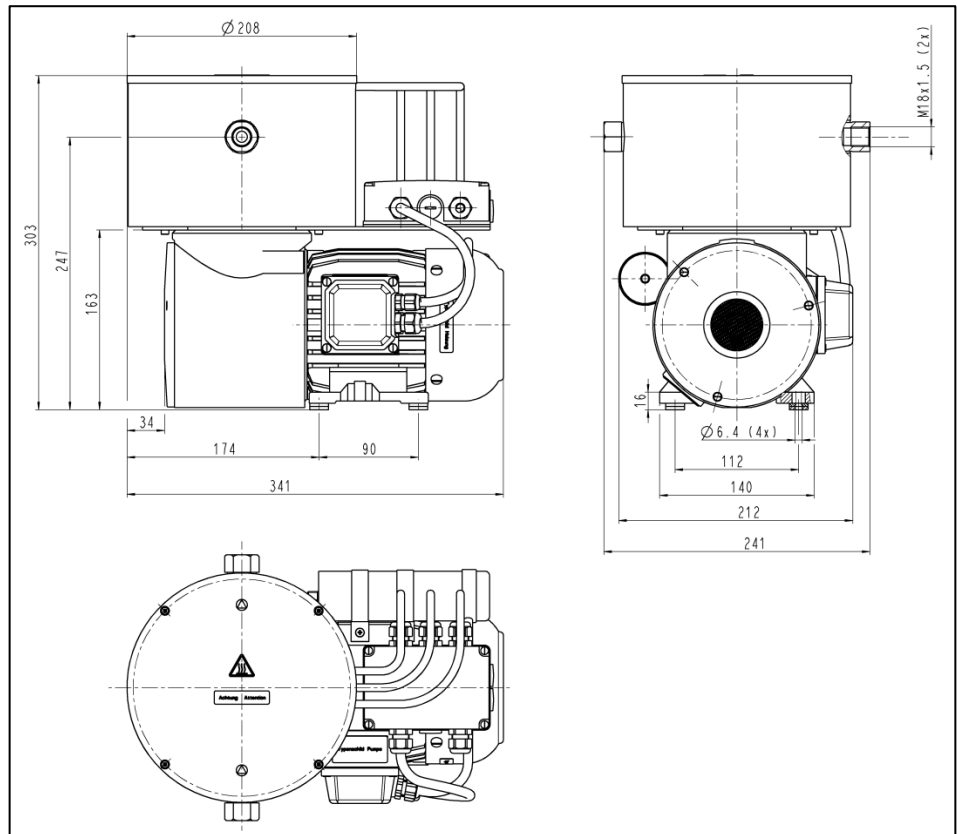


Fig. 5: Mounting dimensions .11-design (All dimensional tolerances conform to DIN ISO 2768-1, Tolerance Class V)

Cooling air supply



Danger of burns from hot surfaces

Hot surfaces may be caused by overheating of the pump.

WARNING

→ Install the pump so that the motor fan can intake sufficient cooling air.

Immediate ambient of the hot pump parts

→ When installing, make sure that there are no combustible or thermally malleable objects placed in the immediate ambient of the hot pump parts (head, motor).

Installation location

→ Make sure that the installation location is dry and the pump is protected against rain, splash, hose and drip water as well as other pollutions.

→ Make sure, that the installation location is accessible for maintenance and service.

→ 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.

**WARNING**

Personal injury and/or damage to property because of vibration

In conjunction with adjacent components, vibration of the pump may result in crushing and/or damage to these components.

- Make sure that vibrations of the pump do not result in hazards associated with adjacent components.

Foreign matter protection

- Protect the pump against contact and intrusion of foreign matter.

6.2. Electrical connection



Extreme danger from electrical shock

DANGER

→ Only have the pump connected by an authorized specialist.

→ Only have the pump connected when the power supply is disconnected.

- When connecting the device to a power source, the relevant standards, directives, regulations, and technical standards must be observed.
- In the electrical installation, arrangements (complying with EN 60335-1) must be made for disconnecting the pump motor from the electrical supply.
- For the pumps with AC motors KNF recommends that a fuse is installed in the motor supply circuit (overcurrent release).



For operating current see type plate or data sheet.

- The pump must be installed so that contact with live parts is impossible.

Attach connection cables

- Fasten the connection cables so that:
 - the cables do not contact moving or hot parts.
 - the cables will not chafe or be damaged on sharp edges or corners.
 - no pulling or pushing forces are exerted on the cable's connection points (strain relief).



The pumps are fitted as standard with a thermal switch to protect against overloading.

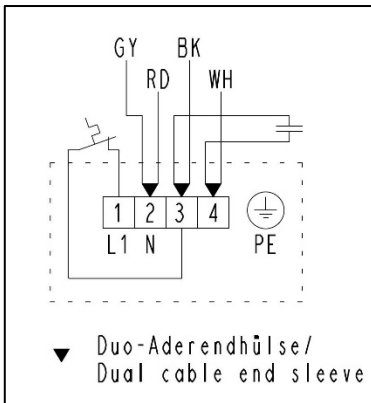


Fig. 6: Electrical Connection
.16-designs.

Connecting pump

a.) Electrical connection for the .16 designs (pumps with temperature-resistant heads):

1. Open the terminal cover of motor (see Fig. 1, position 4).
2. Compare the supply data with the data on the motor-plate. For operating current see type plate.

i The voltage must not vary by more than + 10% and – 10% from that shown on the type plate.

3. Connect the earth (ground) wire to the pump motor.
4. Connect the mains cable to the pump (see Fig. 6).
5. Close the terminal cover; make sure the cover sealing is properly sited.

b.) Electrical connection for the .11 designs (pumps with heated heads; thermostatically regulated):

1. Take off the electric supply cover (see Fig. 2, position 6); to do this, release the four screws.
2. Draw the mains cables into the electric supply through the free cable screw holes.
3. Compare the supply data with the data on the motor-plate. For operating current see type plate.

i The voltage must not vary by more than + 10% and – 10% from that shown on the type plate.

4. Connect the protective ground lead to the earth connection.
5. Connect the mains cables to the connections L1 and N of the luster terminal (see Fig. 7).
6. Place the electric supply cover back in position and screw it tight; make sure the cover sealing is properly sited.

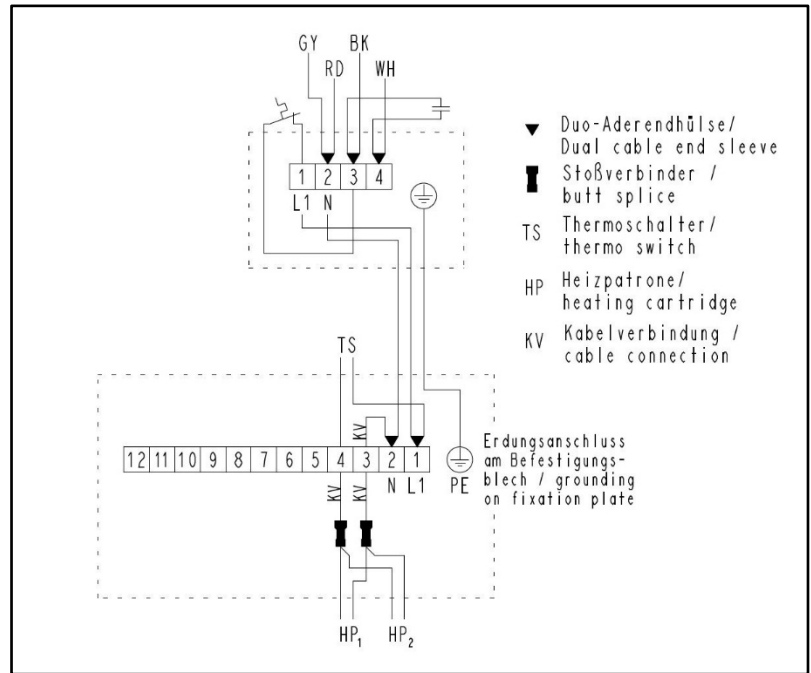


Fig. 7: Electrical connection .11-designs

6.3. Pneumatic connection



CAUTION

Personal injury or damages to property by ejected plugs

If the plug at the pressure side of the pump hasn't been removed, it could be ejected because of the overpressure during operation.

→ Remove the plug during the installation.

-
- | | |
|------------------------|--|
| Connected components | → Only connect components to the pump which are designed for the pneumatic data of the pump (see Chapter 4, Technical Data). |
| Pressure relief device | → Protect the pump with a pressure relief device between the pressure connection of the pump and the first shut-off valve. |
| Pump exhaust | → If the pump is used as a vacuum pump, safely discharge the pump exhaust at the pump's pneumatic outlet. |
| Disengaging | → KNF recommends mechanically disengaging the pump from the piping system. This can be achieved with flexible tubing or pipes, for example. This will avoid transferring to the system any pump oscillations that may arise. |

Connecting pump



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



Confusion between suction and pressure sides can lead to breakage of connected components on the suction and pressure sides.

1. Remove the protective plugs from the hose connection threads.
2. Connect the suction line and pressure line (thread size M 18 x 1.5).
3. Lay the suction and pressure line at a downward angle to prevent condensate from running into the pump.

7. Operation



Danger of burns from hot pump parts or hot medium

During or after operation of the pump, some pump parts may be hot.

WARNING

- Allow the pump to cool after operation.
 - Take safety precautions against the contact of hot parts/media.
-



Injury of the eyes

During excessive approach to the inlet or outlet of the pump, the eyes could be injured by the upcoming vacuum or overpressure.

WARNING

- Don't look into the pump's inlet or outlet during the 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 Chapter 2.1).
 - Make sure the pumps are not used improperly (see Chapter 2.2).
 - Observe the safety precautions (see Chapter 3).
 - The pumps are intended for installation. Before putting them into service it must be established that machinery or equipment in which they are installed meets the relevant regulations.
-



Hazard of the pump head bursting due to excessive pressure and temperature increase

WARNING

- Do not exceed max. permissible operating pressure (see Chapter 4. Technical Data).
 - Monitor pressure during operation.
 - If the pressure exceeds the maximum permissible operating pressure, immediately switch off pump and eliminate fault (see Chapter 9. Troubleshooting).
 - Only throttle or regulate the air or gas quantity in the suction line to prevent the maximum permissible operating pressure from being exceeded.
 - If the air or gas quantity in the pressure line is throttled or regulated, make sure that the maximum permissible operating pressure is not exceeded.
 - Ensure that the pump outlet is not closed or constricted.
-

	<p>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 (contact data: see www.knf.com).</p>
Pump standstill	<p>→ With the pump at a standstill, open pressure and suction lines to normal atmospheric pressure.</p> <p>i The pump may not start up against pressure or vacuum during switch-on. This also applies in operating following a brief power failure. If a pump starts against pressure or vacuum, it may block. This activates the thermal switch, and the pump switches off.</p> <p>→ Make sure that normal atmospheric pressure is present in the lines during switch-on.</p>
Thermo switch	<hr/> <div style="display: flex; align-items: center;">  <p>Automatic starting can cause personal injury and pump damage</p> </div> <p>WARNING When the operation of the pump is interrupted by the thermal switch, the pump will restart automatically after cooling down.</p> <p>→ Take all necessary care to prevent this leading to a dangerous situation.</p> <hr/>
Hot media	<hr/> <div style="display: flex; align-items: center;">  <p>Danger of burning yourself when using hot media</p> </div> <p>→ Do not touch the supply and return lines of the pumps, pump head or pump head insulation.</p> <p>CAUTION</p> <hr/>
Vapors as media	<p>The life of the diaphragm is prolonged the formation of condensate is avoided. Therefore the following precautions should be taken:</p> <p>→ Run the pump for a few minutes to warm it up before handling saturated or nearly saturated vapors.</p> <p>→ KNF recommends: When transferring aggressive media, flush the pump prior to switch off (see Chapter 8.2.1) to increase the service life of the diaphragm.</p>
Switching off the pump / removing from operation	<p>→ Restore the system to normal atmospheric pressure (release pneumatic pressure in pump).</p>

8. Servicing

8.1. Servicing schedule

Component	Servicing interval
Pump	- Regular inspection for external damage or leaks
Diaphragm and valve plates	- Replace at the latest, when pump output decreases

Tab. 9

8.2. Cleaning

8.2.1. Flushing pump

→ KNF recommends: When transferring aggressive media, flush the pump under atmospheric conditions some minutes with air (or, if necessary for safety reasons, with an inert gas) prior to switch-off to increase the service life of the diaphragm.

8.2.2. Cleaning pump

→ Only use solvents for cleaning if the head materials cannot be attacked (check the resistance of the material!).

→ If compressed air is available, blow out the components.

8.3. Replacing diaphragm and valve plates

- Conditions
- Motor disconnected from mains and de-energized
 - Pump is clean and free of dangerous substances
 - Tubes removed from pump's pneumatic inlet and outlet

Spare parts

Spare part*	Positon**	Quantity
Diaphragm	(8)	1
Valve plate	(4)	2
O-ring	(5)	2

Tab. 10

* according to Spare Parts list, chapter 10

** according to Fig. 8

Tools and Material

Quantity	Tools/Material
1	Fork wrench or socket wrench 27 mm
1	Allen key 3 mm
1	Allen key 6 mm with torque indicator
1	Fork wrench 19 mm
1	Face spanner, pin diameter 5 mm*
1	Phillips screwdriver (only for .11-versions)
1	Heat resistant thread adhesive (e.g. DELO ML 5327)
1	Felt-tip pen
1	Hot-air blower

Tab. 11

* available as KNF accessory (see Chapter 10)

Information on procedure

- ➔ Always replace the valve plates and diaphragm together to maintain the pump performance



WARNING

Health hazard due to dangerous substances in the pump!

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

- ➔ Wear protective clothing if necessary, e.g. protective gloves.
- ➔ Clean pump with suitable measures.

Preparatory steps

i See Fig. 1 (.16-designs) or Fig. 2 (.11-designs).

1. Loosen the screws on the upper side of the pump-head insulation and lift off the cover plate.
2. Loosen screws on the lower side of the pump-head insulation.

i See Fig. 8 for further steps.

Removing pump head

i For pumps with heating insets (.11- designs): Heating insets and temperature sensors remain fitted in the head plate.

1. Mark the installation position for the head plate **(3)** (felt pen line in direction of motor).
2. Release the screws **(1)** and remove them together with the disk springs **(2)**.
3. Grasp head plate **(3)** by threaded adapters and lift off together with pump-head insulation.

i The pump head insulation must be removed carefully. The electric wires (.11-designs) must not be damaged.

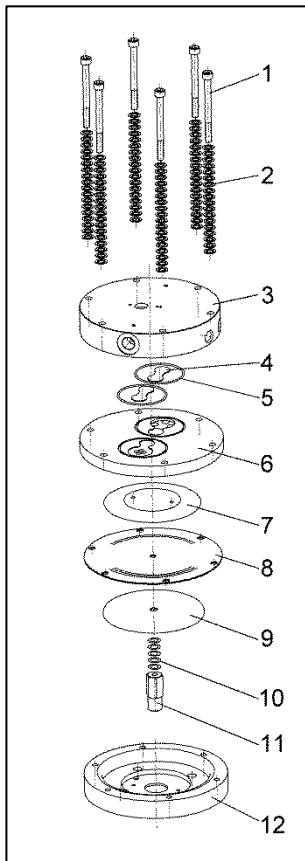


Fig. 8: Parts of pump head

4. Mark the installation position of the carrier (12) with respect to the intermediate plate (6) with a continuous felt pen line.
5. Remove intermediate plate (6).

i Set down the intermediate plate carefully to avoid damaging its sealing edge.
Diaphragm (8) is visible.

Changing diaphragms

i When completing these work steps, ensure that the diaphragm spacer(s) (10) positioned beneath the diaphragm support do not fall into the crankcase housing.

1. Use a hot-air blower (T=approx. 400°C) to heat the retainer plate (7) for about five minutes until it heats up to approx. 100°C.
2. You must observe the following when removing the retainer plate:



Danger of burns from hot parts

Touching a hot retainer plate or any other hot pump part can burn your skin.

WARNING

- ➔ Wear protective gloves.
- ➔ Always use a wrench for retainer plate to remove the retainer plate.
- ➔ Always plate the retainer plate on a heatproof surface.

Use a wrench for retainer plate to loosen the retainer plate (7) in a counterclockwise direction while counter-holding the conrod extension (11) with 19 mm open end wrench. Remove retainer plate.

3. Carefully remove diaphragm (8).
4. Remove diaphragm support (9).
5. Remove diaphragm spacer(s) (10) from conrod extension (11) and retain them.
6. Inspect all parts for dirt and clean them if necessary.

i There might be adhesive residue on the external thread of the retainer plate and on the internal thread of the conrod extension. Remove any adhesive residue!

7. Slide new diaphragm (8) and diaphragm support (9) onto the retainer plate's (7) threaded stud.
8. Replace the previously removed diaphragm spacer(s) (10) on the threaded stud of the retainer plate (7).
9. Completely cover the thread start of the retainer plate (7) and the threaded hole of the conrod extension (11) with heat-resistant adhesive (DELO ML 5327 50G or comparable product). Then screw the retainer plate into the conrod extension.

i Before you screw in the retainer plate completely, unscrew it 360 degrees to ensure that the thread flanks of the retainer plate and the conrod extension, respectively, are coated with adhesive.

i Be sure to observe the adhesive's USE BY date!
Adhesive might not be as effective if used after its USE BY date.

10. Tighten the retainer plate (7) firmly while counter-holding conrod extension (11); use the wrench for retainer plate to do so (tightening torque: 18 Nm).

i Be sure to allow the adhesive to cure before restarting the pump.
Adhesive curing lasts approx. 24 hours!

Changing valve plates

1. Remove the valve plates (4) and O-rings (5) from intermediate plate (6).
2. Check that intermediate plate (6) and head plate (3) are clean. Clean the parts if necessary. Make sure that the sealing edges of the head plate (3) and intermediate plate (6) are undamaged.
3. Contact KNF in case of roughness, scratches and corrosion. Order and replace damaged parts.

4. Insert valve plates:

i Upper and lower side of the valve plates are identical. The position of the valve plates is determined by the shape of the valve seats.
Lay new valve plates (4) in the valve seats of the intermediate plate (6).

5. Fit the new O-rings (5) in the intermediate plate (6).
6. Dispose of the old diaphragm, valve plates and O-rings properly.

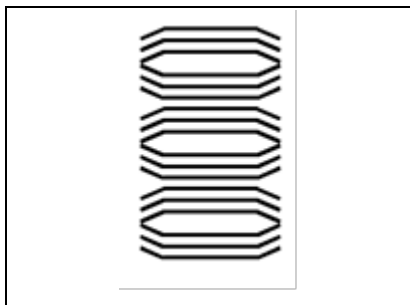


Fig. 9: Position and orientation of disk springs (2)

Mounting pump head

1. Place the intermediate plate (6) on the carrier (12) in the position indicated by the felt tip pen mark.
2. Place head plate (3) together with pump-head insulation and threaded adapters on intermediate plate (6) (felt pen marking in direction of motor).
3. Place disk springs (2) (for position and orientation see Fig. 9).
4. Insert head screws (1) with disk springs (2) and tighten diagonally (tightening torque: 9 Nm).

- i** Perform a leak test in order to ensure the required gastightness of the pump head after maintenance.

Final steps

- ➔ Refit head insulation.

9. Troubleshooting



DANGER

Extreme danger from electrical shock!

- Disconnect the pump power supply before working on the pump.
- Make sure the pump is de-energized and secure.

→ Check the pump (see Tab. 12 and Tab. 13).

Pump does not transfer	
Cause	Fault remedy
Thermo switch has operated following to over-heating.	<ul style="list-style-type: none"> → Disconnect pump from mains. → Allow pump to cool. → Trace cause of over-heating and eliminate it.
Connections or lines blocked.	<ul style="list-style-type: none"> → Check connections and lines. → Remove blockage.
External valve is closed or filter is clogged.	<ul style="list-style-type: none"> → Check external valves and filters.
Condensate has collected in pump head.	<ul style="list-style-type: none"> → Detach the condensate source from the pump. → Flush the pump under atmospheric conditions some minutes with air (if necessary for safety reasons: with an inert gas).
Diaphragm or valve plates are worn.	<ul style="list-style-type: none"> → Replace diaphragm, valve plates and O-rings (see Chapter 8.3).

Tab. 12

Flow rate, pressure or vacuum too low	
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"> → Detach the condensate source from the pump. → Flush the pump under atmospheric conditions some minutes with air (if necessary for safety reasons: with an inert gas).
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"> → Change the pressure conditions.
Pneumatic lines or connection parts have an insufficient cross chapter.	<ul style="list-style-type: none"> → Disconnect pump from system to determine output values. → Eliminate throttling (e.g. valve) if necessary. → Use lines or connection parts with larger cross chapter if necessary.
Leaks occur on connections, lines or pump head.	<ul style="list-style-type: none"> → Eliminate leaks.
Connections or lines completely or partially jammed.	<ul style="list-style-type: none"> → Check connections and lines. → Remove the jamming parts and particles.
Head parts are soiled.	<ul style="list-style-type: none"> → Clean head components.
Diaphragm or valve plates are worn.	<ul style="list-style-type: none"> → Replace diaphragm, valve plates and O-rings (see Chapter 8.3).

Tab. 13

Pump head is not heating up*	
Cause	Fault remedy
Cable connection in terminal box (.11 designs) has no contact.	➔ Attach cable (see Fig. 7).
No voltage in the power source.	➔ Check power source.
Thermo switch defective.	➔ Replace thermos switch**

Tab. 14

*only .11- designs

** Please contact KNF customer service if you have questions.

Fault cannot be rectified

If you are unable to determine any of the specified causes, send the pump to KNF Customer Service (contact data: see www.knf.com).

1. Flush the pump to free the pump head of dangerous or aggressive gases (see Chapter 8.2.1).
2. Remove the pump.
3. Clean the pump (see Chapter 8.2.2).
4. Send the pump, together with completed Health and Safety Clearance and Decontamination Form, to KNF stating the nature of the transferred medium.

10. Spare parts and accessories

Spare parts

Spare part	Position*	Order No.
Spare part set (2x valve plate, 1x diaphragm, 2x O-ring)		120782
Valve plate	(4)	114126
Diaphragm	(8)	008602
O-ring	(5)	113567
Thermo switch		114831
Fuse temperature control		023901

Tab. 15

*according to Fig. 8

Accessory

Accessory	Order No.
Wrench for retainer plate	020204
DELO ML 5327 50G adhesive	021756

Tab. 16

11. 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 8.2.1).

i Please contact your KNF sales partner if the pump cannot be flushed due to damage.

2. Remove the pump.
3. Clean up the pump (see chapter 8.2.2).
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. In this case too, old devices can be returned. Please follow the instructions at knf.com/repairs here.

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

KNF worldwide

Find your local KNF partner on www.knf.com